# MORRISANIA EAST
# 310 EAST 161ST STREET
# BRONX, NEW YORK

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# Remedial Action Work Plan

**NYSDEC BCP Number: C203183**

DRAFT

**Prepared for:**

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**AUGUST 2026**

# Certifications

I, Charles J. McGuckin, P.E., certify that I am currently a NYS registered professional engineer and that this Remedial Action Work 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 DER Green Remediation (DER-31).

I certify that all information and statements in this certification 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.

| Charles J. McGuckin, P.E. | | |
|---|---|---|
| NYS Professional Engineer #072491 | Date | Signature |

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# Acronyms

mg/kg..... Milligrams per Kilogram
AMI ..... Area Median Income
ASP ..... Analytical Services Protocol
AWQSGVs ..... Ambient Water Quality Standards and Guidance Values
BCA ..... Brownfield Cleanup Agreement
BCP ..... Brownfield Cleanup Program
bls..... Below Land Surface
BOA..... Brownfield Opportunity Areas
CAMP ..... Community Air Monitoring Plan
C/D ..... Construction and Demolition
CEH..... Center for Environmental Health
CFR ..... Code of Federal Regulations
CO2e ..... carbon dioxide equivalents of global warming potential
COC ..... Certificate of Completion
CP ..... Commissioner Policy
CPP ..... Citizen Participation Plan
CQAP ..... Construction Quality Assurance Plan
CSM ..... Conceptual Site Model
CVOCs ..... Chlorinated Volatile Organic Compounds
CY ..... Cubic Yards
DEC..... Department of Environmental Conservation
DER-10..... NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation
DMM..... Division of Materials Management
DO ..... Dissolved Oxygen
DUSR ..... Data Usability Summary Report
EA..... Exposure Assessment
EC ..... Engineering Control
ECL ..... Environmental Conservation Law
EDD..... Electronic Data Deliverable
EJ ..... Environmental Justice
ELAP ..... Environmental Laboratory Approval Program
ESA ..... Environmental Site Assessment
FER ..... Final Engineering Report
Ft ..... Feet/Foot
HASP..... Health and Safety Plan
HAZWOPER ..... Hazardous Waste Operations and Emergency Response
HVAC ..... Heating, Ventilation, and Air Conditioning
IC..... Institutional Control
ng/L ..... Nanograms per Liter
NYCDEP ..... New York City Department of Environmental Protection
NYCDOH..... New York City Department of Health
NYCDOT ..... New York City Department of Transportation
NYCRR..... New York Codes, Rules, and Regulations
NYSDEC ..... New York State Department of Environmental Conservation
NYSDOH..... New York State Department of Health

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NYSDOT ..... New York State Department of Transportation
MG..... Million of gallons
MMBtu ..... Million of British Thermal Units
MWH ..... Megawatt Hours
OSHA ..... Occupational Safety and Health Administration
PAHs ..... Polycyclic Aromatic Hydrocarbons
PCBs ..... Polychlorinated Biphenyls
PCE ..... Tetrachloroethene (Perchloroethene)
PDF ..... Portable Document Format
PEJA ..... Potential Environmental Justice Area
PFAS ..... Per and Polyfluoroalkyl Substances
PFOA..... Perfluorooctanoic Acid
PFOS..... Perfluorooctanesulfonic acid
PGWSCOs ..... Protection of Groundwater Soil Cleanup Objectives
PID ..... Photo Ionization Detector
PPE ..... Personal Protective Equipment
PVC ..... Polyvinyl Chloride
QAPP ..... Quality Assurance Project Plan
QA/QC..... Quality Assurance/Quality Control
RAOs..... Remedial Action Objectives
RAWP..... Remedial Action Work Plan
RI..... Remedial Investigation
RIR ..... Remedial Investigation Report
RRSCOs..... Restricted Residential Soil Cleanup Objectives
SCG..... Standards, Criteria, and Guidance
SCOs..... Soil Cleanup Objectives
SEQRA..... State Environmental Quality Review Act
SMP..... Site Management Plan
SOE..... Support of Excavation
SoMP..... Soil Management Plan
SOP..... Site Operations Plan
SSO..... Site Safety Officer
SVOC ..... Semivolatile Organic Compounds
SWPPP ..... Stormwater Pollution Prevention Plan
TAGM ..... Technical and Administrative Memorandum
TAL..... Target Analyte List
TCE ..... Trichloroethene
TCL..... Target Compound List
TCLP ..... Toxicity Characteristics Leaching Procedure
TOGS ..... Technical and Operational Guidance Series
USEPA ..... United States Environmental Protection Agency
USGS ..... United States Geological Survey
UUSCOs..... Unrestricted Use Soil Cleanup Objectives
VOC..... Volatile Organic Compounds

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# Executive Summary

Roux Environmental Engineering and Geology, D.P.C. (Roux), on behalf of TEG Morrisania Development LLC (Volunteer), has prepared this Remedial Action Work Plan (RAWP) for the property located at 310 East 161st Street, Bronx, New York (Site), as shown on **Figure 1**. The Volunteer executed a Brownfield Cleanup Agreement (BCA) Index No. 203183-04-25 with NYSDEC on June 4, 2025, and the Site was assigned Brownfield Cleanup Program (BCP) Site number C203183.

The Site address is 310 East 161st Street, Bronx, New York, and consists of Tax Block 2420, p/o Lot 150 and encompasses approximately 0.8747 acres. A BCA amendment executed on February 27, 2026 was accepted by the NYSDEC to reduce the property by 0.0243 acres on the western portion of Site. As shown on **Figure 2**, the Site was most recently utilized as a parking lot for the adjacent offsite eight-story multifamily residential building. As detailed in the NYSDEC-approved Change of Use (COU) dated February 11, 2026, the Site has been utilized as a truck route and equipment staging area for redevelopment activities for the adjacent Tax Block 2420, Lot 130. Redevelopment for the adjacent Tax Block 2420, Lot 130 is being completed in accordance with the New York City Department of Environmental Protection (NYCDEP)-approved Remedial Action Plan (RAP).

When the proposed redevelopment at the Site is completed, it will contain 100% affordable housing. The planned development will include a 26-story, approximately 284,542 gross square foot (gsf) residential building containing 347 units of affordable housing and community facility space at the Site. The redevelopment will include approximately 6,450 square feet (SF) of cellar space which will be utilized for back-of -house, laundry, supply rooms, and superintendent/staff office spaces. The remainder of the building footprint will be constructed above an elevated second floor with open air parking at the ground level below . The proposed project is anticipated to be completed and open for residents by 2029. Restricted Residential use, as defined in 6 NYCRR Part 375-6 Environmental Remediation Programs, is proposed for the Site. The proposed redevelopment plans, including floor plans for all levels of the proposed building, are included as **Appendix A**.

Previous investigation and reporting at the Site included: a Phase I Environmental Site Assessment (ESA) performed by Hillman Consulting in November 2018; June 2022 ASTM Phase I ESA, prepared by Roux; June 2022 Phase II ESA, prepared by Roux; December 2023 BCP Eligibility Investigation, completed by Roux; February 2024 Supplemental BCP Eligibility Investigation completed by Roux; and the September 2024 Supplemental East Tower BCP Eligibility Investigation completed by Roux. The data from the Phase II ESA and multiple BCP Eligibility Investigations were used to establish eligibility for the Site into the BCP.

A Remedial Investigation (RI) was completed from January 12 through February 11, 2026, in accordance with the NYSDEC-approved Remedial Investigation Work Plan (RIWP), dated December 19, 2025. The objective of the RI was to determine the nature and extent of contamination at the Site, characterize environmental media at the Site, qualitatively assess the potential exposure of receptors to Site contaminants, and generate sufficient data necessary to support the development of a RAWP based on the planned future use of the Site as residential use.

The following four Areas of Concern (AOCs) were investigated as part of the RI:

- AOC 1 – Former Filling Station
- AOC 2 – Former Automobile Repair Shop

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- AOC 3 - Former Garage, Welding, and Boiler Repair Shop
- AOC 4 – Fill Material

The anticipated use of the Site is multi-family residential, and therefore analytical data generated during the RI was compared to the Unrestricted Use Soil Cleanup Objectives (UUSCOs), Restricted Residential Use Soil Cleanup Objectives (RRSCOs), and the Protection of Groundwater Soil Cleanup Objectives (PGWSCOs) as defined in the New York Codes, Rules, and Regulations (NYCRR), 6 NYCRR Part 375-6-8(a-b)(revised December 31, 2025) in order to evaluate achieving a Track 1, Track 2, and/or Track 4 remediation.

## Site Description/Physical Setting/Site History

A Site location map is included as **Figure 1**.

| Property Location | |
|---|---|
| Site Name: | Morrisania East |
| Property Address: | 310 East 161st Street |
| Property Town, County, State: | Bronx, New York |
| Property Tax Identification: | Block 2420, p/o Lot 150 |
| Property Topographic Quadrangle: | United States Geological Survey (USGS)-Bronx, New York |
| Nearest Intersection: | Morris Avenue and East 161st Street. |
| Area Description: | The Site is in a mixed-use densely populated area in the Morrisania neighborhood of The Bronx, New York. The surrounding area consists of commercial and residential uses. |

A Site Plan showing an aerial view of the existing conditions is provided as **Figure 2**.

| Property Information | |
|---|---|
| Property Acreage: | 0.8747-acres |
| Property Use: | The Site was most recently utilized as a parking lot for the adjacent offsite eight-story multifamily residential building. As of the NYSDEC-approved COU dated February 11, 2026, the Site has been utilized as a truck route and equipment staging area for redevelopment activities for the adjacent Tax Block 2420, Lot 130. Redevelopment for the adjacent Tax Block 2420, Lot 130 is being completed in accordance with the NYCDEP-approved RAP. |
| Improvements: | The majority of the Site is paved with asphalt and concrete, with limited areas of landscaping. |

## Summary of the Previous Investigations

A summary of the following environmental investigations previously conducted at the Site are included below. The 2018 and 2022 Phase I ESAs, and the Roux 2022 Phase II ESA were completed for the entirety of former Lot 150, prior to apportionment into Lot 130 and Lot 150. The summaries provided below are specific to the current extents of the Morrisania East BCP Site (Site formal reports were not prepared for the "BCP Eligibility Investigation," Supplemental BCP Eligibility Investigation," and "Supplemental East Tower BCP Eligibility Investigation"). These investigations were completed for the purpose of generating data to establish

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eligibility data as part of BCP Application preparation. The soil boring logs and laboratory reports associated with the BCP Eligibility Investigation, Supplemental BCP Eligibility Investigation, and Supplemental East Tower BCP Eligibility Investigation are included in **Appendix B**.

- **ASTM Phase I Environmental Site Assessment Report,** prepared by Hillmann Consulting, dated November 20, 2018;
- **ASTM Phase I Environmental Site Assessment Report,** prepared by Roux Environmental Engineering and Geology, D.P.C. (Roux), dated June 14, 2022;
- **Phase II Environmental Site Assessment Summary Letter Report,** prepared by Roux, dated June 27, 2022;
- **BCP Eligibility Investigation,** completed by Roux in December 2023;
- **Supplemental BCP Eligibility Investigation,** completed by Roux in February 2024; and
- **Supplemental East Tower BCP Eligibility Investigation,** completed by Roux in September 2024.

The proposed Site redevelopment plan is considered restricted residential use, therefore the soil data from the previous investigations are compared to UUSCOs, RRSCOs, and PGWSCO. Soil analytical data is summarized in **Tables 1** through **6**, groundwater analytical data is summarized in **Tables 7** through **12**, and soil vapor analytical data is summarized in **Table 13**. Soil, groundwater, and soil vapor analytical data exceeding the applicable Standards, Criteria, or Guidance (SCGs) is summarized in **Figures 6** through **8**.

In total, during all the previous investigations, a total of 17 soil borings were installed, and 27 soil samples were collected for laboratory analysis. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and pesticides were detected in soil samples at concentrations exceeding UUSCOs, RRSCOs, and/or PGWSCOs. Fill material was observed at depths ranging from 3 to 14 feet below land surface (ft bls). Bedrock was encountered at one location at 16.5 ft bls. One groundwater sample was collected for laboratory analysis and exceedances of NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs) were detected for metals. Three soil vapor samples were collected for laboratory analysis and one location had elevated detections of butane and another for toluene.

## Summary of the Remedial Investigation

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved RIWP dated December 19, 2025. The investigation was completed from January 12 through February 11, 2026. A final and certified RIR, dated June 2026, was submitted to the NYSDEC on June 9, 2026 and final approval from NYSDEC is pending.

Field activities completed during the RI included the following:

- The completion of a Site reconnaissance to confirm sampling locations;
- The advancement of 11 soil borings, laboratory analysis of 52 soil samples which includes the surface soil samples;
- Installation of five permanent groundwater monitoring wells into bedrock and collection of five groundwater samples for laboratory analysis;
- Installation of six soil vapor monitoring points for sample collection and laboratory analysis;
- The collection of additional soil, groundwater, and soil vapor data sufficient to define the nature and extent of impacted media;

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- The collection of groundwater level measurements and the collection of additional land survey data as needed for developing a groundwater elevation contour map; and
- The performance of a qualitative exposure assessment (EA) to identify exposure and evaluate contaminant fate and transport.

The data generated indicated the following Site-wide conditions:

- Based on the field observations during the RI implementation, the Site is underlain by fill (consisting of silt, sand, gravel, asphalt, brick, concrete, and wood) to maximum depths ranging from 1 to 7 ft bls. Beneath the fill layer, the observed lithology of the Site is comprised of silt, sand, gravel, and weathered bedrock. Top of weathered bedrock was encountered between 9 and 17 ft bls during the RI. A geotechnical report prepared by MRCE dated June 27, 2022 noted that the shallowest depth that the top of weathered bedrock was observed at 7 ft bls at the Site and bedrock underlying the Site consists of Inwood Marble.
- According to water-level data collected as part of the RI from the permanent wells on January 23, 2026, the elevation of the water table surface at the Site ranges from 23.16 ft to 25.5 ft North American Vertical Datum of 1988 (NAVD 88) or a depth of 25.28 to 27.54 ft bls, within weathered bedrock. Groundwater flow is generally to the northeast. Petroleum-related VOCs were detected in soil at concentrations exceeding UUSCOs, RRSCOs and PGWSCOs at soil boring ETSB-08 from 5-7 ft bls. Soil at ETSB-08 revealed staining, elevated photoionization detector (PID) readings, and petroleum odor from 5-7 ft bls. Staining and petroleum VOCs were not exceeding UUSCOs at ETSB-08 from 8-10 ft bls. Collocated groundwater monitoring well ETMW-04 and closely installed temporary soil vapor point ETSV-04 revealed similar petroleum VOC exceedance of AWQSGVs in groundwater and detections in soil vapor. ETSB-08, ETMW-04, and ETSV-04 were installed within AOC 2 – former automobile repair shop, and petroleum VOCs are likely related to the historical use. Acetone was detected above UUSCOs and PGWSCOs in two soil samples. Acetone is a typical laboratory artifact, and the detections are not indicative of Site soil conditions.
- SVOCs were detected at concentrations above the UUSCOs, RRSCOs, and PGWSCOs in the fill material present across the Site in three samples, two of which were from 0-2 inches bls and one from 2-4 ft bls. No SVOCs were detected in groundwater samples at concentrations above the AWQSGVs. This data indicates that is in soil are related to the presence of fill material likely from historical buildings demolished in place and are not impacting groundwater.
- Metals were detected in soil at concentrations above the UUSCOs, RRSCOs, and PGWSCOs across the Site. Arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, and zinc were detected at concentrations above the UUSCOs. Arsenic, cadmium, lead, and mercury were detected at concentrations exceeding their applicable RRSCOs. Metals contamination, with the exception of the mercury exceedance of the UUSCO and RRSCO in the field duplicate sample from soil boring ETSB-02 from 12-14 ft bls, are exclusively detected within the fill material likely from historical buildings demolished in place at the Site. None of the exceedances in soil were detected in concentrations above the PGWSCOs in total or dissolved groundwater samples indicating that metals in soil are not a source of groundwater contamination. Iron, total and dissolved magnesium, and total and dissolved sodium were detected at concentrations above the AWQSGVs. All three compounds are naturally occurring in groundwater.
- Polychlorinated biphenyls (PCBs) were detected in one soil sample above the UUSCO at soil boring ETSB-08 from 5-7 ft bls likely related to the AOC 2 – former automobile repair shop. PCBs were not detected in groundwater samples indicating that PCBs are not a source of groundwater contamination.
- Pesticides were detected at concentrations exceeding the UUSCOs, but none of these pesticides were at concentrations in exceedance of their applicable RRSCOs or PGWSCOs, and pesticides were not detected in groundwater. Therefore, pesticides in soil are not a source of groundwater contamination at the Site.

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- Per- and Polyfluorinated Substances (PFAS) compounds were detected above the UUSCO and PGWSCO in one shallow soil sample ETSB-03 from 2-4 ft bls. Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) were detected in groundwater above the AWQSGVs for all but one sample. Based on concentrations detected during the RI, the presence of PFAS in groundwater is most likely due to background levels of these compounds ubiquitous to the New York City area.
- Petroleum-related and chlorinated VOCs were detected in soil vapor samples at relatively low levels across the Site. Other than petroleum-related VOCs in the AOC 2 – former automobile repair shop, the relatively low-level concentrations of petroleum-related and chlorinated VOCs, combined with the absence of these compounds in groundwater and soil outside of AOC-2, indicate it is unlikely there is an onsite source of soil vapor impacts in the location of the future building. The future building will be fully sealed with waterproofing/vapor barrier and an active sub-slab depressurization system (SSDS) will be installed, which will mitigate any potential soil vapor intrusion.

## Qualitative Human Health Exposure Assessment

| Environmental Media and Exposure Route | Human Exposure Assessment |
|---|---|
| Direct contact with surface soils (and incidental ingestion) | • Direct contact with surface soils is minimal since the Site is predominantly paved with asphalt and concrete. Limited areas of landscaping include unpaved grassy areas with small shrubs and trees.<br>• During remediation, remedial workers, trespassers, passersby, and utility workers could come into dermal contact with contaminated soil. Proper PPE and personal hygiene measures, as defined in the Health and Safety Plan (HASP), will be required to prevent dermal contact and the potential for incidental ingestion impacted soil during construction.<br>• Nearby sensitive receptors will not come into contact with Site surface soils as the Site is currently and will continue to be surrounded with construction fencing during remediation.<br>• Future building occupant's exposure will be eliminated though addressing contaminated soil as described in the RIR and RAWP. Substantial remedial excavation will occur to remove onsite contamination. |
| Direct contact with subsurface soils (and incidental ingestion) | • Construction and remedial contractors can come into contact with soil if they complete ground intrusive work at the Site. During remediation, remedial workers and utility workers could come into contact with contaminated soil contained in dust through dermal contact. Proper PPE and personal hygiene measures, as defined in the HASP, will be required to prevent dermal contact and the potential for incidental ingestion impacted soil during construction.<br>• Nearby sensitive receptors will not come into contact with Site subsurface soils as the Site is currently and will continue to be surrounded with construction fencing during remediation.<br>• Future building occupant's exposure will be eliminated though addressing contaminated soil as described in the RIR and RAWP. Substantial remedial excavation will occur to remove onsite contamination. |

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| Environmental Media and Exposure Route | Human Exposure Assessment |
|---|---|
| Ingestion of groundwater | • Groundwater is not and will not be used for drinking water, as any future buildings proposed on the Site will be connected to the public water supply.<br>• A Site Management Plan (SMP) and environmental easement will be put in place to the extent required to minimize the potential for exposure by direct contact with remaining contamination by both the public and any future construction workers performing ground intrusive activities at the Site. |
| Direct contact with groundwater (and incidental ingestion) | • Remedial workers, trespassers, and utility workers could come into contact with contaminated groundwater through dermal contact and incidental ingestion during ground intrusive work.<br>• Nearby sensitive receptors will not encounter Site groundwater as the Site is currently and will continue to be surrounded with construction fencing during remediation. Proper PPE and personal hygiene measures, as defined in the HASP, will be required to prevent dermal contact and the potential for incidental ingestion impacted groundwater during construction.<br>• Future exposure to Site groundwater will be eliminated by the presence of the redevelopment that covers the entire Site. An environmental easement will be placed on the Site to prevent use of groundwater without NYSDEC/New York State Department of Health (NYSDOH) approval. |
| Inhalation of air (exposures related to soil vapor intrusion) | • Remedial workers, trespassers, sensitive receptors, and utility workers may be exposed to contaminated soil vapor or dust during ground intrusive activities. Soil vapor and dust exposures to workers, passersby, and nearby sensitive receptors during the remedial action and future ground intrusive activities will be reduced or eliminated through implementation of the HASP, Community Air Monitoring Plan (CAMP), and dust suppressant and odor/vapor controls during construction.<br>• A soil vapor intrusion evaluation will be completed based on the soil vapor data collected onsite. The evaluation will be summarized in the Final Engineering Report (FER) and include a desktop review of all onsite analytical data relative to the future uses of the property. The future building will be fully sealed with waterproofing/vapor barrier and an active SSDS will be installed, which will mitigate any potential soil vapor intrusion. |

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## Fish and Wildlife Assessment (FWIA)

The RI for this Site did not identify fish and wildlife resources, therefore, a fish and wildlife assessment was not necessary to include in this RAWP.

## Summary of the Remedy

The proposed remedy for the Site is Track 2 within the future building's footprint and the achievement of UUSCOs in soil to allow for a modified Track 1 Certificate of Completion to be issued within five years of the initial Certificate of Completion contingent upon meeting objectives for groundwater and soil vapor. The remainder of the Site will be Track 4 Restricted Residential Use Cleanup. The elements of the selected remedy combined Track 2 and Track 4 Restricted Residential Use cleanup are:

1. A remedial program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation

principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, United States Environmental Protection Agency [USEPA]), SiteWise™ (available in the Sustainable Remediation Forum [SURF] library) or similar Department accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be 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 incorporated into the remedial program, as appropriate. The project will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the FER, including a comparison to the goals established during the remedial program.

Additionally, the remedial program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and drought), flooding, and sea level rise will be identified, and the remedial program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Preparation and implementation of a Pre-Design Investigation (PDI) work plan, in order to collect soil samples to confirm remediation excavation depths within the Track 2 remediation area to achieve UUSCOs.
3. In the Track 2 remediation area, installation of support of excavation (SOE) to reach the remedial excavation depth to achieve UUSCOs, to 14 ft bls for Hot Spot 3, and prevent damage to adjacent offsite structures. Final remedial excavation depths and associated SOE will be determined following completion of the PDI. In the Track 4 remediation area, installation of SOE as needed to reach the remedial excavation depths of 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, and 6 ft bls for the two underground storage tanks (UST area) as shown on **Figure 12**.

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4. Within the Track 4 remediation area, excavation and offsite disposal of approximately 1,900 in-place cubic yards (CY) of soil. Remedial excavation within the majority of the Track 4 remediation area will be to 2 ft bls. Offsite disposal of all material removed from the Site will be in accordance with all Federal, State, and local rules and regulations for handling, transport, and disposal.
5. Excavation and offsite disposal of soil within the Track 4 remediation area which exceeds PGWSCOs for 1,2,4-trimethylbenzene within Hot Spot 1, to 5 ft bls, and Hot Spot 2, to 8 ft bls, to remove source area material for 1,2,4-trimethylbenzene which also exceeded AWQSGVs in groundwater during the RI. Concentrations of 1,2,4-trimethylbenzene in groundwater within weathered bedrock will attenuate over time and will be monitored under the SMP.
6. Excavation and offsite disposal of soil for installation of the building cellar foundation, elevator pit, foundation elements for the elevated second floor, and stormwater detention system as part of the future redevelopment of the Site. The building cellar foundation will be installed at 20 ft bls, the elevator pit will be installed at 25 ft bls, and the foundation elements for the elevated second floor will be installed at 15 ft bls all within the Track 2 remediation area. The stormwater detention system and associated piping will require excavation ranging from 4 to 12 ft bls within the Track 4 remediation area.
7. Within the Track 2 remediation area, excavation and offsite disposal of approximately 2,400 in-place CY of soil exceeding UUSCOs. The remedial excavation depth for the Track 2 remediation area will range from 4 to 14 ft bls (actual volume is subject to change based on field conditions, results of the PDI, and post-excavation endpoint sampling). Offsite disposal of all material removed from the Site will be in accordance with all Federal, State, and local rules and regulations for handling, transport, and disposal.
8. Excavation and offsite disposal of soil within the Track 2 remediation area which exceeds UUSCOs for mercury within Hot Spot 3, to 14 ft bls.
9. Excavation and offsite disposal of bedrock in order to reach final redevelopment grade within the future building's cellar footprint to allow for the installation of the active SSDS.
10. Within the Track 4 remediation area, installation of SOE as needed, excavation and offsite disposal of soil, and removal of two 550-gallon USTs located in the southeast portion of the Site (UST area) and collection of bottom endpoint samples in accordance with the procedures defined in DER-10, as shown on **Figure 12**.
11. A soil vapor intrusion evaluation will be completed based on the previously collected soil vapor data collected onsite. The evaluation will be summarized in the FER and include a desktop review of all onsite analytical data relative to the future uses of the property.
12. Dewatering, in compliance with city, state, and federal laws and regulations. Extracted groundwater and perched rainwater atop the bedrock will either be containerized for offsite licensed or permitted disposal or will be discharged to the municipal sewer system under a permit from NYCDEP and NYSDEC, if applicable. Water will be treated onsite to meet pretreatment requirements prior to discharge.
13. Collection and analysis of excavation bottom confirmation endpoint samples within the Track 2 remediation area to confirm UUSCOs have been achieved and documentation endpoint samples in the Track 4 remediation area at a frequency of one per 900 square feet to properly document the remaining onsite soil quality. One bottom and four sidewall samples will be collected from each of the three hot spots and two bottom samples will be collected from the UST area (**Figure 12**).
14. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the Site, if required. Within the Track 2 remediation area, imported fill will meet UUSCOs and within the Track 4 remediation area, imported fill will meet the lower of RRSCOs and PGWSCOs. Import of materials to be used for backfill and cover will be in compliance with chemical limits and other specifications included in **Table 18,** Table 5.4(e)10 from DER-10**,** and all Federal, State, and local rules and regulations for handling and transport of material.

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15. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State, and local regulations.
16. Construction and maintenance of a Site Cover System with the Track 4 remediation area consisting of concrete sidewalks, asphalt pavement, 2-feet of clean stone, and/or 2-feet of clean fill meeting the lower of RRSCOs and PGWSCOs for the landscaped areas to prevent human exposure to residual contaminated soil/fill remaining under the Site, as shown in **Figure 13**.
17. Construction, operation and maintenance of an active SSDS and vapor barrier within the future building's cellar footprint to mitigate potential soil vapor. An SSDS will not be installed in the remainder of the building footprint which will consist of an elevated second floor with open air parking at ground level below. The active SSDS design is shown in **Figure 14**.
18. Recording of an Environmental Easement, including Institutional Controls (ICs), to prevent future exposure to any residual contamination remaining at the Site;
19. Publication of a SMP for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls (ICs/ECs), (2) monitoring, (3) operation and maintenance, and (4) reporting;
20. Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER.

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# 1. Introduction

TEG Morrisania Development LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on June 4, 2025, to investigate and remediate a 0.8747-acre property located at 310 East 161st Street in Bronx, New York (Site), as shown on **Figures 1 and 2**. TEG Morrisania Development LLC is a Volunteer in the Brownfield Cleanup Program. Restricted Residential is proposed for the property. When completed, the Site will contain an approximately 26-story affordable housing building. Refer to the Brownfield Cleanup Program (BCP) application for additional details. The Site was accepted into the BCP as a Volunteer under BCP #C203183 under Site name Morrisania East, and a Brownfield Cleanup Agreement (BCA) was executed June 4, 2025 (Index No. 203183-04-25) and Amendment No. 1, dated February 27, 2026 to reduce the property by 0.0243 acres on the western portion of Site.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed from January 12 through February 11, 2026. It provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10, DER-31, and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have determined the Site does not pose a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources. A formal Remedial Design document will not be prepared.

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## 1.1 Site Location and Description

The Site is located in the County of The Bronx, New York, New York and is identified as Block 2420, p/o Lot 150 on the Bronx Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (**Figure1**) shows the Site location. The Site is situated on an approximately 0. 0.8747-acre area bounded by East 161st Street to the north, residential properties and Park Avenue to the east, NYCHA Park to the south, and a parking lot and Morris Avenue to the west (see **Figure 2**).

Additional information regarding the Site is provided in the tables below:

| Property Location | |
|---|---|
| Site Name: | Morrisania East |
| Property Address: | 310 East 161st Street |
| Property Town, County, State: | Bronx, New York |
| Property Tax Identification: | Block 2420, p/o Lot 150 |
| Property Topographic Quadrangle: | USGS-Bronx, New York |
| Nearest Intersection: | Morris Avenue and East 161st Street. |
| Area Description: | The Site is in a mixed-use densely populated area in the Morrisania neighborhood of The Bronx, New York. The surrounding area consists of commercial and residential uses. |

| Property Information | |
|---|---|
| Property Acreage: | 0.8747-acres |
| Property Use: | The Site was most recently utilized as a parking lot for the adjacent offsite eight-story multifamily residential building. As of the NYSDEC-approved COU dated February 11, 2026, the Site has been utilized as a truck route and equipment staging area for redevelopment activities for the adjacent Tax Block 2420, Lot 130. Redevelopment for the adjacent Tax Block 2420, Lot 130 is being completed in accordance with the New York City Department of Environmental Protection (NYCDEP)-approved Remedial Action Plan (RAP). |
| Improvements: | The majority of the Site is paved with asphalt and concrete, with limited areas of landscaping. |

## 1.2 Contemplated Redevelopment Plan

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan **Appendix A**.

The anticipated redevelopment for the Site includes a 26-story, approximately 284,542 gsf residential building containing 347 units of affordable housing and community facility space at the Site. The redevelopment will include approximately 6,450 SF of cellar space which will be utilized for back-of-house, laundry, supply rooms, and superintendent/staff office spaces. The remainder of the building footprint will be constructed above an elevated second floor with open air parking at ground level below. When the proposed redevelopment is completed, the Site usage will contain 100% affordable housing. The proposed project is anticipated to be completed and open for residents by 2029. The redevelopment plans are included in **Appendix A**.

## 1.3 Description of Surrounding Property

The Site is bounded by the following properties, as summarized in the table below. Adjacent property owners are shown in **Figure 3** and land use and sensitive receptors within a 0.25 mile radius is shown in **Figure 4**.

Zoning for the Site is currently labeled as “R8” which allows high-density apartment housing within this zoning district. The area surrounding the Site is similar with residential zoning mixed with a commercial zoning overlay. Underground public utilities within the streets and sidewalks surrounding the Site on E 161st Street and Concourse Village include electric, gas, municipal drinking water, sanitary, and combined sewer stormwater including storm drains. Directly west of the Site is the new development of Tax Block 2420, Lot 130, identified as the 860 Concourse Village East project, which is being completed in accordance with the NYCDEP-approved RAP.

Several properties surrounding the Site are enrolled in the Voluntary Cleanup Program (VCP) NYC database were identified in the 2022 Phase I ESA for the Site completed by Roux, including, 289 East 161st Street (north), 3160 Park Avenue (east), 3120 Park Avenue (southeast), and 200 East 161st Street (west). All of

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which have been previously remediated with approved Remedial Action Reports and Notices of Completion. All upgradient and adjacent properties are not expected to impact the Site.

No upgradient sites of environmental concern were identified in the Environmental Database Resources (EDR) Radius Map. The majority of the surrounding and upgradient listings consisted of minor NY SPILLS and leaking tank cases, which have been closed to the satisfaction of the NYSDEC with no further action required. These listings are not likely to affect the Site.

| Adjacent Property Direction | Property Use |
|---|---|
| North | Commercial (161st Street Pharmacy, JSTAR Wine and Liquors, Montefiore Medical Group) and Residential (Morrisania II Apartments). |
| South | Marshall England Early Learning Center, New York City Housing Association Park, New York City Department of Education, Epworth United Methodist Church |
| East | Residential (PSS Morrisania Air Rights Senior Center) located on a podium above the overbuilt Metro-North Railroad Tracks |
| West | 860 Concourse Village East redevelopment, Commercial (Concourse Plaza), Epworth United Methodist Church |

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# 2. Description Of Remedial Investigation Findings

## 2.1 Summary of Remedial Investigations Performed

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation Work Plan (RIWP) dated December 19, 2025. The investigation was completed from January 12 through February 11, 2026. A final and certified RIR, dated June 2026, was submitted to the NYSDEC on June 9, 2026 and final approval from NYSDEC is pending.

Field activities completed during the RI included the following:

- The completion of a Site reconnaissance to confirm sampling locations;
- The advancement of 11 soil borings, laboratory analysis of 52 soil samples which includes surface soil samples;
- Installation of five permanent groundwater monitoring wells into bedrock and collection of five groundwater samples for laboratory analysis;
- Installation of six soil vapor monitoring points for sample collection and laboratory analysis;
- The collection of additional soil, groundwater, and soil vapor data sufficient to define the nature and extent of impacted media;
- The collection of groundwater level measurements and the collection of additional land survey data as needed for developing a groundwater elevation contour map; and
- The performance of a qualitative exposure assessment (EA) to identify exposure and evaluate contaminant fate and transport.

### 2.1.1 Borings and Wells

A total of 11 soil borings, five permanent monitoring wells, and six soil vapor points were completed and sampled as part of the RI, as shown on **Figure 5**.

Borings were advanced to depths ranging from 4-17 feet below land surface (ft bls). Weathered bedrock was encountered in several borings at depths ranging from 9-17 ft bls. Prior to advancement with a drill rig, each boring location was cleared to a depth of 5 ft bls using hand tools (e.g., post-hole digger, shovel, hand-auger, etc.) to verify the absence of utilities. Following completion of utility clearance, the soil borings were advanced using a Geoprobe™ direct push drill rig. During advancement of borings, the soil was inspected for evidence of contamination (visual and olfactory) and field screened continuously for organic vapors using a photoionization detector (PID) with a 10.6 eV lamp. Soil lithology was recorded according to the Unified Soil Classification System (USCS).

The monitoring wells were installed using a CRS XL 140 DUO drill rig and constructed with 10 ft of 2-inch diameter, 0.02-inch slot polyvinyl chloride (PVC) screen to bridge the water table. The monitoring wells were developed following installation to establish good hydraulic connection between the well column and the surrounding formation aquifer. Groundwater in each well was measured using an electronic oil/water interface probe. Field parameters (e.g., pH, dissolved oxygen [DO], oxidation-reduction potential, turbidity, etc.) were collected using a water quality meter during monitoring well purging, prior to sampling.

Soil vapor samples were collected from temporary soil vapor points installed utilizing the Geoprobe™ direct push drill rig to reach the target sample depth of 2 ft below the proposed redevelopment excavation depth at

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14-16 ft bls, or 2-ft above bedrock, whichever was shallower. New Teflon®-lined polyethylene tubing was attached to a 6-inch stainless steel sample screen, at each soil vapor sampling location. The soil vapor points were backfilled with #2 Morie sand to approximately 1-ft above the screen. The remainder of the borehole was backfilled with soil cuttings to grade. A helium tracer gas test was performed on each soil vapor point to ensure the integrity of the vapor point seal prior to sampling in accordance with the procedures outlined in the NYSDOH Guidance for Evaluating Soil Vapor Intrusion, dated October 2006 and revised 2017 and 2024 (NYSDOH SVI Guidance).

### 2.1.2 Samples Collected

A total of 59 soil samples were collected from 11 soil borings, five groundwater samples were collected, one from each of the five permanent monitoring wells, and six soil vapor samples were collected, one from each of the six soil vapor points.

### 2.1.3 Chemical Analytical Work Performed

A total of 59 soil samples were collected from the depth intervals and analyzed for the parameters listed below. Of the 59 collected soil samples, 51 samples were submitted for laboratory analysis, while eight were submitted with analysis on hold. The samples on hold were to be analyzed only if the corresponding 2-ft interval directly above exceeded the UUSCOs. Only one sample on hold required analysis based on exceedances identified in its overlying interval, for a total of 52 soil samples analyzed as part of the RI.

| Soil Boring ID | Target Soil Grab Sample Depths (feet below land surface) | Rationale | Parameters[2] |
|---|---|---|---|
| ETSB-01 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/Target Compound List (TCL) semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), NYSDEC Part 375/Target Analyte List (TAL) metals, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL volatile organic compounds (VOCs) |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent underground storage tanks (USTs) and Area of Concern (AOC) 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and Emerging Contaminants[1] |
| | 6-8 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |

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| Soil Boring ID | Target Soil Grab Sample Depths (feet below land surface) | Rationale | Parameters[2] |
|---|---|---|---|
| | 9-11 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| ETSB-02 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 4 – fill material. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| | 12-14 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 4 – fill material. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| ETSB-03 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375 metals/TAL, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with AOC 1 - former filling station. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| | 6-8 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with AOC 1 - former filling station. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 10-12 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375 metals, hexavalent/trivalent chromium, and total cyanide |

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| Soil Boring ID | Target Soil Grab Sample Depths (feet below land surface) | Rationale | Parameters[2] |
|---|---|---|---|
| | | with AOC 1 - former filling station. | |
| | 14-16 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with AOC 1 - former filling station. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| ETSB-04 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375 metals/TAL, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| ETSB-05 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 4 – fill material. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| ETSB-06 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |

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| Soil Boring ID | Target Soil Grab Sample Depths (feet below land surface) | Rationale | Parameters[2] |
|---|---|---|---|
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| | 6-8 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 8-10 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 10-12 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| ETSB-07 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| | 6-8 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 9-11 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |

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| Soil Boring ID | Target Soil Grab Sample Depths (feet below land surface) | Rationale | Parameters[2] |
|---|---|---|---|
| | 11.5-13.5 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| ETSB-08 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with AOC 2 – former auto repair shop. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| | 5-7 feet | Visual impacts, petroleum odor, and elevated PID reading of 320.1 ppm. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide |
| | 8-10 feet | 2-ft interval directly below impacted material. | NYSDEC Part 375/TCL VOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide. Sample was released from hold[2]. |
| ETSB-09 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 4 – fill material. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| | 6-8 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |

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| Soil Boring ID | Target Soil Grab Sample Depths (feet below land surface) | Rationale | Parameters[2] |
|---|---|---|---|
| | | with the adjacent UST and AOC 4 – fill material. | |
| | 10-12 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 4 – fill material. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| | 12-14 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated with the adjacent UST and AOC 4 – fill material. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| ETSB-10 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375 metals/TAL, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |
| | 11-13 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated AOC 3 – former garage, welding, and boiler repair shop | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |
| ETSB-11 | 0-2 inches | Surface soil samples will be collected from a depth of 0-2 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL SVOCs, pesticides, PCBs, NYSDEC Part 375 metals/TAL, hexavalent/trivalent chromium, and total cyanide |
| | 2-6 inches | Surface soil samples will be collected from a depth of 2-6 inches below the vegetative cover to properly evaluate exposure pathways. | NYSDEC Part 375/TCL VOCs |
| | 2-4 feet | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated AOC 2 – former auto repair shop. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, total cyanide and emerging contaminants[1] |

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| Soil Boring ID | Target Soil Grab Sample Depths (feet below land surface) | Rationale | Parameters[2] |
|---|---|---|---|
| | 14-16 feet (2-ft interval directly above bedrock) | Fill in a spatial data gap and evaluate the potential presence of soil contamination associated AOC 2 – former auto repair shop. | NYSDEC Part 375/TCL VOCs, SVOCs, pesticides, PCBs, NYSDEC Part 375/TAL metals, hexavalent/trivalent chromium, and total cyanide |

1 - As required by NYSDEC, soil samples were analyzed for the emerging contaminants 1,4-Dioxane and PFAS, which include the 41 compounds listed in accordance with the Sampling, Analysis, and Assessment of PFAS under NYSDEC's Part 375 Remedial Programs guidance document (NYSDEC April 2023 PFAS Guidance).

2 – Soil samples were analyzed for the following list of methods: NYSDEC Part 375 list and TCL VOCs via USEPA method 8260C, NYSDEC Part 375 list and TCL SVOCs via USEPA method 8270D, NYSDEC Part 375 list pesticides via USEPA method 8081B, NYSDEC Part 375 and TAL metals (including hexavalent chromium, trivalent chromium, and total cyanide) via USEPA methods 6020B/7470A/9010C/7196A, NYSDEC 1,4-dioxane via USEPA method 8270D, and NYSDEC method PFAS via USEPA method 1633A.

Five groundwater samples were collected for laboratory analysis for the following list of parameters. Groundwater samples were field filtered for metals and both total and dissolved results were reported.

- NYSDEC Part 375/TCL VOCs via United States Environmental Protection Agency (USEPA) method 8260D;
- NYSDEC Part 375/TCL SVOCs via USEPA method 8270E;
- NYSDEC Part 375/TCL pesticides via USEPA method 8081B;
- NYSDEC Part 375/TCL PCBs via USEPA method 8082A;
- NYSDEC Part 375/TAL total and dissolved metals (including hexavalent chromium, trivalent chromium, and total cyanide) via USEPA method 6020B, 7470A, and 9012B; and
- Emerging contaminants* via USEPA method 1633.

* As required by NYSDEC, groundwater samples will also be analyzed for the emerging contaminants 1,4-Dioxane and per and polyfluoroalkyl substances (PFAS), which include the 41 compounds listed in the NYSDEC April 2023 Guidance.

| Groundwater Sample Locations | Rationale |
|---|---|
| ETMW-01 | Groundwater sample was collected in AOC 3 – former garage, welding, and boiler repair shop |
| ETMW-02 | Groundwater sample was collected in AOC 4 – fill material |
| ETMW-03 | Groundwater sample was collected in AOC 1 - former filling station |
| ETMW-04 | Groundwater sample was collected in AOC 2 - former auto repair shop |
| ETMW-05 | Groundwater sample was collected in AOC 2 - former auto repair shop |

The six soil vapor samples were collected using pre-cleaned (batch-certified) 6-liter summa canisters with regulators calibrated to collect samples over an eight-hour period. The soil vapor samples were collected for laboratory analysis of VOCs using USEPA Method TO-15.

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| Soil Vapor Sample Locations | Rationale |
|---|---|
| ETSV-01 | Soil vapor sample was collected in AOC 3 – former garage, welding, and boiler repair shop |
| ETSV-02 | Soil vapor sample was collected in AOC 3 – former garage, welding, and boiler repair shop |
| ETSV-03 | Soil vapor sample was collected in AOC 4 – fill material |
| ETSV-04 | Soil vapor sample was collected in AOC 2 - former auto repair shop |
| ETSV-05 | Soil vapor sample was collected in AOC 4 – fill material |
| ETSV-06 | Soil vapor sample was collected in AOC 1 - former filling station |

All soil, groundwater, and soil vapor samples were analyzed by Eurofins and were reported using Category B data deliverables. A data usability summary report (DUSR) was prepared by Data Validation Services, an independent party. A summary of data usability was included in the RIR.

### 2.1.4 Site Reconnaissance and Geophysical Work

Roux performed a preliminary Site reconnaissance. An inspection of the existing Site conditions was conducted to determine final locations of soil borings and monitoring wells based on actual field conditions. A geophysical survey was completed by Nova Geophysical Services on December 22, 2023, February 20, 2024, and September 10, 2024, prior to the start of each of the three BCP eligibility investigations, which cover the entirety of the Site. One geophysical anomaly resembling a UST was encountered, and the location of the anomaly corresponds with the former automobile garage in the southeastern portion of the Site based on a review of the Sanborn Maps. Anomalies resembling potential subsurface utilities (such as sewer, storm drain and/or electric) were identified within the survey area. There were no additional observations of geophysical anomalies consistent with USTs made during the survey. Presence of two USTs was verified via test pit excavation as part of the September 2024 BCP Eligibility Investigation.

### 2.1.5 Best Management Practices

The NYSDEC DER-31 Green and Sustainable Remediation Initiative requires that green remediation concepts and techniques be considered during all stages of the remedial program, including investigation, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. The following measures were implemented during the RI:

- Select service providers, product suppliers and analytical laboratories from the local area and consolidate the service and delivery schedules;
- Minimize the need for disposable single-use items such as plastic bags;
- Reduce travel through increased teleconferencing;
- Utilize technologies for collecting real-time data which are non-invasive or minimally invasive (i.e., PIDs for screening, SUMMA cannisters for soil vapor sampling, etc.);
- Re-use materials whenever possible;

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- Minimize equipment and truck idling to reduce discharges of pollutants and greenhouse gases (GHGs) to the atmosphere;
- Limit use of generators, drilling equipment, and vehicles to reduce emissions to the atmosphere;
- Minimize IDW generated by reusing soil/fill that does not exhibit visual, olfactory, or PID evidence of contamination to backfill boreholes after sampling;
- Minimize truck travel for disposal of IDW by selecting local disposal facilities for IDW;
- Request that the environmental drillers use clean diesel equipment to reduce emissions to the atmosphere; and
- Utilize public transportation to access the site during implementation of the RI, to the extent practicable.

### 2.1.6 Summary of Remedial Investigation Findings

Four AOCs were investigated as part of the RI: AOC 1 – former filling station; AOC 2 – former auto repair shop; AOC 3 –former garage, welding, and boiler repair shop; and AOC 4 – fill material.

The data generated during the RI indicated the following about Site-wide conditions:

- Based on the field observations during the previous investigations and RI implementation, the Site is underlain by fill (consisting of silt, sand, gravel, asphalt, brick, concrete, and wood) to maximum depths ranging from 1 to 7 ft bls. Beneath the fill layer, the observed lithology of the Site is comprised of silt, sand, gravel, and weathered bedrock. Top of weathered bedrock was encountered between 9 and 17 ft bls during the RI. A geotechnical report prepared by MRCE dated June 27, 2022 noted that the shallowest depth that the top of weathered bedrock was observed at 7 ft bls at the Site and bedrock underlying the Site consists of Inwood Marble.
- According to water-level data collected as part of the RI from the permanent wells on January 23, 2026, the elevation of the water table surface at the Site ranges from 23.16 ft to 25.5 ft NAVD 88 or a depth of 25.28 to 27.54 ft bls, within weathered bedrock. Groundwater flow is generally to the northeast.
- Petroleum-related VOCs were detected in soil at concentrations exceeding UUSCOs, RRSCOs and PGWSCOs at soil boring ETSB-08 from 5-7 ft bls. Soil at ETSB-08 revealed staining, elevated PID readings, and petroleum odor from 5-7 ft bls. Staining and petroleum VOCs were not exceeding UUSCOs at ETSB-08 from 8-10 ft bls. Collocated groundwater monitoring well ETMW-04 and closely installed temporary soil vapor point ETSV-04 revealed similar petroleum VOC exceedance of NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs) in groundwater and detections in soil vapor. ETSB-08, ETMW-04, and ETSV-04 were installed within AOC 2 – former automobile repair shop, and petroleum VOCs are likely related to the historical use. Acetone was detected above UUSCOs and PGWSCOs in two soil samples. Acetone is a typical laboratory artifact, and the detections are not indicative of Site soil conditions.
- SVOCs were detected at concentrations above the UUSCOs, RRSCOs, and PGWSCOs in the fill material present across the Site in three samples, two of which were from 0-2 inches bls and one from 2-4 ft bls. No SVOCs were detected in groundwater samples at concentrations above the AWQSGVs. This data indicates that SVOCs in soil are related to the presence of fill material likely from historical buildings demolished in place and are not impacting groundwater.
- Metals were detected in soil at concentrations above the UUSCOs, RRSCOs, and PGWSCOs across the Site. Arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, and zinc were detected at concentrations above the UUSCOs. Arsenic, cadmium, lead, and mercury were detected at concentrations exceeding their applicable RRSCOs. Metals contamination, with the exception of the mercury exceedance of the UUSCO and RRSCO in the field duplicate sample from soil boring ETSB-02 from 12-14 ft bls, are exclusively detected within the fill material

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likely from historical buildings demolished in place at the Site. None of the exceedances in soil were detected in concentrations above the PGWSCOs in total or dissolved groundwater samples indicating that metals in soil are not a source of groundwater contamination. Iron, total and dissolved magnesium, and total and dissolved sodium were detected at concentrations above the AWQSGVs. All three compounds are naturally occurring in groundwater.

- PCBs were detected in one soil sample above the UUSCO at soil boring ETSB-08 from 5-7 ft bls likely related to the AOC 2 – former automobile repair shop. PCBs were not detected in groundwater samples indicating that PCBs are not a source of groundwater contamination.
- Pesticides were detected at concentrations exceeding the UUSCOs, but none of these pesticides were at concentrations in exceedance of their applicable RRSCOs or PGWSCOs, and pesticides were not detected in groundwater. Therefore, pesticides in soil are not a source of groundwater contamination at the Site.
- PFAS compounds were detected above the UUSCO and PGWSCO in one shallow soil sample ETSB-03 from 2-4 ft bls. Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) were detected in groundwater above the AWQSGVs for all but one sample. Based on concentrations detected during the RI, the presence of PFAS in groundwater is most likely due to background levels of these compounds ubiquitous to the New York City area.
- Petroleum-related and chlorinated VOCs were detected in soil vapor samples at relatively low levels across the Site. Other than petroleum-related VOCs in the AOC 2 – former automobile repair shop, the relatively low-level concentrations of petroleum-related and chlorinated VOCs, combined with the absence of these compounds in groundwater and soil outside of AOC-2, indicate it is unlikely there is an onsite source of soil vapor impacts in the location of the future building. The future building will be fully sealed with waterproofing/vapor barrier, which will mitigate any potential soil vapor intrusion.

## 2.2 Site History

The following sections provide pertinent background information, including the documented history of the Site, and the results of previous environmental investigation work conducted at the Site.

### 2.2.1 Past Uses and Ownership

Based on the Roux Phase I Environmental Site Assessment, dated June 2022 (Roux 2022 Phase I ESA), historical use at the Site included mixed residential as well as commercial and industrial use. The Site was initially developed for residential use as early as 1891 with East 160th Street bisecting the Site. By 1951, several buildings appear to have been demolished and new buildings were constructed. The new construction observed in the 1951 Sanborn Map included an automobile repair facility with a 550-gallon gasoline UST, an automobile brake service shop with a 550-gallon gasoline UST, multiple 1- and 2-story residential dwellings, and a 2-story Baptist Church. In 1969, a portion of the Site was used as a welding and boiler repair facility with a gasoline UST of unknown size (i.e., the former garage identified in 1951), and the automobile brake service shop (also identified in 1951) and a gasoline filling station. There were no records found in regard to the documentation or closure of the USTs, so it is unknown if the USTs have undergone any testing since their installation or if the USTs had/have secondary containment. By 1970, the buildings at the Site were demolished, East 160th Street was demapped, and the current parking area was constructed at the Site. Fill material, including asphalt, brick, wood, and concrete, were observed during previous investigations, suggesting the pre-1970 buildings were demolished and used as fill material to prepare the Site for the parking area.

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### 2.2.2 Phase I and Phase II Reports

A summary of the following environmental investigations previously conducted at the Site are included below. The 2018 and 2022 Phase I ESAs, and the Roux 2022 Phase II ESA were completed for the entirety of former Lot 150, prior to apportionment into Lot 130 and Lot 150. The summaries provided below are specific to the current extents of the Morrisania East BCP Site (Site formal reports were not prepared for the "BCP Eligibility Investigation," Supplemental BCP Eligibility Investigation," and "Supplemental East Tower BCP Eligibility Investigation"). These investigations were completed for the purpose of generating data to establish eligibility data as part of BCP Application preparation. A summary of the analytical data from these investigations is included below. The soil boring logs and laboratory reports associated with the BCP Eligibility Investigation, Supplemental BCP Eligibility Investigation, and Supplemental East Tower BCP Eligibility Investigation are included in **Appendix B.**

- **ASTM Phase I Environmental Site Assessment Report,** prepared by Hillmann Consulting, dated November 20, 2018;
- **ASTM Phase I Environmental Site Assessment Report,** prepared by Roux Environmental Engineering and Geology, D.P.C. (Roux), dated June 14, 2022;
- **Phase II Environmental Site Assessment Summary Letter Report,** prepared by Roux, dated June 27, 2022;
- **BCP Eligibility Investigation,** completed by Roux in December 2023;
- **Supplemental BCP Eligibility Investigation,** completed by Roux in February 2024; and
- **Supplemental East Tower BCP Eligibility Investigation,** completed by Roux in September 2024.

The proposed Site redevelopment plan is considered restricted residential use, therefore the soil data from the previous investigations are compared to UUSCOs, PGWSCOs, and RRSCOs. Soil analytical data is summarized in **Tables 1** through **6**, groundwater analytical data is summarized in **Tables 7** through **12**, and soil vapor analytical data is summarized in **Table 13**. Soil, groundwater, and soil vapor analytical data exceeding the applicable Standards, Criteria, or Guidance (SCGs) is summarized in **Figures 6** through **8**.

The following subsections present a summary of the previous investigations completed at the Site.

#### 2.2.2.1 Phase I Environmental Site Assessment Report, prepared by Hillmann Consulting, dated November 20, 2018

The Hillmann Consulting 2018 Phase I ESA identified the following Recognized Environmental Conditions (RECs) in connection with the Site:

- The previous use of the Site as an automobile repair facility, garage, and dairy facility;
- The potential for abandoned USTs in relation to the previous Site usage;
- The potential to encounter historic fill material from the former basements; and
- The presence of a Volunteer Cleanup Program (VCP) enrolled property approximately 219 feet to the south-southeast of the Site. A remedial investigation report (RIR) completed in June 2017 indicated the presence of SVOCs and metals in soil and low-level petroleum and chlorinated volatile organic compounds (CVOCs) in soil vapor. A RAWP recommended the installation of a soil vapor barrier for that particular property. Because on-site clean-up was ongoing, this listing was considered a REC. However, according to the New York City Office of Environmental Remediation (NYCOER) database, the VCP status for the facility is listed as complete.

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#### 2.2.2.2 Phase I Environmental Site Assessment Report, prepared by Roux Environmental Engineering and Geology, D.P.C. (Roux), dated June 14, 2022

The Roux 2022 Phase I ESA identified the following RECs in connection with the Site:

Use of a portion of the Site as an Automobile Repair Facility and Garage: According to the 1951 Sanborn Map, the Site was developed with an automobile repair facility and garage with associated USTs containing gasoline. No violations or compliance monitoring programs are associated with the former automobile repair facility. No records were found regarding the potential USTs buried onsite. The use of the Site as an automobile repair facility and garage with unaccounted USTs is considered a REC.

#### 2.2.2.3 Phase II Environmental Site Assessment Summary Letter Report, prepared by Roux, dated June 27, 2022

Roux prepared a Phase II ESA in June 2022. The results of the field investigation are included below.

**Soil**

A total of eight soil samples were collected within the Site as part of the Roux 2022 Phase II ESA. All samples were analyzed for TCL/Part 375 VOCs, TCL/Part 375 SVOCs, TAL metals, pesticides, and PCBs. The Phase II ESA was performed to investigate the RECs found during the Phase I ESA and to collect data to evaluate BCP eligibility. There were no soil exceedances of UUSCOs, PGWSCOs, or RRSCOs for VOCs or PCBs during the Phase II ESA. Soil analytical data exceeding the applicable SCOs is summarized below.

- Several SVOCs, specifically polycyclic aromatic hydrocarbons (PAHs) exceeded UUSCOs, PGWSCOs, and/or RRSCOs in one sample: RX-5 at 0 – 2 ft bls. Exceedances included benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-c,d)pyrene.
- Exceedances of metals were limited to RX-5 at 0 – 2 ft bls for UUSCOs only. Metal exceedances included lead and zinc.
- Exceedances of pesticides were limited to RX-5 at 0 – 2 ft bls for UUSCOs only. Pesticides exceedances included cis-chlordane P,P'-DDD and P,P'-DDE.

Soil analytical results are summarized in **Tables 1** through **6** and exceedances of UUSCOs, PGWSCOs, or RRSCOs are included in **Figure 6**.

**Groundwater**

One groundwater sample was analyzed for VOCs, SVOCs, PCBs, and metals. Groundwater concentrations of dissolved and total metals exceeded the AWQSGVs. There were no exceedances of the AWQSGVs for VOCs, SVOCs, or PCBs. Total iron and manganese exceeded AWQSGVs. Dissolved concentrations of these metals did not exceed AWQSGVs in filtered groundwater grab samples. Magnesium and sodium were detected at concentrations exceeding AWQSGVs in both filtered and unfiltered groundwater grab samples. Groundwater analytical results are summarized in **Tables 7** through **12** and exceedances of AWQSVS are included in **Figure 7**.

**Soil Vapor**

Two soil vapor points were installed and sampled in Lot 150 during the Phase II ESA. The soil vapor points were installed to an approximate depth of 10 to 12 ft bls. The soil vapor samples were collected over a 2-hour period and analyzed for VOCs via USEPA method TO-15.

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In the list below a "D" signifies the concentration of analyte was quantified from diluted analysis and a "J" signifies an estimated value. The following VOCs were detected in the two soil vapor samples:

- 1,2,4-Trimethylbenzene was detected in both samples at a maximum concentration of 13 micrograms per cubic meter (µg/m$^3$).
- 1,3,5-Trimethylbenzene was detected in both samples at a maximum concentration of 4.3 J µg/m$^3$.
- 2,2,4-Trimethylpentane was detected in one sample at a concentration of 9. µg/m$^3$.
- 2-Hexanone was detected in one sample at a concentration of 16 µg/m$^3$.
- 4-Ethyltoluene was detected in both samples at a maximum concentration of 4.2 J µg/m$^3$.
- Acetone was detected in both samples at a maximum concentration of 150 µg/m$^3$.
- Benzene was detected in both samples at a maximum concentration of 5.6 µg/m$^3$.
- Butane was detected in one sample at a concentration of 1400 D µg/m$^3$.
- Carbon Disulfide was detected in both samples at a maximum concentration of 25 µg/m$^3$.
- Ethylbenzene was detected in both samples at a maximum concentration of 11 µg/m$^3$.
- Isopropylbenzene was detected in both samples at a maximum concentration of 1.2 J µg/m$^3$.
- M,p-Xylene was detected in both samples at a maximum concentration of 26 µg/m$^3$.
- Methyl Ethyl Ketone was detected in both samples at a maximum concentration of 60 µg/m$^3$.
- N-Heptane was detected in both samples at a maximum concentration of 190 µg/m$^3$.
- N-Hexane was detected in both samples at a maximum concentration of 280 µg/m$^3$.
- N-Propylbenzene was detected in both samples at a maximum concentration of 3.3 J µg/m$^3$.
- O-Xylene was detected in both samples at a maximum concentration of 10 µg/m$^3$.
- Sec-Butylbenzene was detected in one sample at a concentration of 1.6 J µg/m$^3$.
- Tetrachloroethylene (PCE) was detected in both samples at a maximum concentration of 96 µg/m$^3$.
- Toluene was detected in both samples at a maximum concentration of 1400 D µg/m$^3$.

Petroleum-related and chlorinated VOCs included in the NYSDOH matrices that were detected during the Phase II ESA includes 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,2,4-trimethylpentane, benzene, toluene, ethylbenzene, m,p-xylene, n-heptane, n-hexane, o-xylene, PCE, and toluene. Toluene was detected at a concentration of 1,400 ug/m3 at RX-3 and n-hexane was detected at a concentration of 280 ug/m3 at RX-5 which may be indicative of a nearby existing or former UST associated with the former Site use as an automobile repair facility and garage. Soil vapor analytical results are summarized in **Table 13** and included in **Figure 8**.

#### 2.2.2.4 BCP Eligibility Sampling, completed by Roux, December 2023, February 2024, July 2024, and September 2024

Roux completed three separate BCP Eligibility Sampling events to further evaluate onsite contamination and to establish eligibility data as part of BCP Application preparation. The summary below includes the details of all three investigations. Soil, groundwater, and soil vapor analytical results are summarized in **Tables 1** through **13.** Soil and soil vapor analytical results are summarized on **Figures 6** and **8**. Groundwater results

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are not included since there were no groundwater samples collected for the BCP Eligibility Sampling events from the Site.

**Geophysical Survey**

A geophysical survey was completed by Nova Geophysical Services on December 22, 2023, February 20, 2024, and September 10, 2024, prior to the start of each of the three investigations, which cover the entirety of the Site. One geophysical anomaly resembling a UST was encountered, and the location of the anomaly corresponds with the former automobile garage in the southeastern portion of the Site based on a review of the Sanborn Maps. Anomalies resembling potential subsurface utilities (such as sewer, storm drain and/or electric) were identified within the survey area. There were no additional observations of geophysical anomalies consistent with USTs made during the survey.

**Soil**

A total of 19 soil samples were collected as part of the BCP Eligibility Sampling and were analyzed for a combination of VOCs, SVOCs, and metals. Soil analytical data exceeding the applicable SCOs is summarized below.

- VOCs exceedances were limited to acetone only in four soil samples and 1,2,4-trichlorobenzene for one sample in 3 – 4 ft bls for UUSCOs and PGWSCOs. There were no VOC exceedances of RRSCOs. Acetone is a common laboratory artifact and is not considered representative of Site conditions.
- SVOCs, specifically PAHs, exceeded UUSCOs, PGWSCOs, and/or RRSCOs in seven soil samples, at depths ranging from 0 – 2 ft bls to 10 – 12 ft bls. Exceedances included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and phenanthrene.
- Metals exceeded UUSCOs PGWSCOs, and/or RRSCOs in 14 samples. Exceedances included arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, mercury, nickel, and zinc.

**Soil Vapor**

One soil vapor point was installed during the September 2024 BCP Eligibility Sampling event. The soil vapor point was installed in the northern corner of the Site, within the vicinity of the historical filling station. The soil vapor point was set at 12 ft bls and a soil vapor sample was collected over a 2-hour period. The soil vapor sample was analyzed for VOCs via USEPA method TO-15.

In the list below a “D” signifies the concentration of analyte was quantified from diluted analysis, a “B” signifies the analyte was found in an associated blank as well as in the sample, and a “J” signifies an estimated value. The following VOCs were detected in the one soil vapor samples:

- 1,2,4-Trimethylbenzene was detected at a concentration of 2.4 micrograms per cubic meter (µg/$m^3$)
- 1,2-Dichlorotetrafluoroethane was detected at a concentration of 1.3 J µg/$m^3$
- 1,3,5-Trimethylbenzene was detected at a concentration of 0.62 J µg/$m^3$
- 2,2,4-Trimethylpentane was detected at a concentration of 9.9 µg/$m^3$
- 2-Hexanone was detected at a concentration of 0.67 µg/$m^3$
- 4-Ethyltoluene was detected at a concentration of 0.98 µg/$m^3$

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- Acetone was detected at a concentration of 24 µg/m$^3$
- Benzene was detected at a concentration of 1.7 µg/m$^3$
- Butane was detected at a concentration of 2.5 µg/m$^3$
- Carbon Disulfide was detected at a concentration of 8 B µg/m$^3$
- Chloroform was detected at a concentration of 3.4 µg/m$^3$
- Cis-1,2-Dichloroethylene was detected at a concentration of 0.12 J µg/m$^3$
- Cyclohexane was detected at a concentration of 0.21 J µg/m$^3$
- Dichlorodifluoromethane was detected at a concentration of 3.3 µg/m$^3$
- Ethylbenzene was detected at a concentration of 3.2 µg/m3
- Isopropylbenzene was detected at a concentration of 0.38 J µg/m$^3$
- m,p-Xylene was detected at a concentration of 11 µg/m$^3$
- Methyl Ethyl Ketone was detected at a concentration of 3.5 µg/m$^3$
- Methyl Isobutyl Ketone was detected at a concentration of 2.2 µg/m$^3$
- N-Heptane was detected at a concentration of 2 µg/m$^3$
- N-Hexane was detected at a concentration of 0.98 J µg/m$^3$
- N-Propylbenzene was detected at a concentration of 0.82 J µg/m$^3$
- O-Xylene was detected at a concentration of 3.2 µg/m$^3$
- Styrene was detected at a concentration of 0.56 J µg/m$^3$
- Tert-Butyl Alcohol was detected at a concentration of 7.7 J µg/m$^3$
- PCE was detected at a concentration of 3.1 µg/m$^3$
- Toluene was detected at a concentration of 9 µg/m$^3$
- Trichloroethylene (TCE) was detected at a concentration of 0.54 µg/m$^3$
- Trichlorofluoromethane was detected at a concentration of 6.5 µg/m$^3$

Petroleum-related and chlorinated VOCs included in the NYSDOH matrices that were detected in soil vapor sample RX-23 includes 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,2,4-trimethylpentane, Cis-1,2-dichloroethylene, cyclohexane, ethylbenzene, m,p-xylene, n-heptane, n-hexane, o-xylene, PCE, toluene, and TCE.

## 2.3 Geologic and Hydrogeologic Conditions

Based on the field observations during the previous investigations and RI implementation, the Site is underlain by fill (consisting of silt, sand, gravel, asphalt, brick, concrete, and wood) to maximum depths ranging from 1 to 14 ft bls. Beneath the fill layer, the observed lithology of the Site is comprised of silt, sand, gravel, and weathered bedrock. Top of weathered bedrock was encountered between 9 and 17 ft bls during the previous investigations and RI implementation. A geotechnical report prepared by MRCE dated June 27, 2022 noted that the shallowest depth that the top of weathered bedrock was observed at 7 ft bls at the Site and bedrock underlying the Site consists of Inwood Marble. A geologic cross-section is shown in **Figure 9**.

The land surface elevation is generally flat across the Site, at approximately 48 to 51 ft NAVD 88. According to water-level data collected as part of the RI from the permanent wells on January 23, 2026, the elevation

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of the water table surface at the Site ranges from 23.16 ft to 25.5 ft NAVD 88 or a depth of 25.28 to 27.54 ft bls, within weathered bedrock. Groundwater gauging data collected as part of the RI is summarized in **Table 14**. Groundwater flow is generally to the northeast. A groundwater contour map is shown in **Figure 10**.

## 2.4 Contamination Conditions

### 2.4.1 Conceptual Model of Site Contamination

The following section explains the occurrence of contaminants and their fate and transport at the Site in the context of the local Site stratigraphy and hydrogeology.

Based on the analytical results from the previous investigations and RI implementation soil, groundwater, and soil vapor are impacted at the Site. The spatial distribution of contaminants of potential concern in various media is shown in **Figures 6** through **8**.

Based on the Site-wide detections and exceedances of UUSCOs, RRSCOs, and PGWSCOs, soil at the Site is impacted with VOCs, SVOCs, and metals. Exceedances of SVOCs and metals are predominantly limited to the shallow soils within 0 - 7 ft bls where fill material is observed. Fill material is likely associated with pre-1970 buildings which were demolished and were likely used as fill material to prepare the Site for the parking area. The limited exceedances of VOCs include petroleum-related compounds and are likely associated with historical Site usage as an automobile repair garage (AOC-2).

Petroleum related VOCs were detected in groundwater in exceedance of AWQSGVs from monitoring well ETMW-04. The limited exceedances of petroleum-related compounds are likely associated with historical Site usage as an automobile repair garage (AOC-2) and along with their presence in both soil and soil vapor indicate a likely onsite source of petroleum impacts in the vicinity of ETMW-04. 1,2,4-trimethylbenzene is the only VOC detected above PGWSCOs and also exceeded the AWQSGVs in groundwater.

PFOS was detected in soil above the NYSDEC GVs in ETSB-03 (2-4 ft bls) only, and there is no documented use of PFAS at the Site or known historical Site use that would indicate the past use of these compounds. The presence of PFAS in groundwater may be attributed to background levels of these compounds ubiquitous to the New York City area.

Based on the concentrations of petroleum-related VOCs, along with their presence in both soil and groundwater, indicate a likely onsite source of petroleum vapor impacts in the vicinity of ETSV-04. In contrast, chlorinated VOCs were detected at low levels and were not observed in soil or groundwater, suggesting the Site does not contain an onsite source of CVOC impacts. The future building will be fully sealed with waterproofing/vapor barrier, which will mitigate any potential soil vapor intrusion.

### 2.4.2 Identification of Standards, Criteria, and Guidance

The following standards, criteria, and guidance will be consulted and adhered to throughout the Remedial Action as applicable:

- 6 New York State Codes, Rules, and Regulations (NYCRR) Part 364 - NYS Waste Transporter Permits
- 6 NYCRR Part 360 - NYS Solid Waste Management Requirements
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes

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- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Part 375 - Environmental Remediation Programs
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 29 Code of Federal Regulations (CFR) Part 1910.120 - Hazardous Waste Operations and Emergency Response
- Commissioner Policy (CP)-43 - Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- CP-49 – Climate Change and Department of Environmental Conservation (DEC) Action (2022)
- CP-51 - Soil Cleanup Guidance (2010)
- DER-2 - Making Changes to Selected Remedies (April 2008)
- DER-10 – Technical Guidance for Site Investigation and Remediation (2010)
- DER-13 – Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York (2006)
- DER-23 – Citizen Participation Handbook for Remedial Programs (2010)
- DER-31 – Green Remediation (2010)
- DER-32 – Brownfield Cleanup Program Applications and Agreements (2017)
- DER-33 – Guide to Drafting and Recording Institutional Controls (2010)
- Technical and Administrative memorandum (TAGM) 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Technical and Operational Guidance Series (TOGS) 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations (1998, Addenda 2000, 2004 and 2023)
- New York State Standards and Specifications for Erosion and Sediment Control (2016)
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006)
- New York State Climate Act (2019)
- NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (2023)

### 2.4.3 Previous Investigation and Remedial Investigation Sample Results

The following section summarizes soil, groundwater, and soil vapor data that was generated by Roux as part of the June 2022 Phase II ESA, December 2023 BCP Eligibility Investigation, February 2024 Supplemental BCP Eligibility Investigation, the September 2024 Supplemental East Tower BCP Eligibility Investigation, and RI. Data tables showing the sample data generated during these events are provided in **Tables 1 through 13**.

#### 2.4.3.1 Summary of Soil/Fill Data

A total of 80 soil samples, three field duplicates, and three MS/MSD soil samples were analyzed from 28 soil boring locations and submitted for laboratory analysis from the previous investigations and RI. Site-wide analytical soil data was compared to the following NYSDEC Subpart 375-6 SCOs in order to evaluate Site-wide soil quality and to determine contamination in soil, if present:

- NYSDEC UUSCOs;

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- NYSDEC RRSCOs; and
- NYSDEC PGWSCOs.

A summary of soil quality results is provided in the below sections. Sample counts reported in the tables below includes exceedances in the duplicate samples.

#### 2.4.3.1.1 Volatile Organic Compounds in Soil

A summary of the VOC exceedances in the soil samples analyzed is provided below:

**VOC Exceedances of SCOs in Soil**

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 5.9 | 2 | 100 | 1 | 5.9 | 2 | 9.6 – 420 | ETSB-08 (5-7) |
| Acetone | 0.03 | 7 | 100 | - | 0.03 | 7 | 0.035 – 0.18 | RX-23 (10-12) |
| Ethylbenzene | 1 | 1 | 76 | - | 1 | 1 | 37 | ETSB-08 (5-7) |
| m,p-Xylene | 0.26 | 1 | 100 | - | 1.2 | - | 0.75 J | ETSB-08 (5-7) |
| N-Butylbenzene | 18 | 1 | 100 | - | 18 | 1 | 35 | ETSB-08 (5-7) |
| N-Propylbenzene | 5 | 1 | 100 | - | 5 | 1 | 62 | ETSB-08 (5-7) |
| Xylenes | 0.26 | 1 | 100 | - | 1.2 | - | 0.75 J | ETSB-08 (5-7) |

- No exceedances detected

J – Estimated value

#### 2.4.3.1.2 Semivolatile Organic Compounds in Soil

A summary of the SVOC exceedances in the soil samples analyzed is provided below:

**SVOC Exceedances of SCOs in Soil**

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection (ft bls) |
|---|---|---|---|---|---|---|---|---|
| Benzo(A)Anthracene | 1 | 6 | 1.4 | 4 | 1 | 6 | 1.1 – 31 | ETSB-03 (2-4) |
| Benzo(A)Pyrene | 1 | 5 | 1 | 5 | 22 | 1 | 1.5 – 24 | ETSB-03 (2-4) |
| Benzo(B)Fluoranthene | 1 | 8 | 1.4 | 5 | 2.1 | 3 | 1.1 – 33 | ETSB-03 (2-4) |
| Benzo(G,H,I)Perylene | 0.64 | 4 | 4.9 | 1 | 1000 | - | 0.99 T – 15 | ETSB-03 (2-4) |
| Benzo(K)Fluoranthene | 0.8 | 4 | 4.9 | 1 | 2 | 3 | 0.97 – 12 | ETSB-03 (2-4) |
| Chrysene | 1 | 6 | 4.9 | 2 | 1 | 6 | 1.1 – 30 | ETSB-03 (2-4) |
| Dibenz(A,H)Anthracene | 0.33 | 4 | 0.33 | 4 | 1000 | - | 0.48 – 4.7 | ETSB-03 (2-4) |
| Indeno(1,2,3-C,D)Pyrene | 0.5 | 7 | 1.4 | 3 | 6.6 | 1 | 0.54 – 17 | ETSB-03 (2-4) |
| Phenanthrene | 1.1 | 9 | 4.9 | 2 | 1000 | - | 1.3 – 43 | ETSB-03 (2-4) |

-No exceedances detected

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#### 2.4.3.1.3 Metals in Soil

A summary of the metals exceedances in the soil samples analyzed is provided below:

**Metal Exceedances of SCOs in Soil**

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection (ft bls) |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 13 | 3 | 16 | 3 | 16 | 3 | 17.8 – 19.6 | RX-10 (0-2) |
| Barium | 410 | 443 | 410 | 443 | 820 | - | 443 | RX-22 (5-6) |
| Beryllium | 4.4 | 1 | 43 | - | 47 | - | 4.8 | RX-24 (14-15) |
| Cadmium | 2.5 | 2 | 2.5 | 1 | 7.5 | - | 3.5 – 3.6 | ETSB-04 (0-2 in) |
| Chromium III | 30 | 2 | 110 | - | - | - | 44.6 – 101 | ETSB-08 (0-2 in) |
| Chromium, Total | 30 | 4 | 110 | - | - | - | 31.2 – 101 | ETSB-08 (0-2 in) |
| Copper | 50 | 4 | 280 | - | 1720 | - | 64.7 – 103 | ETSB-04 (0-2 in) |
| Cyanide | 2.3 | 1 | 13 | - | 40 | - | 7.6 | ETSB-08 (5-7) |
| Lead | 63 | 17 | 400 | 2 | 450 | 1 | 64.3 – 665 | RX-21 (10-12) |
| Manganese | 1600 | 2 | 2000 | 2 | 2000 | 2 | 5790 - 5800 | RX-25 (3-5) |
| Mercury | 0.18 | 9 | 0.3 | 5 | 0.73 | 1 | 0.21 – 2.5 | RX-17 (4-6) |
| Nickel | 30 | 3 | 320 | - | 130 | - | 34.2 – 63.8 | ETSB-04 (0-2 in) |
| Zinc | 109 | 20 | 6600 | - | 2480 | - | 116 - 1060 | RX-20 (6-8) |

-No exceedances detected/no SCO available

#### 2.4.3.1.4 Polychlorinated Biphenyls in Soil

A summary of the PCBs exceedances in the soil samples analyzed is provided below:

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection (ft bls) |
|---|---|---|---|---|---|---|---|---|
| Polychlorinated Biphenyl (PCBs) | 0.1 | 1 | 1 | - | 3.2 | - | 0.16 | ETSB-08 (5-7) |

-No exceedances detected

#### 2.4.3.1.5 Pesticides in Soil

A summary of the pesticides exceedances in the soil samples analyzed is provided below:

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**Pesticide Exceedances of SCOs in Soil**

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection (ft bls) |
|---|---|---|---|---|---|---|---|---|
| cis-Chlordane | 0.014 | 1 | 0.65 | - | 4.5 | - | 0.022 | RX-5 (0-2) |
| P,P'-DDD | 0.0033 | 2 | 5 | - | 14 | - | 0.0071 – 0.0087 | ETSB-08 (5-7) |
| P,P'-DDE | 0.0033 | 4 | 3.4 | - | 9.3 | - | 0.0039 J – 0.032 | ETSB-03 (0-2 in) |
| P,P'-DDT | 0.0033 | 6 | 3.8 | - | 135 | - | 0.0054 JP - 0.026 | ETSB-03 (0-2 in) |

-No exceedances detected
J – Estimated value
P – Concentration difference between the primary and confirmation column >40%; the lower result is reported

#### 2.4.3.1.6 PFAS in Soil

A summary of the PFAS exceedances in the soil samples analyzed is provided below:

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection (ft bls) |
|---|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 0.88 | 1 | 44 | - | 1 | 1 | 1.03 | ETSB-03 (2-4) |

### 2.4.3.2 Summary of Groundwater Data

A total of five groundwater samples, one field duplicate groundwater sample, and one MS/MSD were collected during the RI from five permanent groundwater monitoring wells onsite. One groundwater sample was collected during the Roux June 2022 Phase II from one permanent groundwater monitoring well onsite. The Site-wide analytical groundwater data was compared to AWQSGVs for Class GA groundwater in order to evaluate groundwater quality and to determine the contamination in groundwater, if present. However, it should be noted that the groundwater beneath the Site is not currently used as a drinking water source and will not be used in the future because drinking groundwater in New York City is prohibited without necessary water quality treatment as determined by the NYSDOH and New York City Department of Health and Mental Hygiene.

A summary of groundwater quality results is provided in the below sections. Sample counts reported in the tables below includes exceedances in the duplicate samples.

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#### 2.4.3.2.1 Volatile Organic Compounds in Groundwater

A summary of the VOC exceedances in the groundwater samples analyzed is provided below:

| Analyte | AWQSGVs (µg/L) | Detections above AWQSGVs | Range in Concentration Above AWQSGVs (µg/L) | Groundwater Sample with Maximum Detection |
|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 5 | 2 | 150 – 180 | ETMW-04 |
| Chloroform | 7 | 3 | 20 – 22 | ETMW-01 & ETMW-03 |
| Ethylbenzene | 5 | 1 | 5.5 | ETMW-04 |
| m,p-Xylene | 5 | 2 | 5.8 – 7.8 | ETMW-04 |
| N-Propylbenzene | 5 | 2 | 8.5 – 10 | ETMW-04 |
| Xylenes | 5 | 2 | 7.1 – 9.7 | ETMW-04 |

#### 2.4.3.2.2 Semivolatile Organic Compounds in Groundwater

SVOCs were not detected in any groundwater samples.

#### 2.4.3.2.3 Metals in Groundwater

A summary of the metal exceedances in the groundwater samples analyzed is provided below:

| Analyte | Analyte | AWQSGVs (µg/L) | Detections above AWQSGVs | Range in Concentration Above AWQSGVs (µg/L) | Groundwater Sample with Maximum Detection |
|---|---|---|---|---|---|
| Total | Iron | 300 | 3 | 542 – 3220 | RX-8G |
| | Magnesium | 35000 | 6 | 41200 - 135000 | RX-8G |
| | Manganese | 300 | 1 | 1170 | RX-8G |
| | Sodium | 20000 | 7 | 44100 - 10700 | ETMW-02 |
| Dissolved | Magnesium | 35000 | 4 | 39300 - 65700 | ETMW-01 |
| | Sodium | 20000 | 7 | 42300 - 117000 | ETMW-02 |

#### 2.4.3.2.4 Polychlorinated Biphenyls in Groundwater

PCBs were not detected in any groundwater samples.

#### 2.4.3.2.5 Pesticides in Groundwater

Pesticides were not detected in any groundwater samples.

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#### 2.4.3.2.6 PFAS in Groundwater

A summary of the exceedances of the GVs for PFOS and PFOA are provided in the below table:

**PFAS Detections in Groundwater (in nanograms per liter [ng/L])**

| Analyte | Proposed GVs (ng/L) | Detections Above GVs | Detection Range (ng/L) | Groundwater Sample with Maximum Detection |
|---|---|---|---|---|
| Perfluorooctanesulfonic Acid (PFOS) | 2.7 | 5 | 4.19 – 12.4 | ETMW-01 |
| Perfluorooctanoic acid (PFOA) | 6.7 | 2 | 24.4 – 30.4 | ETMW-01 |

### 2.4.3.3 Summary of Soil Vapor Results

A summary of all soil vapor detection from the samples collected during the Roux June 2022 Phase II ESA, the Roux September 2024 Supplemental BCP Eligibility Investigation, and the RI are provided in the table below.

Sample counts reported in the tables below includes exceedances in the duplicate samples.

| Analyte | Detections | Range in Concentrations (µg/m$^3$) | Sample with Maximum Detection |
|---|---|---|---|
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | 3 | 0.45 J – 0.48 J | AMB_012926_SV |
| 1,2,4-Trimethylbenzene | 4 | 2.4 – 13 | RX-3 |
| 1,2-Dichlorotetrafluoroethane | 4 | 1.3 J – 2.9 | ETSV-06 |
| 1,3,5-Trimethylbenzene (Mesitylene) | 4 | 0.62 J – 4.3 J | RX-3 |
| 1,3-Butadiene | 1 | 0.19 J | ETSV-04 |
| 2,2,4-Trimethylpentane | 5 | 0.87 J - 230 | ETSV-04 |
| 2-Hexanone | 4 | 0.67 J - 16 | RX-3 |
| 4-Ethyltoluene | 4 | 0.98 – 4.2 J | RX-3 |
| Acetone | 11 | 6 J – 91 D | ETSV-05 |
| Benzene | 9 | 0.54 J – 2.4 J | RX-3 |
| Butane | 10 | 2.5 – 1400 D | RX-5 |
| Carbon Disulfide | 10 | 0.76 J – 25 | RX-5 |
| Chloroform | 8 | 0.27 J – 3.4 | RX-23 |
| Chloromethane | 1 | 0.38 J | AMB_012926_SV |
| Cis-1,2-Dichloroethylene | 1 | 0.12 J | RX-23 |
| Cyclohexane | 6 | 0.21 J - 41 | ETSV-04 |
| Dichlorodifluoromethane | 9 | 2.6 – 27 | ETSV-05 |
| Ethylbenzene | 4 | 2.9 – 11 | RX-3 |
| Isopropylbenzene (Cumene) | 4 | 0.38 J – 1.2 J | RX-3V & RX-5V |
| m,p-Xylene | 5 | 0.61 J - 26 | RX-3 |
| Methyl Ethyl Ketone (2-Butanone) | 10 | 3.5 – 140 D | ETSV-05 |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | 1 | 2.2 | RX-23 |

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| Analyte | Detections | Range in Concentrations (µg/m$^3$) | Sample with Maximum Detection |
|---|---|---|---|
| N-Heptane | 8 | 0.62 J – 190 | RX-5 |
| N-Hexane | 10 | 0.4 J – 280 | RX-5 |
| N-Propylbenzene | 4 | 0.82 J – 3.3 J | RX-3 |
| O-Xylene (1,2-Dimethylbenzene) | 4 | 2.9 – 10 | RX-3 |
| Styrene | 1 | 0.56 J | RX-23 |
| Tert-Butyl Alcohol | 1 | 7.7 J | RX-23 |
| Tetrachloroethylene (PCE) | 6 | 2.1 J – 96 | RX-3 |
| Toluene | 10 | 0.46 J – 1400 D | RX-3 |
| Trichloroethylene (TCE) | 3 | 0.54 – 5.2 | ETSV-05 |
| Trichlorofluoromethane | 9 | 1.1 – 6.5 | RX-23 |

J – Estimated value
D – Concentration of analyte was quantified from diluted analysis; flag only applies to field samples that have detectable concentrations of the analyte

## 2.5 Environmental and Public Health Assessments

### 2.5.1 Qualitative Human Health Exposure Assessment

As described in Appendix 3B of DER-10, *"The overall purpose of the Qualitative Human Health Exposure Assessment (or the exposure assessment) is to evaluate and document how people might be exposed to site related contaminants, and to identify and characterize the potentially exposed population(s) now and under the reasonably anticipated future use of the site."* The following section details the Qualitative Human Health Exposure Assessment based on data collected during the previous investigations and RI.

#### 2.5.1.1 Soil Exposure

As described above in Section 2.4.4.1, soil samples collected during the previous investigations and RI indicated the presence of VOCs, SVOCs, metals, pesticides, PCBs, and PFAS at concentrations above the UUSCOs. An individual could be exposed to these contaminants through direct contact with Site soil during ground intrusive work at the Site. Direct contact without the use of proper PPE and personal hygiene measures could lead to dermal contact and incidental ingestion of these compounds. Since the Site is currently fully paved and will be fully fenced during construction activities, and access is controlled, potential contact with Site soil is restricted to remedial and construction contract workers at the Site performing ground intrusive activities in addition to trespassers and passersby (through potential particulate matter in the air). The general public will not be exposed to direct contact with Site soil. A Community Air Monitoring Program (CAMP) and dust control measures (as needed) will be implemented during intrusive activities to minimize the potential for offsite exposures from soil/dust/vapor leaving the Site.

Substantial remedial excavation will occur to remove onsite contaminated soil. The proposed remedy described in the RAWP includes addressing impacted soil through excavation ranging from 4 to 14 ft bls in the Track 2 remediation area to achieve UUSCOs, therefore eliminating soil exposure. In the Track 4 remediation area, excavation of impacted soil to 5 ft bls in the area of Hot Spot 1, 8 ft bls in the area of Hot Spot 2, 6 feet bls in the UST area, and 2 ft bls in the Track 4 remediation area. Exposure to remaining contamination in soil in the Track 4 remediation area will be prevented through engineering controls (ECs)

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(Site Cover System) and Institutional Controls (ICs) (Site Management Plan [SMP] and Environmental Easement).

#### 2.5.1.2 Groundwater Exposure

As described above in Section 2.4.4.2, groundwater samples collected during the previous investigations and RI indicated the presence of VOCs, metals, and PFAS at concentrations above the AWQSGVs. Groundwater is not used for drinking or other potable purposes (the area is connected to the public water supply), and there is no direct contact with or ingestion of groundwater by the general public. Furthermore, no public water supply wells are located in the area surrounding the Site.

Individuals who perform groundwater sampling, or remedial activities may come into contact with contaminated groundwater. Proper PPE and personal hygiene measures will be required to prevent dermal contact and the potential for incidental ingestion of these compounds. Depth to groundwater onsite is 25.28 to 27.54 ft, within weathered bedrock.

The proposed onsite buildings will be serviced by public water supply. Based on this, there is no potential for public exposure by direct contact with contaminated groundwater.

#### 2.5.1.3 Soil Vapor Exposure

As described above in Section 2.4.4.3, the concentrations of petroleum related VOCs, along with their presence in both soil and groundwater, indicate a likely onsite source of petroleum vapor impacts in the vicinity of ETSV-04. In contrast, chlorinated VOCs were detected at low levels and were not observed in soil or groundwater, suggesting the Site does not contain an onsite source of CVOC impacts. Exposure to potential soil vapor intrusion in the future building's cellar will be mitigated through ECs (active sub-slab depressurization system [SSDS] and vapor barrier) and ICs (SMP and Environmental Easement)

Individuals who perform ground intrusive work and passersby during the remedial action may be exposed to contaminated soil vapor. A CAMP and odor/vapor control measures (as needed) will be implemented during intrusive activities to minimize the potential for offsite exposures from vapors leaving the Site during the remedial action.

#### 2.5.1.4 Exposure Assessment Summary

The following table summarizes the exposure assessment. As shown on **Figure 4** and discussed in Section 1.3, nearby sensitive receptors within 0.25 miles of the Site include p.s. 035 Franz Siegel and Comprehensive Health Care Center to the north, Railroad Park and Yolanda Garcia Park to the east, and NYCHA Park to the south.

| Environmental Media and Exposure Route | Human Exposure Assessment |
|---|---|
| Direct contact with surface soils (and incidental ingestion) | • Direct contact with surface soils is minimal since the Site is predominantly paved with asphalt and concrete. Limited areas of landscaping include unpaved grassy areas with small shrub and trees.<br>• During remediation, remedial workers, trespassers, passersby, and utility workers could come into dermal contact with contaminated soil. Proper PPE and personal hygiene measures, as defined in the HASP, will be required to prevent dermal contact and the potential for incidental ingestion impacted soil during construction. |

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| Environmental Media and Exposure Route | Human Exposure Assessment |
|---|---|
| | • Nearby sensitive receptors will not come into contact with Site surface soils as the Site is currently and will continue to be surrounded with construction fencing during remediation.<br>• Future building occupant's exposure will be eliminated though addressing contaminated soil as described in the RIR and RAWP. Substantial remedial excavation will occur to remove onsite contamination. |
| Direct contact with subsurface soils (and incidental ingestion) | • Construction and remedial contractors can come into contact with soil if they complete ground intrusive work at the Site. During remediation, remedial workers and utility workers could come into contact with contaminated soil contained in dust through dermal contact. Proper PPE and personal hygiene measures, as defined in the HASP, will be required to prevent dermal contact and the potential for incidental ingestion impacted soil during construction.<br>• Nearby sensitive receptors will not come into contact with Site subsurface soils as the Site is currently and will continue to be surrounded with construction fencing during remediation.<br>• Future building occupant's exposure will be eliminated though addressing contaminated soil as described in the RIR and RAWP. Substantial remedial excavation will occur to remove onsite contamination. |
| Ingestion of groundwater | • Groundwater is not and will not be used for drinking water, as any future buildings proposed on the Site will be connected to the public water supply.<br>• A SMP and environmental easement will be put in place to the extent required to minimize the potential for exposure by direct contact with remaining contamination by both the public and any future construction workers performing ground intrusive activities at the Site. |
| Direct contact with groundwater (and incidental ingestion) | • Groundwater is not and will not be used for drinking water, as any future buildings proposed on the Site will be connected to the public water supply.<br>• A SMP and environmental easement will be put in place to the extent required to minimize the potential for exposure by direct contact with remaining contamination by both the public and any future construction workers performing ground intrusive activities at the Site.<br>• Future exposure to Site groundwater will be eliminated by the presence of the redevelopment that covers the entire Site. An environmental easement will be placed on the Site to prevent use of groundwater without DEC/DOH approval. |
| Inhalation of air (exposures related to soil vapor intrusion) | • Prior to remediation, there is a low potential for soil vapor exposure to offsite sensitive receptors and passersby. While there are low-level detections in onsite soil vapor, the Site is predominantly paved with asphalt and concrete, which inhibits soil vapor intrusion to buildings and the ambient air.<br>• Remedial workers, trespassers, sensitive receptors, and utility workers may be exposed to contaminated soil vapor or dust during ground intrusive activities. Soil vapor and dust exposures to workers, passersby, and nearby sensitive receptors during the remedial action and future ground intrusive activities will be reduced or eliminated through implementation of the HASP, CAMP, and dust suppressant and odor/vapor controls during construction.<br>• A soil vapor intrusion evaluation will be completed based on the soil vapor data collected onsite. The evaluation will be summarized in the Final Engineering Report (FER) and include a desktop review of all onsite analytical data relative to the future uses of the property. The future building |

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| Environmental Media and Exposure Route | Human Exposure Assessment |
|---|---|
| | will be fully sealed with waterproofing/vapor barrier, which will mitigate any potential soil vapor intrusion. |

## 2.6 Remedial Action Objectives

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified for this Site.

### 2.6.1 Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

### 2.6.2 Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Remove the source of ground or surface water contamination.

### 2.6.3 Soil Vapor

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

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# 3. Description of Remedial Action Plan

The following is a detailed description of the alternatives analysis and remedy selection process to address impacted media on the Site.

This section of the RAWP was prepared in accordance with Subpart 375 – 3.8(f), Subpart 375 – 1.8(f), and Section 4.3 of NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER10). Two remedial alternatives were evaluated, as follows:

- One alternative (Remedial Alternative 1) that will achieve an Unrestricted Use cleanup relative to all onsite soil (Track 1), as shown on **Figure 11**, without the use of ICs or ECs; and
- One alternative (Remedial Alternative 2) that will achieve a combined Track 2 and Track 4 Restricted Residential Use cleanup for the Site, as shown on **Figure 12**, with the use of ICs and ECs.

A detailed description of the alternatives is provided below.

*Remedial Alternative 1: Track 1 Unrestricted Use Cleanup (**Figure 11**):*

1. Preparation and implementation of a Pre-Design Investigation (PDI) work plan, in order to collect soil samples to determine remediation excavation depths throughout the Site.
2. Installation of SOE to reach the proposed remedial excavation depths to meet Track 1 and prevent damage to adjacent offsite structures, and removal of a 550-gallon UST located in the southeast portion of the Site and collection of two bottom endpoint samples in accordance with the procedures defined in DER-10, as shown on **Figure 11**.
3. Excavation and offsite disposal of approximately 28,300 in-place cubic yards (CY) of soil (i.e., all soil exceeding UUSCOs) over the entire Site. Since the Site has not been fully delineated vertically to UUSCOs, the remedial excavation volume is based on a 20 ft bls excavation depth for the entire Site footprint. The remedial excavation depth is subject to change based on field conditions, results of the PDI, and post-excavation endpoint sampling).
4. Dewatering, in compliance with city, state, and federal laws and regulations. Extracted groundwater and perched rainwater atop the bedrock will either be containerized for offsite licensed or permitted disposal or will be discharged to the municipal sewer system under a permit from NYCDEP and NYSDEC, if applicable. Water will be treated onsite to meet pretreatment requirements prior to discharge.
5. Collection and analysis of excavation bottom endpoint samples at a frequency of one per 900 square feet to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs and to properly document the remaining onsite soil quality. Confirmation samples will be collected following completion of onsite excavation for remedial and redevelopment purposes in order to ensure UUSCOs have been met and to properly document the remaining onsite soil quality. Two bottom samples will be collected from the UST area (**Figure 11**)
6. Clean fill meeting the UUSCOs will be brought in to replace the excavated soil and establish the designed grades at the Site, if required.
    - A soil vapor intrusion evaluation will be completed based on the previously collected soil vapor data collected onsite. The evaluation will be summarized in the FER and include a desktop review of all onsite analytical data relative to the future uses of the property.

*Remedial Alternative 2: Track 2/Track 4 Restricted Residential Use Cleanup (**Figure 12**):*

This remedial alternative for the Site is a Track 2 within the future building's footprint and the achievement of UUSCOs in soil to allow for a modified Track 1 Certificate of Completion to be issued within five years of the initial Certificate of Completion contingent upon meeting objectives for groundwater and soil vapor.

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The remainder of the Site will be Track 4 Restricted Residential Use Cleanup. The elements of this remedial alternative combined Track 2 and Track 4 Restricted Residential Use cleanup are:

1. A remedial program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

    - Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
    - Reducing direct and indirect greenhouse gases and other emissions;
    - Increasing energy efficiency and minimizing use of non-renewable energy;
    - Conserving and efficiently managing resources and materials;
    - Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
    - Maximizing habitat value and creating habitat when possible;
    - Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
    - Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
    - Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

    As part of the remedial program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise™ (available in the Sustainable Remediation Forum [SURF] library) or similar Department accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be 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 incorporated into the remedial program, as appropriate. The project will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the FER, including a comparison to the goals established during the remedial program.

    Additionally, the remedial program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and drought), flooding, and sea level rise will be identified, and the remedial program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Preparation and implementation of a PDI work plan, in order to collect soil samples to confirm remediation excavation depths within the Track 2 remediation area to achieve UUSCOs.

3. In the Track 2 remediation area, installation of SOE to reach the remedial excavation depth to achieve UUSCOs, to 14 ft bls for Hot Spot 3, and prevent damage to adjacent offsite structures. Final remedial excavation depths and associated SOE will be determined following completion of the PDI. In the Track 4 remediation area, installation of SOE as needed to reach the remedial excavation depths of

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5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, and 6 ft bls for the two underground storage tanks (UST area) as shown on **Figure 12**.

4. Within the Track 4 remediation area, excavation and offsite disposal of approximately 1,900 in-place CY of soil. Remedial excavation within the majority of the Track 4 remediation area will be to 2 ft bls. Offsite disposal of all material removed from the Site will be in accordance with all Federal, State, and local rules and regulations for handling, transport, and disposal.
5. Excavation and offsite disposal of soil within the Track 4 remediation area which exceeds PGWSCOs for 1,2,4-trimethylbenzene within Hot Spot 1, to 5 ft bls, and Hot Spot 2, to 8 ft bls, to remove source area material for 1,2,4-trimethylbenzene which also exceeded AWQSGVs in groundwater during the RI. Concentrations of 1,2,4-trimethylbenzene in groundwater in weathered bedrock will attenuate over time and will be monitored under the SMP.
6. Excavation and offsite disposal of soil for installation of the building cellar foundation, elevator pit, foundation elements for the elevated second floor, and stormwater detention system as part of the future redevelopment of the Site. The building cellar foundation will be installed at 20 ft bls, the elevator pit will be installed at 25 ft bls, and the foundation elements for the elevated second floor will be installed at 15 ft bls all within the Track 2 remediation area. The stormwater detention system and associated piping will require excavation ranging from 4 to 12 ft bls within the Track 4 remediation area.
7. Within the Track 2 remediation area, excavation and offsite disposal of approximately 2,400 in-place CY of soil exceeding UUSCOs. The remedial excavation depth for the Track 2 remediation area will range from 4 to 14 ft bls (actual volume is subject to change based on field conditions, results of the PDI, and post-excavation endpoint sampling). Offsite disposal of all material removed from the Site will be in accordance with all Federal, State, and local rules and regulations for handling, transport, and disposal.
8. Excavation and offsite disposal of soil within the Track 2 remediation area which exceeds UUSCOs for mercury within Hot Spot 3, to 14 ft.
9. Excavation and offsite disposal of bedrock in order to reach final redevelopment grade within the future building's cellar footprint to allow for the installation of the active SSDS.
10. Within the Track 4 remediation area, installation of SOE as needed, excavation and offsite disposal of soil, and removal of two 550-gallon USTs located in the southeast portion of the Site (UST area) and collection of bottom endpoint samples in accordance with the procedures defined in DER-10, as shown on **Figure 12**.
11. A soil vapor intrusion evaluation will be completed based on the previously collected soil vapor data collected onsite. The evaluation will be summarized in the FER and include a desktop review of all onsite analytical data relative to the future uses of the property.
12. Dewatering, in compliance with city, state, and federal laws and regulations. Extracted groundwater and perched rainwater atop the bedrock will either be containerized for offsite licensed or permitted disposal or will be discharged to the municipal sewer system under a permit from NYCDEP and NYSDEC, if applicable. Water will be treated onsite to meet pretreatment requirements prior to discharge.
13. Collection and analysis of excavation bottom confirmation endpoint samples within the Track 2 remediation area to confirm UUSCOs have been achieved and documentation endpoint samples in the Track 4 remediation area at a frequency of one per 900 square feet to properly document the remaining onsite soil quality. One bottom and four sidewall samples will be collected from each of the three hot spots and two bottom samples will be collected from the UST area (**Figure 12**).
14. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the Site, if required. Within the Track 2 remediation area, imported fill will meet UUSCOs and within the Track 4 remediation area, imported fill will meet the lower of RRSCOs and PGWSCOs. Import of materials to be used for backfill and cover will be in compliance with chemical limits and other specifications included in **Table 18,** Table

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5.4(e)10 from DER-10**,** and all Federal, State, and local rules and regulations for handling and transport of material.

15. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State, and local regulations.
16. Construction and maintenance of a Site Cover System with the Track 4 remediation area consisting of concrete sidewalks, asphalt pavement, 2-feet of clean stone, and/or 2-feet of clean fill meeting the lower of RRSCOs and PGWSCOs for the landscaped areas to prevent human exposure to residual contaminated soil/fill remaining under the Site, as shown in **Figure 13**.
17. Construction, operation and maintenance of an active SSDS and vapor barrier within the future building's cellar footprint to mitigate potential soil vapor. An SSDS will not be installed in the remainder of the building footprint which will consist of an elevated second floor with open air parking at ground level below. The active SSDS design is shown in **Figure 14**.
18. Recording of an Environmental Easement, including ICs, to prevent future exposure to any residual contamination remaining at the Site;
19. Publication of a SMP for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls (ICs/ECs), (2) monitoring, (3) operation and maintenance, and (4) reporting;
20. Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER.

## 3.1 Evaluation of Remedial Alternatives

The goal of the remedy selection process under the BCP is to select a remedy that is protective of human health and the environment taking into consideration the current, intended, and reasonably anticipated future use of the property. Each remedial alternative is evaluated based on the factors listed below:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance;
- Land use; and
- Green and Sustainable Remediation (GSR) (including climate resiliency).

SCGs applicable to the Site remediation are described briefly below:

- 6 NYCRR Part 375-6 Soil Cleanup Objectives (SCOs) – The UUSCOs, RRSCOs, and PGWSCOs listed in the guidance were used to evaluate soils, delineate areas with impacts, and specify cleanup objectives;
- New York State Groundwater Quality Standards – 6 NYCRR Part 703 – 6 NYCRR Subpart 703; the standards listed in the guidance were used to evaluate groundwater quality, delineate areas with impacts, and specify cleanup objectives;

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- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1 – the standards listed in the guidance were used to evaluate groundwater quality, delineate areas with impacts, and specify cleanup objectives (TOGS 1.1.1 incorporates the same standards as listed in 6 NYCRR Part 703 for the constituents of concern at the Site);
- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation – May 2010 (or later version if available) – the proposed remedial alternatives were developed in accordance with the abovementioned document;
- NYSDEC DER-31 Green Remediation – August 2010 – The proposed remedial alternatives were developed in accordance with the abovementioned document;
- NYSDOH Generic Community Air Monitoring Plan - will be required for all ground intrusive activities, and the abovementioned document was used to prepare the CAMP;
- NYS Waste Transporter Permits – 6 NYCRR Part 364 – As the remedial alternatives include excavation and disposal of soil, the abovementioned guidance document applies;
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364 – As the remedial alternatives include excavation and disposal of soil, the abovementioned guidance document applies;
- NYSDEC guidance regarding PFAS dated April 2023; and
- NYSDOH Guidance October 2006 and Revised 2017 and 2024, was used to develop the soil vapor sampling program.

### 3.1.1 Overall Protection of Human Health and the Environment

This criterion is an evaluation of the ability of each alternative or the remedy to protect public health and the environment.

**Remedial Alternative 1, Track 1** will be protective of human health and the environment by removing soil at the Site that exceeds the UUSCOs and backfilling the area with material meeting the UUSCOs (as necessary), thus eliminating the potential for human and environmental exposure to contaminated soil/fill once construction is complete. The source of groundwater impacts will be removed and groundwater contamination will attenuate over time, and as such, groundwater does not require remediation. A soil vapor intrusion evaluation will be completed as part of the remedy.

**Remedial Alternative 2, Combined Track 2 and Track 4** will be protective of human health and the environment by excavating and removing soil above the UUSCOs through remedial excavation that will range from 4 to 14 ft bls. In the Track 4 remediation area, human health and the environment will be protected through remedial excavation to a depth of 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site. ICs including a SMP and Environmental Easement, will ensure long-term management of use restrictions. The source of groundwater impacts will be removed through Hot Spots 1 and 2 and contamination will attenuate over time. Although soil vapor is not significantly impacted, a soil vapor intrusion evaluation will be completed as part of the remedy.

For all alternatives, during Site remediation (e.g., excavation of soil, etc.) and other construction activities, workers may be exposed to impacted soil and soil vapor. Potential worker exposure during remediation activities will be mitigated through the implementation of the HASP, which includes the CAMP, and required worker training. Potential environmental exposures will be mitigated by ECs implemented during remedial construction (i.e., dust suppression, odor control and traffic control). Waterproofing/vapor barrier and ECs including an active SSDS within the future building's cellar footprint will mitigate future tenants and workers of

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the building from being exposed to remaining Site contamination. The SMP will include ICs/ECs (Remedial Alternative 2, Combined Track 2 and Track 4) to be implemented during future ground intrusive work to protect the workers and public from remaining contamination onsite.

### 3.1.2 Standards, Criteria, and Guidance

The remedy must conform to officially promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance as appropriate.

**Remedial Alternative 1** will achieve compliance with the UUSCOs for all onsite areas. The handling and management of contaminated materials will be in compliance with the applicable SCGs. The excavation will be backfilled as necessary, with material meeting the Track 1 UUSCOs presented in the Part 375 Regulations.

**Remedial Alternative 2** will achieve compliance with the UUSCOs for the Track 2 remediation area through remedial excavation that will range from 4 to 14 ft bls. Compliance with the RRSCOs will be achieved in the Track 4 remediation through excavation to 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site. The handling and management of contaminated materials will be in compliance with the applicable SCGs. The excavation will be backfilled as necessary, with material meeting UUSCOs in the Track 2 remediation area and the lower of PGWSCOs and RRSCOs in the Track 4 remediation area as presented in the Part 375 Regulations.

### 3.1.3 Long-Term Effectiveness and Performance

This criterion is an evaluation of the long-term effectiveness and permanence of an alternative or remedy after implementation.

**Remedial Alternative 1** would achieve long term effectiveness by providing a permanent cleanup of onsite contamination through removal of all soil exceeding the UUSCOs and removal of a UST. Although temporary dewatering will be required to facilitate deep excavation, no groundwater remediation or long-term groundwater monitoring is proposed. Upon completion of the Track 1 remedy, no ECs or ICs will be required, other than a prohibition on groundwater use, and the remedy would meet RAOs without the need for long term stewardship. As all contaminated soil would be removed, the remedy would provide a permanent and reliable long term solution.

**Remedial Alternative 2** would achieve long term effectiveness by removing all impacted soil exceeding UUSCOs for the Track 2 through remedial excavation that will range from 4 to 14 ft bls. Long-term effectiveness will be achieved by removing impacted soil exceeding RRSCOs to 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site. Dewatering may be required during excavation, and groundwater monitoring is proposed to be completed under the SMP. Waterproofing/vapor barrier and ECs including an active SSDS within the future building's cellar footprint and Site Cover System, and ICs including a SMP and Environmental Easement will ensure long-term management of use restrictions. The SMP will ensure long-term effectiveness of all ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as intended.

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### 3.1.4 Reduction in Toxicity, Mobility, or Volume of Contamination through Treatment

This criterion is an evaluation of the ability of an alternative or remedy to reduce the toxicity, mobility, and volume of Site contamination. Preference should be given to remedies that permanently or significantly reduce the toxicity, mobility, or volume of the contamination at the Site. The following is the hierarchy of source removal and control measures, ranked from most preferable to least preferable:

- Removal and/or treatment;
- Containment;
- Elimination of exposure; and
- Treatment of source at the point of exposure.

Remedial alternatives that use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce the total volume of contaminated media are preferable.

**Remedial Alternative 1** permanently eliminates the toxicity, mobility, and volume of contaminants within the Site by removing all soil with concentrations that exceeded the UUSCOs.

**Remedial Alternative 2** will permanently eliminate toxicity, mobility, and volume of contaminants above UUSCO to depths ranging from 4 to 14 ft bls in the Track 2 remediation area and to 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site. ICs, including a SMP and Environmental Easement, will provide a long-term Site management for the Site.

### 3.1.5 Short-Term Impacts and Effectiveness

This criterion is an evaluation of the potential short-term adverse environmental impacts and human exposures during the construction and/or implementation of an alternative or remedy.

**Remedial Alternatives 1 and 2** pose minimal health and environmental risks during implementation. The remedy implementation time is similar and relatively short and the potential adverse impacts to the community and workers (e.g., increased traffic or exposure to contaminants during soil excavation and transportation) can be mitigated with ECs (e.g., dust, odor and traffic controls). Other potential risks include material handling, electrical shock, general trip hazards, and noise. These potential impacts are addressed in the Site-specific HASP and CAMP and the Soil/Materials Management Plan (SoMP), which detail monitoring during the remedial construction and describe ECs to be implemented as necessary (e.g., dust suppression and traffic control).

### 3.1.6 Implementability

This criterion is an evaluation of the technical and administrative feasibility of implementing an alternative or remedy.

The techniques, materials and equipment to implement both remedial alternatives are readily available and have been proven effective in remediating the contaminants associated with the Site. Standard materials, services, and well-established technologies will be implemented. There are no specific difficulties associated with any of the activities proposed, which utilize standard construction methods.

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### 3.1.7 Cost Effectiveness

This criterion is an evaluation of the overall cost effectiveness of an alternative or remedy. The costs provided below are rough estimates used for comparison purposes only based on the consultant's experience. They do not reflect actual costs or the complete array of hard and soft costs that may be necessary to implement the various remedial alternatives. Actual costs may vary, and the applicant makes no representation and is not bound in any respect by the rough cost estimate(s) provided.

The total cost for **Remedial Alternative 1** is estimated to be approximately $15,700,000 (no monitoring and reporting is required). The cost estimate details for Remedial Alternative 1 are provided in **Table 15**.

The total cost for Remedial **Alternative 2** is estimated to be approximately $5,500,000 with approximately $20,000/year for annual inspections and reporting in accordance with the SMP. The cost estimate details for Remedial Alternative 2 are provided in **Table 16**.

The costs associated with Remedial Alternative 1 are higher than Remedial Alternatives 2 due to the additional excavation, backfill materials, and offsite disposal that will be required to achieve Track 1 Unrestricted Use SCOs throughout the Site. However, there would be no long term costs. Remedial Alternative 2 includes long term costs associated with implementation of the SMP, which will likely have to continue in perpetuity for the controlled areas of the Site.

### 3.1.8 Community Acceptance

This criterion is evaluated after the public review of the remedy selection process as part of the final NYSDEC selection/approval of a remedy for a site.

- Any public comment relative to these criteria will be considered by NYSDEC after the close of the public comment period.
- Documentation of the public comments received is to be consistent with the citizen participation plan identified for a remedial program in accordance with applicable DEC policy.

Although a full evaluation of this criterion cannot be made until after the public comment period is complete, it is expected that all alternatives will be equally as acceptable to the community because the Site will be remediated sufficiently for the planned safe residential use.

### 3.1.9 Land Use

This criterion is an evaluation of the current, intended, and reasonably anticipated future use of the Site and its surroundings, as it relates to an alternative or remedy, when unrestricted levels would not be achieved.

This evaluation has considered reasonably anticipated future uses of the Site and considers:

- Current use and historical and/or recent development patterns;
- Applicable zoning laws and maps;
- NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law;
- Applicable land use plans;
- Proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas;

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- Environmental justice impacts, federal or state land use designations;
- Population growth patterns and projections;
- Accessibility to existing infrastructure;
- Proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site;
- Proximity to flood plains;
- Geography and geology; and
- Current ICs applicable to the Site.

**All Remedial Alternatives** are compatible with land use and zoning.

### 3.1.10 Green and Sustainable Remediation

GSR practices are evaluated for the implementation of an alternative or remedy. Each remedial alternative includes the excavation and offsite disposal of onsite soil exceeding the appropriate SCO and the collection of confirmation and/or documentation endpoint samples. The magnitude of water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste generation, and material use would be similar, differing slightly in the amount of greenhouse gas emissions and waste generation. The Track 1 Unrestricted Use cleanup, which includes excavation and disposal of approximately 28,300 CY of soil, will produce the most greenhouse gas emissions and waste compared to the combined Track 2 and Track 4 Restricted Residential Use cleanup. The combined Track 2 and Track 4 Restricted Residential Use cleanup produces significantly less greenhouse gas emissions and waste than the Track 1. Combined Track 2 and Track 4 Restricted Residential Use cleanups produce less greenhouse gas emissions and waste than Track 1 Unrestricted Use cleanup due to the reduced anticipated soil disposal volumes and duration to achieve the cleanup objective. Neither of the remedial alternatives include groundwater treatment. **Appendix H** includes tables and chart generated using Spreadsheets for Environmental Footprint Analyses SEFA for both.

| Core Elements | Metric | Unit of Measure | Track 1 | Track 2 and Track 4 |
|---|---|---|---|---|
| Materials & Waste | Refined materials used on-site | Tons | 0.0 | 0.0 |
| | % of refined materials from recycled or reused material | % | NA | NA |
| | Unrefined materials used on-site | Tons | 32,721.053 | 4648.630 |
| | % of unrefined materials from recycled or reused material | % | 0.4% | 1.0% |
| | On-site hazardous waste disposed of off-site | Tons | 0.0 | 0.0 |
| | On-site non-hazardous waste disposed of off-site | Tons | 36,112.0 | 6386.6 |
| | Recycled or reused waste | Tons | 0.0 | 0.0 |
| | % of total potential waste recycled or reused | % | 0.0% | 0.0% |

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| Core Elements | Metric | Unit of Measure | Track 1 | Track 2 and Track 4 |
|---|---|---|---|---|
| **Water (used on-site)** | Public water use | Millions of gallons (MG) | 0.0 | 0.0 |
| | Groundwater use | MG | 0.5 | 0.1 |
| | Surface water use | MG | 0.0 | 0.0 |
| | Reclaimed water use | MG | 0.0 | 0.0 |
| | Storm water use | MG | 0.0 | 0.0 |
| | User-defined water resource #1 | MG | 0.0 | 0.0 |
| | User-defined water resource #2 | MG | 0.0 | 0.0 |
| | Wastewater generated | MG | 0.0 | 0.0 |
| **Energy** | Total energy used (on-site and off-site) | Millions of British thermal units (MMBtu) | 33,141.4 | 9,386.6 |
| | Energy voluntarily derived from renewable resources | NA | NA | NA |
| | On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | 0.0 | 0.0 |
| | Voluntary purchase of renewable electricity | Megawatt hours (MWh) | 0.0 | 0.0 |
| | Voluntary purchase of RECs | MWh | 0.0 | 0.0 |
| | On-site grid electricity use | MWh | 0.000 | 0.000 |
| **Air** | On-site NOx, SOx, and PM emissions | Pounds | 11,487.4 | 4,864.2 |
| | On-site HAP emissions | Pounds | 3.9 | 1.5 |
| | Total NOx, SOx, and PM emissions | Pounds | 48,759.4 | 11,954.0 |
| | Total NOx emissions | Pounds | 27,683.6 | 7,9588.5 |
| | Total SOx emissions | Pounds | 4,880.4 | 1,190.6 |
| | Total PM emissions | Pounds | 16,195.4 | 3,174.9 |
| | Total HAP emissions | Pounds | 311.9 | 100.1 |
| | Total greenhouse gas emissions | Tons CO2e* | 2,661.8 | 763.7 |

* Total greenhouse gases emissions (in carbon dioxide equivalents of global warming potential [CO2e]) include consideration of CO2, CH4, and N2O (nitrous oxide) emissions.

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## 3.2 Selection of the Preferred Remedy

The Preferred Remedy for the Site, Remedial Alternative 2 combined Track 2 and Track 4 Restricted Residential Use cleanup, was selected for implementation since it meets each of the evaluation criteria. In summary, the Preferred Remedy for the Site:

- Is protective of public health and the environment;
- Removes all soil with concentrations exceeding the UUSCOs to depths ranging from 4 to 14 ft bls in the Track 2 remediation area inside of the SOE. Removes all soil with concentrations exceeding the RRSCOs to 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site;
- Provides a high level of long-term effectiveness and permanence through removal of all soil exceeding UUSCOs to depths ranging from 4 to 14 ft bls in the Track 2 remediation area inside of the SOE. Removes all soil concentration exceeding RRSCOs to 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site. A high level of long-term effectiveness and permanence is also achieved through implementation of ICs and ECs;
- Reduces the toxicity, mobility, or volume of impacted material through removal of all soil exceeding UUSCOS to depths ranging from 4 to 14 ft bls in the Track 2 remediation area inside of the SOE. Removes all soil concentrations exceeding RRSCOs to 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site, and removal of source areas in soil for 1,2,4-trimethylbenzene that exceed the PGWSCOs. Reduced toxicity, mobility or volume of impacted material is also achieved through implementation of ICs and ECs;
- Is readily implemented;
- Should be acceptable to the community; and
- Is compatible with land use.

The proposed remedial action for the Site (Remedial Action), presented in the following section, is consistent with the Preferred Remedy and the combined Track 2 and Track 4 Restricted Residential Use scenario described in the Part 375 Regulations.

### 3.2.1 Zoning

The current Site and surrounding area zoning is “R8” which allows high-density apartment housing within this zoning district. The construction of an approximately 26-story mixed-use affordable housing development is consistent with the current property zoning.

### 3.2.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The proposed redevelopment will contain 100% affordable housing. The planned development will include a 26-story, approximately 284,542 gsf residential building containing 347 units of affordable housing and community facility space. Additionally, the Site is located within a Disadvantaged Community area as defined by the Climate Leadership and Community Protection Act (CLCPA). Disadvantaged communities are identified to ensure that these areas are prioritized to benefit from green energy sources to reduce pollution and promote climate change considerations and promote public participation.

### 3.2.3 Surrounding Property Use

The area surrounding the Site is an urban area comprised primarily of commercial and multi-family residential properties (**Figure 4**). The Site is adjoined by the following: 161st Street Pharmacy, JSTAR Wine and Liquors, Montefiore Medical Group and Residential (Morrisania II Apartments) to the north., Marshall England

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Early Learning Center, New York City Housing Association Park, New York City Department of Education, and Epworth United Methodist Church to the south, PSS Morrisania Air Rights Senior Center located on a podium above the overbuilt Metro-North Railroad Tracks to the east, and 860 Concourse Village East redevelopment, Commercial (Concourse Plaza), Epworth United Methodist Church to the west.

### 3.2.4 Citizen Participation

Citizen participation has been and will continue to be pursued throughout the remedial process in accordance with the Citizen Participation Plan (CPP) for the Site (**Appendix C**).

### 3.2.5 Environmental Justice

According to the NYSDEC database for environmental justice concerns, the Site is included as part of the Potential Environmental Justice Areas (PEJAs). As such fact sheets will be translated to Spanish to ensure that residents are informed of remedial activities at the Site.

### 3.2.6 Proximity to Natural Resources

There are no federal or state land use designations related to the Site.

### 3.2.7 Offsite Groundwater Impacts

According to the publicly available environmental reports, offsite groundwater impacts are not a concern for the Site.

### 3.2.8 Proximity to Floodplains

The Site does not appear in the 100-year or 500-year flood zones according to online Federal Emergency Management Act (FEMA) maps.

### 3.2.9 Current Institutional Controls

There are currently no ICs on the property.

## 3.3 Summary of Selected Remedial Actions

The proposed remedy for the Site is Track 2 within the future building's footprint and the achievement of UUSCOs in soil to allow for a modified Track 1 Certificate of Completion to be issued within five years of the initial Certificate of Completion contingent upon meeting objectives for groundwater and soil vapor. The remainder of the Site will be Track 4 Restricted Residential Use Cleanup. The elements of the selected combined Track 2 and Track 4 Restricted Residential Use cleanup are:

1. A remedial program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:
    - Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
    - Reducing direct and indirect greenhouse gases and other emissions;
    - Increasing energy efficiency and minimizing use of non-renewable energy;

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- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise™ (available in the Sustainable Remediation Forum [SURF] library) or similar Department accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be 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 incorporated into the remedial program, as appropriate. The project will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the FER, including a comparison to the goals established during the remedial program.

Additionally, the remedial program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and drought), flooding, and sea level rise will be identified, and the remedial program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Preparation and implementation of a PDI work plan, in order to collect soil samples to confirm remediation excavation depths within the Track 2 remediation area to achieve UUSCOs.
3. In the Track 2 remediation area, installation of SOE to reach the remedial excavation depth to achieve UUSCOs, to 14 ft bls for Hot Spot 3, and prevent damage to adjacent offsite structures. Final remedial excavation depths and associated SOE will be determined following completion of the PDI. In the Track 4 remediation area, installation of SOE as needed to reach the remedial excavation depths of 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, and 6 ft bls for the two underground storage tanks (UST area) as shown on **Figure 12**.
4. Within the Track 4 remediation area, excavation and offsite disposal of approximately 1,900 in-place CY of soil. Remedial excavation within the majority of the Track 4 remediation area will be to 2 ft bls. Offsite disposal of all material removed from the Site will be in accordance with all Federal, State, and local rules and regulations for handling, transport, and disposal.
5. Excavation and offsite disposal of soil within the Track 4 remediation area which exceeds PGWSCOs for 1,2,4-trimethylbenzene within Hot Spot 1, to 5 ft bls, and Hot Spot 2, to 8 ft bls, to remove source area material for 1,2,4-trimethylbenzene which also exceeded AWQSGVs in groundwater during the RI. Concentrations of 1,2,4-trimethylbenzene in groundwater will attenuate over time and will be monitored under the SMP.
6. Excavation and offsite disposal of soil for installation of the building cellar foundation, elevator pit, foundation elements for the elevated second floor, and stormwater detention system as part of the

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future redevelopment of the Site. The building cellar foundation will be installed at 20 ft bls, the elevator pit will be installed at 25 ft bls, and the foundation elements for the elevated second floor will be installed at 15 ft bls all within the Track 2 remediation area. The stormwater detention system and associated piping will require excavation ranging from 4 to 12 ft bls within the Track 4 remediation area.

7. Within the Track 2 remediation area, excavation and offsite disposal of approximately 2,400 in-place CY of soil exceeding UUSCOs. The remedial excavation depth for the Track 2 remediation area will range from 4 to 14 ft bls (actual volume is subject to change based on field conditions, results of the PDI, and post-excavation endpoint sampling). Offsite disposal of all material removed from the Site will be in accordance with all Federal, State, and local rules and regulations for handling, transport, and disposal.
8. Excavation and offsite disposal of soil within the Track 2 remediation area which exceeds UUSCOs and RRSCOs for mercury within Hot Spot 3, to 14 ft bls in order to remove soil within the Track 2 remediation area exceeding UUSCOs.
9. Excavation and offsite disposal of bedrock in order to reach final redevelopment grade within the future building's cellar footprint to allow for the installation of the active SSDS.
10. Within the Track 4 remediation area, installation of SOE as needed, excavation and offsite disposal of soil, and removal of two 550-gallon USTs located in the southeast portion of the Site (UST area) and collection of bottom endpoint samples in accordance with the procedures defined in DER-10, as shown on **Figure 12**.
11. A soil vapor intrusion evaluation will be completed based on the previously collected soil vapor data collected onsite. The evaluation will be summarized in the FER and include a desktop review of all onsite analytical data relative to the future uses of the property.
12. Dewatering, in compliance with city, state, and federal laws and regulations. Extracted groundwater and perched rainwater atop the bedrock will either be containerized for offsite licensed or permitted disposal or will be discharged to the municipal sewer system under a permit from NYCDEP and NYSDEC, if applicable. Water will be treated onsite to meet pretreatment requirements prior to discharge.
13. Collection and analysis of excavation bottom confirmation endpoint samples within the Track 2 remediation area to confirm UUSCOs have been achieved and documentation endpoint samples in the Track 4 remediation area at a frequency of one per 900 square feet to properly document the remaining onsite soil quality. One bottom and four sidewall samples will be collected from each of the three hot spots and two bottom samples will be collected from the UST area (**Figure 12**).
14. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the Site, if required. Within the Track 2 remediation area, imported fill will meet UUSCOs and within the Track 4 remediation area, imported fill will meet the lower of RRSCOs and PGWSCOs. Import of materials to be used for backfill and cover will be in compliance with chemical limits and other specifications included in **Table 18,** Table 5.4(e)10 from DER-10**,** and all Federal, State, and local rules and regulations for handling and transport of material.
15. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State, and local regulations.
16. Construction and maintenance of a Site Cover System with the Track 4 remediation area consisting of concrete sidewalks, asphalt pavement, 2-feet of clean stone, and/or and 2-feet of clean fill meeting the lower of RRSCOs and PGWSCOs for the landscaped areas to prevent human exposure to residual contaminated soil/fill remaining under the Site, as shown in **Figure 13**.
17. Construction, operation and maintenance of an active SSDS and vapor barrier within the future building's cellar footprint to mitigate potential soil vapor. An SSDS will not be installed in the remainder of the building footprint which will consist of an elevated second floor with open air parking at ground level below. The active SSDS design is shown in **Figure 14**.

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18. Recording of an Environmental Easement, including ICs, to prevent future exposure to any residual contamination remaining at the Site;
19. Publication of a SMP for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) ICs/ECs, (2) monitoring, (3) operation and maintenance, and (4) reporting;
20. Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER.

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# 4. Remedial Action Program

## 4.1 Governing Documents

### 4.1.1 Standards, Criteria, and Guidance (SCGs)

The following standards, criteria, and guidance will be consulted and adhered to throughout the Remedial Action as applicable:

- 6 NYCRR Part 364 - NYS Waste Transporter Permits
- 6 NYCRR Part 360 - NYS Solid Waste Management Requirements
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Part 375 - Environmental Remediation Programs
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- CP-43 - Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- CP-49 – Climate Change and DEC Action (2022)
- CP-51- Soil Cleanup Guidance (2010)
- DER-2 - Making Changes to Selected Remedies (April 2008)
- DER-10 – Technical Guidance for Site Investigation and Remediation (2010)
- DER-13 – Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York (2006)
- DER-23 – Citizen Participation Handbook for Remedial Programs (2010)
- DER-31 – Green Remediation (2010)
- DER-32 – Brownfield Cleanup Program Applications and Agreements (2017)
- DER-33 – Guide to Drafting and Recording Institutional Controls (2010)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations (1998, Addenda 2000, 2004 and 2023)
- New York State Standards and Specifications for Erosion and Sediment Control (2016)
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006)
- New York State Climate Act (2019)
- NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (2023)

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### 4.1.2 Green and Sustainable Remediation and Climate Resiliency

Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major GSR components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases, and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling, and increasing reuse of materials that would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible, including maximizing the planting of trees, shrubs, and other carbon dioxide sinks in redevelopment;
- Fostering green and healthy communities and working landscapes that balance ecological, economic, and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate GSR principles and techniques to the extent feasible in the future development at this site, any future onsite buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

To evaluate the remedy with respect to GSR principles as part of the remedial design program, Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use estimation, and goals for the project related to these GSR metrics, as well as goals for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate.

The proposed redevelopment to be completed alongside the remediation will include a newly constructed building that will not utilize fossil fuel-powered boiler(s) for the Heating, Ventilation, and Air Conditioning (HVAC) systems. The newly constructed building will utilize electricity for both heat and hot water and will result in no Site emissions. The proposed redevelopment and remediation of the Site will not have an adverse impact on any existing natural resources. The Site is located within the Bronx River-East River Watershed and within an urbanized area of Concourse Village. Since the Site is currently vacant, there will not be significant adverse impacts to the Bronx River-East River Watershed. As discussed in Section 3.2.5, the Site is located within a PEJA that works to address environmental issues and concerns that affect primarily low income and minority communities through grant opportunities, enforcement of environmental laws and regulations, consultation, guidance, and enhance public participation. The proposed redevelopment and remediation will comply with the requirements established for PEJAs by providing much needed affordable housing.

To further incorporate green remediation principles and techniques to the extent feasible in the future development at this Site, any future onsite buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

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Additionally, the American Society for Testing and Materials (ASTM) Standard Guide for Greener Cleanups will be taken into consideration during remediation implementation to minimize total energy use, air pollutants and greenhouse gas emissions, water use and impacts to water resources, recycling of materials and waste, and promote the protection of land and ecosystems.

In the FER, a Base Management Practices (BMPs) assessment and an environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise(TM) (available in the Sustainable Remediation Forum [SURF] library), or a similar NYSDEC accepted tool. Further, progress with respect to GSR metrics will be tracked during implementation of the Remedial Action and reported in the FER, including a comparison to the goals established during the remedial design program.

### 4.1.3 Site Specific Health & Safety Plan (HASP)

The Site-specific HASP, including CAMP, is included in **Appendix D**. All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by the Federal Occupational Safety and Health Administration (minimum OSHA 40 hour Hazardous Waste Operations and Emergency Response [HAZWOPER]).

The Volunteers and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate HASP and for the appropriate performance of work according to that plan and applicable laws.

The HASP and requirements defined in this RAWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

The Roux Site Safety Officer (SSO) will be determined prior to implementation of the Remedial Action. A resume will be provided to NYSDEC prior to the start of remedial construction.

### 4.1.4 Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP)

The QAPP/FSP (**Appendix E**) includes all procedures to be followed for sampling and analysis. The QAPP/FSP includes all requirements outlined in DER-10 Section 2.4.

### 4.1.5 Soil/Materials Management Plan (SoMP)

Section 5.4 of the RAWP provides the SoMP to be implemented during the Remedial Action.

### 4.1.6 Contractors Site Operations Plan (SOP)

The Remedial Engineer will review all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and will confirm that they are in compliance with this RAWP. The Remedial Engineer is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

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### 4.1.7 Citizen Participation Plan

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing. Fact sheets will be provided in English and Spanish. Fact sheets will be sent electronically by the NYSDEC project manager.

A certification of mailing will be sent by the Volunteers to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet; (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

The approved Citizen Participation Plan for this project is attached in **Appendix C**.

Document repositories have been established at the following locations and contain all applicable project documents:

**Melrose Branch**
**New York Public Library**
910 Morris Avenue
Bronx, NY 10451
718-588-0110
melrose@nypl.org

**Bronx Community Board 4**
1650 Selwyn Avenue, Suite 11A
Bronx, NY 10457
Phone: (718) 299-0800
Leonardo J. Coello - District Manager
Housing & Land Use – Chairperson - Ms. Lilliam Rosa
Chairperson: Beverly Bond

## 4.2 General Remedial Construction Information

### 4.2.1 Project Organization

The Remedial Contractors have not been selected to date. Once established, a listing of key personnel involved in the Remedial Action will be provided to the NYSDEC.

| Title | Contact |
|---|---|
| Site Ownership | Serin Leung |
| Project Principal | Frank Cherena |
| Project Principal, Remedial Engineer | Charles J McGuckin |
| Senior Project Manager | Lauren Dolginko |
| Project Manager | Patrick Perry |

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A copy of professional profiles for the Project Principal/Remedial Engineer and Project Manager for Roux are presented in **Appendix F**.

### 4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Charles McGuckin, P. E. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the project. The Remedial Engineer will certify in the FER that the remedial activities were observed by qualified environmental professionals under her supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of Environmental Conservation Law (ECL) 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal. The Remedial Engineer will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER.

The Remedial Engineer will provide the certifications listed in Section 10.1 in the FER.

### 4.2.3 Remedial Action Construction Schedule

A schedule for the major elements of the remedial construction and portions of the redevelopment construction is presented in Section 11.

### 4.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. NYSDEC will be notified by the Volunteers of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

### 4.2.5 Site Security

Security for the work, equipment, materials, supplies, facilities, personnel, and incidentals will be provided throughout the performance of the work at the Site. The Site will be fully fenced with construction fencing conforming to New York City Department of Buildings requirements. This fencing will be maintained throughout the remedial construction work. Temporary fencing and barricades will be used to delineate and secure areas of ongoing remediation activities. Site security personnel will be employed as needed.

### 4.2.6 Traffic Control

All construction work will occur between 7 A.M. and 6 P.M. from Monday to Friday. The contractors may work longer hours and/or weekends, as permitted by the proper authorities. If work beyond these hours or on weekends is required, the proper authorities will be notified. Disturbances to the local community will be minimized to the extent practical.

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For any trucking required, the proposed truck routes for ingress and egress to the Site are shown in **Figure 15**.

All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. These are the most appropriate routes and take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting offsite queuing of trucks entering the facility, to the extent practicable; (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.

The contractors operating on the Site will be responsible for providing all necessary personnel and materials (i.e., traffic lanes, safety cones, etc.) to control traffic entering and exiting the Site and for coordinating traffic control measures with the New York City Police Department, as necessary. Contractors operating on the Site shall be responsible for all applicable New York city Department of Transportation (NYCDOT) traffic control and notification requirements and incorporating those elements into this Traffic Control Plan.

### 4.2.7 Contingency Plan

The Contingency Plan is described in Section 5.4.11.

### 4.2.8 Worker Training and Monitoring

All excavation work will be performed in accordance with the Site-specific HASP and CAMP. Removal of impacted soil will be performed by qualified contractors and trained personnel (Minimum 40HR OSHA HAZWOPER). In the event that removal of UST is required, work will be performed by a qualified contractor and trained personnel (Minimum 40HR OSHA HAZWOPER) in accordance with DER-10, NYSDEC PBS regulations and NYC Fire Department regulations.

### 4.2.9 Agency Approvals

The Volunteers will address all State Environmental Quality Review Act (SEQRA) requirements for this Site, as appropriate for the future redevelopment. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The potential future end use for the Site is in conformance with the zoning for the property as determined by New York City Department of Planning.

A complete list of all local, regional and national governmental permits, certificates, or other approvals or authorizations required to perform the remedial work is attached in **Table 18**. This list includes a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the FER.

### 4.2.10 NYSDEC BCP Signage

A BCP project sign is not required for this Site.

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### 4.2.11 Pre-construction Meeting with NYSDEC

A project kick-off meeting will be conducted with the Volunteers, Roux, NYSDEC, the General Contractor, and the selected Remedial Contractor prior to the commencement of any intrusive remedial activities proposed in this RAWP.

### 4.2.12 Emergency Contact Information

The Site-specific HASP (**Appendix D**) will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency. Since the contractors have not yet been selected, the emergency contact list will be prepared prior to the start of work and the HASP will be updated.

### 4.2.13 Remedial Action Costs

The total cost for Remedial Alternative 1 is estimated to be $15,700,000 (no monitoring and reporting is required) and the total cost for Remedial Alternative 2 is estimated to be $5,500,000 itemized and detailed summary of estimated costs for all remedial activity is attached as **Tables 15 and 16**. The costs provided are rough estimates used for comparison purposes only based on the consultant's experience. They do not reflect actual costs or the complete array of hard and soft costs that may be necessary to implement the various remedial alternatives. Actual costs may vary, and the applicant makes no representation and is not bound in any respect by the rough cost estimate(s) provided.

## 4.3 Site Preparation

### 4.3.1 Mobilization

Mobilization

The soil contractors shall supply any labor and materials required for the removal and disposal of contaminated soil. Mobilization and Site preparation activities include:

1. Mobilization of equipment to the work area.
2. Installation/maintenance of the perimeter construction fencing, temporary fencing and traffic barricades to delineate the work zone and act as a work Site security measure. Security personnel will be onsite as needed.
3. Implementation of erosion and sediment control measures in accordance with the New York Guidelines for Urban Erosion and Sediment Control and the SWPPP.
4. Set-up of decontamination facilities.

### 4.3.2 Monitoring Well/Vapor Probe Decommissioning

Existing groundwater monitoring wells will either be protected during remediation and development for use in post-remedial monitoring or will be properly decommissioned in accordance with NYSDEC Commissioners Policy CP-43. The only exception to this is if the full length of the well is to be excavated during remediation.

Similarly, existing soil vapor probes will be properly decommissioned unless they are to be fully removed during remediation or used for post-remedial monitoring.

### 4.3.3 Erosion and Sedimentation Controls

Soil erosion and sediment control measures for management of stormwater will be installed in accordance with the New York Guidelines for Urban Erosion and Sediment Control. Hay bales and/or silt fence will be

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placed by the remedial contractor at locations surrounding excavation areas, within the perimeter fencing, to control storm water runoff and surface water from entering or exiting the excavation. These control measures will be installed prior to initiating soil excavation.

Implementation of erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control and the SWPPP. Construction water will be managed in accordance with the SoMP described in Section 5.4.7.

### 4.3.4 Stabilized Construction Entrance(s)

The stabilized entrance will be installed to provide continuity between the truck wash and the stone-based egress path so that trucks do not get re-contaminated prior to departure from the Site.

### 4.3.5 Utility Marker and Easements Layout

The Volunteers and their contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Volunteers and their contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteers and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

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

### 4.3.6 Sheeting and Shoring

Appropriate management of structural stability of onsite or offsite structures during onsite activities include excavation is the sole responsibility of the Volunteers and its contractors. The Volunteers and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteers and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this RAWP.

### 4.3.7 Equipment and Material Staging

An equipment and materials staging area will be established in a designated area onsite.

### 4.3.8 Decontamination Area

A temporary decontamination pad/truck wash will be constructed to decontaminate trucks and other vehicles/equipment leaving the Site. The decontamination pad will be sized to accommodate the largest construction vehicle used and located prior to the stabilized construction egress. The decontamination pad may be integrated with the stabilized construction entrance. Dry decontamination will be employed to the extent practical, within a designated area of the Site. The truck decontamination area/construction entrance will be adequately sloped toward the interior of the Site to prevent offsite tracking of soils and water.

### 4.3.9 Site Fencing

The Site will remain fenced and enclosed from public access at all times.

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### 4.3.10 Demobilization

The Demobilization plan should address:

- Restoration of areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management area[s], and access area);
- Removal of temporary access areas (whether onsite or offsite) and restoration of disturbed access areas to pre-remediation conditions;
- Removal of sediment and erosion control measures and disposal of materials in accordance with acceptable rules and regulations;
- Equipment decontamination;
- General refuse disposal.

## 4.4 Reporting

All daily and monthly Reports will be included in the FER.

### 4.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of the next day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP results, including excursions;
- An explanation of notable Site conditions;
- A look ahead portion that describes immediate future work; and
- Photos of site activity.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), complaints, requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions, complaints, and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

The alpha-numeric map for use in identifying locations described in reports submitted to NYSDEC is attached on **Figure 16**.

The NYSDEC assigned project number will appear on all reports.

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### 4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers by the 10th of the month following the end of the month of the reporting period and will include:

- Activities related to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e., tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

### 4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be included in the daily reports as needed, and a comprehensive collection of photos will be included in the FER.

The Climate Screening process and results will be documented in the form of a completed checklist and brief letter report. If the Climate Screening results indicate that a Climate Vulnerability Assessment (CVA) is necessary, a complete CVA Report will be developed. The CVA Report will be included as an Appendix or Attachment in the FER and/or submitted as a standalone report.

Job-Site record keeping for all remedial work will be appropriately documented. These records will be maintained onsite at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

### 4.4.4 Complaint Management Plan

If an odor or dust complaint is received, the following procedure will be implemented:

1. Work in the affected area will be halted, and the source of odors/dust will be identified.
2. NYSDEC, NYSDOH, and the Volunteers will be notified of the complaint.
3. Nuisance odors, if any, will be abated through covering/containerizing excavated materials, backfilling open excavations in a timely manner; and/or using a foam unit or other appropriate measures.
4. As described in NYSDEC DER-10, Appendix 1B – Fugitive Dust Control and discussed in Section 5.4.13.2 of this RAWP, nuisance dust, if any, will be abated through applying water on haul roads; wetting equipment and excavation faces; spraying water on buckets during excavation and dumping; hauling materials in properly tarped or watertight containers; restricting vehicle speeds to 10 mph; covering excavated areas and material after excavation activity ceases; and reducing the excavation size and/or number of excavations.
5. Work will resume in the affected area when the nuisance odors/dust have been abated, as determined by the Roux onsite personnel.

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### 4.4.5 Deviations from the Remedial Action Work Plan

Deviations from the RAWP will be reported to NYSDEC for approval and fully explained in the FER.

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# 5 Remedial Action Implementation

## 5.1 Pre-Design Investigation

A PDI work plan will be prepared and submitted to NYSDEC for review and approval under separate cover prior to RAWP implementation. The PDI work plan will outline the sampling plan, methodology, analyses, and frequency for the investigation. The findings of the PDI will further delineate specific horizons of contamination within the Track 2 remediation area to confirm final remedial excavation depths. The findings of the PDI will be summarized in a PDI Summary Letter Report for submittal to NYSDEC prior to RAWP implementation.

## 5.2 Soil Cleanup Objectives

The SCOs for this Site are listed in **Table 17**. The SCOs for the Track 2 remediation area are UUSCOs and RRSCOs for the Track 4 remediation area, with the exception of Hot Spots 1 and 2 which will remediate 1,2,4-trimehtylbenzene to PGWSCOs. All soil proposed for onsite reuse and import from offsite sources will be compared to UUSCOs for the Track 2 remediation area and the lower of RRSCOs and PGWSCOs in the Track 4 remediation area. Soil and materials management onsite and offsite will be conducted in accordance with the SoMP as described below.

**Tables 1 through 6** present all soil samples that exceed the SCOs proposed for this Remedial Action. **Figure 6** shows all soil samples that exceed the SCOs proposed for this Remedial Action.

## 5.3 Remedial Performance Evaluation (Post Excavation Endpoint Sampling)

Endpoint sampling and reporting will be conducted in accordance with DER-10 and the QAPP and is discussed in the sections below.

A confirmation sample means a sample taken during the course of the Remedial Action to determine whether cleanup requirements have been achieved or whether further remediation is required. A documentation sample means a sample taken after the Remedial Action is complete to document the remaining level of contamination.

### 5.3.1 Endpoint Sampling Frequency

A summary of the proposed combined Track 2 and Track 4 Restricted Residential Use cleanup confirmation and documentation endpoint designations, sample depths, and analytical parameters are summarized in **Table 19**. The location of confirmation and documentation endpoint samples are included in **Figure 12**.

**Track 4 Remediation Area**

Bottom documentation sampling will be conducted in the Track 4 remediation area (29 samples total) at a frequency of approximately one sample per 900 square feet of excavation area. Within Hot Spot 1 and Hot Spot 2, additional bottom and sidewall confirmation sampling will be conducted following completion of excavation to demonstrate that exceedances of the PGWSCO for 1,2,4-trimethylbenzene have been removed. One bottom confirmation sample will be collected, and four sidewall confirmation samples will be collected from the interval of the initial exceedance of 1,2,4-trimethylbenzene above PGWSCOs.

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Bottom documentation samples collected within the Track 4 remediation area will be analyzed for the full NYSDEC Part 375 TCL/TAL analytical suite (VOCs, SVOCs, metals, pesticides, PCBs, and emerging contaminants). Bottom and sidewall confirmation samples collected at Hot Spot 1 and Hot Spot 2 will be analyzed for 1,2,4-trimethylbenzene only. If bottom or sidewall confirmation samples within Hot Spot 1 or Hot Spot 2 do not meet the PGWSCO for 1,2,4-trimethylbenzene, an additional 2 feet of soil will be removed, and an additional confirmation sample will be collected and analyzed for 1,2,4-trimethylbenzene only.

In the UST area, two bottom documentation samples will be collected following tank removal and will be analyzed for the full NYSDEC Part 375 TCL/TAL analytical suite.

If competent bedrock is encountered in any portion of the Track 4 excavation, it will be cleared and photo-documented, and no endpoint samples will be collected in areas where competent bedrock is encountered.

The proposed sampling frequency is consistent with the guidance provided in NYSDEC DER-10 Sections 5.4 and 5.5.

**Track 2 Remediation Area**

Bottom confirmation sampling will be conducted in the Track 2 remediation area (15 samples total) at a frequency of approximately one sample per 900 square feet of excavation area.

Within Hot Spot 3, additional bottom and sidewall confirmation sampling will be conducted following completion of excavation to demonstrate that exceedances of the UUSCO for mercury have been removed. One bottom confirmation sample will be collected, and four sidewall confirmation samples will be collected from the interval of the initial exceedance of mercury above UUSCOs.

Bottom confirmation samples collected within the Track 2 remediation area will be analyzed for the full NYSDEC Part 375 TCL/TAL analytical suite. Bottom and sidewall confirmation samples collected at Hot Spot 3 will be analyzed for mercury only. If bottom or sidewall confirmation samples from the Track 2 remediation area and Hot Spot 3 do not meet UUSCOs, an additional 2 feet of soil will be removed, and an additional confirmation sample will be collected and analyzed for the exceeding parameter only.

If competent bedrock is encountered in any portion of the Track 2 excavation, it will be cleared and photo documented, and no endpoint samples will be collected in areas where competent bedrock is encountered.

The proposed sampling frequency is consistent with the guidance provided in NYSDEC DER-10 Sections 5.4 and 5.5.

### 5.3.2 Methodology

Endpoint samples will be collected in accordance with DER-10 Section 5.4(b). Each sample will be inspected for visual evidence of contamination (i.e., staining, presence of petroleum or odors) and field screened for VOCs using a PID. Soil samples to be submitted for analysis will be placed in a laboratory sample jar, placed in an iced cooler and transported to the laboratory.

### 5.3.3 Reporting of Results

The laboratory will report analytical results for endpoint samples in analytical service protocol (ASP) Category B deliverable packages. An Electronic Data Deliverable (EDD) in the required NYSDEC format will also be provided by the laboratory.

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All endpoint sample data generated for the Remedial Action will be logged in a database and organized to facilitate data review and evaluation. The electronic dataset will include the data flags provided in accordance with USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organic Analysis and Inorganic Analyses, as well as additional comments of the data review for ASP analyses. The data flags include such items as: 1) concentration below required detection limit; 2) estimated concentration due to poor recovery below required detection limit; 3) estimated concentration due to poor spike recovery; and 4) concentration of chemical also found in laboratory blank.

### 5.3.4 QA/QC

QA/QC samples serve as checks on both the sampling and measurement systems and assist in determining the overall data quality with regard to representation, accuracy, and precision. The QAPP/FSP, included as **Appendix E** to this RAWP, describes QA/QC procedures and sampling for the project.

### 5.3.5 DUSR and EDDs

A DUSR will be prepared to evaluate the endpoint samples by Data Validation Services, a party independent from the laboratory performing the analysis in accordance with Appendix 2B of DER-10. The QAPP/FSP, included as **Appendix E** to this RAWP, describes the DUSR to be prepared for the project.

### 5.3.6 Reporting of Endpoint Data in FER

Chemical laboratories used for all endpoint sample results will be NYSDOH Environmental Laboratory Approval Program (ELAP) certified. The FER will provide a tabular and map summary of all endpoint sample results and exceedances of SCOs.

## 5.4 Estimated Material Removal Quantities

As part of the redevelopment, which includes building construction, the detention system, and landscape area, a total of 11,700 CY of soil will be excavated and disposed of. As part of the proposed Remedial Action which includes remedial excavation to a depth ranging from 4 to 14 ft bls for the Track 2 area, 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site. Offsite disposal will include a total of approximately 4,300 in-place CY of soil across the Site to achieve a combined Track 2 and Track 4 Restricted Residential Use cleanup. Remedial excavation volumes may vary depending on the results of confirmation endpoint samples and the PDI.

| Remedial Excavation Area | Voume of Soil to be Removed (CY) |
|---|---|
| Track 2 | 2,400 |
| Track 4 | 1,900 |

As part of the RI field implementation, Roux completed waste characterization sampling for all soil proposed for excavation and offsite disposal. Based on the waste characterization analytical results, the soil to be disposed of offsite was characterized to be non-hazardous.

## 5.5 Soil/Materials Management Plan

The following sections provide the SoMP to be implemented during the Remedial Action.

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### 5.5.1 Soil Screening Methods

Visual, olfactory, and PID soil screening and assessment will be performed by a qualified environmental professional or experienced field geologist under the direction of the Remedial Engineer during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy, prior to issuance of the Certificate of Completion (COC).

All primary contaminant sources (including but not limited to tanks and hot spots) identified during Site Characterization, RI, 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 FER.

Resumes will be provided for all personnel responsible for field screening (i.e., those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

### 5.5.2 Stockpile Methods

Although direct loading of trucks will be performed to the extent practical, stockpiles, if any, will be inspected at a minimum once each week and after every storm event. At a minimum, a storm event should be considered a rainfall of three inches or greater in 12 hours. Judgement should be used to evaluate water infiltration, nearby waterbodies where runoff is likely, and ECs that may be affected.

Stockpiles, if any, will always be kept covered with appropriately anchored tarps when not actively used. Stockpiles will be routinely inspected, and damaged tarp covers will be promptly replaced.

Soil stockpiles, if any, will be continuously encircled with silt fences or hay bales. Hay bales will be used as needed near catch basins and other discharge points.

Water will be available onsite at suitable supply and pressure for use in dust control.

### 5.5.3 Materials Excavation and Load Out

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

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

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

Vehicles leaving the Site will not be overloaded. The Remedial Engineer's representative will make reasonable efforts to ensure that vehicles are not loaded beyond their NYSDOT weight rating and that all material is secured beneath the truck bed cover.

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A truck wash will be operated onsite. The Remedial Engineer will be responsible for ensuring that all outbound trucks 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 offsite sediment tracking.

The Remedial Engineer will be responsible for ensuring that all 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 Volunteers and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all 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 will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil onsite is prohibited.

All primary contaminant sources (including but not limited to tanks and hot spots) identified during Site Characterization, RI, and 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 FER.

### 5.5.4 Materials Transport Offsite

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.

All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site are shown in **Figure 15**. 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 offsite queueing 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 onsite in order to minimize offsite disturbance. Offsite queuing will be prohibited.

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

All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of offsite in an appropriate manner.

### 5.5.5 Materials Disposal Offsite

The disposal locations will be determined prior to implementation of the Remedial Action and will be reported to the NYSDEC Project Manager.

The total remedial quantity of material expected to be disposed offsite is approximately 4,300 in-place CY of soil exceeding UUSCOs from a range of 4 to 14 ft bls inside the SOE for the Track 2 remediation area, and exceeding RRSCOs for the Track 4 remediation area include excavation to 5 ft bls for the Hot Spot 1 area, 8 ft bls for the Hot Spot 2 area, 6 ft bls for the UST area, and 2 ft bls for the remainer of Site. Remedial depths and remedial material disposal volumes within the Track 2 remediation area and hotspots may vary depending on results of the confirmation endpoint samples and the PDI. As part of the redevelopment excavation, a total of 11,700 CY of material will be excavated to install the building construction, detention system, and landscaping.

All soil/fill/solid waste exceeding UUSCOs that is excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed of in accordance with all local, State (including 6 NYCRR 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 offsite management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 UUSCOs is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 36015 Registration Facility).

Non-hazardous historic fill and contaminated soils taken offsite will be handled, at minimum, as a Municipal Solid Waste per 6 NYCRR Part 360.2. The Remedial Engineer is responsible for assuring material is properly characterized and determining the appropriate disposal methods based on the characterization results.

Historic fill and contaminated soils from the Site are prohibited from being disposed of 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 NYSDEC Division of Materials Management (DMM) 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 DMM. This material is prohibited from being sent or redirected to a Part 360-15 Registration Facility. In this case, as dictated by DMM, 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 onsite or offsite 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 all chemical data for the material being transported.

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The FER will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all 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 offsite movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes derived from onsite will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

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

Waste characterization sampling will be performed exclusively for the purposes of offsite soil disposal in a manner suitable to receiving facilities and in conformance with applicable federal, state and local laws rules and regulations and facility-specific permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC associated with waste characterization activities will be reported in the FER. All 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. Waste characterization data will be used solely for complying with requirements for offsite disposal. Waste Characterization sampling cannot be utilized for:

- Delineating the extent of contamination required for remediation at a Site.
- Replacing or substituting data collected as part of Site Characterization and/or Remedial Investigation.
- Replacing or substituting confirmation or documentation sampling as described in NYSDEC DER-10, Section 5.4.
- To modify remedial decisions as formalized in a NYSDEC approved Decision Document or Record of Decision.

### 5.5.6 Materials Reuse Onsite

Although not planned, onsite soil may be reused for backfill. In the event this occurs, chemical criteria for onsite reuse of material has been approved by NYSDEC. These criteria are listed in Table 18. The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain onsite.

A “Request to Import/Reuse Fill Material” form will be filed with the NYSDEC project manager for review and approval prior to material reuse on the site. A copy of the form is presented in **Appendix G**.

Concrete crushing or processing onsite is prohibited, unless NYSDEC has specifically approved onsite processing and reuse of acceptable demolition material.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse onsite.

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Contaminated onsite material, including contaminated fill material and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer (if required), within landscaping berms, or as backfill for subsurface utility lines.

### 5.5.7 Fluids Management

Construction wastewater will be generated from dewatering of groundwater and proper management of perched rainwater atop the bedrock, personnel/equipment decontamination, and run-off/run-on in bermed soil stockpile and excavation areas. Extracted groundwater and rainwater will either be containerized for offsite licensed or permitted disposal or will be discharged to the municipal sewer system under a permit from NYCDEP and NYSDEC, if applicable. Water will be treated onsite to meet pretreatment requirements prior to discharge.

All liquids to be removed from the Site will be handled, transported, and disposed in accordance with applicable laws and regulations. If any USTs are encountered, all liquids observed in the USTs will be removed prior to closure. All liquids removed from the USTs will be sampled in a manner required by the receiving facility and in compliance with applicable laws and regulations. Liquid waste manifests will be reported to NYSDEC in the FER.

Any accumulated stormwater and/or groundwater encountered during the remediation will be managed and discharged under the appropriate New York City permit and will follow all local, state, and federal regulations.

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

### 5.5.8 Demarcation

Within the Track 4 Restricted Residential Use cleanup a land survey will be completed by a New York State licensed surveyor to define the top of elevation of residual contaminated soils. Within the Track 2 Restricted Residential Use cleanup area there will be no demarcation layer, however, should the Track 2 Restricted Residential Use Cleanup area default to a Track 4 Restricted Residential Use cleanup, a land survey will be completed by a New York State licensed surveyor to define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of the underside of the impervious surface systems (concrete or asphalt) associated with the walkways and traffic areas, and a geotextile layer, or equivalent, in landscaped areas will provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone,' the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the SMP. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the SMP. A map showing the survey results will be included in the FER and the SMP, if applicable.

### 5.5.9 Backfill from Offsite Sources

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the Site, if required. Within the Track 2 remediation area, imported fill will meet UUSCOs and within the Track 4 remediation area, imported fill will meet the lower of RRSCOs and PGWSCOs, as listed in **Table 18**.

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Any backfill requiring sampling will be analyzed for the full suite of Part 375 parameters and emerging contaminants.

Solid waste, material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site. Material from other environmental remediation sites will not be imported to the Site without prior approval of NYSDEC.

The FER will include the following certification by the Remedial Engineer:

> *"I certify that all import of soils from offsite, 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."*

Non-compliant soil will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet "general 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 RAWP should be construed as an approval for this purpose.

A "Request to Import/Reuse Fill Material" form will be filed with the NYSDEC project manager for review and approval prior to import to the site. A copy of the form is presented in **Appendix G**.

### 5.5.10 Stormwater Pollution Prevention

A SWPPP is required for the Remedial Action since the area of disturbance will be more than 20,000 square feet. A SWPPP has been prepared and was approved by the NYCDEP on November 17, 2025. A copy of the SWPPP is included in **Appendix I**.

### 5.5.11 Contingency Plan

In the event that underground tanks or other previously unidentified contaminant sources are found during onsite remedial excavation, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full suite of parameters (VOCs, SVOCs, metals, pesticides, PCBs, and emerging contaminants), or a more limited list as approved by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval. Discovery of underground storage tanks will be handled in accordance with NYSDEC DER-10, Section 5.5.

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 also be included in daily and monthly reports and in the FER.

#### 5.5.11.1 Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of SOE structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the Volunteers will undertake the following steps for site preparedness prior to the event and response after the event.

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#### 5.5.11.1.1 Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

#### 5.5.11.1.2 Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to NYSDEC at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911.

Petroleum spills will be reported to NYSDEC within 2 hours of identification and consistent with State regulations. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed.

Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. SOE structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Stormwater control systems and structures will be inspected and maintained as necessary.

If soil or fill materials are discharged off site to adjacent properties, property owners and NYSDEC will be notified, and corrective measure plan designed to remove and clean dislocated material will be submitted to NYSDEC and implemented following approval by NYSDEC and granting of site access by the property owner. Impacted offsite areas may require characterization based on site conditions, at the discretion of NYSDEC.

If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYSDEC's spill hotline at (800) 457-7362 within statutory defined timelines. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYSDEC.

#### 5.5.11.1.3 Storm Response Reporting

A site inspection report will be submitted to NYSDEC at the completion of site inspection. An inspection report will be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be

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sent to the NYSDEC project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number.

Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the SOE; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYSDEC; description of corrective actions; schedule for corrective actions.

This report should be completed and submitted to NYSDEC project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

### 5.5.12 Community Air Monitoring Plan

CAMP will be conducted during any intrusive activities. The CAMP is included as Appendix F within the HASP in **Appendix D**. A map showing the location of mobile sampling stations will be provided in each daily CAMP report.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers within 24-hour of their occurrence and will be included in the daily report.

### 5.5.13 Odor, Dust and Nuisance Control Plan

The FER will include the following certification by the Remedial Engineer: *"I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."*

#### 5.5.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors offsite. Specific odor control methods to be used on a routine basis will include limiting open excavation areas and covering excavated soil (i.e., with polyethylene sheeting or in covered roll off containers). If nuisance odors are identified, 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 all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteers' Remedial Engineer, who is responsible for certifying the FER.

All necessary means will be employed to prevent on- and offsite 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) use of chemical odorants in spray or misting systems; and (e) 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 onsite 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.

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#### 5.5.13.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive onsite work, will include, at a minimum, the items listed below and will comply with NYSDEC DER-10 Appendix 1B – Fugitive Dust Control:

- Dust suppression will be achieved through applying water on haul roads; wetting equipment and excavation faces; spraying water on buckets during excavation and dumping; hauling materials in properly tarped or watertight containers; restricting vehicle speeds to 10 mph; covering excavated areas and material after excavation activity ceases; and reducing the excavation size and/or number of excavations.
- Clearing and grubbing will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to limit dust generation.

#### 5.5.13.3 Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

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# 6. Residual Contamination to Remain Onsite

The proposed remedy for the Site is Track 2 within the future building's footprint and the achievement of UUSCOs in soil to allow for a modified Track 1 Certificate of Completion to be issued within five years of the initial Certificate of Completion contingent upon meeting objectives for groundwater and soil vapor. The remainder of the Site will be Track 4 Restricted Residential Use Cleanup. ECs will be required where a Track 2 Restricted Residential Use cleanup has not been achieved to protect human health and the environment. Long-term management of EC/ICs and of residual contamination will be executed under a Site-specific SMP that will be developed and included in the FER.

## 6.1 Residual Soil Contamination to Remain Onsite

The following sections present a summary of residual contamination that will remain onsite following completion of the Remedial Action. As part of the selected remedial approach, the Site will be excavated to a depth of ranging from 4 to 14 ft bls in the Track 2 remediation area. Any residual soil vapor contamination in the Track 2 remediation area will be mitigated and managed with an active SSDS system below the future building's cellar footprint. The Track 4 remediation area will be excavated to a depth of 5 ft bls for Hot Spot 1, 8 ft bls for Hot Spot 2, 6 ft bls for the UST area, and 2 ft bls for the remainder of the Site. All soil exceeding applicable cleanup objectives above this depth will be removed, while any remaining contamination located below 2 ft bls for the Track 4 remediation area will remain in place and be managed under ECs, ICs, and the SMP.

As part of the redevelopment, the building cellar foundation will be installed to a depth of 20 ft bls, the elevator pit will be installed to 25 ft bls, and foundation elements for the elevated second floor will be installed to a depth of 15 ft bls. Excavation for installation of the stormwater detention system as part of the future redevelopment of the Site will range from 4 to 12 ft bls within the Track 4 remediation area. Soil and any residual contamination in the Track 4 remediation area and within the stormwater detention system will be removed. Residual contamination below the stormwater detention system will remain in place and be managed under ICs/ECs and the SMP

### 6.1.1 Residual VOCs in Soil to Remain Onsite

A summary of the VOC exceedances in the soil samples to remain onsite is provided below:

**VOC Exceedances of SCOs in Soil to Remain Onsite**

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| Acetone | 0.03 | 3 | 100 | - | 0.03 | 3 | 0.037 – 0.18 | RX-23 (10-12) |

- No exceedances detected

Acetone is a typical laboratory artifact and the detections are not indicative of Site soil conditions

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### 6.1.2 Residual SVOCs in Soil to Remain Onsite

A summary of the SVOC exceedances in the soil samples to remain onsite is provided below:

**SVOC Exceedances of SCOs in Soil to Remain Onsite**

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection (ft bls) |
|---|---|---|---|---|---|---|---|---|
| Benzo(A)Anthracene | 1 | 1 | 1.4 | 1 | 1 | 1 | 1.5 | RX-24 (7-8) |
| Benzo(A)Pyrene | 1 | 1 | 1 | 1 | 22 | - | 1.5 | RX-24 (7-8) |
| Benzo(B)Fluoranthene | 1 | 3 | 1.4 | 1 | 2.1 | - | 1.1 – 1.7 | RX-24 (7-8) |
| Benzo(G,H,I)Perylene | 0.64 | 1 | 4.9 | - | 1000 | - | 0.99 T | RX-16 (2-4) |
| Chrysene | 1 | 6 | 4.9 | - | 1 | 6 | 1.1 | RX-24 (7-8) |
| Dibenz(A,H)Anthracene | 0.33 | 1 | 0.33 | 1 | 1000 | - | 0.48 | RX-16 (2-4) |
| Indeno(1,2,3-C,D)Pyrene | 0.5 | 3 | 1.4 | - | 6.6 | - | 0.54 – 1 | RX-16 (2-4) |
| Phenanthrene | 1.1 | 2 | 4.9 | - | 1000 | - | 1.9 – 2.7 | RX-24 (7-8) |

- No exceedances detected
Sample counts above include exceedances in the duplicates

### 6.1.3 Residual Metals in Soil to Remain Onsite

A summary of the metal exceedances in the soil samples to remain onsite is provided below:

**Metal Exceedances of SCOs in Soil**

| Analyte | UUSCO (mg/kg) | Exceedances above UUSCOs | RRSCOs (mg/kg) | Exceedances above RRSCOs | PGWSCOs (mg/kg) | Exceedances above PGWSCOs | Range in Concentration Above SCOs (mg/kg) | Soil Sample with Maximum Detection (ft bls) |
|---|---|---|---|---|---|---|---|---|
| Beryllium | 4.4 | 1 | 43 | - | 47 | - | 4.8 | RX-24 (14-15) |
| Cadmium | 2.5 | 1 | 2.5 | 1 | 7.5 | - | 3.5 | RX-24 (14-15) |
| Copper | 50 | 1 | 280 | - | 1720 | - | 83.6 | RX-21 (10-12) |
| Lead | 63 | 5 | 400 | 1 | 450 | 1 | 665 | RX-21 (10-12) |
| Manganese | 1600 | 1 | 2000 | 1 | 2000 | 1 | 5790 | RX-24 (14-15) |
| Mercury | 0.18 | 1 | 0.3 | 1 | 0.73 | - | 0.35 | RX-17 (4-6) |
| Nickel | 30 | 1 | 320 | - | 130 | - | 34.2 | RX-24 (14-15) |
| Zinc | 109 | 7 | 6600 | - | 2480 | - | 116 - 310 | RX-24 (14-15) |

- No exceedances detected/no SCO available
Sample counts above include exceedances in the duplicates

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### 6.1.4 Residual Polychlorinated Biphenyls in Soil to Remain Onsite

No PCBs exceedances in soil samples will remain onsite.

### 6.1.5 Residual Pesticides in Soil to Remain Onsite

No pesticide exceedances in soil samples will remain onsite.

### 6.1.6 Residual PFAS in Soil to Remain Onsite

No PFAS exceedances in soil samples will remain onsite.

## 6.2 Residual Groundwater Contamination to Remain Onsite

Groundwater samples indicated the presence of VOCs, metals, and PFAS at concentrations above the NYSDEC AWQSGVs. During the Remedial Action, excavation and offsite disposal of soil within the Track 4 remediation area which exceeds PGWSCOs for 1,2,4-trimethylbenzene within Hot Spot 1, to 5 ft bls, and Hot Spot 2, to 8 ft bls, to remove source area material for 1,2,4-trimethylbenzene which also exceeded AWQSGVs in groundwater during the RI will be completed. Concentrations of 1,2,4-trimethylbenzene in groundwater within weathered bedrock will attenuate over time and will be monitored under the SMP. Sampling of groundwater at two permanent bedrock monitoring wells to monitor groundwater quality and document groundwater attenuation of 1,2,4-trimethylbenzene only following source area removal. Should groundwater quality at ETMW-04 demonstrate bulk reduction in 1,2,4-trimethylbenzene concentrations under the SMP, a petition for a modified Track 1 COC will be submitted to NYSDEC. The location of permanent monitoring wells to be sampled under the SMP is included in **Figure 17**.

Iron, total manganese, total and dissolved magnesium, and total and dissolved sodium were detected at concentrations above the AWQSGVs. Iron, magnesium, manganese, and sodium are naturally occurring in groundwater.

PFOS and PFOA were detected in groundwater above the AWQSGVs for all but one sample. Based on concentrations detected during the RI, the presence of PFAS in groundwater is most likely due to background levels of these compounds ubiquitous to the New York City area.

Groundwater is not used for drinking or other potable purposes (the area is connected to the public water supply), and there is no direct contact with or ingestion of groundwater by the general public. Furthermore, no public water supply wells are located in the area surrounding the Site.

## 6.3 Residual Soil Vapor Contamination to Remain Onsite

Petroleum-related VOCs and chlorinated VOCs were detected in several locations throughout the Site, as well as low-level chlorinated VOCs. Based on the concentrations of petroleum-related VOCs, along with their presence in both soil and groundwater, indicate a likely onsite source of petroleum vapor impacts in the vicinity of ETSV-04 located in AOC-2. Excavation of these impacts in AOC-2 will be addressed as part of the Remedial Action through hot spot source area removal and natural attenuation of groundwater. To mitigate potential soil vapor intrusion, the future building will be fully sealed with waterproofing/vapor barrier and an active SSDS will be installed beneath the future building's cellar footprint.

Post mitigation confirmatory testing will be completed under the SMP, prior to occupancy of the future building. The post mitigation confirmatory testing will include collection of samples from sub-slab monitoring

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points and co-located indoor air samples to be compared to the NYSDOH matrices, as stipulated in the NYSDOH SVI Guidance. Should analytical data collected as part of the post mitigation confirmatory testing meet the appropriate action levels in the NYSDOH SVI Guidance under the SMP, a petition for a modified Track 1 COC will be submitted to NYSDEC.

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# 7. Engineering Controls

## 7.1 Site Cover System

In the Track 4 remediation area, exposure to residual contaminated soils will be prevented by an engineered Site Cover System that will be built on the Site. The Site Cover System is a permanent control, and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity. The Site Cover System elements to be completed as part of this RAWP will include a compacted subbase layer, asphalt covered parking areas, concrete covered sidewalks/walkways, a minimum of 2-feet of clean stone, and/or landscaped areas with a minimum of 2-feet of clean fill (soil meeting the lower of the NYSDEC PGWSCOs and RRSCOs), as shown in **Figure 13**. Clean stone or soil used for the Site Cover System will be in compliance with procedures defined for material import in the SoMP and will meet NYSDEC-approved cover soil quality objectives for this Site

An Excavation Plan will be included in the SMP and will outline the procedures to be followed if the site cover system and underlying residual contamination are disturbed after the Remedial Action is complete.

The components of the Site cover system will be documented in the FER. Maintenance of this Site cover system will be described in the SMP.

## 7.2 Active Sub-slab Depressurization System

An active SSDS will be installed under the building cellar footprint as part of this RAWP. An SSDS will not be installed in the remainder of the building footprint which will consist of an elevated second floor with open air parking at ground level below.

A minimum 20-mil vapor barrier will be installed under the future building foundations as an element of the remedy and as part of the SSDS design to prevent potential exposure from impacted vapor. A description of the proposed active SSDS is provided below.

The active SSDS will consist of a network of sub-slab vapor collection loops (4-inch diameter perforated PVC pipe) installed within a gas permeable bed immediately beneath the building slab and vapor barrier system. The gas permeable bed will consist of gravel or crushed stone wrapped in protective geotextile fabric to prevent entry of fines. The vapor collection loops will be joined below the slab by a solid PVC header pipe that connects to a vertical riser pipe. The vertical riser pipe will penetrate the slab and be routed upward through each floor level, along a building column or foundation wall, and terminate on the roof. A vacuum gauge and sample port will be installed on riser pipes and accessible via the roof. Each riser will ultimately connect to a roof-mounted regenerative blower, capable of providing the flowrate/vacuum required for depressurization of the sub-slab zone. The blower systems will have a low vacuum switch, knock-out tank with high level alarm, an in-line air filter, and effluent discharge stack. The blowers will operate continuously and include an alarm system capable of notifying appropriate building personnel of a shut-down incident. Four soil vapor monitoring points will be installed in the slab of the building to monitor the effectiveness of the system on a periodic basis. The active SSDS design and details are included in **Figure 14**.

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# 8. Criteria for Completion of Remediation/Termination of Remedial Systems

The remediation will be considered complete in the Track 2 remediation area once the following is complete:

- excavation and offsite disposal of soil exceeding UUSCOs at depths ranging from 4 to 14 ft bls;
- collection of post-excavation confirmation samples to demonstrate UUSCOs have been met; and
- installation of the subgrade portions of the active SSDS.

The remediation will be considered complete in the Track 4 remediation area once the following is complete:

- excavation and offsite disposal of source area material to 5 ft bls for Hot Spot 1 and 8 ft bls for Hot Spot 2 is complete;
- collection of post-excavation confirmation samples at Hot Spot 1 and Hot Spot 2 to demonstrate that PGWSCOs for 1,2,4-trimethylbenzene have been met;
- excavation to 6 ft bls for the UST area and 2 ft bls in the Track 4 remediation area;
- collection of post-excavation documentation samples in the UST area and remainder of the Track 4 remediation area; and
- Installation of the Site Cover System in the Track 4 remediation area.

A soil vapor intrusion evaluation will be completed based on the soil vapor data previously collected onsite. The evaluation will be summarized in the FER and include a desktop review of all onsite analytical data relative to the future uses of the property

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# 9. Institutional Controls

After the remedy and redevelopment excavation is complete, the Site will have residual contamination remaining in place. ECs for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of soils that exceed RRSCOs in perpetuity: an Environmental Easement and a SMP.

A Site-specific Environmental Easement will be recorded with Bronx County to provide an enforceable means of ensuring the continual and proper management of soils that exceed RRSCOs and protection of public health and the environment. It will require the grantor of the Environmental Easement and the grantor's successors and assigns to adhere to all ECs/ICs placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions onsite usage and mandate operation, maintenance, and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

## 9.1 Environmental Easement

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when soils exceeding RRSCOs is left onsite after the Remedial Action is complete. As part of this Remedial Action, an Environmental Easement approved by NYSDEC will be filed and recorded with the Bronx County Clerk. The Environmental Easement will be submitted as part of the FER.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement:

- requires the remedial party or Site owner to complete and submit to the NYSDEC a periodic certification of ICs and ECs in accordance with Part 375-1.8 (h)(3).
- allows the use and development of the controlled property for restricted residential, commercial, or industrial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws; and
- requires compliance with the Department approved SMP.

The Environmental Easement must be recorded with the Bronx County Clerk before the Certificate of Completion can be issued by NYSDEC. A series of ICs are required under this remedy to implement, maintain and monitor the ECs. These ICs are requirements or restrictions placed on the Site, that are listed in and required by the Environmental Easement. ICs can, generally, be subdivided between controls that support ECs, and those that place general restrictions onsite usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The ICs that support ECs are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;

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- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP; and
- ECs may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these ICs for the Site is mandated by the Environmental Easement and will be implemented under the SMP (discussed in the next section). The Controlled Property (Site) will also have a series of ICs in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited, with the exception of raised planters;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb soil that exceed RRSCOs are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;
- The Controlled Property may be used for restricted residential, commercial, or industrial use, provided the long-term ECs and ICs included in the SMP are employed; and
- The Controlled Property may not be used for a higher level of use without an amendment or extinguishment of this Environmental Easement and unless allowed by local zoning.

Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

## 9.2 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the FER and issuance of the Certificate of Completion for the Remedial Action. The SMP is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the SMP are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This may include the following, if necessary: (1) development, implementation, and management of all ECs and ICs; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

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A SMP is required, which includes the following:

- an Institutional Control Plan that identifies all use restrictions for the site and details the steps necessary to ensure environmental easement remains in place and is effective.
- ECs: Site composite cover system and active SSDS

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use, and groundwater or surface water use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in the section 3.3 above will be placed in any areas where the upper two feet of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);
- provisions for the management and inspection of the identified ECs;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or ECs.

A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of the composite cover system to assess the performance and effectiveness of the remedy; and
- a schedule of monitoring and frequency of submittals to the NYSDEC.

Site management activities, reporting, and IC certification will be scheduled on a certification period basis and summarized in a Periodic Review Report (PRR). The certification period will be annually. The SMP will be based on the certifying period relative to the date of issuance of the COC. The first submission will be due 16 months after the issuance of the COC, and annually (or at another frequency as approved by NYSDEC) thereafter.

No exclusions for handling of residual contaminated soils will be provided in SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

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# 10. Final Engineering Report

A FER will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, certifications, manifests, and bills of lading. The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10, Section 5.8.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the SMP and Environmental Easement. This determination will be made by NYSDEC in the context of the FER review.

The FER will include written and photographic documentation of all remedial work performed under this remedy.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the RRSCOs in the Track 2 remediation area. A table that shows exceedances from Track 2 Restricted Residential SCOs for all soil/fill remaining at the Site after the Remedial Action and redevelopment excavation, and a map that shows the location and summarizes exceedances from Track 2 Restricted Residential SCOs for all soil/fill remaining at the Site after the Remedial Action and redevelopment excavation will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The FER will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

The FER must include a discussion of the green remediation practices/technologies employed throughout the remedial program. A final footprint analysis using a DER accepted model, and any tracking methods used through the construction including restoration activities. Before approval of a FER and issuance of a COC, all project reports must be submitted in digital form on electronic media (PDF).

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## 10.1 Certifications

The following certification will appear in front of the Executive Summary of the FER. The FER will be prepared, stamped and the following certification signed by an individual licensed or otherwise authorized in accordance with article 145 of the education law to practice the profession of engineering. The certification will include the following statements:

I, Charles J. McGuckin, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program activities, and I certify that the RAWP was implemented and that all construction activities were completed in substantial conformance with the Department-approved RAWP.

I certify that all use restrictions, ICs, ECs, and/or any operation and maintenance requirements applicable to the Site are contained in an environmental easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a SMP has been submitted for the continual and proper operation, maintenance, and monitoring of all ECs employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by Department.

If financial assurance is required:

I certify that any financial assurance mechanisms required by the Department pursuant to Environmental Conservation Law have been executed.

I certify that all data generated in support of this report have been submitted in accordance with the Department's EDD and have been accepted by the Department.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as Owner’s Designated Site Representative (and if the site consists of multiple properties): [and I have been authorized and designated by all site owners to sign this certification] for the site.

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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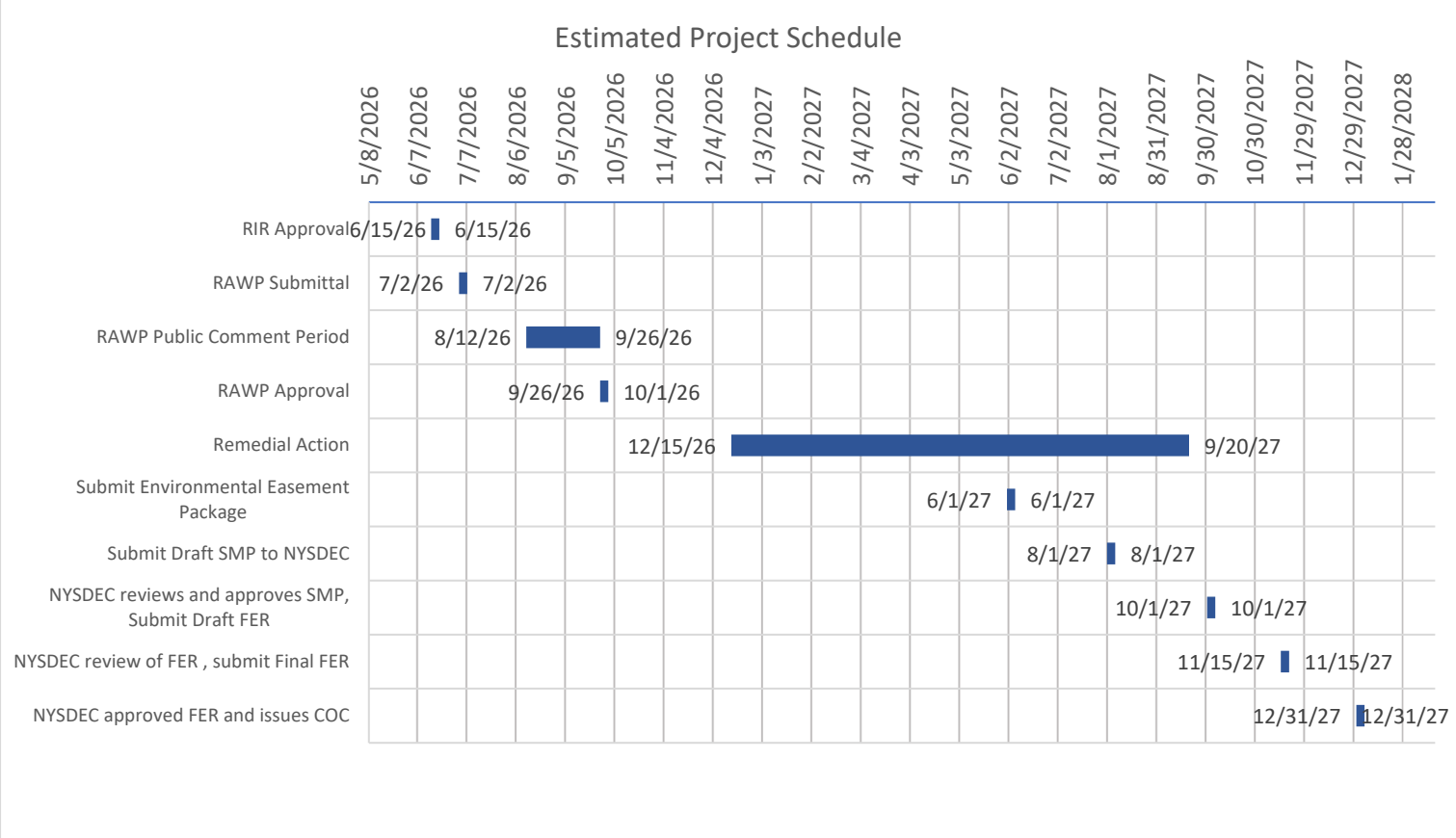
# 11. Schedule

A schedule for the proposed Remedial Action is presented below.

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1. Summary of VOCs in Soil Samples
2. Summary of SVOCs in Soil Samples
3. Summary of Metals in Soil Samples
4. Summary of PCBs in Soil Samples
5. Summary of Pesticides and Herbicides in Soil Samples
6. Summary of PFAS in Soil Samples
7. Summary of VOCs in Groundwater Samples
8. Summary of SVOCs in Groundwater Samples
9. Summary of Metals in Groundwater Samples
10. Summary of PCBs in Groundwater Samples
11. Summary of Pesticides and Herbicides in Groundwater Samples
12. Summary of Per- and Polyfluoroalkyl Substances in Groundwater
13. Summary of VOCs in Soil Vapor
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15. Remedial Alternative 1 Remedial Cost Estimate
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18. List of Required Permits
19. List of Endpoint Samples

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| Notes Utilized Throughout Tables | |
|---|---|
| **Soil Tables** | |
| J - | Estimated value |
| J+ - | Estimated value, high bias |
| U - | The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit |
| NJ - | Detection is tentative in identification and estimated in value |
| T - | Indicates that a quality control parameter has exceeded laboratory limits |
| bls - | Below land surface |
| FD - | Duplicate sample |
| mg/kg - | Milligrams per kilogram |
| µg/kg - | Micrograms per kilogram |
| NYSDEC - | New York State Department of Environmental Conservation |
| SCO - | Soil Cleanup Objectives |
| -- | No SCO available |
| Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use SCO | |
| Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential SCO | |
| Red data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater SCO | |
| **Groundwater Tables** | |
| J - | Estimated Value |
| J+ - | Estimated value, high bias |
| U - | The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit |
| T - | Indicates that a quality control parameter has exceeded laboratory limits |
| FD - | Duplicate |
| NA - | Compound was not analyzed for by laboratory |
| µg/L - | Micrograms per liter |
| ng/L - | Nanogram per liter |
| NYSDEC - | New York State Department of Environmental Conservation |
| AWQSGVs - | Ambient Water-Quality Standards and Guidance Values |
| -- | No NYSDEC AWQSGV available |
| Bold data indicates that parameter was detected above the NYSDEC AWQSGVs | |
| **Soil Vapor/Ambient Air** | |
| J - | Estimated value |
| U - | The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit |
| D - | Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte |
| FD - | Duplicate sample |
| ug/m3 - | Micrograms per cubic meter |
| Bold data indicates that parameter was detected | |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 |
| Sample Date: | | | | | 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 |
| Sample Depth (bls): | | | | | 2 - 6 in | 2 - 4 ft | 2 - 4 ft | 6 - 8 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | FD | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.0012 UT | 0.00083 UT | 0.0011 U | 0.0011 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.0012 UT | 0.00083 UT | 0.0011 U | 0.0011 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0062 U | 0.0042 U | 0.0055 U | 0.0055 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.016 | 0.0057 J | 0.01 | 0.0082 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Bromoform | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0025 U | 0.0017 U | 0.0022 U | 0.0022 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.0012 UT | 0.00083 UT | 0.0011 U | 0.0011 U |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-01 01/14/2026 2 - 6 in N | ETSB-01 01/14/2026 2 - 4 ft N | ETSB-01 01/14/2026 2 - 4 ft FD | ETSB-01 01/14/2026 6 - 8 ft N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 |
| Sample Date: | | | | | 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 |
| Sample Depth (bls): | | | | | 2 - 6 in | 2 - 4 ft | 2 - 4 ft | 6 - 8 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | FD | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0062 U | 0.0042 U | 0.0055 U | 0.0055 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0062 U | 0.0042 U | 0.0055 U | 0.0055 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0062 U | 0.0042 U | 0.0055 U | 0.0055 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.0012 UT | 0.00083 UT | 0.0011 U | 0.0011 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0025 UT | 0.0017 UT | 0.0022 U | 0.0022 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 UJ | 0.0011 UJ |
| Styrene | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.0012 U | 0.00083 UJ | 0.0011 U | 0.0011 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.0012 UT | 0.00083 UT | 0.0011 U | 0.0011 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.0012 U | 0.00083 U | 0.0011 U | 0.0011 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.0012 U | 0.00083 U | 0.0011 UJ | 0.0011 UJ |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0025 U | 0.0017 UJ | 0.0022 U | 0.0022 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-01 | ETSB-02 | ETSB-02 | ETSB-02 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-01 | ETSB-02 | ETSB-02 | ETSB-02 |
| Sample Date: | | | | | 01/14/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 |
| Sample Depth (bls): | | | | | 9 - 11 ft | 2 - 6 in | 2 - 4 ft | 12 - 14 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0054 U | 0.0054 U | 0.0049 U | 0.0056 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.0065 U | 0.0071 | 0.0058 J | 0.0067 U |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Bromoform | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0022 U | 0.0022 U | 0.002 U | 0.0022 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 UT | 0.00099 UT | 0.0011 UT |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 UT | 0.00099 UJ | 0.0011 UT |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-01 | ETSB-02 | ETSB-02 | ETSB-02 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-01 | ETSB-02 | ETSB-02 | ETSB-02 |
| Sample Date: | | | | | 01/14/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 |
| Sample Depth (bls): | | | | | 9 - 11 ft | 2 - 6 in | 2 - 4 ft | 12 - 14 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0054 U | 0.0054 U | 0.0049 UJ | 0.0056 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0054 U | 0.0054 U | 0.0049 U | 0.0056 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0054 U | 0.0054 U | 0.0049 U | 0.0056 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0022 U | 0.0022 U | 0.002 U | 0.0022 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.0011 UJ | 0.0011 UJ | 0.00099 UJ | 0.0011 UJ |
| Styrene | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 UJ | 0.0011 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0011 U | 0.00099 U | 0.0011 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.0011 UJ | 0.0011 UJ | 0.00099 UJ | 0.0011 UJ |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0022 U | 0.0022 U | 0.002 UJ | 0.0022 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-02 01/16/2026 12 - 14 ft FD | ETSB-03 01/15/2026 2 - 6 in N | ETSB-03 01/15/2026 2 - 4 ft N | ETSB-03 01/15/2026 6 - 8 ft N |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.0011 U | 0.00092 U | 0.005 | 0.00081 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.0011 U | 0.00038 J | 0.0011 | 0.00028 J |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0055 U | 0.0046 U | 0.0042 U | 0.0041 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.0065 U | 0.0055 U | 0.015 | 0.0097 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Bromoform | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0022 U | 0.0018 U | 0.0017 U | 0.0016 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.0011 UT | 0.00092 UT | 0.00083 U | 0.00081 UT |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.0011 UT | 0.00092 UT | 0.00083 U | 0.00081 UT |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-02 01/16/2026 12 - 14 ft FD | ETSB-03 01/15/2026 2 - 6 in N | ETSB-03 01/15/2026 2 - 4 ft N | ETSB-03 01/15/2026 6 - 8 ft N |
|---|---|---|---|---|---|---|---|---|
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.0011 U | 0.00092 U | 0.0012 | 0.00081 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.0011 U | 0.0007 J | 0.0052 | 0.00081 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0055 U | 0.0046 U | 0.0042 U | 0.0041 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0055 U | 0.0046 U | 0.0042 U | 0.0041 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0055 U | 0.0046 U | 0.0042 U | 0.0041 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0022 U | 0.0018 U | 0.0017 U | 0.0016 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.0011 U | 0.00092 U | 0.0019 | 0.00081 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.0011 UJ | 0.00092 UJ | 0.00083 UJ | 0.00081 UJ |
| Styrene | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.00092 U | 0.00083 U | 0.00081 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.0011 UJ | 0.00092 UJ | 0.00083 UJ | 0.00081 UJ |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0022 U | 0.0007 J | 0.0071 | 0.0016 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-03 | ETSB-03 | ETSB-04 | ETSB-04 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/15/2026 | 01/15/2026 | 01/13/2026 | 01/13/2026 |
| | | | | | Sample Depth (bls): 10 - 12 ft | 14 - 16 ft | 2 - 6 in | 2 - 4 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 UT | 0.0013 UT |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 UT | 0.0013 UT |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.0016 | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 UJ | 0.0013 UJ |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.00089 J | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0047 U | 0.0054 U | 0.0063 U | 0.0065 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | **0.037** | 0.0071 | 0.014 | 0.018 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Bromoform | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0019 U | 0.0022 U | 0.0025 UT | 0.0026 UT |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.005 J+ | 0.0011 UT | 0.0013 UT | 0.0013 UT |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.00093 UT | 0.0011 UT | 0.0013 U | 0.0013 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-03 01/15/2026 10 - 12 ft N | ETSB-03 01/15/2026 14 - 16 ft N | ETSB-04 01/13/2026 2 - 6 in N | ETSB-04 01/13/2026 2 - 4 ft N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-03 | ETSB-03 | ETSB-04 | ETSB-04 |
| Sample Date: | | | | | 01/15/2026 | 01/15/2026 | 01/13/2026 | 01/13/2026 |
| Sample Depth (bls): | | | | | 10 - 12 ft | 14 - 16 ft | 2 - 6 in | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.00046 J | 0.0011 U | 0.0013 U | 0.0013 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.0018 | 0.0011 U | 0.0013 U | 0.0013 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0047 U | 0.0054 U | 0.0063 U | 0.0065 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0055 | 0.0054 U | 0.0063 U | 0.0065 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0047 U | 0.0054 U | 0.0063 U | 0.0065 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0019 U | 0.0022 U | 0.0025 UT | 0.0026 UT |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.00071 J | 0.0011 U | 0.0013 U | 0.0013 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.00093 UJ | 0.0011 UJ | 0.0013 U | 0.0013 U |
| Styrene | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.00067 J | 0.0011 U | 0.0013 U | 0.0013 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 UT | 0.0013 UT |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.00093 U | 0.0011 U | 0.0013 U | 0.0013 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.00093 U | 0.0011 UJ | 0.0013 U | 0.0013 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0025 | 0.0022 U | 0.0025 U | 0.0026 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-05 | Sample Date: 01/13/2026 | Sample Depth (bls): 2 - 6 in | Normal Sample or Field Duplicate: N | Sample Designation: ETSB-05 | Sample Date: 01/13/2026 | Sample Depth (bls): 2 - 4 ft | Normal Sample or Field Duplicate: N | Sample Designation: ETSB-06 | Sample Date: 01/20/2026 | Sample Depth (bls): 2 - 6 in | Normal Sample or Field Duplicate: N | Sample Designation: ETSB-06 | Sample Date: 01/20/2026 | Sample Depth (bls): 2 - 4 ft | Normal Sample or Field Duplicate: N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 UJ | | | | 0.00094 UJ | | | |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 UJ | | | | 0.00094 UJ | | | |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.001 UT | | | | 0.00086 UT | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.001 UT | | | | 0.00086 UT | | | | 0.001 UT | | | | 0.00094 UT | | | |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.001 UJ | | | | 0.00086 UJ | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0051 U | | | | 0.0043 U | | | | 0.0051 U | | | | 0.0047 U | | | |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.0093 | | | | 0.014 | | | | 0.0061 U | | | | 0.0064 | | | |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 UT | | | | 0.00094 UT | | | |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Bromoform | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 UT | | | | 0.00094 UT | | | |
| Bromomethane | -- | -- | -- | MG/KG | 0.0021 UT | | | | 0.0017 UT | | | | 0.002 UT | | | | 0.0019 UT | | | |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.001 UT | | | | 0.00086 UT | | | | 0.001 U | | | | 0.00094 U | | | |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Chloroethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Chloromethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 UJ | | | | 0.00094 UJ | | | |
| Cyclohexane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.001 U | | | | 0.00086 U | | | | 0.001 U | | | | 0.00094 U | | | |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-05 01/13/2026 2 - 6 in N | ETSB-05 01/13/2026 2 - 4 ft N | ETSB-06 01/20/2026 2 - 6 in N | ETSB-06 01/20/2026 2 - 4 ft N |
|---|---|---|---|---|---|---|---|---|
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0051 U | 0.0043 U | 0.0051 U | 0.0047 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0051 U | 0.0017 J | 0.0051 U | 0.0047 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0051 U | 0.0043 U | 0.0051 U | 0.0047 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0021 UT | 0.0017 UT | 0.002 U | 0.0011 J |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Styrene | -- | -- | -- | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.001 UT | 0.00086 UT | 0.001 U | 0.00094 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.001 U | 0.00086 U | 0.001 U | 0.00094 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0021 U | 0.0017 U | 0.002 U | 0.0019 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-06 01/20/2026 6 - 8 ft N | ETSB-06 01/20/2026 8 - 10 ft N | ETSB-06 01/20/2026 10 - 12 ft N | ETSB-07 01/12/2026 2 - 6 in N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 |
| Sample Date: | | | | | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/12/2026 |
| Sample Depth (bls): | | | | | 6 - 8 ft | 8 - 10 ft | 10 - 12 ft | 2 - 6 in |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.001 UJ | 0.0011 UJ | 0.0012 UJ | 0.00085 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 UT |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.001 UJ | 0.0011 UJ | 0.0012 UJ | 0.00085 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.001 UT | 0.0011 UT | 0.0012 UT | 0.00085 UT |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.005 U | 0.0053 U | 0.0058 U | 0.0042 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.006 U | 0.0064 U | 0.013 | 0.017 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.001 UT | 0.0011 UT | 0.0012 UT | 0.00085 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Bromoform | -- | -- | -- | MG/KG | 0.001 UT | 0.0011 UT | 0.0012 UT | 0.00085 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.002 UT | 0.0021 UT | 0.0023 UT | 0.0017 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 UT |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.001 UJ | 0.0011 UJ | 0.0012 UJ | 0.00085 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-06 01/20/2026 6 - 8 ft N | ETSB-06 01/20/2026 8 - 10 ft N | ETSB-06 01/20/2026 10 - 12 ft N | ETSB-07 01/12/2026 2 - 6 in N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 |
| Sample Date: | | | | | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/12/2026 |
| Sample Depth (bls): | | | | | 6 - 8 ft | 8 - 10 ft | 10 - 12 ft | 2 - 6 in |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.005 U | 0.0053 U | 0.0058 U | 0.0042 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.005 U | 0.0053 U | 0.0058 U | 0.0042 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.005 U | 0.0053 U | 0.0058 U | 0.0042 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.002 U | 0.0021 U | 0.0023 U | 0.0017 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Styrene | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 UT |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.001 U | 0.0011 U | 0.0012 U | 0.00085 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.002 U | 0.0021 U | 0.0023 U | 0.0017 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 |
| Sample Date: | | | | | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 6 - 8 ft | 6 - 8 ft | 9 - 11 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | FD | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.00084 UT | 0.00098 UT | 0.00095 UT | 0.001 UT |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.00084 UT | 0.00098 UT | 0.00095 UT | 0.001 UT |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0042 UJ | 0.0049 U | 0.0047 U | 0.005 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.013 | 0.0099 | 0.0079 | 0.01 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Bromoform | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0017 U | 0.002 U | 0.0019 U | 0.002 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.00084 UT | 0.00098 UT | 0.00095 UT | 0.001 UT |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 |
| | | | | | Sample Depth (bls): 2 - 4 ft | 6 - 8 ft | 6 - 8 ft | 9 - 11 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | FD | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0042 U | 0.0049 U | 0.0047 U | 0.005 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0042 U | 0.0049 U | 0.0047 U | 0.005 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0042 U | 0.0049 U | 0.0047 U | 0.005 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0017 U | 0.002 U | 0.0019 U | 0.002 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| Styrene | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.00084 UJ | 0.00098 U | 0.00095 U | 0.001 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.00084 UT | 0.00098 UT | 0.00095 UT | 0.001 UT |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.00084 U | 0.00098 U | 0.00095 U | 0.001 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0017 UJ | 0.002 U | 0.0019 U | 0.002 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-07 | ETSB-08 | ETSB-08 | ETSB-08 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-07 | ETSB-08 | ETSB-08 | ETSB-08 |
| Sample Date: | | | | | 01/12/2026 | 01/13/2026 | 01/13/2026 | 01/14/2026 |
| Sample Depth (bls): | | | | | 11.5 - 13.5 ft | 2 - 6 in | 2 - 4 ft | 5 - 7 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.00083 UT | 0.0013 U | 0.0012 U | 2.3 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.00083 U | 0.0013 UT | 0.0012 UT | 2.3 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.00083 UT | 0.0013 UT | 0.0012 UT | 2.3 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 UT |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | **420** |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 UJ | 0.0012 UJ | 2.3 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0041 U | 0.0066 U | 0.006 U | 12 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.005 U | 0.008 U | 0.01 | 12 U |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Bromoform | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0017 U | 0.0027 UT | 0.0024 UT | 2.3 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.00083 UT | 0.0013 UT | 0.0012 UT | 2.3 U |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-07 | ETSB-08 | ETSB-08 | ETSB-08 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-07 | ETSB-08 | ETSB-08 | ETSB-08 |
| Sample Date: | | | | | 01/12/2026 | 01/13/2026 | 01/13/2026 | 01/14/2026 |
| Sample Depth (bls): | | | | | 11.5 - 13.5 ft | 2 - 6 in | 2 - 4 ft | 5 - 7 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | **37** |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 14 |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | **0.75 J** |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0041 U | 0.0066 U | 0.006 U | 12 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0041 U | 0.0066 U | 0.006 U | 12 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0041 U | 0.0066 U | 0.006 U | 12 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 17 |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0017 U | 0.0027 UT | 0.0024 UT | 2.3 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | **35** |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | **62** |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 13 |
| Styrene | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.00083 UT | 0.0013 UT | 0.0012 UT | 2.3 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.00083 U | 0.0013 U | 0.0012 U | 2.3 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0017 U | 0.0027 U | 0.0024 U | **0.75 J** |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-08 | ETSB-09 | ETSB-09 | ETSB-09 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-08 | ETSB-09 | ETSB-09 | ETSB-09 |
| Sample Date: | | | | | 01/14/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 |
| Sample Depth (bls): | | | | | 8 - 10 ft | 2 - 6 in | 2 - 4 ft | 6 - 8 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.0077 | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.00037 J | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0051 U | 0.0046 U | 0.0043 U | 0.0042 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | **0.044** | 0.012 | 0.005 J | 0.007 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Bromoform | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.002 UT | 0.0018 U | 0.0017 U | 0.0017 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.0051 | 0.00091 UT | 0.00087 UT | 0.00083 UT |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.001 UT | 0.00091 UT | 0.00087 U | 0.00083 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.001 UT | 0.00091 U | 0.00087 U | 0.00083 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-08 | ETSB-09 | ETSB-09 | ETSB-09 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/14/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 |
| | | | | | Sample Depth (bls): 8 - 10 ft | 2 - 6 in | 2 - 4 ft | 6 - 8 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.0013 | 0.00091 U | 0.00087 U | 0.00083 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.0012 | 0.00091 U | 0.00087 U | 0.00083 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0051 U | 0.0046 U | 0.0043 U | 0.0042 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.012 | 0.0046 U | 0.0043 U | 0.0042 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0051 U | 0.0046 U | 0.0043 U | 0.0042 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.002 U | 0.0018 U | 0.0017 U | 0.0017 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.00046 J | 0.00091 U | 0.00087 U | 0.00083 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0011 | 0.00091 U | 0.00087 U | 0.00083 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.001 U | 0.00091 UJ | 0.00087 UJ | 0.00083 UJ |
| Styrene | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.001 U | 0.00091 U | 0.00087 U | 0.00083 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.001 UT | 0.00091 UJ | 0.00087 U | 0.00083 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0015 J | 0.0018 U | 0.0017 U | 0.0017 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-09 | ETSB-09 | ETSB-10 | ETSB-10 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/19/2026 | 01/19/2026 | 01/23/2026 | 01/23/2026 |
| | | | | | Sample Depth (bls): 10 - 12 ft | 12 - 14 ft | 2 - 6 in | 2 - 4 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 UT | 0.00086 UT |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 UT | 0.00086 UT |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0043 U | 0.0042 U | 0.0053 U | 0.0043 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.0051 U | 0.0076 | 0.0063 U | 0.0052 U |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Bromoform | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0017 U | 0.0017 U | 0.0021 U | 0.0017 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.00086 UT | 0.00084 UT | 0.0011 UT | 0.00086 UT |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-09 | ETSB-09 | ETSB-10 | ETSB-10 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/19/2026 | 01/19/2026 | 01/23/2026 | 01/23/2026 |
| | | | | | Sample Depth (bls): 10 - 12 ft | 12 - 14 ft | 2 - 6 in | 2 - 4 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 UT | 0.00086 UT |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0043 U | 0.0042 U | 0.0053 U | 0.0043 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0043 U | 0.0042 U | 0.0053 U | 0.0043 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0043 U | 0.0042 U | 0.0053 U | 0.0043 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0017 U | 0.0017 U | 0.0021 U | 0.0017 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.00086 UJ | 0.00084 UJ | 0.0011 UJ | 0.00086 UJ |
| Styrene | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 UT | 0.00086 UT |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.00086 U | 0.00084 U | 0.0011 U | 0.00086 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0017 U | 0.0017 U | 0.0021 U | 0.0017 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-10 | ETSB-11 | ETSB-11 | ETSB-11 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-10 | ETSB-11 | ETSB-11 | ETSB-11 |
| Sample Date: | | | | | 01/23/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
| Sample Depth (bls): | | | | | 11 - 13 ft | 2 - 6 in | 2 - 4 ft | 14 - 16 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.00099 UT | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.00099 UT | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0049 U | 0.0043 U | 0.0048 U | 0.0042 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.0059 | 0.0073 | 0.0079 | 0.0085 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Bromoform | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.002 U | 0.0017 U | 0.0019 U | 0.0017 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.00099 UT | 0.00086 U | 0.00096 U | 0.00085 U |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-10 | ETSB-11 | ETSB-11 | ETSB-11 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/23/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
| | | | | | Sample Depth (bls): 11 - 13 ft | 2 - 6 in | 2 - 4 ft | 14 - 16 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.00099 UT | 0.00086 U | 0.00096 U | 0.00085 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0049 U | 0.0043 U | 0.0048 U | 0.0042 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0049 U | 0.0043 U | 0.0048 U | 0.0042 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0049 U | 0.0043 U | 0.0048 U | 0.0042 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.002 U | 0.0017 U | 0.0019 U | 0.0017 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.00099 UJ | 0.00086 UJ | 0.00096 UJ | 0.00085 UJ |
| Styrene | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.00099 UT | 0.00086 U | 0.00096 U | 0.00085 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.00099 U | 0.00086 U | 0.00096 U | 0.00085 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.00099 U | 0.00086 UJ | 0.00096 UJ | 0.00085 UJ |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.002 U | 0.0017 U | 0.0019 U | 0.0017 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: RX-3 | RX-3 | RX-4 | RX-4 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| | | | | | Sample Depth (bls): 0 - 2 ft | 12 - 14 ft | 0 - 2 ft | 11 - 13 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0054 U | 0.0078 U | 0.005 U | 0.0053 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.0065 U | 0.0094 U | 0.006 U | 0.0064 U |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Bromoform | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0022 U | 0.0031 U | 0.002 U | 0.0021 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-3 | RX-3 | RX-4 | RX-4 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-3 | RX-3 | RX-4 | RX-4 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft | 11 - 13 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0054 U | 0.0078 U | 0.005 U | 0.0053 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0054 U | 0.0078 U | 0.005 U | 0.0053 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0054 U | 0.0078 U | 0.005 U | 0.0053 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0022 U | 0.0031 U | 0.002 U | 0.0021 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Styrene | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.0011 U | 0.0016 U | 0.001 U | 0.0011 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0022 U | 0.0031 U | 0.002 U | 0.0021 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-5 | RX-5 | RX-6 | RX-6 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-5 | RX-5 | RX-6 | RX-6 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 10 - 12 ft | 0 - 2 ft | 12 - 14 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.0007 J | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.029 | 0.0012 U | 0.001 U | 0.0012 U |
| 2-Hexanone | -- | -- | -- | MG/KG | 0.0065 U | 0.0059 U | 0.0052 U | 0.0059 U |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | **0.035** | 0.0071 U | 0.0063 U | 0.0071 U |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Bromochloromethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Bromodichloromethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Bromoform | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Bromomethane | -- | -- | -- | MG/KG | 0.0026 U | 0.0024 U | 0.0021 U | 0.0024 U |
| Carbon Disulfide | -- | -- | -- | MG/KG | 0.0039 | 0.0012 U | 0.001 U | 0.0012 U |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.0013 | 0.0012 U | 0.001 U | 0.0012 U |
| Chloroethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Chloromethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Cyclohexane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Dibromochloromethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-5 | RX-5 | RX-6 | RX-6 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-5 | RX-5 | RX-6 | RX-6 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 10 - 12 ft | 0 - 2 ft | 12 - 14 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.00023 J | 0.0012 U | 0.001 U | 0.0012 U |
| Methyl Acetate | -- | -- | -- | MG/KG | 0.0065 U | 0.0059 U | 0.0052 U | 0.0059 U |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0065 U | 0.0059 U | 0.0052 U | 0.0059 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | 0.0065 U | 0.0059 U | 0.0052 U | 0.0059 U |
| Methylcyclohexane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0026 U | 0.0024 U | 0.0021 U | 0.0024 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.00091 J | 0.0012 U | 0.001 U | 0.0012 U |
| Styrene | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.0013 U | 0.0012 U | 0.001 U | 0.0012 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.00023 J | 0.0024 U | 0.0021 U | 0.0024 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-18 | RX-19 | RX-20 | RX-21 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-18 | RX-19 | RX-20 | RX-21 |
| Sample Date: | | | | | 02/15/2024 | 02/15/2024 | 02/15/2024 | 02/15/2024 |
| Sample Depth (bls): | | | | | 3 - 4 ft | 3 - 5 ft | 6 - 8 ft | 10 - 12 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | **9.6** | 0.0004 J | 0.0015 U | 0.0015 U |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.63 | 0.0012 U | 0.0015 U | 0.0015 U |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| 2-Hexanone | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.58 U | 0.011 | 0.0091 U | 0.0087 U |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Bromochloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bromodichloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bromoform | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bromomethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbon Disulfide | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Chloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Chloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Cyclohexane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Dibromochloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-18 | RX-19 | RX-20 | RX-21 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-18 | RX-19 | RX-20 | RX-21 |
| Sample Date: | | | | | 02/15/2024 | 02/15/2024 | 02/15/2024 | 02/15/2024 |
| Sample Depth (bls): | | | | | 3 - 4 ft | 3 - 5 ft | 6 - 8 ft | 10 - 12 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.24 | 0.0012 U | 0.0015 U | 0.0015 U |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | 0.19 | 0.0012 U | 0.0015 U | 0.0015 U |
| Methyl Acetate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.58 U | 0.006 U | 0.0076 U | 0.0073 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Methylcyclohexane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.12 U | 0.0024 U | 0.003 U | 0.0029 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 3 | 0.0012 U | 0.0015 U | 0.0015 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 2.6 | 0.0012 U | 0.0015 U | 0.0015 U |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 1.1 | 0.0012 U | 0.0015 U | 0.0015 U |
| Styrene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.07 J | 0.0012 U | 0.0015 U | 0.0015 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.12 U | 0.0012 U | 0.0015 U | 0.0015 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.19 J | 0.0024 U | 0.003 U | 0.0029 U |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-22 | RX-23 | RX-23 | RX-24 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-22 | RX-23 | RX-23 | RX-24 |
| Sample Date: | | | | | 09/05/2024 | 09/06/2024 | 09/06/2024 | 09/06/2024 |
| Sample Depth (bls): | | | | | 5 - 6 ft | 5 - 7 ft | 10 - 12 ft | 7 - 8 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.00046 J | 0.0067 | 0.0007 J | 0.11 |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.0012 U | 0.00063 J | 0.0011 U | 0.038 |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.00029 J | 0.00097 U | 0.0011 U | 0.0011 U |
| 2-Hexanone | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | **0.1** | **0.043** | **0.18** | 0.023 |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.0012 U | 0.00097 U | 0.00041 J | 0.00035 J |
| Bromochloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bromodichloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bromoform | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bromomethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbon Disulfide | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Chloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Chloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Cyclohexane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Dibromochloromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-22 | RX-23 | RX-23 | RX-24 |
| | | | | Sample Date: | 09/05/2024 | 09/06/2024 | 09/06/2024 | 09/06/2024 |
| | | | | Sample Depth (bls): | 5 - 6 ft | 5 - 7 ft | 10 - 12 ft | 7 - 8 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.0012 U | 0.0011 | 0.0011 U | 0.014 |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | NA | NA | NA | NA |
| Methyl Acetate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.013 | 0.0074 | 0.046 | 0.0031 J |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Methylcyclohexane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0023 U | 0.0019 U | 0.0022 U | 0.0023 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.0012 U | 0.0012 | 0.0011 U | 0.0047 |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0012 U | 0.00088 J | 0.0011 U | 0.011 |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | NA | NA | NA | NA |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.001 J | 0.0015 | 0.00076 J | 0.0028 |
| Styrene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.0012 U | 0.00028 J | 0.0011 U | 0.0011 U |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.0012 U | 0.0003 J | 0.00027 J | 0.00034 J |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.0012 U | 0.00097 U | 0.0011 U | 0.0011 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.0012 U | 0.00097 UT | 0.0011 UT | 0.0011 UT |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0023 U | 0.00033 J | 0.00023 J | 0.075 |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: RX-24<br>Sample Date: 09/06/2024<br>Sample Depth (bls): 14 - 15 ft<br>Normal Sample or Field Duplicate: N | Sample Designation: RX-25<br>Sample Date: 09/06/2024<br>Sample Depth (bls): 3 - 5 ft<br>Normal Sample or Field Duplicate: N |
|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane (TCA) | 0.68 | 100 | 0.68 | MG/KG | 0.00095 U | 0.0011 U |
| 1,1,2,2-Tetrachloroethane | -- | -- | -- | MG/KG | NA | NA |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | -- | -- | -- | MG/KG | NA | NA |
| 1,1,2-Trichloroethane | -- | -- | -- | MG/KG | NA | NA |
| 1,1-Dichloroethane | 0.27 | 47 | 0.27 | MG/KG | 0.00095 U | 0.0011 U |
| 1,1-Dichloroethene | 0.24 | 0.98 | 0.33 | MG/KG | 0.00095 U | 0.0011 UT |
| 1,2,3-Trichlorobenzene | -- | -- | -- | MG/KG | NA | NA |
| 1,2,4-Trichlorobenzene | -- | -- | -- | MG/KG | NA | NA |
| 1,2,4-Trimethylbenzene | **5.9** | 100 | 5.9 | MG/KG | 0.00042 J | 0.0012 |
| 1,2-Dibromo-3-Chloropropane | -- | -- | -- | MG/KG | NA | NA |
| 1,2-Dibromoethane (Ethylene Dibromide) | -- | -- | -- | MG/KG | NA | NA |
| 1,2-Dichlorobenzene | 1.1 | 100 | 1.1 | MG/KG | 0.00095 U | 0.0011 U |
| 1,2-Dichloroethane | 0.02 | 5.8 | 0.02 | MG/KG | 0.00095 U | 0.0011 U |
| 1,2-Dichloropropane | -- | -- | -- | MG/KG | NA | NA |
| 1,3,5-Trimethylbenzene (Mesitylene) | 3.1 | 100 | 3.1 | MG/KG | 0.00095 U | 0.00042 J |
| 1,3-Dichlorobenzene | 2.6 | 38 | 2.6 | MG/KG | 0.00095 U | 0.0011 U |
| 1,4-Dichlorobenzene | 1.8 | 24 | 1.8 | MG/KG | 0.00095 U | 0.00037 J |
| 2-Hexanone | -- | -- | -- | MG/KG | NA | NA |
| Acetone | **0.03** | 100 | 0.03 | MG/KG | 0.021 | **0.038** |
| Benzene | 0.06 | 3.7 | 0.06 | MG/KG | 0.00095 U | 0.0011 U |
| Bromochloromethane | -- | -- | -- | MG/KG | NA | NA |
| Bromodichloromethane | -- | -- | -- | MG/KG | NA | NA |
| Bromoform | -- | -- | -- | MG/KG | NA | NA |
| Bromomethane | -- | -- | -- | MG/KG | NA | NA |
| Carbon Disulfide | -- | -- | -- | MG/KG | NA | NA |
| Carbon Tetrachloride | 0.76 | 7.1 | 0.76 | MG/KG | 0.00095 U | 0.0011 U |
| Chlorobenzene | 4.5 | 100 | 4.5 | MG/KG | 0.00095 U | 0.0011 U |
| Chloroethane | -- | -- | -- | MG/KG | NA | NA |
| Chloroform | 0.37 | 24 | 0.37 | MG/KG | 0.00095 U | 0.0011 U |
| Chloromethane | -- | -- | -- | MG/KG | NA | NA |
| Cis-1,2-Dichloroethylene | 0.19 | 41 | 0.19 | MG/KG | 0.00095 U | 0.0011 U |
| Cis-1,3-Dichloropropene | -- | -- | -- | MG/KG | NA | NA |
| Cyclohexane | -- | -- | -- | MG/KG | NA | NA |
| Dibromochloromethane | -- | -- | -- | MG/KG | NA | NA |

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**Table 1. Summary of Volatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: RX-24 | Sample Designation: RX-25 |
|---|---|---|---|---|---|---|
| | | | | | Sample Date: 09/06/2024 | Sample Date: 09/06/2024 |
| | | | | | Sample Depth (bls): 14 - 15 ft | Sample Depth (bls): 3 - 5 ft |
| | | | | | Normal Sample or Field Duplicate: N | Normal Sample or Field Duplicate: N |
| Dichlorodifluoromethane | -- | -- | -- | MG/KG | NA | NA |
| Ethylbenzene | **1** | 76 | 1 | MG/KG | 0.00095 U | 0.00035 J |
| Isopropylbenzene (Cumene) | -- | -- | -- | MG/KG | NA | NA |
| m,p-Xylene | **0.26** | 100 | 1.2 | MG/KG | NA | NA |
| Methyl Acetate | -- | -- | -- | MG/KG | NA | NA |
| Methyl Ethyl Ketone (2-Butanone) | 0.1 | 100 | 0.1 | MG/KG | 0.0021 J | 0.0045 J |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | -- | -- | MG/KG | NA | NA |
| Methylcyclohexane | -- | -- | -- | MG/KG | NA | NA |
| Methylene Chloride | 0.05 | 81 | 0.05 | MG/KG | 0.0019 U | 0.0021 U |
| N-Butylbenzene | **18** | 100 | 18 | MG/KG | 0.0067 | 0.0011 U |
| N-Propylbenzene | **5** | 100 | 5 | MG/KG | 0.0025 | 0.0006 J |
| O-Xylene (1,2-Dimethylbenzene) | 0.26 | 100 | 1.2 | MG/KG | NA | NA |
| Sec-Butylbenzene | 25 | 100 | 25 | MG/KG | 0.00095 U | 0.0032 |
| Styrene | -- | -- | -- | MG/KG | NA | NA |
| T-Butylbenzene | 11 | 100 | 11 | MG/KG | 0.00095 U | 0.00054 J |
| Tert-Butyl Methyl Ether | 0.1 | 100 | 0.1 | MG/KG | 0.00095 U | 0.0011 U |
| Tetrachloroethylene (PCE) | 1.3 | 18 | 1.3 | MG/KG | 0.00095 U | 0.0011 U |
| Toluene | 0.7 | 100 | 0.7 | MG/KG | 0.00095 U | 0.0011 U |
| Trans-1,2-Dichloroethene | 0.19 | 100 | 0.19 | MG/KG | 0.00095 U | 0.0011 U |
| Trans-1,3-Dichloropropene | -- | -- | -- | MG/KG | NA | NA |
| Trichloroethylene (TCE) | 0.47 | 6.4 | 0.47 | MG/KG | 0.00095 U | 0.0011 U |
| Trichlorofluoromethane | -- | -- | -- | MG/KG | NA | NA |
| Vinyl Chloride | 0.03 | 0.48 | 0.03 | MG/KG | 0.00095 UT | 0.0011 U |
| Xylenes | **0.26** | 100 | 1.2 | MG/KG | 0.0019 U | 0.00024 J |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-01 01/14/2026 0 - 2 in N | ETSB-01 01/14/2026 2 - 4 ft N | ETSB-01 01/14/2026 2 - 4 ft FD | ETSB-01 01/14/2026 6 - 8 ft N |
|---|---|---|---|---|---|---|---|---|
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.072 | 0.033 | 0.036 | 0.033 U |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.069 | 0.025 J | 0.026 J | 0.033 U |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.082 | 0.032 J | 0.032 J | 0.033 U |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.05 J | 0.017 J | 0.017 J | 0.33 U |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.036 | 0.013 J | 0.019 J | 0.033 U |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.035 U | 0.033 U | 0.033 U | 0.033 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Carbazole | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.076 J | 0.027 J | 0.038 J | 0.33 U |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.035 U | 0.033 U | 0.033 U | 0.033 U |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.13 J | 0.05 J | 0.059 J | 0.33 U |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.035 U | 0.033 U | 0.033 U | 0.033 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.067 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.35 UJ | 0.33 UJ | 0.33 UJ | 0.33 UJ |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.035 U | 0.033 U | 0.033 U | 0.033 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.069 | 0.036 | 0.038 | 0.033 U |
| Isophorone | -- | -- | -- | MG/KG | 0.14 U | 0.13 U | 0.13 U | 0.13 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.035 U | 0.033 U | 0.033 U | 0.033 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.035 U | 0.033 U | 0.033 U | 0.033 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.28 U | 0.27 U | 0.27 U | 0.27 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample Designation: | | ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 |
| | | | Sample Date: | | 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 |
| | | | Sample Depth (bls): | | 0 - 2 in | 2 - 4 ft | 2 - 4 ft | 6 - 8 ft |
| | | | Normal Sample or Field Duplicate: | | N | N | FD | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.06 J | 0.032 J | 0.022 J | 0.33 U |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.33 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.11 J | 0.045 J | 0.052 J | 0.01 J |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-01<br>Sample Date: 01/14/2026<br>Sample Depth (bls): 9 - 11 ft<br>Normal Sample or Field Duplicate: N | ETSB-02<br>01/16/2026<br>0 - 2 in<br>N | ETSB-02<br>01/16/2026<br>2 - 4 ft<br>N | ETSB-02<br>01/16/2026<br>12 - 14 ft<br>N |
|---|---|---|---|---|---|---|---|---|
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.033 U | 0.073 | 0.033 U | 0.033 U |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.033 U | 0.066 | 0.033 U | 0.033 U |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.033 U | 0.08 | 0.033 U | 0.033 U |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.33 U | 0.05 J | 0.33 UJ | 0.33 U |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.033 U | 0.028 J | 0.033 U | 0.033 U |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.033 U | 0.035 U | 0.033 U | 0.033 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Carbazole | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.33 U | 0.072 J | 0.33 U | 0.33 U |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.033 U | 0.035 U | 0.033 U | 0.033 U |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.33 U | 0.13 J | 0.33 U | 0.33 U |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.33 U | 0.018 J | 0.33 U | 0.33 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.033 U | 0.035 U | 0.033 U | 0.033 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.067 U | 0.071 U | 0.067 U | 0.066 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.33 UJ | 0.35 U | 0.33 U | 0.33 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.033 U | 0.035 U | 0.033 U | 0.033 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.033 U | 0.05 | 0.033 U | 0.033 U |
| Isophorone | -- | -- | -- | MG/KG | 0.13 U | 0.14 U | 0.13 U | 0.13 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.33 U | 0.0081 J | 0.33 U | 0.33 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.033 U | 0.035 U | 0.033 U | 0.033 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.033 U | 0.035 U | 0.033 U | 0.033 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.28 U | 0.27 U | 0.26 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-01 | ETSB-02 | ETSB-02 | ETSB-02 |
| | | | | Sample Date: | 01/14/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 |
| | | | | Sample Depth (bls): | 9 - 11 ft | 0 - 2 in | 2 - 4 ft | 12 - 14 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.33 U | 0.11 J | 0.33 U | 0.33 U |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.35 U | 0.33 U | 0.33 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.33 U | 0.14 J | 0.33 U | 0.33 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-02 01/16/2026 12 - 14 ft FD | ETSB-03 01/15/2026 0 - 2 in N | ETSB-03 01/15/2026 2 - 4 ft N | ETSB-03 01/15/2026 6 - 8 ft N |
|---|---|---|---|---|---|---|---|---|
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.033 U | 0.18 | **31** | 0.033 U |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.0094 J | 0.19 | **24** | 0.033 U |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.013 J | 0.28 | **33** | 0.033 U |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.33 U | 0.15 J | **15** | 0.33 U |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.033 U | 0.094 | **12** | 0.033 U |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.024 J | 0.33 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.066 J | 0.33 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.033 U | 0.041 U | 0.033 U | 0.033 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.062 J | 0.21 J | 0.33 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.33 U | 0.41 UT | 0.33 UT | 0.33 UT |
| Carbazole | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 1.4 | 0.33 U |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.33 U | 0.2 J | **30** | 0.33 U |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.033 U | 0.034 J | **4.7** | 0.033 U |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.33 U | 0.41 U | 1.5 | 0.33 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.33 U | 0.35 J | 66 | 0.33 U |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.33 U | 0.41 U | 3.9 | 0.33 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.033 U | 0.041 U | 0.033 U | 0.033 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.067 U | 0.083 U | 0.068 U | 0.068 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.033 U | 0.041 U | 0.033 U | 0.033 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.033 U | 0.15 | **17** | 0.033 U |
| Isophorone | -- | -- | -- | MG/KG | 0.13 U | 0.16 U | 0.13 U | 0.13 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.33 U | 0.41 U | 0.059 J | 0.33 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.033 U | 0.041 U | 0.033 U | 0.033 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.033 U | 0.041 U | 0.033 U | 0.033 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.33 U | 0.27 U | 0.27 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-02 | ETSB-03 | ETSB-03 | ETSB-03 |
| | | | | Sample Date: | 01/16/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
| | | | | Sample Depth (bls): | 12 - 14 ft | 0 - 2 in | 2 - 4 ft | 6 - 8 ft |
| | | | | Normal Sample or Field Duplicate: | FD | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.33 U | 0.12 J | **43** | 0.33 U |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.41 U | 0.33 U | 0.33 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.012 J | 0.32 J | 51 | 0.33 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-03 01/15/2026 10 - 12 ft N | ETSB-03 01/15/2026 14 - 16 ft N | ETSB-04 01/13/2026 0 - 2 in N | ETSB-04 01/13/2026 2 - 4 ft N |
|---|---|---|---|---|---|---|---|---|
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.037 U | 0.035 U | 0.66 | 0.057 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.021 J | 0.035 U | 0.66 | 0.051 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.029 J | 0.035 U | 1 | 0.075 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.016 J | 0.35 U | 0.32 J | 0.04 J |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.01 J | 0.035 U | 0.38 | 0.031 J |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.025 J | 0.34 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.037 U | 0.035 U | 0.036 U | 0.034 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.37 UT | 0.35 UT | 0.36 U | 0.34 U |
| Carbazole | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.084 J | 0.34 U |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.019 J | 0.35 U | 0.82 | 0.069 J |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.037 U | 0.035 U | 0.081 | 0.034 U |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.37 U | 0.35 U | 0.039 J | 0.34 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.038 J | 0.35 U | 2.1 | 0.14 J |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.37 U | 0.35 U | 0.1 J | 0.34 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.037 U | 0.035 U | 0.036 U | 0.034 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.074 U | 0.071 U | 0.073 U | 0.069 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.037 U | 0.035 U | 0.036 U | 0.034 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.016 J | 0.035 U | 0.31 | 0.04 |
| Isophorone | -- | -- | -- | MG/KG | 0.15 U | 0.14 U | 0.14 U | 0.14 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.037 U | 0.035 U | 0.036 U | 0.034 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.037 U | 0.035 U | 0.036 U | 0.034 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.3 U | 0.28 U | 0.29 U | 0.27 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-03 | ETSB-03 | ETSB-04 | ETSB-04 |
| | | | | Sample Date: | 01/15/2026 | 01/15/2026 | 01/13/2026 | 01/13/2026 |
| | | | | Sample Depth (bls): | 10 - 12 ft | 14 - 16 ft | 0 - 2 in | 2 - 4 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.017 J | 0.35 U | 1 | 0.075 J |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.37 U | 0.35 U | 0.36 U | 0.34 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.036 J | 0.35 U | 1.4 | 0.12 J |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-05 01/13/2026 0 - 2 in N | ETSB-05 01/13/2026 2 - 4 ft N | ETSB-06 01/20/2026 0 - 2 in N | ETSB-06 01/20/2026 2 - 4 ft N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-05 | ETSB-05 | ETSB-06 | ETSB-06 |
| Sample Date: | | | | | 01/13/2026 | 01/13/2026 | 01/20/2026 | 01/20/2026 |
| Sample Depth (bls): | | | | | 0 - 2 in | 2 - 4 ft | 0 - 2 in | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.036 U | 0.13 | **6.1** | 0.36 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.036 U | 0.12 | **5.7** | 0.4 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.036 U | 0.16 | **6.3** | 0.55 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.36 U | 0.083 J | **3.2** | 0.25 J |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.036 U | 0.06 | **2.9** | 0.2 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.042 J | 0.34 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.013 J | 0.34 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.036 U | 0.033 U | 0.035 U | 0.034 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.22 J | 0.085 J |
| Caprolactam | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Carbazole | -- | -- | -- | MG/KG | 0.36 U | 0.03 J | 0.43 | 0.032 J |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.36 U | 0.13 J | **6.9** | 0.39 |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.036 U | 0.023 J | **0.84** | 0.059 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.36 U | 0.015 J | 0.15 J | 0.34 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.1 J | 0.34 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.36 U | 0.27 J | 11 | 0.66 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.36 U | 0.018 J | 0.36 | 0.013 J |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.036 U | 0.033 U | 0.035 U | 0.034 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.073 U | 0.067 U | 0.07 U | 0.069 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.036 U | 0.033 U | 0.035 U | 0.034 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.036 U | 0.091 | **3.4** | 0.24 |
| Isophorone | -- | -- | -- | MG/KG | 0.14 U | 0.13 U | 0.14 U | 0.14 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.36 U | 0.023 J | 0.029 J | 0.015 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.036 U | 0.033 U | 0.035 U | 0.034 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.036 U | 0.033 U | 0.035 U | 0.034 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.29 U | 0.27 U | 0.28 U | 0.28 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-05 | ETSB-05 | ETSB-06 | ETSB-06 |
| | | | | Sample Date: | 01/13/2026 | 01/13/2026 | 01/20/2026 | 01/20/2026 |
| | | | | Sample Depth (bls): | 0 - 2 in | 2 - 4 ft | 0 - 2 in | 2 - 4 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.36 U | 0.24 J | **6.7** | 0.28 J |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.33 U | 0.35 U | 0.34 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.014 J | 0.24 J | 7.7 | 0.6 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-06 01/20/2026 6 - 8 ft N | ETSB-06 01/20/2026 8 - 10 ft N | ETSB-06 01/20/2026 10 - 12 ft N | ETSB-07 01/12/2026 0 - 2 in N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 |
| Sample Date: | | | | | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/12/2026 |
| Sample Depth (bls): | | | | | 6 - 8 ft | 8 - 10 ft | 10 - 12 ft | 0 - 2 in |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.061 | 0.033 U | 0.033 U | 0.24 J |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.057 | 0.033 U | 0.033 U | 0.33 J |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.085 | 0.033 U | 0.033 U | 0.42 J |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.04 J | 0.33 U | 0.33 U | 0.25 J |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.03 J | 0.033 U | 0.033 U | 0.16 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 UJ |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 UJ |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.036 UJ |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 UJ |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Carbazole | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.018 J |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.065 J | 0.33 U | 0.33 U | 0.25 J |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.056 J |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 UJ |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.099 J | 0.33 U | 0.33 U | 0.37 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.011 J |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.036 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 UJ |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 UJ |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.036 UJ |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.036 | 0.033 U | 0.033 U | 0.25 J |
| Isophorone | -- | -- | -- | MG/KG | 0.14 U | 0.13 U | 0.13 U | 0.14 UJ |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.023 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.036 UJ |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.036 UJ |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.27 U | 0.27 U | 0.29 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 |
| | | | | Sample Date: | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/12/2026 |
| | | | | Sample Depth (bls): | 6 - 8 ft | 8 - 10 ft | 10 - 12 ft | 0 - 2 in |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.044 J | 0.33 U | 0.33 U | 0.15 J |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.36 UJ |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.092 J | 0.33 U | 0.33 U | 0.37 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 |
| Sample Date: | | | | | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 6 - 8 ft | 6 - 8 ft | 9 - 11 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | FD | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.028 J | 0.033 U | 0.033 U | 0.033 U |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.02 J | 0.033 U | 0.033 U | 0.033 U |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.025 J | 0.0085 J | 0.033 U | 0.033 U |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.014 J | 0.33 U | 0.33 U | 0.33 U |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.012 J | 0.033 U | 0.033 U | 0.033 U |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.033 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Carbazole | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.024 J | 0.33 U | 0.33 U | 0.33 U |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.033 U |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.038 J | 0.018 J | 0.33 U | 0.33 U |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.033 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.34 UJ | 0.33 UJ | 0.33 UJ | 0.33 UJ |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.033 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.037 | 0.028 J | 0.033 U | 0.033 U |
| Isophorone | -- | -- | -- | MG/KG | 0.14 U | 0.13 U | 0.13 U | 0.13 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.033 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.034 U | 0.033 U | 0.033 U | 0.033 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.27 U | 0.27 U | 0.27 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 |
| | | | | Sample Date: | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 |
| | | | | Sample Depth (bls): | 2 - 4 ft | 6 - 8 ft | 6 - 8 ft | 9 - 11 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | FD | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.016 J | 0.013 J | 0.33 U | 0.33 U |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.34 U | 0.33 U | 0.33 U | 0.33 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.031 J | 0.017 J | 0.33 U | 0.33 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-07 | ETSB-08 | ETSB-08 | ETSB-08 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/12/2026 | 01/13/2026 | 01/13/2026 | 01/14/2026 |
| | | | | | Sample Depth (bls): 11.5 - 13.5 ft | 0 - 2 in | 2 - 4 ft | 5 - 7 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.68 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.55 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.033 U | 0.014 J | 0.034 U | 0.73 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.36 |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.31 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.56 |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.035 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.66 |
| Caprolactam | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Carbazole | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.11 J |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.62 |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.1 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.36 |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.07 J |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.33 U | 0.017 J | 0.34 U | 1.9 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.82 |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.035 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.067 U | 0.078 U | 0.068 U | 0.072 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.33 UJ | 0.38 U | 0.34 U | 0.35 UJ |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.035 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.37 |
| Isophorone | -- | -- | -- | MG/KG | 0.13 U | 0.16 U | 0.14 U | 0.14 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.035 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.033 U | 0.038 U | 0.034 U | 0.035 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.31 U | 0.27 U | 0.28 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample Designation: | | ETSB-07 | ETSB-08 | ETSB-08 | ETSB-08 |
| | | | Sample Date: | | 01/12/2026 | 01/13/2026 | 01/13/2026 | 01/14/2026 |
| | | | Sample Depth (bls): | | 11.5 - 13.5 ft | 0 - 2 in | 2 - 4 ft | 5 - 7 ft |
| | | | Normal Sample or Field Duplicate: | | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.33 U | 0.38 U | 0.34 U | **2.9** |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.38 U | 0.34 U | 0.35 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.33 U | 0.018 J | 0.34 U | 1.5 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-09 | ETSB-09 | ETSB-09 | ETSB-09 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 |
| | | | | | Sample Depth (bls): 0 - 2 in | 2 - 4 ft | 6 - 8 ft | 10 - 12 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | **3.2** | 0.045 | 0.034 U | 0.033 U |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | **4.1** | 0.051 | 0.034 U | 0.033 U |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | **6.1** | 0.072 | 0.034 U | 0.033 U |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | **2.5** | 0.052 J | 0.34 U | 0.33 U |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | **2.2** | 0.027 J | 0.034 U | 0.033 U |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.018 J | 0.35 U | 0.34 U | 0.33 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.036 U | 0.035 U | 0.034 U | 0.033 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.065 J | 0.35 U | 0.34 U | 0.33 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Carbazole | -- | -- | -- | MG/KG | 0.12 J | 0.35 U | 0.34 U | 0.33 U |
| Chrysene | **1** | 4.9 | 1 | MG/KG | **3.6** | 0.042 J | 0.34 U | 0.33 U |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | **0.6** | 0.035 U | 0.034 U | 0.033 U |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.13 J | 0.35 U | 0.34 U | 0.33 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 5.6 | 0.057 J | 0.34 U | 0.012 J |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.26 J | 0.35 U | 0.34 U | 0.33 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.036 U | 0.035 U | 0.034 U | 0.033 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.073 U | 0.071 U | 0.07 U | 0.067 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.036 U | 0.035 U | 0.034 U | 0.033 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | **2.5** | 0.047 | 0.034 U | 0.033 U |
| Isophorone | -- | -- | -- | MG/KG | 0.14 U | 0.14 U | 0.14 U | 0.13 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.19 J | 0.0088 J | 0.0073 J | 0.33 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.036 U | 0.035 U | 0.034 U | 0.033 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.036 U | 0.035 U | 0.034 U | 0.033 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.29 U | 0.28 U | 0.28 U | 0.27 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-09 | ETSB-09 | ETSB-09 | ETSB-09 |
| | | | | Sample Date: | 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 |
| | | | | Sample Depth (bls): | 0 - 2 in | 2 - 4 ft | 6 - 8 ft | 10 - 12 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | **1.6** | 0.021 J | 0.34 U | 0.33 U |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.35 U | 0.34 U | 0.33 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 5 | 0.062 J | 0.34 U | 0.01 J |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-09 | ETSB-10 | ETSB-10 | ETSB-10 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/19/2026 | 01/23/2026 | 01/23/2026 | 01/23/2026 |
| | | | | | Sample Depth (bls): 12 - 14 ft | 0 - 2 in | 2 - 4 ft | 11 - 13 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.033 U | 0.5 | 0.11 | 0.033 U |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.033 U | 0.64 | 0.13 | 0.033 U |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.033 U | 0.88 | 0.17 | 0.033 U |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.33 U | 0.4 | 0.1 J | 0.33 U |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.033 U | 0.41 | 0.066 | 0.033 U |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.042 J | 0.35 U | 0.33 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.033 U | 0.037 U | 0.035 U | 0.033 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.14 J | 0.35 U | 0.33 U |
| Caprolactam | -- | -- | -- | MG/KG | 0.33 U | 0.37 UT | 0.35 UT | 0.33 UT |
| Carbazole | -- | -- | -- | MG/KG | 0.33 U | 0.055 J | 0.014 J | 0.33 U |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.33 U | 0.61 | 0.14 J | 0.33 U |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.026 J | 0.35 U | 0.33 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.033 U | 0.1 | 0.018 J | 0.033 U |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.33 U | 0.98 | 0.23 J | 0.33 U |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.33 U | 0.021 J | 0.35 U | 0.33 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.033 U | 0.037 U | 0.035 U | 0.033 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.068 U | 0.075 U | 0.07 U | 0.068 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.033 U | 0.037 U | 0.035 U | 0.033 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.033 U | 0.43 | 0.12 | 0.033 U |
| Isophorone | -- | -- | -- | MG/KG | 0.13 U | 0.15 U | 0.14 U | 0.13 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.33 U | 0.017 J | 0.35 U | 0.33 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.033 U | 0.037 U | 0.035 U | 0.033 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.033 U | 0.037 U | 0.035 U | 0.033 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.3 U | 0.28 U | 0.27 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-09 | ETSB-10 | ETSB-10 | ETSB-10 |
| | | | | Sample Date: | 01/19/2026 | 01/23/2026 | 01/23/2026 | 01/23/2026 |
| | | | | Sample Depth (bls): | 12 - 14 ft | 0 - 2 in | 2 - 4 ft | 11 - 13 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.33 U | 0.35 J | 0.1 J | 0.33 U |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.37 U | 0.35 U | 0.33 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.33 U | 0.81 | 0.19 J | 0.33 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-11 01/15/2026 0 - 2 in N | ETSB-11 01/15/2026 2 - 4 ft N | ETSB-11 01/15/2026 14 - 16 ft N | RX-3 05/31/2022 0 - 2 ft N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-11 | ETSB-11 | ETSB-11 | RX-3 |
| Sample Date: | | | | | 01/15/2026 | 01/15/2026 | 01/15/2026 | 05/31/2022 |
| Sample Depth (bls): | | | | | 0 - 2 in | 2 - 4 ft | 14 - 16 ft | 0 - 2 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.044 | 0.035 U | 0.035 U | 0.19 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.043 | 0.035 U | 0.035 U | 0.23 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.054 | 0.0097 J | 0.035 U | 0.36 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.031 J | 0.35 U | 0.35 U | 0.37 |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.027 J | 0.035 U | 0.035 U | 0.14 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.036 U | 0.035 U | 0.035 U | 0.034 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.042 J |
| Caprolactam | -- | -- | -- | MG/KG | 0.36 U | 0.35 UT | 0.35 UT | 0.34 U |
| Carbazole | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.028 J |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.044 J | 0.35 U | 0.35 U | 0.26 J |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.036 U | 0.035 U | 0.035 U | 0.059 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.017 J |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.069 J | 0.35 U | 0.35 U | 0.44 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.036 U | 0.035 U | 0.035 U | 0.034 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.072 U | 0.071 U | 0.071 U | 0.07 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.036 U | 0.035 U | 0.035 U | 0.034 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.055 | 0.035 U | 0.035 U | 0.32 |
| Isophorone | -- | -- | -- | MG/KG | 0.14 U | 0.14 U | 0.14 U | 0.14 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.036 U | 0.035 U | 0.035 U | 0.034 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.036 U | 0.035 U | 0.035 U | 0.034 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.29 U | 0.28 U | 0.28 U | 0.28 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-11 | ETSB-11 | ETSB-11 | RX-3 |
| | | | | Sample Date: | 01/15/2026 | 01/15/2026 | 01/15/2026 | 05/31/2022 |
| | | | | Sample Depth (bls): | 0 - 2 in | 2 - 4 ft | 14 - 16 ft | 0 - 2 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.029 J | 0.35 U | 0.35 U | 0.13 J |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.35 U | 0.35 U | 0.34 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.061 J | 0.35 U | 0.35 U | 0.35 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-3 | RX-4 | RX-4 | RX-5 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-3 | RX-4 | RX-4 | RX-5 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| Sample Depth (bls): | | | | | 12 - 14 ft | 0 - 2 ft | 11 - 13 ft | 0 - 2 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.02 J | 0.14 | 0.035 U | **1.1** |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.016 J | 0.14 | 0.035 U | 0.98 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.02 J | 0.2 | 0.035 U | **1.4** |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.011 J | 0.098 J | 0.35 U | 0.61 |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.0085 J | 0.076 | 0.035 U | 0.48 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.025 J |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.033 U | 0.035 U | 0.035 U | 0.035 U |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.37 |
| Caprolactam | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Carbazole | -- | -- | -- | MG/KG | 0.33 U | 0.016 J | 0.35 U | 0.12 J |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.013 J | 0.14 J | 0.35 U | **1.1** |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.033 U | 0.035 | 0.035 U | 0.12 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.2 J |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.13 J |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.022 J | 0.27 J | 0.35 U | 3 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.33 U | 0.011 J | 0.35 U | 0.34 J |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.033 U | 0.035 U | 0.035 U | 0.035 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.033 U | 0.035 U | 0.035 U | 0.035 U |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.032 J | 0.13 | 0.035 U | **0.81** |
| Isophorone | -- | -- | -- | MG/KG | 0.13 U | 0.14 U | 0.14 U | 0.14 U |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.33 U | 0.0082 J | 0.35 U | 0.073 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.033 U | 0.035 U | 0.035 U | 0.035 U |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.033 U | 0.035 U | 0.035 U | 0.035 U |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.28 U | 0.28 U | 0.28 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-3 | RX-4 | RX-4 | RX-5 |
| | | | | Sample Date: | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| | | | | Sample Depth (bls): | 12 - 14 ft | 0 - 2 ft | 11 - 13 ft | 0 - 2 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.013 J | 0.13 J | 0.35 U | **2.1** |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.35 U | 0.35 U | 0.35 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.017 J | 0.22 J | 0.35 U | 2.5 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-5 | RX-6 | RX-6 | RX-13 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-5 | RX-6 | RX-6 | RX-13 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 12/19/2023 |
| Sample Depth (bls): | | | | | 10 - 12 ft | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.033 U | 0.15 | 0.035 U | 0.091 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.033 U | 0.16 | 0.035 U | 0.15 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.033 U | 0.22 | 0.035 U | 0.2 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.33 U | 0.12 J | 0.35 U | 0.17 JT |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.033 U | 0.084 | 0.035 U | 0.073 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | 0.033 U | 0.036 U | 0.035 U | NA |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Caprolactam | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Carbazole | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.33 U | 0.15 J | 0.35 U | 0.12 J |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.36 U | 0.35 U | 0.36 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.033 U | 0.04 | 0.035 U | 0.046 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.33 U | 0.36 U | 0.35 U | 0.36 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.33 U | 0.25 J | 0.35 U | 0.15 J |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.33 U | 0.36 U | 0.35 U | 0.36 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.033 U | 0.036 U | 0.035 U | 0.036 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U | NA |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Hexachloroethane | -- | -- | -- | MG/KG | 0.033 U | 0.036 U | 0.035 U | NA |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.033 U | 0.19 | 0.035 U | 0.18 |
| Isophorone | -- | -- | -- | MG/KG | 0.13 U | 0.14 U | 0.14 U | NA |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.33 U | 0.0095 J | 0.35 U | 0.017 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | 0.033 U | 0.036 U | 0.035 U | NA |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | 0.033 U | 0.036 U | 0.035 U | NA |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | 0.33 U | 0.36 U | 0.35 U | NA |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.29 U | 0.28 U | 0.29 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-5 | RX-6 | RX-6 | RX-13 |
| | | | | Sample Date: | 05/31/2022 | 05/31/2022 | 05/31/2022 | 12/19/2023 |
| | | | | Sample Depth (bls): | 10 - 12 ft | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.33 U | 0.097 J | 0.35 U | 0.055 J |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.36 U | 0.35 U | 0.36 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.33 U | 0.2 J | 0.35 U | 0.13 J |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-13 | RX-14 | RX-15 | RX-15 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-13 | RX-14 | RX-15 | RX-15 |
| Sample Date: | | | | | 12/19/2023 | 12/18/2023 | 12/19/2023 | 12/19/2023 |
| Sample Depth (bls): | | | | | 3 - 5 ft | 1 - 3 ft | 0 - 2 ft | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.033 J | 0.17 | 0.44 | 0.63 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.048 | 0.19 | 0.42 | 0.74 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.069 | 0.22 | 0.62 | 0.99 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.085 JT | 0.092 JT | 0.16 JT | 0.28 JT |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.029 J | 0.1 | 0.24 | 0.42 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Caprolactam | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbazole | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.041 J | 0.18 J | 0.53 | 0.74 |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.39 U | 0.39 U | 0.35 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.034 J | 0.046 | 0.055 | 0.096 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.36 U | 0.39 U | 0.39 U | 0.35 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.055 J | 0.3 J | 0.88 | 1.3 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.36 U | 0.015 J | 0.02 J | 0.013 J |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.036 U | 0.039 U | 0.039 U | 0.035 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.1 | 0.16 | 0.27 | 0.44 |
| Isophorone | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.36 U | 0.014 J | 0.39 U | 0.35 U |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | NA | NA | NA | NA |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.29 U | 0.31 U | 0.31 U | 0.28 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-13 | RX-14 | RX-15 | RX-15 |
| | | | | Sample Date: | 12/19/2023 | 12/18/2023 | 12/19/2023 | 12/19/2023 |
| | | | | Sample Depth (bls): | 3 - 5 ft | 1 - 3 ft | 0 - 2 ft | 2 - 4 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.023 J | 0.14 J | 0.36 J | 0.37 |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.36 U | 0.39 U | 0.39 U | 0.35 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.044 J | 0.25 J | 0.75 | 1 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-16 | RX-16 | RX-17 | RX-17 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-16 | RX-16 | RX-17 | RX-17 |
| Sample Date: | | | | | 12/19/2023 | 12/19/2023 | 12/19/2023 | 12/19/2023 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 2 - 4 ft | 0 - 2 ft | 4 - 6 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.91 | 0.78 | 0.049 | 0.2 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.9 | 0.85 | 0.042 | 0.18 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 1 | **1.2** | 0.054 | 0.21 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.53 T | **0.99 T** | 0.04 JT | 0.074 JT |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.37 | 0.41 | 0.028 J | 0.11 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Caprolactam | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbazole | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.93 | 0.94 | 0.041 J | 0.22 J |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.37 U | 0.37 U | 0.4 U | 0.41 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.14 | **0.48** | 0.04 U | 0.043 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.026 J | 0.043 J | 0.4 U | 0.41 U |
| Diethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 1.6 | 1.5 | 0.075 J | 0.36 J |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.072 J | 0.074 J | 0.4 U | 0.41 U |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.037 U | 0.037 U | 0.04 U | 0.041 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | **0.61** | **1** | 0.066 | 0.13 |
| Isophorone | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.028 J | 0.039 J | 0.4 U | 0.06 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | NA | NA | NA | NA |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.3 U | 0.3 U | 0.32 U | 0.33 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-16 | RX-16 | RX-17 | RX-17 |
| | | | | Sample Date: | 12/19/2023 | 12/19/2023 | 12/19/2023 | 12/19/2023 |
| | | | | Sample Depth (bls): | 0 - 2 ft | 2 - 4 ft | 0 - 2 ft | 4 - 6 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 1 | 1.1 | 0.043 J | 0.19 J |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.37 U | 0.37 U | 0.4 U | 0.41 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 1.7 | 1.3 | 0.057 J | 0.35 J |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-18 | RX-19 | RX-20 | RX-21 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-18 | RX-19 | RX-20 | RX-21 |
| Sample Date: | | | | | 02/15/2024 | 02/15/2024 | 02/15/2024 | 02/15/2024 |
| Sample Depth (bls): | | | | | 3 - 4 ft | 3 - 5 ft | 6 - 8 ft | 10 - 12 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.59 | 0.27 | 0.64 | 0.36 |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.59 | 0.27 | 0.67 | 0.46 |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.68 | 0.3 | 0.82 | 0.5 |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.29 J | 0.14 J | 0.38 | 0.34 J |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.28 | 0.11 | 0.31 | 0.2 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Caprolactam | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbazole | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.66 | 0.26 J | 0.64 | 0.38 |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.39 U | 0.36 U | 0.38 U | 0.37 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.095 | 0.04 | 0.13 | 0.096 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.097 J | 0.04 J | 0.074 J | 0.02 J |
| Diethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 1.4 | 0.58 | 1.2 | 0.64 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.23 J | 0.029 J | 0.12 J | 0.029 J |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.039 U | 0.036 U | 0.038 U | 0.037 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.36 | 0.17 | 0.47 | 0.39 |
| Isophorone | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.47 | 0.029 J | 0.11 J | 0.027 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | NA | NA | NA | NA |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.31 U | 0.29 U | 0.31 U | 0.3 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-18 | RX-19 | RX-20 | RX-21 |
| | | | | Sample Date: | 02/15/2024 | 02/15/2024 | 02/15/2024 | 02/15/2024 |
| | | | | Sample Depth (bls): | 3 - 4 ft | 3 - 5 ft | 6 - 8 ft | 10 - 12 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.67 | 0.54 | 0.94 | 0.4 |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.39 U | 0.36 U | 0.38 U | 0.37 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 1.4 | 0.55 | 1.1 | 0.66 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-22 | RX-23 | RX-23 | RX-24 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-22 | RX-23 | RX-23 | RX-24 |
| Sample Date: | | | | | 09/05/2024 | 09/06/2024 | 09/06/2024 | 09/06/2024 |
| Sample Depth (bls): | | | | | 5 - 6 ft | 5 - 7 ft | 10 - 12 ft | 7 - 8 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.061 | 0.56 | 0.76 | **1.5** |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.034 J | 0.57 | 0.74 | **1.5** |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.048 | 0.76 | **1.1** | **1.7** |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.02 J | 0.34 | 0.53 | 0.53 |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.032 J | 0.35 | 0.47 | 0.6 |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Caprolactam | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Carbazole | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.054 J | 0.61 | 0.85 | **1.7** |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.35 U | 0.33 U | 0.029 J | 0.38 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.035 U | 0.057 | 0.14 | 0.13 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.35 U | 0.17 J | 0.17 J | 0.058 J |
| Diethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.12 J | 1.5 | 2 | 3 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.02 J | 0.32 J | 0.35 | 0.18 J |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.035 U | 0.033 U | 0.033 U | 0.038 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Hexachloroethane | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.025 J | 0.34 | **0.54** | **0.59** |
| Isophorone | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.35 U | 0.15 J | 0.21 J | 0.15 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | NA | NA | NA | NA |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | NA | NA | NA | NA |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.28 U | 0.27 U | 0.27 U | 0.3 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-22 | RX-23 | RX-23 | RX-24 |
| | | | | Sample Date: | 09/05/2024 | 09/06/2024 | 09/06/2024 | 09/06/2024 |
| | | | | Sample Depth (bls): | 5 - 6 ft | 5 - 7 ft | 10 - 12 ft | 7 - 8 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.1 J | **1.3** | **1.9** | **2.7** |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.35 U | 0.33 U | 0.33 U | 0.38 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.12 J | 1.3 | 1.7 | 3.5 |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: RX-24<br>Sample Date: 09/06/2024<br>Sample Depth (bls): 14 - 15 ft<br>Normal Sample or Field Duplicate: N | Sample Designation: RX-25<br>Sample Date: 09/06/2024<br>Sample Depth (bls): 3 - 5 ft<br>Normal Sample or Field Duplicate: N |
|---|---|---|---|---|---|---|
| Benzo(A)Anthracene | **1** | 1.4 | 1 | MG/KG | 0.033 U | **1.3** |
| Benzo(A)Pyrene | **1** | 1 | 22 | MG/KG | 0.033 U | **1.5** |
| Benzo(B)Fluoranthene | **1** | 1.4 | 2.1 | MG/KG | 0.033 U | **1.9** |
| Benzo(G,H,I)Perylene | **0.64** | 4.9 | 1000 | MG/KG | 0.33 U | 0.57 |
| Benzo(K)Fluoranthene | **0.8** | 4.9 | 2 | MG/KG | 0.033 U | **0.97** |
| Benzyl Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA |
| Biphenyl (Diphenyl) | -- | -- | -- | MG/KG | NA | NA |
| Bis(2-Chloroethoxy) Methane | -- | -- | -- | MG/KG | NA | NA |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | -- | -- | -- | MG/KG | NA | NA |
| Bis(2-Chloroisopropyl) Ether | -- | -- | -- | MG/KG | NA | NA |
| Bis(2-Ethylhexyl) Phthalate | -- | -- | -- | MG/KG | NA | NA |
| Caprolactam | -- | -- | -- | MG/KG | NA | NA |
| Carbazole | -- | -- | -- | MG/KG | NA | NA |
| Chrysene | **1** | 4.9 | 1 | MG/KG | 0.33 U | **1.6** |
| Cresols, M & P | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.33 U |
| Dibenz(A,H)Anthracene | **0.33** | 0.33 | 1000 | MG/KG | 0.033 U | 0.092 |
| Dibenzofuran | **2.1** | 18 | 110 | MG/KG | 0.33 U | 0.14 J |
| Diethyl Phthalate | -- | -- | -- | MG/KG | NA | NA |
| Dimethyl Phthalate | -- | -- | -- | MG/KG | NA | NA |
| Di-N-Butyl Phthalate | -- | -- | -- | MG/KG | NA | NA |
| Di-N-Octylphthalate | -- | -- | -- | MG/KG | NA | NA |
| Fluoranthene | 85 | 100 | 1000 | MG/KG | 0.33 U | 2.6 |
| Fluorene | 30 | 100 | 386 | MG/KG | 0.021 J | 0.34 |
| Hexachlorobenzene | 0.33 | 0.33 | 3.2 | MG/KG | 0.033 U | 0.033 U |
| Hexachlorobutadiene | -- | -- | -- | MG/KG | NA | NA |
| Hexachlorocyclopentadiene | -- | -- | -- | MG/KG | NA | NA |
| Hexachloroethane | -- | -- | -- | MG/KG | NA | NA |
| Indeno(1,2,3-C,D)Pyrene | **0.5** | 1.4 | 6.6 | MG/KG | 0.033 U | **0.65** |
| Isophorone | -- | -- | -- | MG/KG | NA | NA |
| Naphthalene | 12 | 100 | 12 | MG/KG | 0.33 U | 0.13 J |
| Nitrobenzene | 0.08 | 1.8 | 0.08 | MG/KG | NA | NA |
| N-Nitrosodi-N-Propylamine | -- | -- | -- | MG/KG | NA | NA |
| N-Nitrosodiphenylamine | -- | -- | -- | MG/KG | NA | NA |
| Pentachlorophenol | 0.8 | 1.3 | 0.8 | MG/KG | 0.27 U | 0.27 U |

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**Table 2. Summary of Semivolatile Organic Compounds in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Sample Designation: | RX-24 | RX-25 |
| | | | | Sample Date: | 09/06/2024 | 09/06/2024 |
| | | | | Sample Depth (bls): | 14 - 15 ft | 3 - 5 ft |
| | | | | Normal Sample or Field Duplicate: | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | |
| Phenanthrene | **1.1** | 4.9 | 1000 | MG/KG | 0.056 J | **2** |
| Phenol | 0.33 | 100 | 0.33 | MG/KG | 0.33 U | 0.33 U |
| Pyrene | 64 | 100 | 1000 | MG/KG | 0.011 J | 2.4 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 |
| | | | | | Sample Depth (bls): 0 - 2 in | 2 - 4 ft | 2 - 4 ft | 6 - 8 ft | 9 - 11 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | FD | N | N |
| Aluminum | -- | -- | -- | MG/KG | 5020 | 5740 | 7360 | 8100 | 2090 |
| Antimony | -- | -- | -- | MG/KG | 0.18 J | 0.16 J | 0.9 U | 0.92 U | 0.93 U |
| Arsenic | **13** | 16 | 16 | MG/KG | 3.6 | 1.2 | 0.89 J | 1.1 | 0.32 J |
| Barium | **410** | 410 | 820 | MG/KG | 35.8 | 49.2 J | 27 J | 26.4 | 13.7 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.54 | 0.96 | 1.3 | 1.6 | 0.53 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.11 J | 0.16 J | 0.19 J | 0.2 J | 0.47 U |
| Calcium | -- | -- | -- | MG/KG | 101000 | 126000 | 132000 | 127000 | 183000 |
| Chromium III | **30** | 110 | -- | MG/KG | 10.5 | 9.6 | 9.8 | 10 | 3.1 |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 1 U | 1 U | 1 U | 1 U | 0.99 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | 10.5 | 9.6 | 9.8 | 10 | 3.1 |
| Cobalt | -- | -- | -- | MG/KG | 5.1 | 3.1 | 3.6 | 3.4 | 1.5 |
| Copper | **50** | 280 | 1720 | MG/KG | 17.6 | 10.7 | 9.1 | 10.5 | 2.9 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.24 U | 0.23 U | 0.23 U | 0.23 U | 0.22 U |
| Iron | -- | -- | -- | MG/KG | 11200 | 9320 | 10200 | 11200 | 4700 |
| Lead | **63** | 400 | 450 | MG/KG | 53.7 | 46.3 J | 17.2 J | 24.3 | 2.7 |
| Magnesium | -- | -- | -- | MG/KG | 57200 | 68800 | 74600 | 71500 | 106000 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 260 | 358 | 405 | 468 | 352 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.053 | 0.064 | 0.051 | 0.063 | 0.016 U |
| Nickel | **30** | 320 | 130 | MG/KG | 10.6 | 6.8 | 6.2 | 6.9 | 2.6 |
| Potassium | -- | -- | -- | MG/KG | 896 | 652 | 807 | 677 | 297 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.16 J | 0.13 J | 1.1 U | 1.1 U | 1.2 U |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.38 U | 0.4 U | 0.36 U | 0.37 U | 0.37 U |
| Sodium | -- | -- | -- | MG/KG | 115 | 335 | 213 | 244 | 65 J |
| Thallium | -- | -- | -- | MG/KG | 0.11 J | 0.13 J | 0.2 J | 0.2 J | 0.056 J |
| Vanadium | -- | -- | -- | MG/KG | 15.2 | 13.2 | 14 | 14.9 | 4.2 |
| Zinc | **109** | 6600 | 2480 | MG/KG | 64.4 | 60.6 | 52.7 | 67.1 | 31.1 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: | ETSB-02 | ETSB-02 | ETSB-02 | ETSB-02 | ETSB-03 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: | 01/16/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 | 01/15/2026 |
| | | | | | Sample Depth (bls): | 0 - 2 in | 2 - 4 ft | 12 - 14 ft | 12 - 14 ft | 0 - 2 in |
| | | | | | Normal Sample or Field Duplicate: | N | N | N | FD | N |
| Aluminum | -- | -- | -- | MG/KG | | 2600 | 2560 | 662 | 863 | 14300 |
| Antimony | -- | -- | -- | MG/KG | | 1 U | 1 UJ | 0.96 U | 0.98 U | 0.3 J |
| Arsenic | **13** | 16 | 16 | MG/KG | | 0.63 J | 0.5 J | 0.16 J | 0.35 J | **19.6** |
| Barium | **410** | 410 | 820 | MG/KG | | 20.9 | 16.8 | 4.9 | 6.5 | 57.4 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | | 0.45 | 0.56 | 0.099 J | 0.16 J | 0.51 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | | 0.15 J | 0.11 J | 0.48 U | 0.49 U | 0.22 J |
| Calcium | -- | -- | -- | MG/KG | | 171000 | 180000 | 203000 | 191000 | 3820 |
| Chromium III | **30** | 110 | -- | MG/KG | | 5.5 | 3.9 | 2 U | 2 U | 18.8 |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | | 1 U | 1 U | 0.99 U | 0.99 U | 1.2 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | | 5.5 | 3.9 | 0.82 J | 1.3 J | 18.8 |
| Cobalt | -- | -- | -- | MG/KG | | 2.3 | 1.7 | 0.28 J | 0.52 J | 4.4 |
| Copper | **50** | 280 | 1720 | MG/KG | | 5.6 | 3.4 | 0.76 J | 2.8 | 34.7 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | | 0.23 U | 0.24 U | 0.23 U | 0.22 U | 0.26 U |
| Iron | -- | -- | -- | MG/KG | | 6790 | 5920 | 1310 | 2020 | 14900 |
| Lead | **63** | 400 | 450 | MG/KG | | 6 | 5.7 J | 1.6 J | 4.2 J | **67.7** |
| Magnesium | -- | -- | -- | MG/KG | | 98300 | 105000 | 115000 | 110000 | 2860 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | | 359 | 360 | 151 | 180 | 173 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | | 0.018 U | 0.017 U | 0.025 | **0.36** | **0.22 J** |
| Nickel | **30** | 320 | 130 | MG/KG | | 4.7 | 3.2 | 0.63 J | 1.5 J | 10.7 |
| Potassium | -- | -- | -- | MG/KG | | 546 | 307 | 141 | 113 | 584 |
| Selenium | 3.9 | 110 | 4 | MG/KG | | 1.3 U | 1.3 U | 1.2 U | 1.2 U | 0.63 J |
| Silver | 2 | 110 | 8.3 | MG/KG | | 0.4 U | 0.4 U | 0.39 U | 0.39 U | 0.46 U |
| Sodium | -- | -- | -- | MG/KG | | 68.4 J | 47.4 J | 96.4 U | 98.1 U | 72.7 J |
| Thallium | -- | -- | -- | MG/KG | | 0.073 J | 0.07 J | 0.39 U | 0.39 U | 0.11 J |
| Vanadium | -- | -- | -- | MG/KG | | 8.1 | 7.8 | 2.4 | 3.4 | 27.2 |
| Zinc | **109** | 6600 | 2480 | MG/KG | | 70.4 | 50.3 | 6.4 J | 12.2 | 66.7 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-03 | ETSB-03 | ETSB-03 | ETSB-03 | ETSB-04 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/13/2026 |
| | | | | | Sample Depth (bls): 2 - 4 ft | 6 - 8 ft | 10 - 12 ft | 14 - 16 ft | 0 - 2 in |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 9090 | 5260 | 10000 | 11300 | 8040 |
| Antimony | -- | -- | -- | MG/KG | 0.21 J | 1 UJ | 0.99 U | 0.98 U | 1.2 |
| Arsenic | **13** | 16 | 16 | MG/KG | 6 | 0.64 J | 1 | 0.6 J | 9.3 |
| Barium | **410** | 410 | 820 | MG/KG | 114 | 14.8 | 35.5 | 17.8 | 253 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.53 | 1.7 | 2.4 | 2.2 | 0.93 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.24 J | 0.34 J | 0.36 J | 0.49 U | **3.6** |
| Calcium | -- | -- | -- | MG/KG | 14700 | 183000 | 156000 | 195000 | 77900 |
| Chromium III | **30** | 110 | -- | MG/KG | 17.5 | 5.6 | 12.7 | 8.4 | **44.6** |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 1 U | 1 U | 1.1 U | 1.1 U | 1.1 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | 17.5 | 5.6 | 12.7 | 8.4 | **44.6** |
| Cobalt | -- | -- | -- | MG/KG | 5.9 | 1.8 | 4.5 | 1.9 | 5.8 |
| Copper | **50** | 280 | 1720 | MG/KG | 26.5 | 3.6 | 8.7 | 4.5 | **103** |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.22 U | 0.22 U | 0.23 U | 0.22 U | 0.25 U |
| Iron | -- | -- | -- | MG/KG | 13100 | 11100 | 17500 | 12800 | 29700 |
| Lead | **63** | 400 | 450 | MG/KG | **137** | 20.3 | 24.1 | 5.3 | **338** |
| Magnesium | -- | -- | -- | MG/KG | 9170 | 98200 | 103000 | 113000 | 28700 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 256 | 754 | 874 | 741 | 612 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.18 | 0.016 U | 0.017 U | 0.018 U | **0.24** |
| Nickel | **30** | 320 | 130 | MG/KG | 15.6 | 3.5 | 8.3 | 3.8 | **63.8** |
| Potassium | -- | -- | -- | MG/KG | 1340 | 225 | 996 | 38.4 J | 1340 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.24 J | 1.3 U | 1.2 U | 1.2 U | 0.89 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.15 J | 0.41 U | 0.4 U | 0.39 U | 0.29 J |
| Sodium | -- | -- | -- | MG/KG | 160 | 46.9 J | 85.1 J | 71.4 J | 472 |
| Thallium | -- | -- | -- | MG/KG | 0.13 J | 0.056 J | 0.15 J | 0.13 J | 0.068 J |
| Vanadium | -- | -- | -- | MG/KG | 26.9 | 10 | 20.8 | 11.3 | 287 |
| Zinc | **109** | 6600 | 2480 | MG/KG | **156** | **131** | **183** | 6.8 J | **180** |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-04 | ETSB-05 | ETSB-05 | ETSB-06 | ETSB-06 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/13/2026 | 01/13/2026 | 01/13/2026 | 01/20/2026 | 01/20/2026 |
| | | | | | Sample Depth (bls): 2 - 4 ft | 0 - 2 in | 2 - 4 ft | 0 - 2 in | 2 - 4 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 9750 | 4010 | 2830 | 8890 | 6370 |
| Antimony | -- | -- | -- | MG/KG | 0.25 J | 0.98 U | 0.14 J | 0.27 J | 0.93 U |
| Arsenic | **13** | 16 | 16 | MG/KG | 11.1 | 4.8 | 2.4 | **19** | 2.9 |
| Barium | **410** | 410 | 820 | MG/KG | 121 | 50.9 | 44 | 40.2 | 72.5 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.66 | 0.55 | 0.41 | 0.37 J | 0.74 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 1 | 0.13 J | 0.25 J | 0.23 J | 0.19 J |
| Calcium | -- | -- | -- | MG/KG | 17700 | 117000 | 143000 | 7100 | 91900 |
| Chromium III | **30** | 110 | -- | MG/KG | 22.4 | 11 | 7 | 14.9 | 11.7 |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 1 U | 1.1 U | 0.99 U | 1 U | 1 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | 22.4 | 11 | 7 | 14.9 | 11.7 |
| Cobalt | -- | -- | -- | MG/KG | 6.8 | 5.3 | 2.6 | 3.7 | 4.3 |
| Copper | **50** | 280 | 1720 | MG/KG | 43.1 | 14.7 | 21.8 | 31.4 | 18.7 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.45 J+ | 0.21 U | 0.22 U | 0.23 U | 0.22 U |
| Iron | -- | -- | -- | MG/KG | 17900 | 10500 | 7190 | 12800 | 10800 |
| Lead | **63** | 400 | 450 | MG/KG | **448** | 59.9 | 53.5 | 39.2 | **95.2** |
| Magnesium | -- | -- | -- | MG/KG | 9580 | 64700 | 81800 | 4780 | 57700 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 473 | 248 | 252 | 170 | 323 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.18 | 0.11 | 0.091 | 0.091 | 0.089 |
| Nickel | **30** | 320 | 130 | MG/KG | 26 | 10.8 | 6.7 | 11.1 | 8.9 |
| Potassium | -- | -- | -- | MG/KG | 919 | 958 | 500 | 595 | 753 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.46 J | 1.2 U | 0.17 J | 0.39 J | 0.12 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.2 J | 0.39 U | 0.13 J | 0.084 J | 0.37 U |
| Sodium | -- | -- | -- | MG/KG | 234 | 128 | 95.3 | 48.9 J | 79.4 J |
| Thallium | -- | -- | -- | MG/KG | 0.13 J | 0.13 J | 0.07 J | 0.098 J | 0.12 J |
| Vanadium | -- | -- | -- | MG/KG | 90.4 | 13.9 | 11.5 | 19.9 | 16.4 |
| Zinc | **109** | 6600 | 2480 | MG/KG | **453** | 63.1 | 78.4 | 67.5 | 107 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 | ETSB-07 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 | ETSB-07 |
| Sample Date: | | | | | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/12/2026 | 01/12/2026 |
| Sample Depth (bls): | | | | | 6 - 8 ft | 8 - 10 ft | 10 - 12 ft | 0 - 2 in | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 3570 | 2280 | 2250 | 5300 | 5770 |
| Antimony | -- | -- | -- | MG/KG | 0.92 U | 1 UJ | 0.91 U | 0.97 U | 1 UJ |
| Arsenic | **13** | 16 | 16 | MG/KG | 0.71 J | 0.32 J | 0.19 J | 1.8 | 1.5 |
| Barium | **410** | 410 | 820 | MG/KG | 23.7 | 10.1 | 7 | 41.3 | 41.5 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.64 | 0.61 | 0.6 | 0.66 | 0.64 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.46 U | 0.5 U | 0.46 U | 0.14 J | 0.21 J |
| Calcium | -- | -- | -- | MG/KG | 160000 | 198000 | 187000 | 107000 | 129000 |
| Chromium III | **30** | 110 | -- | MG/KG | 5.2 | 2 U | 2 U | 10.9 | 10.8 |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 1 U | 1 U | 1 U | 1.1 U | 1 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | 5.2 | 1.8 J | 1.8 | 10.9 | 10.8 |
| Cobalt | -- | -- | -- | MG/KG | 1.7 | 0.47 J | 0.49 J | 5.1 | 3.6 |
| Copper | **50** | 280 | 1720 | MG/KG | 6.1 | 1.3 J | 0.84 J | 13 | 14 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.23 U | 0.21 U | 0.23 U | 0.24 U | 0.22 U |
| Iron | -- | -- | -- | MG/KG | 6050 | 3960 | 3670 | 11500 | 9590 |
| Lead | **63** | 400 | 450 | MG/KG | 23.8 | 2.4 | 1.4 | 43.2 | **64.3** |
| Magnesium | -- | -- | -- | MG/KG | 93100 | 116000 | 109000 | 62600 | 75100 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 271 | 285 | 269 | 317 | 317 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.024 | 0.015 U | 0.017 U | 0.052 | 0.12 |
| Nickel | **30** | 320 | 130 | MG/KG | 4.2 | 0.84 J | 0.79 J | 10.9 | 7.6 |
| Potassium | -- | -- | -- | MG/KG | 439 | 40.9 J | 44.4 J | 883 | 992 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 1.2 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.37 U | 0.4 U | 0.36 U | 0.39 U | 0.41 U |
| Sodium | -- | -- | -- | MG/KG | 49.3 J | 100 U | 91.1 U | 104 | 141 |
| Thallium | -- | -- | -- | MG/KG | 0.067 J | 0.052 J | 0.36 U | 0.13 J | 0.13 J |
| Vanadium | -- | -- | -- | MG/KG | 9.6 | 3.5 | 3.7 | 17 | 13.8 |
| Zinc | **109** | 6600 | 2480 | MG/KG | 33.9 | 10.2 | 9.6 | 70.1 | **159 J** |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 | ETSB-08 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 | ETSB-08 |
| Sample Date: | | | | | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/13/2026 |
| Sample Depth (bls): | | | | | 6 - 8 ft | 6 - 8 ft | 9 - 11 ft | 11.5 - 13.5 ft | 0 - 2 in |
| Normal Sample or Field Duplicate: | | | | | N | FD | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 2780 | 3060 | 5240 | 1660 | 12000 |
| Antimony | -- | -- | -- | MG/KG | 0.91 U | 0.92 U | 0.9 U | 0.92 U | 0.33 J |
| Arsenic | **13** | 16 | 16 | MG/KG | 0.51 J | 0.56 J | 0.85 J | 0.2 J | **17.8** |
| Barium | **410** | 410 | 820 | MG/KG | 11.2 | 14.5 | 25.9 | 3.4 | 51.4 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.47 | 0.49 | 0.95 | 0.43 | 0.45 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.46 U | 0.46 U | 0.12 J | 0.46 U | 0.21 J |
| Calcium | -- | -- | -- | MG/KG | 183000 | 141000 | 145000 | 189000 | 3910 |
| Chromium III | **30** | 110 | -- | MG/KG | 3.5 | 4.1 | 7.5 | 2 U | **101** |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 1 U | 1 U | 1 U | 1 U | 1.2 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | 3.5 | 4.1 | 7.5 | 1.5 J | **101** |
| Cobalt | -- | -- | -- | MG/KG | 1 | 1.3 | 3.1 | 0.63 J | 4.5 |
| Copper | **50** | 280 | 1720 | MG/KG | 3.2 | 5.4 | 7.3 | 1.1 J | 30.9 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.21 U | 0.22 U | 0.23 U | 0.23 U | 0.27 U |
| Iron | -- | -- | -- | MG/KG | 4240 | 4830 | 7710 | 3090 | 14000 |
| Lead | **63** | 400 | 450 | MG/KG | 10.1 | 13.3 | 25.7 | 5.4 | 55.5 |
| Magnesium | -- | -- | -- | MG/KG | 103000 | 84200 | 88400 | 112000 | 2900 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 200 | 193 | 312 | 260 | 204 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.016 J | 0.019 | 0.029 | 0.017 U | **0.33** |
| Nickel | **30** | 320 | 130 | MG/KG | 2.3 | 2.9 | 5.5 | 1.2 J | 12.2 |
| Potassium | -- | -- | -- | MG/KG | 248 | 383 | 653 | 94.3 | 793 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 1.1 U | 1.1 U | 1.1 U | 1.2 U | 0.5 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.37 U | 0.37 U | 0.36 U | 0.37 U | 0.43 U |
| Sodium | -- | -- | -- | MG/KG | 73.2 J | 73.8 J | 128 | 61.6 J | 54.6 J |
| Thallium | -- | -- | -- | MG/KG | 0.04 J | 0.056 J | 0.12 J | 0.37 U | 0.12 J |
| Vanadium | -- | -- | -- | MG/KG | 5 | 6.1 | 10.9 | 2.5 | 25.1 |
| Zinc | **109** | 6600 | 2480 | MG/KG | 21.4 | 26.5 | 43.4 | 12.7 | 60.3 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-08 | ETSB-08 | ETSB-08 | ETSB-09 | ETSB-09 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-08 | ETSB-08 | ETSB-08 | ETSB-09 | ETSB-09 |
| Sample Date: | | | | | 01/13/2026 | 01/14/2026 | 01/14/2026 | 01/19/2026 | 01/19/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 5 - 7 ft | 8 - 10 ft | 0 - 2 in | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 9300 | 3290 | 8360 | 6620 | 4020 |
| Antimony | -- | -- | -- | MG/KG | 0.94 U | 1.1 | 0.93 U | 0.99 U | 0.96 U |
| Arsenic | **13** | 16 | 16 | MG/KG | 2.1 | **13.4** | 0.87 J | 2.8 | 0.66 J |
| Barium | **410** | 410 | 820 | MG/KG | 73.7 | 94.5 | 23.9 | 46.7 | 42.1 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.6 | 0.17 J | 1.1 | 0.67 | 1.1 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.26 J | 1.9 | 0.46 U | 0.24 J | 0.17 J |
| Calcium | -- | -- | -- | MG/KG | 2520 | 51000 | 31600 | 63000 | 84700 |
| Chromium III | **30** | 110 | -- | MG/KG | 19.4 | 15.2 | 20.7 | 14.1 | 6.8 |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 1 U | 1.1 U | 1 U | 1.1 U | 1.1 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | 19.4 | 15.2 | 20.7 | 14.1 | 6.8 |
| Cobalt | -- | -- | -- | MG/KG | 8.8 | 6.1 | 4.1 | 5.9 | 5 |
| Copper | **50** | 280 | 1720 | MG/KG | 24.2 | **87.5** | 8.4 | 18.7 | 5.1 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.2 U | **7.6** | 0.22 U | 0.24 U | 0.22 U |
| Iron | -- | -- | -- | MG/KG | 21100 | 42500 | 8750 | 12300 | 10800 |
| Lead | **63** | 400 | 450 | MG/KG | 18.3 | **298** | 10.2 | 57 | 4 |
| Magnesium | -- | -- | -- | MG/KG | 5430 | 6490 | 10300 | 37100 | 61300 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 242 | 243 | 117 | 291 | 656 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.018 | 0.043 | 0.017 U | 0.067 | 0.017 U |
| Nickel | **30** | 320 | 130 | MG/KG | 15.2 | 17 | 8 | 12.9 | 9.8 |
| Potassium | -- | -- | -- | MG/KG | 4100 | 707 | 1880 | 1150 | 420 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 1.2 U | 0.15 J | 1.2 U | 0.15 J | 1.2 U |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.37 U | 0.41 U | 0.37 U | 0.4 U | 0.39 U |
| Sodium | -- | -- | -- | MG/KG | 109 | 235 | 46.6 J | 209 J+ | 97.6 J+ |
| Thallium | -- | -- | -- | MG/KG | 0.25 J | 0.41 U | 0.14 J | 0.12 J | 0.21 J |
| Vanadium | -- | -- | -- | MG/KG | 23.9 | 14.2 | 21 | 27.7 | 10.2 |
| Zinc | **109** | 6600 | 2480 | MG/KG | 66.9 | **122** | 26.9 | 85 | 40 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-09 | ETSB-09 | ETSB-09 | ETSB-10 | ETSB-10 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/23/2026 | 01/23/2026 |
| | | | | | Sample Depth (bls): 6 - 8 ft | 10 - 12 ft | 12 - 14 ft | 0 - 2 in | 2 - 4 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 8550 | 2080 | 694 | 9290 | 4920 |
| Antimony | -- | -- | -- | MG/KG | 0.93 U | 0.9 U | 0.94 U | 1 U | 0.96 U |
| Arsenic | **13** | 16 | 16 | MG/KG | 0.7 J | 0.47 J | 0.37 J | 12.7 | 3.4 |
| Barium | **410** | 410 | 820 | MG/KG | 31.6 | 14.4 | 11.6 | 46 | 29.3 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 1.9 | 0.49 | 0.24 J | 0.59 | 0.68 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.19 J | 0.13 J | 0.16 J | 0.22 J | 0.15 J |
| Calcium | -- | -- | -- | MG/KG | 149000 | 195000 | 218000 | 48600 | 135000 |
| Chromium III | **30** | 110 | -- | MG/KG | 9.5 | 3.3 | 2 U | 14.4 | 7.4 |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 1 U | 1 U | 1 U | 1.1 U | 1 U |
| Chromium, Total | **30** | 110 | -- | MG/KG | 9.5 | 3.3 | 1.3 J | 14.4 | 7.4 |
| Cobalt | -- | -- | -- | MG/KG | 4 | 1.4 | 0.55 J | 4 | 2.8 |
| Copper | **50** | 280 | 1720 | MG/KG | 6.4 | 2.2 | 1.1 J | 29.3 | 10.4 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.22 U | 0.22 U | 0.23 U | 0.26 U | 0.22 U |
| Iron | -- | -- | -- | MG/KG | 14800 | 5050 | 3570 | 11600 | 7770 |
| Lead | **63** | 400 | 450 | MG/KG | 7.7 | 4 | 3.4 | 53.1 | 24.1 |
| Magnesium | -- | -- | -- | MG/KG | 113000 | 119000 | 133000 | 29300 | 82700 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 633 | 313 | 368 | 251 | 310 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.017 U | 0.017 U | 0.017 U | 0.13 | 0.036 |
| Nickel | **30** | 320 | 130 | MG/KG | 8.9 | 3.3 | 2.6 | 9.5 | 6 |
| Potassium | -- | -- | -- | MG/KG | 537 | 240 | 85.9 J | 644 | 539 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 1.2 U | 1.1 U | 1.2 U | 0.33 J | 0.12 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.37 U | 0.36 U | 0.38 U | 0.4 U | 0.39 U |
| Sodium | -- | -- | -- | MG/KG | 208 J+ | 90.1 U | 94.1 U | 83.3 J | 106 |
| Thallium | -- | -- | -- | MG/KG | 0.2 J | 0.061 J | 0.12 J | 0.081 J | 0.065 J |
| Vanadium | -- | -- | -- | MG/KG | 18.2 | 5.8 | 3.1 | 20.3 | 12 |
| Zinc | **109** | 6600 | 2480 | MG/KG | 91.9 | 42.3 | 30.2 | 67.9 | 46 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-10 | ETSB-11 | ETSB-11 | ETSB-11 | RX-3 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/23/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 | 05/31/2022 |
| | | | | | Sample Depth (bls): 11 - 13 ft | 0 - 2 in | 2 - 4 ft | 14 - 16 ft | 0 - 2 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 6360 | 7000 | 8840 | 11400 | 4370 |
| Antimony | -- | -- | -- | MG/KG | 0.93 U | 1 U | 0.95 U | 0.98 U | 0.99 U |
| Arsenic | **13** | 16 | 16 | MG/KG | 0.49 J | 3.3 | 1.1 | 0.61 J | 3.7 |
| Barium | **410** | 410 | 820 | MG/KG | 8.7 | 82.8 | 62 | 11.6 | 39.3 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 1.8 | 0.88 | 0.62 | 2 | 0.36 J |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.46 U | 0.3 J | 0.13 J | 0.24 J | 0.12 J |
| Calcium | -- | -- | -- | MG/KG | 183000 | 86900 | 7910 | 218000 | 90400 |
| Chromium III | **30** | 110 | -- | MG/KG | 3.6 | 14.1 | 20.5 | 9 | NA |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | 0.99 U | 1.1 U | 1.1 U | 1.1 U | NA |
| Chromium, Total | **30** | 110 | -- | MG/KG | 3.6 | 14.1 | 20.5 | 9 | 9.8 |
| Cobalt | -- | -- | -- | MG/KG | 1.2 | 5.6 | 8 | 2.7 | 4.6 |
| Copper | **50** | 280 | 1720 | MG/KG | 2.2 | 35.7 | 17.7 | 6.1 | 19.9 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | 0.22 U | 0.26 U | 0.25 U | 0.23 U | NA |
| Iron | -- | -- | -- | MG/KG | 6530 | 12500 | 15100 | 12900 | 10600 |
| Lead | **63** | 400 | 450 | MG/KG | 1.8 | **120** | 9 | 8.3 | 37.6 |
| Magnesium | -- | -- | -- | MG/KG | 118000 | 46200 | 9170 | 90300 | 54600 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 497 | 391 | 376 | 492 | 237 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.016 U | 0.18 | 0.018 U | 0.016 U | 0.043 |
| Nickel | **30** | 320 | 130 | MG/KG | 2.1 | 12.7 | 16.5 | 5.9 | 10.6 |
| Potassium | -- | -- | -- | MG/KG | 23.6 J | 1110 | 1910 | 84.9 J | 1040 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 1.2 U | 0.18 J | 1.2 U | 1.2 U | 1.2 U |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.37 U | 0.4 U | 0.38 U | 0.39 U | 0.39 U |
| Sodium | -- | -- | -- | MG/KG | 48 J | 142 | 321 | 179 | 233 |
| Thallium | -- | -- | -- | MG/KG | 0.37 U | 0.14 J | 0.18 J | 0.18 J | 0.077 J |
| Vanadium | -- | -- | -- | MG/KG | 5.6 | 23.8 | 25.2 | 13.9 | 30.5 |
| Zinc | **109** | 6600 | 2480 | MG/KG | 22.9 | **116** | 63.5 | 12.7 | 52.4 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-3 | RX-4 | RX-4 | RX-5 | RX-5 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-3 | RX-4 | RX-4 | RX-5 | RX-5 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| Sample Depth (bls): | | | | | 12 - 14 ft | 0 - 2 ft | 11 - 13 ft | 0 - 2 ft | 10 - 12 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 1430 | 8330 | 4100 | 7760 | 2250 |
| Antimony | -- | -- | -- | MG/KG | 4.7 U | 1 U | 1 U | 1 U | 0.95 U |
| Arsenic | **13** | 16 | 16 | MG/KG | 4.7 U | 1.5 | 0.58 J | 2.4 | 0.42 J |
| Barium | **410** | 410 | 820 | MG/KG | 18.7 | 41.9 | 14.9 | 176 | 14.2 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.32 J | 1.4 | 1.3 | 0.86 | 0.56 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 4.7 U | 0.2 J | 1 U | 0.3 J | 0.95 U |
| Calcium | -- | -- | -- | MG/KG | 197000 | 138000 | 189000 | 49800 | 188000 |
| Chromium III | **30** | 110 | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Total | **30** | 110 | -- | MG/KG | 9.4 U | 13 | 3.2 | 15.9 | 2.3 |
| Cobalt | -- | -- | -- | MG/KG | 1 J | 4.8 | 1.3 J | 7 | 0.89 J |
| Copper | **50** | 280 | 1720 | MG/KG | 1.9 J | 13.5 | 1.2 J | 18.3 | 1.2 J |
| Cyanide | **2.3** | 13 | 40 | MG/KG | NA | NA | NA | NA | NA |
| Iron | -- | -- | -- | MG/KG | 5800 | 13100 | 7280 | 15200 | 4580 |
| Lead | **63** | 400 | 450 | MG/KG | 2.5 J | 32.1 | 3.5 | **144** | 3.2 |
| Magnesium | -- | -- | -- | MG/KG | 121000 | 87900 | 135000 | 31300 | 129000 |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 424 | 485 | 523 | 325 | 338 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.017 U | 0.055 | 0.017 U | 0.13 | 0.015 U |
| Nickel | **30** | 320 | 130 | MG/KG | 9.4 U | 9.6 | 2.2 | 14.8 | 1.4 J |
| Potassium | -- | -- | -- | MG/KG | 258 J | 1260 | 147 | 1920 | 135 |
| Selenium | 3.9 | 110 | 4 | MG/KG | 5.9 U | 1.3 U | 1.3 U | 0.13 J | 1.2 U |
| Silver | 2 | 110 | 8.3 | MG/KG | 1.9 U | 0.41 U | 0.4 U | 0.41 U | 0.38 U |
| Sodium | -- | -- | -- | MG/KG | 472 U | 123 | 46.2 J | 154 | 44.2 J |
| Thallium | -- | -- | -- | MG/KG | 1.9 U | 0.21 J | 0.11 J | 0.17 J | 0.079 J |
| Vanadium | -- | -- | -- | MG/KG | 5 J | 19.8 | 5.8 | 24.3 | 3.6 |
| Zinc | **109** | 6600 | 2480 | MG/KG | 18.5 J | 67.6 | 25 | **147** | 16.5 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-6 | RX-6 | RX-13 | RX-13 | RX-14 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-6 | RX-6 | RX-13 | RX-13 | RX-14 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 12/19/2023 | 12/19/2023 | 12/18/2023 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft | 3 - 5 ft | 1 - 3 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | 7680 | 5760 | NA | NA | NA |
| Antimony | -- | -- | -- | MG/KG | 1.1 U | 1 U | NA | NA | NA |
| Arsenic | **13** | 16 | 16 | MG/KG | 3.1 | 0.72 J | 3.2 | 2.2 | 2.5 |
| Barium | **410** | 410 | 820 | MG/KG | 52.1 | 10.8 | 25.2 | 40.6 | 66.7 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.66 | 1.7 | 0.36 | 1 | 0.56 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.22 J | 0.2 J | 0.14 J | 0.4 J | 0.32 J |
| Calcium | -- | -- | -- | MG/KG | 28100 | 217000 | NA | NA | NA |
| Chromium III | **30** | 110 | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Total | **30** | 110 | -- | MG/KG | 13 | 8.3 | 8 | 16.4 | 16.3 |
| Cobalt | -- | -- | -- | MG/KG | 6.1 | 1.4 J | NA | NA | NA |
| Copper | **50** | 280 | 1720 | MG/KG | 17.6 | 3.2 | 11.1 | 17.7 | 19.5 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | NA | NA | NA | NA | NA |
| Iron | -- | -- | -- | MG/KG | 11800 | 11100 | NA | NA | NA |
| Lead | **63** | 400 | 450 | MG/KG | 59.1 | 11.3 | 40.6 | 57.3 | **75.1** |
| Magnesium | -- | -- | -- | MG/KG | 16700 | 110000 | NA | NA | NA |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 301 | 838 | 233 | 683 | 371 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.03 | 0.018 U | 0.05 | 0.022 | 0.11 |
| Nickel | **30** | 320 | 130 | MG/KG | 10.6 | 2.7 | 8 | 13.8 | 11.9 |
| Potassium | -- | -- | -- | MG/KG | 1200 | 44.6 J | NA | NA | NA |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.22 J | 1.2 U | 0.14 J | 0.15 J | 0.18 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.43 U | 0.4 U | 0.34 U | 0.33 U | 0.36 U |
| Sodium | -- | -- | -- | MG/KG | 71.5 J | 51.3 J | NA | NA | NA |
| Thallium | -- | -- | -- | MG/KG | 0.14 J | 0.077 J | NA | NA | NA |
| Vanadium | -- | -- | -- | MG/KG | 20.5 | 9.4 | NA | NA | NA |
| Zinc | **109** | 6600 | 2480 | MG/KG | 76.1 | 87.2 | 41.7 | 107 | 101 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-15 | RX-15 | RX-16 | RX-16 | RX-17 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-15 | RX-15 | RX-16 | RX-16 | RX-17 |
| Sample Date: | | | | | 12/19/2023 | 12/19/2023 | 12/19/2023 | 12/19/2023 | 12/19/2023 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 2 - 4 ft | 0 - 2 ft | 2 - 4 ft | 0 - 2 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Antimony | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Arsenic | **13** | 16 | 16 | MG/KG | 2.7 | 1.2 | 6.7 | 4.5 | 1.2 |
| Barium | **410** | 410 | 820 | MG/KG | 62.2 | 121 | 71.3 | 93 | 54.2 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.65 | 0.43 | 0.55 | 0.79 | 0.85 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.14 J | 0.85 U | 0.25 J | 0.26 J | 0.18 J |
| Calcium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium III | **30** | 110 | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Total | **30** | 110 | -- | MG/KG | 20.1 | **37.8** | 19.6 | 21.9 | 12.9 |
| Cobalt | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Copper | **50** | 280 | 1720 | MG/KG | 24.7 | 29.8 | **64.7** | 22.9 | 13.2 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | NA | NA | NA | NA | NA |
| Iron | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Lead | **63** | 400 | 450 | MG/KG | 44.3 | 10 | **84.8** | **122** | 61.7 |
| Magnesium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 353 | 276 | 330 | 582 | 394 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | 0.098 | 0.015 J | 0.15 | 0.13 | 0.079 |
| Nickel | **30** | 320 | 130 | MG/KG | 16.6 | **34.3** | 14.2 | 17.7 | 12.1 |
| Potassium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.32 J | 0.4 J | 0.29 J | 0.28 J | 0.13 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.35 U | 0.34 U | 0.08 J | 0.077 J | 0.35 U |
| Sodium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Thallium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Vanadium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Zinc | **109** | 6600 | 2480 | MG/KG | 84.6 | 65.8 | 91.1 | **117** | 93.6 |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-17 | RX-18 | RX-19 | RX-20 | RX-21 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-17 | RX-18 | RX-19 | RX-20 | RX-21 |
| Sample Date: | | | | | 12/19/2023 | 02/15/2024 | 02/15/2024 | 02/15/2024 | 02/15/2024 |
| Sample Depth (bls): | | | | | 4 - 6 ft | 3 - 4 ft | 3 - 5 ft | 6 - 8 ft | 10 - 12 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Antimony | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Arsenic | **13** | 16 | 16 | MG/KG | 5 | 0.61 J | 2 | 2.9 | 3.4 |
| Barium | **410** | 410 | 820 | MG/KG | 181 | 18.1 | 89.8 | 111 | 203 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.34 J | 0.094 J | 0.95 | 0.74 | 0.72 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.28 J | 1.2 U | 0.36 J | 0.55 J | 0.46 J |
| Calcium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium III | **30** | 110 | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Total | **30** | 110 | -- | MG/KG | 16.2 | 9.1 | 23.7 | **31.2** | 22.1 |
| Cobalt | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Copper | **50** | 280 | 1720 | MG/KG | 33.6 | 11.1 | 22.3 | 30.4 | **83.6** |
| Cyanide | **2.3** | 13 | 40 | MG/KG | NA | NA | NA | NA | NA |
| Iron | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Lead | **63** | 400 | 450 | MG/KG | **391** | 0.88 | **138** | 51.8 | **665** |
| Magnesium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 520 | 284 | 438 | 487 | 347 |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | **2.5** | 0.055 | 0.059 | **0.42** | **0.35** |
| Nickel | **30** | 320 | 130 | MG/KG | 13.1 | 5.1 | 14.7 | 23 | 16.2 |
| Potassium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.54 J | 1.5 U | 0.17 J | 0.17 J | 0.35 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.14 J | 0.46 U | 0.39 U | 0.43 U | 0.14 J |
| Sodium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Thallium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Vanadium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Zinc | **109** | 6600 | 2480 | MG/KG | **189** | 18.5 | **155** | **1060** | **250** |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-22 | RX-23 | RX-23 | RX-24 | RX-24 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-22 | RX-23 | RX-23 | RX-24 | RX-24 |
| Sample Date: | | | | | 09/05/2024 | 09/06/2024 | 09/06/2024 | 09/06/2024 | 09/06/2024 |
| Sample Depth (bls): | | | | | 5 - 6 ft | 5 - 7 ft | 10 - 12 ft | 7 - 8 ft | 14 - 15 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N | N |
| Aluminum | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Antimony | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Arsenic | **13** | 16 | 16 | MG/KG | 3 | 2.9 | 3.1 | 5.7 | 2 |
| Barium | **410** | 410 | 820 | MG/KG | **443** | 194 | 187 | 92.6 | 42.5 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 0.75 | 0.66 | 0.84 | 0.77 | **4.8** |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 0.48 J | 0.32 J | 0.53 J | 0.36 J | **3.5** |
| Calcium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium III | **30** | 110 | -- | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | NA | NA | NA | NA | NA |
| Chromium, Total | **30** | 110 | -- | MG/KG | 13.5 | 21.1 | 24.9 | 23.3 | 10.1 |
| Cobalt | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Copper | **50** | 280 | 1720 | MG/KG | 20.1 | 25.6 | 31.3 | 31.3 | 7.3 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | NA | NA | NA | NA | NA |
| Iron | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Lead | **63** | 400 | 450 | MG/KG | **248** | **249** | **264** | 55.1 | 15.7 |
| Magnesium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Manganese | **1600** | 2000 | 2000 | MG/KG | 299 | 319 | 308 | 256 | **5790** |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | **0.21** | 0.13 | 0.14 | 0.047 | 0.016 U |
| Nickel | **30** | 320 | 130 | MG/KG | 12 | 13.7 | 18.3 | 22.1 | **34.2** |
| Potassium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.26 J | 0.25 J | 0.29 J | 0.2 J | 1.2 U |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.33 U | 0.17 J | 0.12 J | 0.4 U | 0.38 U |
| Sodium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Thallium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Vanadium | -- | -- | -- | MG/KG | NA | NA | NA | NA | NA |
| Zinc | **109** | 6600 | 2480 | MG/KG | **311** | **185** | **211** | **116** | **310** |

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**Table 3. Summary of Metals in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: RX-25<br>Sample Date: 09/06/2024<br>Sample Depth (bls): 3 - 5 ft<br>Normal Sample or Field Duplicate: N |
|---|---|---|---|---|---|
| Aluminum | -- | -- | -- | MG/KG | NA |
| Antimony | -- | -- | -- | MG/KG | NA |
| Arsenic | **13** | 16 | 16 | MG/KG | 3.6 |
| Barium | **410** | 410 | 820 | MG/KG | 300 |
| Beryllium | **4.4** | 43 | 47 | MG/KG | 1 |
| Cadmium | **2.5** | 2.5 | 7.5 | MG/KG | 1.5 |
| Calcium | -- | -- | -- | MG/KG | NA |
| Chromium III | **30** | 110 | -- | MG/KG | NA |
| Chromium, Hexavalent | 1 | 1 | 19 | MG/KG | NA |
| Chromium, Total | **30** | 110 | -- | MG/KG | 15.4 |
| Cobalt | -- | -- | -- | MG/KG | NA |
| Copper | **50** | 280 | 1720 | MG/KG | 33.9 |
| Cyanide | **2.3** | 13 | 40 | MG/KG | NA |
| Iron | -- | -- | -- | MG/KG | NA |
| Lead | **63** | 400 | 450 | MG/KG | **201** |
| Magnesium | -- | -- | -- | MG/KG | NA |
| Manganese | **1600** | 2000 | 2000 | MG/KG | **5800** |
| Mercury | **0.18** | 0.3 | 0.73 | MG/KG | **0.24** |
| Nickel | **30** | 320 | 130 | MG/KG | 26.5 |
| Potassium | -- | -- | -- | MG/KG | NA |
| Selenium | 3.9 | 110 | 4 | MG/KG | 0.28 J |
| Silver | 2 | 110 | 8.3 | MG/KG | 0.1 J |
| Sodium | -- | -- | -- | MG/KG | NA |
| Thallium | -- | -- | -- | MG/KG | NA |
| Vanadium | -- | -- | -- | MG/KG | NA |
| Zinc | **109** | 6600 | 2480 | MG/KG | **160** |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 |
| | | | | | Sample Depth (bls): 0 - 2 in | 2 - 4 ft | 2 - 4 ft | 6 - 8 ft | 9 - 11 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | FD | N | N |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.076 J+ | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U | 0.067 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.076 J+ | 0.068 U | 0.067 U | 0.067 U | 0.067 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-02 01/16/2026 0 - 2 in N | ETSB-02 01/16/2026 2 - 4 ft N | ETSB-02 01/16/2026 12 - 14 ft N | ETSB-02 01/16/2026 12 - 14 ft FD | ETSB-03 01/15/2026 0 - 2 in N |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-02 | ETSB-02 | ETSB-02 | ETSB-02 | ETSB-03 |
| Sample Date: | | | | | 01/16/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 | 01/15/2026 |
| Sample Depth (bls): | | | | | 0 - 2 in | 2 - 4 ft | 12 - 14 ft | 12 - 14 ft | 0 - 2 in |
| Normal Sample or Field Duplicate: | | | | | N | N | N | FD | N |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.071 U | 0.067 U | 0.067 U | 0.068 U | 0.083 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Designation: | | ETSB-03 | ETSB-03 | ETSB-03 | ETSB-03 | ETSB-04 |
| | | | Sample Date: | | 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/13/2026 |
| | | | Sample Depth (bls): | | 2 - 4 ft | 6 - 8 ft | 10 - 12 ft | 14 - 16 ft | 0 - 2 in |
| | | | Normal Sample or Field Duplicate: | | N | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | | |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.071 U | 0.073 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-04<br>Sample Date: 01/13/2026<br>Sample Depth (bls): 2 - 4 ft<br>Normal Sample or Field Duplicate: N | ETSB-05<br>01/13/2026<br>0 - 2 in<br>N | ETSB-05<br>01/13/2026<br>2 - 4 ft<br>N | ETSB-06<br>01/20/2026<br>0 - 2 in<br>N | ETSB-06<br>01/20/2026<br>2 - 4 ft<br>N |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.069 U | 0.073 U | 0.068 U | 0.07 U | 0.069 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 | ETSB-07 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/12/2026 | 01/12/2026 |
| | | | | | Sample Depth (bls): 6 - 8 ft | 8 - 10 ft | 10 - 12 ft | 0 - 2 in | 2 - 4 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N | N |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U | 0.069 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 |
| | | | | | Sample Depth (bls): 6 - 8 ft | 6 - 8 ft | 9 - 11 ft | 11.5 - 13.5 ft |
| | | | | | Normal Sample or Field Duplicate: N | FD | N | N |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.067 U | 0.067 U | 0.067 U | 0.067 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-08 | ETSB-08 | ETSB-08 | ETSB-08 | ETSB-09 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/13/2026 | 01/13/2026 | 01/14/2026 | 01/14/2026 | 01/19/2026 |
| | | | | | Sample Depth (bls): 0 - 2 in | 2 - 4 ft | 5 - 7 ft | 8 - 10 ft | 0 - 2 in |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N | N |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.16 | 0.067 U | 0.073 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.079 U | 0.068 U | 0.072 U | 0.067 U | 0.073 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.079 U | 0.068 U | **0.16** | 0.067 U | 0.073 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-09 | ETSB-09 | ETSB-09 | ETSB-09 | ETSB-10 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/23/2026 |
| | | | | | Sample Depth (bls): 2 - 4 ft | 6 - 8 ft | 10 - 12 ft | 12 - 14 ft | 0 - 2 in |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N | N |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.071 U | 0.07 U | 0.067 U | 0.068 U | 0.075 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Designation: | | ETSB-10 | ETSB-10 | ETSB-11 | ETSB-11 | ETSB-11 |
| | | | Sample Date: | | 01/23/2026 | 01/23/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
| | | | Sample Depth (bls): | | 2 - 4 ft | 11 - 13 ft | 0 - 2 in | 2 - 4 ft | 14 - 16 ft |
| | | | Normal Sample or Field Duplicate: | | N | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | | |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.07 U | 0.068 U | 0.072 U | 0.071 U | 0.071 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Designation: | | RX-3 | RX-3 | RX-4 | RX-4 | RX-5 |
| | | | Sample Date: | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| | | | Sample Depth (bls): | | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft | 11 - 13 ft | 0 - 2 ft |
| | | | Normal Sample or Field Duplicate: | | N | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | | |
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.07 U | 0.068 U | 0.071 U | 0.07 U | 0.071 U |

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**Table 4. Summary of Polychlorinated Biphenyls in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: RX-5<br>Sample Date: 05/31/2022<br>Sample Depth (bls): 10 - 12 ft<br>Normal Sample or Field Duplicate: N | Sample Designation: RX-6<br>Sample Date: 05/31/2022<br>Sample Depth (bls): 0 - 2 ft<br>Normal Sample or Field Duplicate: N | Sample Designation: RX-6<br>Sample Date: 05/31/2022<br>Sample Depth (bls): 12 - 14 ft<br>Normal Sample or Field Duplicate: N |
|---|---|---|---|---|---|---|---|
| PCB-1016 (Aroclor 1016) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1221 (Aroclor 1221) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1232 (Aroclor 1232) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1242 (Aroclor 1242) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1248 (Aroclor 1248) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1254 (Aroclor 1254) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1260 (Aroclor 1260) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1262 (Aroclor 1262) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| PCB-1268 (Aroclor 1268) | -- | -- | -- | MG/KG | 0.067 U | 0.072 U | 0.071 U |
| Polychlorinated Biphenyl (PCBs) | **0.1** | 1 | 3.2 | MG/KG | 0.067 U | 0.072 U | 0.071 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-01 | ETSB-01 | ETSB-01 | ETSB-01 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/14/2026 | 01/14/2026 | 01/14/2026 | 01/14/2026 |
| | | | | | Sample Depth (bls): 0 - 2 in | 2 - 4 ft | 2 - 4 ft | 6 - 8 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | FD | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0071 U | 0.0068 UJ | 0.0067 U | 0.0067 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0071 U | 0.0068 UJ | 0.0067 U | 0.0067 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.0021 U | 0.002 UJ | 0.002 U | 0.002 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0071 U | 0.0068 UJ | 0.0067 U | 0.0067 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0071 U | 0.0068 UJ | 0.0067 U | 0.0067 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0071 U | 0.0068 UJ | 0.0067 U | 0.0067 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0071 U | 0.0068 U | 0.0067 U | 0.0067 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.071 U | 0.068 U | 0.067 U | 0.067 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-01 | ETSB-02 | ETSB-02 | ETSB-02 |
|---|---|---|---|---|---|---|---|---|
| Sample Date: | | | | | 01/14/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 |
| Sample Depth (bls): | | | | | 9 - 11 ft | 0 - 2 in | 2 - 4 ft | 12 - 14 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 U | 0.0067 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.002 U | 0.0021 UT | 0.002 UT | 0.002 UT |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 U | 0.0067 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.002 U | 0.0021 U | 0.002 U | 0.002 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 UJ | 0.0067 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.067 U | 0.071 U | 0.067 U | 0.067 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 U | 0.0067 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.002 U | 0.0021 U | 0.002 U | 0.002 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.002 U | 0.0021 U | 0.002 U | 0.002 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 UJ | 0.0067 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 U | 0.0067 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0067 U | 0.0071 U | 0.0067 UJ | 0.0067 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0067 U | 0.0071 U | 0.0067 UJ | 0.0067 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.002 U | 0.0021 U | 0.002 U | 0.002 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 U | 0.0067 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0067 U | 0.0071 U | 0.0067 U | 0.0067 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0067 U | 0.0071 U | 0.0067 UJ | 0.0067 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0067 U | 0.0071 U | 0.0067 U | 0.0067 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0067 U | 0.0071 UT | 0.0067 UT | 0.0067 UT |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0067 U | 0.0071 UT | 0.0067 UT | 0.0067 UT |
| Toxaphene | -- | -- | -- | MG/KG | 0.067 U | 0.071 U | 0.067 U | 0.067 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-02 | ETSB-03 | ETSB-03 | ETSB-03 |
| | | | | Sample Date: | 01/16/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
| | | | | Sample Depth (bls): | 12 - 14 ft | 0 - 2 in | 2 - 4 ft | 6 - 8 ft |
| | | | | Normal Sample or Field Duplicate: | FD | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.002 UT | 0.0025 U | 0.002 U | 0.002 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.002 U | 0.0025 U | 0.002 U | 0.002 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.068 U | 0.083 U | 0.067 U | 0.068 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.002 U | 0.0025 U | 0.002 U | 0.002 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.002 U | 0.0025 U | 0.002 U | 0.002 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.002 U | 0.0025 U | 0.002 U | 0.002 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0068 U | 0.0083 U | 0.0067 U | 0.0068 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0068 UT | **0.032** | **0.0073** | 0.0068 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0068 UT | **0.026** | **0.011** | 0.0068 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.068 U | 0.083 U | 0.067 U | 0.068 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-03 | ETSB-03 | ETSB-04 | ETSB-04 |
| | | | | Sample Date: | 01/15/2026 | 01/15/2026 | 01/13/2026 | 01/13/2026 |
| | | | | Sample Depth (bls): | 10 - 12 ft | 14 - 16 ft | 0 - 2 in | 2 - 4 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.0022 U | 0.0021 U | 0.0022 U | 0.0021 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.0022 U | 0.0021 U | 0.0022 U | 0.0021 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.075 U | 0.071 U | 0.073 U | 0.069 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.0022 U | 0.0021 U | 0.0022 U | 0.0021 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.0022 U | 0.0021 U | 0.0022 U | 0.0021 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.0022 U | 0.0021 U | 0.0022 U | 0.0021 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0075 U | 0.0071 U | 0.0073 U | 0.0069 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.075 U | 0.071 U | 0.073 U | 0.069 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-05 01/13/2026 0 - 2 in N | ETSB-05 01/13/2026 2 - 4 ft N | ETSB-06 01/20/2026 0 - 2 in N | ETSB-06 01/20/2026 2 - 4 ft N |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-05 | ETSB-05 | ETSB-06 | ETSB-06 |
| Sample Date: | | | | | 01/13/2026 | 01/13/2026 | 01/20/2026 | 01/20/2026 |
| Sample Depth (bls): | | | | | 0 - 2 in | 2 - 4 ft | 0 - 2 in | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.0022 U | 0.002 U | 0.0021 U | 0.0021 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.0022 U | 0.002 U | 0.0021 U | 0.0021 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.073 U | 0.068 U | 0.07 U | 0.069 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.0022 U | 0.002 U | 0.0021 U | 0.0021 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.0022 U | 0.002 U | 0.0021 U | 0.0021 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.0022 U | 0.002 U | 0.0021 U | 0.0021 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0073 U | 0.0068 U | 0.007 U | 0.0069 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0073 U | 0.0068 U | **0.011** | **0.0081** |
| Toxaphene | -- | -- | -- | MG/KG | 0.073 U | 0.068 U | 0.07 U | 0.069 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-06 | ETSB-06 | ETSB-06 | ETSB-07 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/12/2026 |
| | | | | | Sample Depth (bls): 6 - 8 ft | 8 - 10 ft | 10 - 12 ft | 0 - 2 in |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.002 U | 0.002 U | 0.002 U | 0.0022 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.002 U | 0.002 U | 0.002 U | 0.0022 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.002 U | 0.002 U | 0.002 U | 0.0022 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.002 U | 0.002 U | 0.002 U | 0.0022 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.002 U | 0.002 U | 0.002 U | 0.0022 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0068 U | 0.0067 U | 0.0067 U | 0.0073 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.068 U | 0.067 U | 0.067 U | 0.073 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-07 | ETSB-07 | ETSB-07 | ETSB-07 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 |
| | | | | | Sample Depth (bls): 2 - 4 ft | 6 - 8 ft | 6 - 8 ft | 9 - 11 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | FD | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.069 U | 0.067 U | 0.067 U | 0.067 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.0021 U | 0.002 U | 0.002 U | 0.002 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0069 U | 0.0067 U | 0.0067 U | 0.0067 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.069 U | 0.067 U | 0.067 U | 0.067 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-07 | ETSB-08 | ETSB-08 | ETSB-08 |
| | | | | Sample Date: | 01/12/2026 | 01/13/2026 | 01/13/2026 | 01/14/2026 |
| | | | | Sample Depth (bls): | 11.5 - 13.5 ft | 0 - 2 in | 2 - 4 ft | 5 - 7 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.002 U | 0.0023 U | 0.002 U | 0.0021 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.002 U | 0.0023 U | 0.002 U | 0.0021 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.067 U | 0.079 U | 0.068 U | 0.072 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.002 U | 0.0023 U | 0.002 U | 0.0021 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.002 U | 0.0023 U | 0.002 U | 0.0021 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.002 U | 0.0023 U | 0.002 U | 0.0021 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | 0.0072 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0067 U | 0.0079 U | 0.0068 U | **0.0087** |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0067 U | **0.0045 J** | 0.0068 U | 0.0072 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0067 U | 0.002 J | 0.0068 U | **0.0066 J** |
| Toxaphene | -- | -- | -- | MG/KG | 0.067 U | 0.079 U | 0.068 U | 0.072 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-08<br>Sample Date: 01/14/2026<br>Sample Depth (bls): 8 - 10 ft<br>Normal Sample or Field Duplicate: N | Sample Designation: ETSB-09<br>Sample Date: 01/19/2026<br>Sample Depth (bls): 0 - 2 in<br>Normal Sample or Field Duplicate: N | Sample Designation: ETSB-09<br>Sample Date: 01/19/2026<br>Sample Depth (bls): 2 - 4 ft<br>Normal Sample or Field Duplicate: N | Sample Designation: ETSB-09<br>Sample Date: 01/19/2026<br>Sample Depth (bls): 6 - 8 ft<br>Normal Sample or Field Duplicate: N |
|---|---|---|---|---|---|---|---|---|
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.002 U | 0.0022 U | 0.0021 U | 0.0021 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.002 U | 0.0022 U | 0.0021 U | 0.0021 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.067 U | 0.073 U | 0.071 U | 0.07 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.002 U | 0.0022 U | 0.0021 U | 0.0021 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.002 U | 0.0022 U | 0.0021 U | 0.0021 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.002 U | 0.0022 U | 0.0021 U | 0.0021 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0067 U | 0.0073 U | 0.0071 U | 0.007 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.067 U | 0.073 U | 0.071 U | 0.07 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-09 | ETSB-09 | ETSB-10 | ETSB-10 |
| Sample Date: | | | | | 01/19/2026 | 01/19/2026 | 01/23/2026 | 01/23/2026 |
| Sample Depth (bls): | | | | | 10 - 12 ft | 12 - 14 ft | 0 - 2 in | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.002 U | 0.002 U | 0.0022 U | 0.0021 UT |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.002 U | 0.002 U | 0.0022 U | 0.0021 UT |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.07 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.002 U | 0.002 U | 0.0022 U | 0.0021 UT |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.002 U | 0.002 U | 0.0022 U | 0.0021 UT |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.002 U | 0.002 U | 0.0022 U | 0.0021 UT |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0067 U | 0.0068 U | 0.0075 U | 0.007 UT |
| Toxaphene | -- | -- | -- | MG/KG | 0.067 U | 0.068 U | 0.075 U | 0.07 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | Sample Designation: ETSB-10 | ETSB-11 | ETSB-11 | ETSB-11 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Sample Date: 01/23/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
| | | | | | Sample Depth (bls): 11 - 13 ft | 0 - 2 in | 2 - 4 ft | 14 - 16 ft |
| | | | | | Normal Sample or Field Duplicate: N | N | N | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.002 UT | 0.0022 U | 0.0021 U | 0.0021 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.002 UT | 0.0022 U | 0.0021 U | 0.0021 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.068 U | 0.072 U | 0.071 U | 0.071 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.002 UT | 0.0022 U | 0.0021 U | 0.0021 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.002 UT | 0.0022 U | 0.0021 U | 0.0021 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.002 UT | 0.0022 U | 0.0021 U | 0.0021 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.0068 UT | 0.0072 U | 0.0071 U | 0.0071 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.0068 UT | 0.0028 NJ | 0.0071 U | 0.0071 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0068 UT | **0.0054 J** | 0.0071 U | 0.0071 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.068 U | 0.072 U | 0.071 U | 0.071 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | | |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-3 | RX-3 | RX-4 | RX-4 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 12 - 14 ft | 0 - 2 ft | 11 - 13 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.0021 U | 0.002 U | 0.0021 U | 0.0021 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.0021 U | 0.002 U | 0.0021 U | 0.0021 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.07 U | 0.067 U | 0.07 U | 0.07 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.0021 U | 0.002 U | 0.0021 U | 0.0021 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.0028 | 0.002 U | 0.0021 U | 0.0021 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.0021 U | 0.002 U | 0.0021 U | 0.0021 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.007 U | 0.0067 U | 0.007 U | 0.007 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.07 U | 0.067 U | 0.07 U | 0.07 U |

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**Table 5. Summary of Pesticides and Herbicides in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | RX-5 | RX-5 | RX-6 | RX-6 |
|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | RX-5 | RX-5 | RX-6 | RX-6 |
| Sample Date: | | | | | 05/31/2022 | 05/31/2022 | 05/31/2022 | 05/31/2022 |
| Sample Depth (bls): | | | | | 0 - 2 ft | 10 - 12 ft | 0 - 2 ft | 12 - 14 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N | N |
| Aldrin | 0.0048 | 0.044 | 0.19 | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.02 | 0.18 | 0.02 | MG/KG | 0.0021 U | 0.002 U | 0.0022 U | 0.0021 U |
| Alpha Endosulfan | 4.3 | 35 | 65 | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.021 | 0.18 | 0.09 | MG/KG | 0.0021 U | 0.002 U | 0.0022 U | 0.0021 U |
| Beta Endosulfan | 4.3 | 35 | 44 | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Chlordane (Technical) | -- | -- | -- | MG/KG | 0.15 | 0.067 U | 0.072 U | 0.071 U |
| cis-Chlordane | **0.014** | 0.65 | 4.5 | MG/KG | **0.022 J** | 0.0067 U | 0.0072 U | 0.0071 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | 100 | 0.1 | MG/KG | 0.0021 U | 0.002 U | 0.0022 U | 0.0021 U |
| Dieldrin | 0.005 | 0.075 | 0.1 | MG/KG | 0.0021 U | 0.002 U | 0.0022 U | 0.0021 U |
| Endosulfan Sulfate | 4.3 | 35 | 47 | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Endrin | 0.014 | 5.3 | 0.06 | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Endrin Aldehyde | -- | -- | -- | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Endrin Ketone | -- | -- | -- | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Gamma Bhc (Lindane) | 0.025 | 0.21 | 0.05 | MG/KG | 0.0021 U | 0.002 U | 0.0022 U | 0.0021 U |
| Heptachlor | 0.013 | 0.53 | 0.38 | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Heptachlor Epoxide | -- | -- | -- | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Methoxychlor | -- | -- | -- | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| P,P'-DDD | **0.0033** | 5 | 14 | MG/KG | **0.0071** | 0.0067 U | 0.0072 U | 0.0071 U |
| P,P'-DDE | **0.0033** | 3.4 | 9.3 | MG/KG | **0.0039 J** | 0.0067 U | 0.0072 U | 0.0071 U |
| P,P'-DDT | **0.0033** | 3.8 | 135 | MG/KG | 0.0071 U | 0.0067 U | 0.0072 U | 0.0071 U |
| Toxaphene | -- | -- | -- | MG/KG | 0.071 U | 0.067 U | 0.072 U | 0.071 U |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-01 | ETSB-02 | ETSB-03 |
|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-01 | ETSB-02 | ETSB-03 |
| Sample Date: | | | | | 01/14/2026 | 01/16/2026 | 01/15/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N |
| 11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| 2-(N-ethyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.98 U | 0.99 U | 0.99 U |
| 2-(N-methyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.98 U | 0.99 U | 0.99 U |
| 2-(N-methyl perfluorooctanesulfonamido) acetic acid | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| 2H,2H,3H,3H-Perfluorooctanoic acid (5:3FTCA) | -- | -- | -- | UG/KG | 0.98 U | 0.99 U | 0.99 U |
| 3-Perfluoroheptyl propanoic acid (7:3FTCA) | -- | -- | -- | UG/KG | 0.98 U | 0.99 U | 0.99 U |
| 3-Perfluoropropyl propanoic acid (3:3 FTCA) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| 4,8-Dioxa-3H-perfluorononanoic acid (ADONA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| 9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| N-ethyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| N-ethyl perfluorooctanesulfonamidoacetic acid | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.23 |
| N-methyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluoro(2-Propoxypropanoic) Acid | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluoro-3-methoxypropanoic acid (PFMPA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluoro-4-methoxybutanoic acid (PFMBA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorobutanesulfonic acid (PFBS) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorobutanoic Acid | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| Perfluorodecane Sulfonic Acid | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.37 |
| Perfluorodecanoic acid (PFDA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.32 |
| Perfluorododecane sulfonate (PFDoDS) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorododecanoic acid (PFDoA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.13 J |
| Perfluoroheptane Sulfonate (PFHPS) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorohexanesulfonic acid (PFHxS) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorohexanoic acid (PFHxA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.11 J |
| Perfluorononanesulfonic Acid (PFNS) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorononanoic acid (PFNA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.17 J |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorooctanesulfonic acid (PFOS) | **0.88** | 44 | 1 | UG/KG | 0.22 | 0.18 J | **1.03** |
| Perfluorooctanoic acid (PFOA) | 0.66 | 33 | 0.8 | UG/KG | 0.1 J | 0.2 U | 0.21 |
| Perfluoropentanesulfonic Acid (PFPeS) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluoropentanoic Acid (PFPeA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.13 J |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-01 | ETSB-02 | ETSB-03 |
| | | | | Sample Date: | 01/14/2026 | 01/16/2026 | 01/15/2026 |
| | | | | Sample Depth (bls): | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | |
| Perfluorotetradecanoic acid (PFTA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Perfluoroundecanoic Acid (PFUnA) | -- | -- | -- | UG/KG | 0.2 U | 0.2 U | 0.2 U |
| Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| Sodium 1H,1H,2H,2H-Perfluorohexane Sulfonate (4:2) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-04 | ETSB-05 | ETSB-06 |
|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-04 | ETSB-05 | ETSB-06 |
| Sample Date: | | | | | 01/13/2026 | 01/13/2026 | 01/20/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N |
| 11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| 2-(N-ethyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.96 U | 0.98 U | 1 U |
| 2-(N-methyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.96 U | 0.98 U | 1 U |
| 2-(N-methyl perfluorooctanesulfonamido) acetic acid | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| 2H,2H,3H,3H-Perfluorooctanoic acid (5:3FTCA) | -- | -- | -- | UG/KG | 0.96 U | 0.98 U | 1 U |
| 3-Perfluoroheptyl propanoic acid (7:3FTCA) | -- | -- | -- | UG/KG | 0.96 U | 0.98 U | 1 U |
| 3-Perfluoropropyl propanoic acid (3:3 FTCA) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| 4,8-Dioxa-3H-perfluorononanoic acid (ADONA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| 9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| N-ethyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| N-ethyl perfluorooctanesulfonamidoacetic acid | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| N-methyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoro(2-Propoxypropanoic) Acid | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoro-3-methoxypropanoic acid (PFMPA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoro-4-methoxybutanoic acid (PFMBA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorobutanesulfonic acid (PFBS) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorobutanoic Acid | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| Perfluorodecane Sulfonic Acid | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorododecane sulfonate (PFDoDS) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorododecanoic acid (PFDoA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoroheptane Sulfonate (PFHPS) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorohexanesulfonic acid (PFHxS) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorohexanoic acid (PFHxA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorononanesulfonic Acid (PFNS) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorononanoic acid (PFNA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorooctanesulfonic acid (PFOS) | **0.88** | 44 | 1 | UG/KG | 0.37 | 0.42 | 0.25 |
| Perfluorooctanoic acid (PFOA) | 0.66 | 33 | 0.8 | UG/KG | 0.13 U | 0.12 U | 0.19 J |
| Perfluoropentanesulfonic Acid (PFPeS) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoropentanoic Acid (PFPeA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | Sample Designation: | ETSB-04 | ETSB-05 | ETSB-06 |
| | | | | Sample Date: | 01/13/2026 | 01/13/2026 | 01/20/2026 |
| | | | | Sample Depth (bls): | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| | | | | Normal Sample or Field Duplicate: | N | N | N |
| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | | | |
| Perfluorotetradecanoic acid (PFTA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Perfluoroundecanoic Acid (PFUnA) | -- | -- | -- | UG/KG | 0.19 U | 0.2 U | 0.2 U |
| Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| Sodium 1H,1H,2H,2H-Perfluorohexane Sulfonate (4:2) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |
| Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) | -- | -- | -- | UG/KG | 0.39 U | 0.39 U | 0.4 U |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-07 | ETSB-08 | ETSB-08 |
|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-07 | ETSB-08 | ETSB-08 |
| Sample Date: | | | | | 01/12/2026 | 01/13/2026 | 01/13/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | FD |
| 11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| 2-(N-ethyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.99 U | 0.97 U | 0.98 U |
| 2-(N-methyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.99 U | 0.97 U | 0.98 U |
| 2-(N-methyl perfluorooctanesulfonamido) acetic acid | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| 2H,2H,3H,3H-Perfluorooctanoic acid (5:3FTCA) | -- | -- | -- | UG/KG | 0.99 U | 0.97 U | 0.98 U |
| 3-Perfluoroheptyl propanoic acid (7:3FTCA) | -- | -- | -- | UG/KG | 0.99 U | 0.97 U | 0.98 U |
| 3-Perfluoropropyl propanoic acid (3:3 FTCA) | -- | -- | -- | UG/KG | 0.4 U | 0.39 U | 0.39 U |
| 4,8-Dioxa-3H-perfluorononanoic acid (ADONA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| 9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| N-ethyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| N-ethyl perfluorooctanesulfonamidoacetic acid | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| N-methyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoro(2-Propoxypropanoic) Acid | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoro-3-methoxypropanoic acid (PFMPA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoro-4-methoxybutanoic acid (PFMBA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorobutanesulfonic acid (PFBS) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorobutanoic Acid | -- | -- | -- | UG/KG | 0.4 U | 0.39 U | 0.39 U |
| Perfluorodecane Sulfonic Acid | -- | -- | -- | UG/KG | 0.2 U | 0.12 J | 0.2 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorododecane sulfonate (PFDoDS) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorododecanoic acid (PFDoA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoroheptane Sulfonate (PFHPS) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorohexanesulfonic acid (PFHxS) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorohexanoic acid (PFHxA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorononanesulfonic Acid (PFNS) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorononanoic acid (PFNA) | -- | -- | -- | UG/KG | 0.2 U | 0.097 J | 0.2 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorooctanesulfonic acid (PFOS) | **0.88** | 44 | 1 | UG/KG | 0.15 J | 0.37 | 0.32 |
| Perfluorooctanoic acid (PFOA) | 0.66 | 33 | 0.8 | UG/KG | 0.065 J | 0.27 | 0.19 J |
| Perfluoropentanesulfonic Acid (PFPeS) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoropentanoic Acid (PFPeA) | -- | -- | -- | UG/KG | 0.2 U | 0.1 J | 0.2 U |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-07 | ETSB-08 | ETSB-08 |
|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-07 | ETSB-08 | ETSB-08 |
| Sample Date: | | | | | 01/12/2026 | 01/13/2026 | 01/13/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | FD |
| Perfluorotetradecanoic acid (PFTA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Perfluoroundecanoic Acid (PFUnA) | -- | -- | -- | UG/KG | 0.2 U | 0.19 U | 0.2 U |
| Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) | -- | -- | -- | UG/KG | 0.4 U | 0.39 U | 0.39 U |
| Sodium 1H,1H,2H,2H-Perfluorohexane Sulfonate (4:2) | -- | -- | -- | UG/KG | 0.4 U | 0.39 U | 0.39 U |
| Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) | -- | -- | -- | UG/KG | 0.4 U | 0.39 U | 0.39 U |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-09 | ETSB-10 | ETSB-11 |
|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-09 | ETSB-10 | ETSB-11 |
| Sample Date: | | | | | 01/19/2026 | 01/23/2026 | 01/15/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N |
| 11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| 2-(N-ethyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.97 U | 0.95 U | 0.95 U |
| 2-(N-methyl perfluoro-1-octanesulfonamido)-ethanol | -- | -- | -- | UG/KG | 0.97 U | 0.95 U | 0.95 U |
| 2-(N-methyl perfluorooctanesulfonamido) acetic acid | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| 2H,2H,3H,3H-Perfluorooctanoic acid (5:3FTCA) | -- | -- | -- | UG/KG | 0.97 U | 0.95 U | 0.95 U |
| 3-Perfluoroheptyl propanoic acid (7:3FTCA) | -- | -- | -- | UG/KG | 0.97 U | 0.95 U | 0.95 U |
| 3-Perfluoropropyl propanoic acid (3:3 FTCA) | -- | -- | -- | UG/KG | 0.39 U | 0.38 U | 0.38 U |
| 4,8-Dioxa-3H-perfluorononanoic acid (ADONA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| 9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| N-ethyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| N-ethyl perfluorooctanesulfonamidoacetic acid | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| N-methyl perfluoro-1-octanesulfonamide | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoro(2-Propoxypropanoic) Acid | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoro-3-methoxypropanoic acid (PFMPA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoro-4-methoxybutanoic acid (PFMBA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorobutanesulfonic acid (PFBS) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorobutanoic Acid | -- | -- | -- | UG/KG | 0.39 U | 0.38 U | 0.38 U |
| Perfluorodecane Sulfonic Acid | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorododecane sulfonate (PFDoDS) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorododecanoic acid (PFDoA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoroheptane Sulfonate (PFHPS) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorohexanesulfonic acid (PFHxS) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorohexanoic acid (PFHxA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorononanesulfonic Acid (PFNS) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorononanoic acid (PFNA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorooctanesulfonic acid (PFOS) | **0.88** | 44 | 1 | UG/KG | 0.17 J | 0.12 J | 0.26 |
| Perfluorooctanoic acid (PFOA) | 0.66 | 33 | 0.8 | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoropentanesulfonic Acid (PFPeS) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoropentanoic Acid (PFPeA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |

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**Table 6. Summary of Per- and Polyfluoroalkyl Substances in Soil, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Part 375 Unrestricted Use SCO | NYSDEC Part 375 Restricted Residential SCO | NYSDEC Part 375 Protection of Groundwater SCO | Units | ETSB-09 | ETSB-10 | ETSB-11 |
|---|---|---|---|---|---|---|---|
| Sample Designation: | | | | | ETSB-09 | ETSB-10 | ETSB-11 |
| Sample Date: | | | | | 01/19/2026 | 01/23/2026 | 01/15/2026 |
| Sample Depth (bls): | | | | | 2 - 4 ft | 2 - 4 ft | 2 - 4 ft |
| Normal Sample or Field Duplicate: | | | | | N | N | N |
| Perfluorotetradecanoic acid (PFTA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Perfluoroundecanoic Acid (PFUnA) | -- | -- | -- | UG/KG | 0.19 U | 0.19 U | 0.19 U |
| Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) | -- | -- | -- | UG/KG | 0.39 U | 0.38 U | 0.38 U |
| Sodium 1H,1H,2H,2H-Perfluorohexane Sulfonate (4:2) | -- | -- | -- | UG/KG | 0.39 U | 0.38 U | 0.38 U |
| Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) | -- | -- | -- | UG/KG | 0.39 U | 0.38 U | 0.38 U |

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**Table 7. Summary of Volatile Organic Compounds in Groundwater, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
| Sample Date: | | | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 06/07/2022 |
| Normal Sample or Field Duplicate: | | | N | N | N | N | FD | N | N |
| 1,1,1-Trichloroethane (TCA) | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 5 | UG/L | 0.2 U | 0.2 U | 0.2 UJ | 0.2 U | 0.2 U | 0.2 U | 1 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | 1 | UG/L | 0.58 U | 0.58 U | 0.58 U | 0.58 U | 0.58 U | 0.58 U | 1 U |
| 1,1-Dichloroethane | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2,3-Trichlorobenzene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2,4-Trichlorobenzene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2,4-Trimethylbenzene | **5** | UG/L | 1 U | 1 U | 1 U | **180** | **150** | 1 U | 1 U |
| 1,2-Dibromo-3-Chloropropane | 0.04 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | 0.0006 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichlorobenzene | 3 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichloroethane | 0.6 | UG/L | 0.3 U | 0.3 U | 0.3 UJ | 0.3 U | 0.3 U | 0.3 U | 1 U |
| 1,2-Dichloropropane | 1 | UG/L | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 1 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | 5 | UG/L | 1 U | 1 U | 1 U | 2.9 | 2.3 | 1 U | 1 U |
| 1,3-Dichlorobenzene | 3 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,4-Dichlorobenzene | 3 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 2-Hexanone | 50 | UG/L | 5 U | 5 U | 5 UJ | 5 U | 5 U | 5 U | 5 U |
| Acetone | 50 | UG/L | 5 U | 5 U | 5 U | 5 U | 5 U | 6.4 | 5.9 |
| Benzene | 1 | UG/L | 0.45 U | 0.45 U | 0.45 U | 0.45 U | 0.45 U | 0.45 U | 1 U |
| Bromochloromethane | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromodichloromethane | 50 | UG/L | 0.98 U | 0.98 U | 1.1 | 0.98 U | 0.98 U | 0.86 J | 0.57 J |
| Bromoform | 50 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromomethane | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 UJ |
| Carbon Disulfide | 60 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Carbon Tetrachloride | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chlorobenzene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroethane | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroform | **7** | UG/L | **22** | 1 U | **22** | 0.78 J | 0.8 J | **20** | 2.8 |
| Chloromethane | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Cis-1,2-Dichloroethylene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Cis-1,3-Dichloropropene | -- | UG/L | 0.45 U | 0.45 U | 0.45 UJ | 0.45 U | 0.45 U | 0.45 U | 1 U |
| Cyclohexane | -- | UG/L | 1 U | 1 U | 1 U | 1.5 | 1.4 | 1 U | 1 U |
| Dibromochloromethane | 50 | UG/L | 0.78 U | 0.78 U | 0.78 U | 0.78 U | 0.78 U | 0.78 U | 1 U |

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**Table 7. Summary of Volatile Organic Compounds in Groundwater, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
| Sample Date: | | | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 06/07/2022 |
| Normal Sample or Field Duplicate: | | | N | N | N | N | FD | N | N |
| Dichlorodifluoromethane | 5 | UG/L | 1 UT | 1 UT | 1 UT | 1 UT | 1 UT | 1 UT | 1 U |
| Ethylbenzene | **5** | UG/L | 1 U | 1 U | 1 U | **5.5** | 4.4 | 1 U | 1 U |
| Isopropylbenzene (Cumene) | 5 | UG/L | 1 U | 1 U | 1 U | 3.9 | 3.1 | 1 U | 1 U |
| m,p-Xylene | **5** | UG/L | 1 U | 1 U | 1 U | **7.8** | **5.8** | 1 U | 1 U |
| Methyl Acetate | -- | UG/L | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Methyl Ethyl Ketone (2-Butanone) | 50 | UG/L | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | -- | UG/L | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Methylcyclohexane | -- | UG/L | 1 U | 1 U | 1 U | 4.5 | 3.8 | 1 U | 1 U |
| Methylene Chloride | 5 | UG/L | 1 U | 1 U | 1.4 | 1.5 U | 1 U | 1 U | 1 U |
| N-Butylbenzene | 5 | UG/L | 1 U | 1 U | 1 U | 3 | 3.2 | 1 U | 1 U |
| N-Propylbenzene | **5** | UG/L | 1 U | 1 U | 1 U | **10** | **8.5** | 1 U | 1 U |
| O-Xylene (1,2-Dimethylbenzene) | 5 | UG/L | 1 U | 1 U | 1 U | 1.9 | 1.2 | 1 U | 1 U |
| Sec-Butylbenzene | 5 | UG/L | 1 U | 1 U | 1 U | 3.4 | 2.9 | 1 U | 1 U |
| Styrene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| T-Butylbenzene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Tert-Butyl Methyl Ether | 10 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Tetrachloroethylene (PCE) | 5 | UG/L | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 1 U |
| Toluene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trans-1,2-Dichloroethene | 5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trans-1,3-Dichloropropene | -- | UG/L | 0.45 U | 0.45 U | 0.45 U | 0.45 U | 0.45 U | 0.45 U | 1 U |
| Trichloroethylene (TCE) | 5 | UG/L | 0.28 U | 0.28 U | 0.28 U | 0.28 U | 0.28 U | 0.28 U | 1 U |
| Trichlorofluoromethane | 5 | UG/L | 1 UT | 1 UT | 1 U | 1 UT | 1 UT | 1 UT | 1 U |
| Vinyl Chloride | 2 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Xylenes | **5** | UG/L | 2 U | 2 U | 2 U | **9.7** | **7.1** | 2 U | 2 U |

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**Table 8. Summary of Semivolatile Organic Compounds in Groundwater, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
| Sample Date: | | | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 06/07/2022 |
| Normal Sample or Field Duplicate: | | | N | N | N | N | FD | N | N |
| 1,2,4,5-Tetrachlorobenzene | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,4-Dioxane (P-Dioxane) | 0.35 | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | NA |
| 2,3,4,6-Tetrachlorophenol | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4,5-Trichlorophenol | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4,6-Trichlorophenol | -- | UG/L | 3 U | 3 U | 3 U | 3 U | 3 U | 3 U | 10 U |
| 2,4-Dichlorophenol | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4-Dimethylphenol | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4-Dinitrophenol | 10 | UG/L | 12 U | 12 U | 12 U | 12 U | 12 U | 12 U | 20 U |
| 2,4-Dinitrotoluene | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 2 U |
| 2,6-Dinitrotoluene | 5 | UG/L | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| 2-Chloronaphthalene | 10 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Chlorophenol | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Methylnaphthalene | -- | UG/L | 10 U | 10 U | 10 U | 0.79 J | 0.78 J | 10 U | 10 U |
| 2-Methylphenol (O-Cresol) | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Nitroaniline | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Nitrophenol | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 3,3'-Dichlorobenzidine | 5 | UG/L | 5.2 U | 5.2 U | 5.2 U | 5.2 U | 5.2 U | 5.2 U | 10 U |
| 3-Nitroaniline | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4,6-Dinitro-2-Methylphenol | -- | UG/L | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U |
| 4-Bromophenyl Phenyl Ether | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Chloro-3-Methylphenol | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Chloroaniline | 5 | UG/L | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| 4-Chlorophenyl Phenyl Ether | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Methylphenol (P-Cresol) | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Nitroaniline | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Nitrophenol | -- | UG/L | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U |
| Acenaphthene | 20 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Acenaphthylene | 20 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Acetophenone | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Anthracene | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Atrazine | 7.5 | UG/L | 2 UT | 2 UT | 2 U | 2 UT | 2 UT | 2 UT | 2 U |
| Benzaldehyde | -- | UG/L | 10 UJ | 10 UJ | 10 UJ | 10 UJ | 10 UJ | 10 UJ | 10 UT |
| Benzo(A)Anthracene | 0.002 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Benzo(A)Pyrene | 0 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |

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**Table 8. Summary of Semivolatile Organic Compounds in Groundwater, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
|---|---|---|---|---|---|---|---|---|---|
| Sample Designation: | | | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
| Sample Date: | | | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 06/07/2022 |
| Normal Sample or Field Duplicate: | | | N | N | N | N | FD | N | N |
| Benzo(B)Fluoranthene | 0.002 | UG/L | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Benzo(G,H,I)Perylene | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(K)Fluoranthene | 0.002 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Benzyl Butyl Phthalate | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Biphenyl (Diphenyl) | 5 | UG/L | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| Bis(2-Chloroethoxy) Methane | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether) | 1 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bis(2-Chloroisopropyl) Ether | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Bis(2-Ethylhexyl) Phthalate | 5 | UG/L | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Caprolactam | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbazole | -- | UG/L | 10 U | 10 U | 10 U | 1 J | 0.7 J | 0.93 J | 10 U |
| Chrysene | 0.002 | UG/L | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Cresols, M & P | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Dibenz(A,H)Anthracene | -- | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Dibenzofuran | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Diethyl Phthalate | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Dimethyl Phthalate | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Di-N-Butyl Phthalate | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Di-N-Octylphthalate | -- | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Fluoranthene | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Fluorene | 50 | UG/L | 10 U | 10 U | 10 U | 1 J | 1 J | 10 U | 10 U |
| Hexachlorobenzene | 0.04 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Hexachlorobutadiene | 0.5 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Hexachlorocyclopentadiene | 5 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Hexachloroethane | 5 | UG/L | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 2 U |
| Indeno(1,2,3-C,D)Pyrene | 0.002 | UG/L | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Isophorone | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Naphthalene | 10 | UG/L | 2 U | 2 U | 2 U | 3.4 | 2.6 | 1.7 J | 2 U |
| Nitrobenzene | 0.4 | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| N-Nitrosodi-N-Propylamine | -- | UG/L | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| N-Nitrosodiphenylamine | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Pentachlorophenol | 1 | UG/L | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U |
| Phenanthrene | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Phenol | 1 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |

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**Table 8. Summary of Semivolatile Organic Compounds in Groundwater, 310 East 161st Street, Bronx, New York**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sample Designation: | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
| | | Sample Date: | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 06/07/2022 |
| | | Normal Sample or Field Duplicate: | N | N | N | N | FD | N | N |
| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | | | | | | | |
| Pyrene | 50 | UG/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |

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**Table 9. Summary of Metals in Groundwater, 310 East 161st Street, Bronx, New York**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample Designation: | | ETMW-01 | ETMW-01 | ETMW-02 | ETMW-02 | ETMW-03 | ETMW-03 | ETMW-03 | ETMW-04 | ETMW-04 |
| | Sample Date: | | 02/11/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 |
| | Normal Sample or Field Duplicate: | | N | N | N | N | N | N | N | N | N |
| | Total or Dissolved: | | Total | Dissolved | Total | Dissolved | Total | Total | Dissolved | Total | Dissolved |
| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | | | | | | | | | |
| Aluminum | -- | UG/L | 76.6 | 40 U | 82.9 | 40 U | NA | 79.8 | 40 U | 12 J | 40 U |
| Antimony | 3 | UG/L | 2 U | 2 U | 2 U | 2 U | NA | 2 U | 2 U | 2 U | 2 U |
| Arsenic | 25 | UG/L | 2 U | 2 U | 2 U | 2 U | NA | 2 U | 2 U | 0.61 J | 0.54 J |
| Barium | 1000 | UG/L | 40.5 | 41.8 | 38.3 | 39.9 | NA | 105 | 103 | 67.8 | 67 |
| Beryllium | **3** | UG/L | 0.8 U | 0.8 U | 0.8 U | 0.8 U | NA | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Cadmium | 5 | UG/L | 0.92 U | 0.92 U | 0.92 U | 0.92 U | NA | 0.92 U | 0.92 U | 0.92 U | 0.92 U |
| Calcium | -- | UG/L | 110000 | 115000 | 75400 | 84600 | NA | 87800 | 87800 | 155000 | 153000 |
| Chromium III | -- | UG/L | 10 UJ | NA | 10 U | NA | NA | 10 U | NA | 10 UJ | NA |
| Chromium, Hexavalent | 50 | UG/L | 8.7 J+ | NA | 10 U | NA | 10 U | 10 U | NA | 7.6 J+ | NA |
| Chromium, Total | 50 | UG/L | 4.6 | 4.1 | 2.8 J | 4 U | NA | 4 U | 4 U | 6.9 | 5.9 |
| Cobalt | -- | UG/L | 2 U | 2 U | 2 U | 2 U | NA | 2 U | 2 U | 1.5 J | 1.5 J |
| Copper | 200 | UG/L | 4 U | 4 U | 4 U | 4 U | NA | 4 U | 4 U | 4 U | 4 U |
| Cyanide | 200 | MG/L | 1.8 J | NA | 5 U | NA | 5 UJ | NA | NA | 1.8 J | NA |
| Iron | **300** | UG/L | 209 | 120 U | **542** | 120 U | NA | 136 | 120 U | 72.5 J | 34.5 J |
| Lead | **25** | UG/L | 0.63 J | 1.2 U | 0.71 J | 1.2 U | NA | 0.74 J | 1.2 U | 1.3 | 0.58 J |
| Magnesium | **35000** | UG/L | **64900** | **65700** | **42000** | **39300** | NA | **41200** | **40000** | **66700** | **65500** |
| Manganese | **300** | UG/L | 30.8 | 14.9 | 89.5 | 5.3 J | NA | 16.5 | 2.5 J | 91 | 85.1 |
| Mercury | 0.7 | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | NA | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Nickel | 100 | UG/L | 4 U | 4 U | 4 U | 4 U | NA | 4 U | 4 U | 3.4 J | 1.6 J |
| Potassium | -- | UG/L | 3250 | 3540 | 2690 | 2960 | NA | 2900 | 2820 | 3580 | 3540 |
| Selenium | 10 | UG/L | 1.4 J | 1.4 J | 0.89 J | 1.6 J | NA | 2.5 U | 0.47 J | 2.2 J | 2.2 J |
| Silver | 50 | UG/L | 2 U | 2 U | 2 U | 2 U | NA | 2 U | 2 U | 2 U | 2 U |
| Sodium | **20000** | UG/L | **50200** | **52100** | **107000** | **117000** | NA | **90200** | **89900** | **95200** | **99400** |
| Thallium | **0.5** | UG/L | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NA | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Vanadium | -- | UG/L | 4 U | 4 U | 4 U | 4 U | NA | 1.5 J | 1 J | 4 U | 4 U |
| Zinc | 2000 | UG/L | 16 U | 16 U | 5.7 J | 16 U | NA | 10.7 J | 6.1 J | 8.7 J | 5.7 J |

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**Table 9. Summary of Metals in Groundwater, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | ETMW-04 02/11/2026 FD Total | ETMW-04 02/11/2026 FD Dissolved | ETMW-05 02/11/2026 N Total | ETMW-05 02/11/2026 N Dissolved | RX-8G 06/07/2022 N Total | RX-8G 06/07/2022 N Dissolved |
|---|---|---|---|---|---|---|---|---|
| Aluminum | -- | UG/L | 40 U | 40 U | 388 | 12.4 J | 1180 | 40 U |
| Antimony | 3 | UG/L | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Arsenic | 25 | UG/L | 0.53 J | 0.71 J | 2 U | 2 U | 2 U | 2 U |
| Barium | 1000 | UG/L | 66.5 | 66 | 11.5 J | 13.9 J | 116 | 12.4 |
| Beryllium | **3** | UG/L | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.35 J | 0.8 U |
| Cadmium | 5 | UG/L | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.68 J | 2 U |
| Calcium | -- | UG/L | 153000 | 153000 | 34900 | 36700 | 414000 | 35500 |
| Chromium III | -- | UG/L | 10 UJ | NA | 10 U | NA | NA | NA |
| Chromium, Hexavalent | 50 | UG/L | 8.7 J+ | NA | 10 U | NA | NA | NA |
| Chromium, Total | 50 | UG/L | 7.6 | 4.6 | 4 U | 4 U | 4.7 | 4 U |
| Cobalt | -- | UG/L | 1.4 J | 1.5 J | 0.34 J | 0.18 J | 1.6 J | 4 U |
| Copper | 200 | UG/L | 4 U | 4 U | 3.4 J | 2.3 J | 15.3 | 3.7 J |
| Cyanide | 200 | MG/L | 1.5 J | NA | 5 U | NA | NA | NA |
| Iron | **300** | UG/L | 53.2 J | 46.7 J | **710** | 120 U | **3220** | 120 U |
| Lead | **25** | UG/L | 0.71 J | 0.66 J | 2.2 | 1.2 U | 3.1 | 1.2 U |
| Magnesium | **35000** | UG/L | **68200** | **64600** | 15700 | 16200 | **135000** | **53500** |
| Manganese | **300** | UG/L | 73.2 J | 90.9 J | 109 | 105 | **1170** | 14.4 |
| Mercury | 0.7 | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.14 J | 0.2 U |
| Nickel | 100 | UG/L | 2.6 J | 1.9 J | 4 U | 4 U | 11.8 | 4 U |
| Potassium | -- | UG/L | 3450 | 3480 | 2020 | 2310 | 4200 | 3680 |
| Selenium | 10 | UG/L | 1.8 J | 2.2 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Silver | 50 | UG/L | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Sodium | **20000** | UG/L | **101000** | **95800** | **43900 J** | **52100 J** | **44100** | **42300** |
| Thallium | **0.5** | UG/L | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.8 U | 0.8 U |
| Vanadium | -- | UG/L | 4 U | 4 U | 2.4 J | 1.2 J | 3.2 J | 4 U |
| Zinc | 2000 | UG/L | 9 J | 6.1 J | 7.5 J | 16 U | 33.1 | 27 |

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**Table 10. Summary of Polychlorinated Biphenyls in Groundwater, 310 East 161st Street, Bronx, New York**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sample Designation: | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 | RX-8G |
| | | Sample Date: | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 | 06/07/2022 |
| | | Normal Sample or Field Duplicate: | N | N | N | N | FD | N | N |
| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | | | | | | | |
| PCB-1016 (Aroclor 1016) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1221 (Aroclor 1221) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1232 (Aroclor 1232) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1242 (Aroclor 1242) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1248 (Aroclor 1248) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1254 (Aroclor 1254) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1260 (Aroclor 1260) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1262 (Aroclor 1262) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| PCB-1268 (Aroclor 1268) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |
| Polychlorinated Biphenyl (PCBs) | 0.09 | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.4 U |

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**Table 11. Summary of Pesticides and Herbicides in Groundwater, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sample Designation: | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 |
| | | Sample Date: | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 |
| | | Normal Sample or Field Duplicate: | N | N | N | N | FD | N |
| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | | | | | | |
| Aldrin | 0 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Alpha Bhc (Alpha Hexachlorocyclohexane) | 0.01 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Alpha Endosulfan | -- | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Beta Bhc (Beta Hexachlorocyclohexane) | 0.04 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Beta Endosulfan | -- | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Chlordane (Technical) | -- | UG/L | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| cis-Chlordane | -- | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Delta BHC (Delta Hexachlorocyclohexane) | 0.04 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Dieldrin | 0.004 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Endosulfan Sulfate | -- | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Endrin | 0 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Endrin Aldehyde | 5 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Endrin Ketone | 5 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Gamma Bhc (Lindane) | 0.05 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Heptachlor | 0.04 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Heptachlor Epoxide | 0.03 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Methoxychlor | 35 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| P,P'-DDD | 0.3 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| P,P'-DDE | 0.2 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| P,P'-DDT | 0.2 | UG/L | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Toxaphene | 0.06 | UG/L | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |

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**Table 12. Summary of Per- and Polyfluoroalkyl Substances in Groundwater, 310 East 161st Street, Bronx, New York**

| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | Sample Designation: ETMW-01<br>Sample Date: 02/11/2026<br>Normal Sample or Field Duplicate: N | ETMW-02<br>02/11/2026<br>N | ETMW-03<br>01/29/2026<br>N | ETMW-04<br>02/11/2026<br>N | ETMW-04<br>02/11/2026<br>FD | ETMW-05<br>02/11/2026<br>N |
|---|---|---|---|---|---|---|---|---|
| 11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| 2-(N-ethyl perfluoro-1-octanesulfonamido)-ethanol | -- | NG/L | 0.00817 U | 0.00805 U | 0.00804 U | 0.00829 U | 0.00863 U | 0.00862 U |
| 2-(N-methyl perfluoro-1-octanesulfonamido)-ethanol | -- | NG/L | 0.00817 U | 0.00805 U | 0.00804 U | 0.00829 U | 0.00863 U | 0.00813 U |
| 2-(N-methyl perfluorooctanesulfonamido) acetic acid | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| 2H,2H,3H,3H-Perfluorooctanoic acid (5:3FTCA) | -- | NG/L | 0.00817 UT | 0.00805 UJ | 0.00804 U | 0.00829 UJ | 0.00863 UJ | 0.00813 UJ |
| 3-Perfluoroheptyl propanoic acid (7:3FTCA) | -- | NG/L | 0.00817 U | 0.00805 U | 0.00804 U | 0.00829 U | 0.00863 U | 0.00813 U |
| 3-Perfluoropropyl propanoic acid (3:3 FTCA) | -- | NG/L | 0.00327 U | 0.00322 U | 0.00322 U | 0.00332 U | 0.00345 U | 0.00325 U |
| 4,8-Dioxa-3H-perfluorononanoic acid (ADONA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| 9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| N-ethyl perfluoro-1-octanesulfonamide | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| N-ethyl perfluorooctanesulfonamidoacetic acid | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| N-methyl perfluoro-1-octanesulfonamide | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluoro(2-Propoxypropanoic) Acid | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluoro-3-methoxypropanoic acid (PFMPA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluoro-4-methoxybutanoic acid (PFMBA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluorobutanesulfonic acid (PFBS) | -- | NG/L | 0.00467 | 0.00175 | 0.00124 J | 0.0117 | 0.0119 | 0.00082 J |
| Perfluorobutanoic Acid | -- | NG/L | 0.00698 | 0.00138 J | 0.00218 J | 0.0287 | 0.0282 | 0.0018 J |
| Perfluorodecane Sulfonic Acid | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluorodecanoic acid (PFDA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluorododecane sulfonate (PFDoDS) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluorododecanoic acid (PFDoA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluoroheptane Sulfonate (PFHPS) | -- | NG/L | 0.00046 J | 0.00087 J | 0.00161 U | 0.00148 J | 0.00147 J | 0.00163 U |
| Perfluoroheptanoic acid (PFHpA) | -- | NG/L | 0.00599 | 0.00159 J | 0.00223 | 0.0299 | 0.0298 | 0.00073 J |
| Perfluorohexanesulfonic acid (PFHxS) | -- | NG/L | 0.00399 | 0.00229 | 0.00128 J | 0.0285 | 0.0298 | 0.00163 U |
| Perfluorohexanoic acid (PFHxA) | -- | NG/L | 0.00901 | 0.00147 J | 0.00309 | 0.0894 | 0.0894 | 0.00175 |
| Perfluorononanesulfonic Acid (PFNS) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluorononanoic acid (PFNA) | -- | NG/L | 0.00136 J | 0.00086 J | 0.00161 U | 0.00122 J | 0.00097 J | 0.00163 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluorooctanesulfonic acid (PFOS) | **2.7** | NG/L | **0.0124** | **0.00714** | **0.00419** | **0.00913** | **0.00752** | 0.00202 |
| Perfluorooctanoic acid (PFOA) | **6.7** | NG/L | **0.0304** | **0.0244** | **0.0171** | **0.111** | **0.11** | 0.00437 |
| Perfluoropentanesulfonic Acid (PFPeS) | -- | NG/L | 0.00058 J | 0.00161 U | 0.00161 U | 0.00384 | 0.00385 | 0.00163 U |
| Perfluoropentanoic Acid (PFPeA) | -- | NG/L | 0.0108 | 0.00108 J | 0.00305 | 0.0878 | 0.0889 | 0.00195 |

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**Table 12. Summary of Per- and Polyfluoroalkyl Substances in Groundwater, 310 East 161st Street, Bronx, New York**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sample Designation: | ETMW-01 | ETMW-02 | ETMW-03 | ETMW-04 | ETMW-04 | ETMW-05 |
| | | Sample Date: | 02/11/2026 | 02/11/2026 | 01/29/2026 | 02/11/2026 | 02/11/2026 | 02/11/2026 |
| | | Normal Sample or Field Duplicate: | N | N | N | N | FD | N |
| Parameter | NYSDEC Ambient Water Quality Standards and Guidance Values | Units | | | | | | |
| Perfluorotetradecanoic acid (PFTA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Perfluoroundecanoic Acid (PFUnA) | -- | NG/L | 0.00163 U | 0.00161 U | 0.00161 U | 0.00166 U | 0.00173 U | 0.00163 U |
| Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) | -- | NG/L | 0.00327 U | 0.00322 U | 0.00322 U | 0.00332 U | 0.00345 U | 0.00325 U |
| Sodium 1H,1H,2H,2H-Perfluorohexane Sulfonate (4:2) | -- | NG/L | 0.00327 U | 0.00322 U | 0.00322 U | 0.00332 U | 0.00345 U | 0.00325 U |
| Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) | -- | NG/L | 0.00327 U | 0.00322 U | 0.00322 U | 0.00332 U | 0.00345 U | 0.00325 U |

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**Table 13. Summary of Volatile Organic Compounds in Soil Vapor, 310 East 161st Street, Bronx, New York**

| Sample Designation: | | AMB_012926_SV | ETSV-01 | ETSV-02 | ETSV-03 | ETSV-04 | ETSV-05 | ETSV-06 | ETSV-06 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Date: | | 01/29/2026 | 01/29/2026 | 02/13/2026 | 01/29/2026 | 01/29/2026 | 01/29/2026 | 01/29/2026 | 01/29/2026 |
| Normal Sample or Field Duplicate: | | N | N | N | N | N | N | N | FD |
| Parameter | Units | | | | | | | | |
| 1,1,1-Trichloroethane (TCA) | UG/M3 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U |
| 1,1,2,2-Tetrachloroethane | UG/M3 | 1.4 U | 1.4 U | 1.4 U | 1.4 U | 1.4 U | 1.4 U | 1.4 U | 1.4 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | UG/M3 | **0.48 J** | 1.5 U | 1.5 U | **0.45 J** | 1.5 U | 1.5 U | **0.47 J** | 1.5 U |
| 1,1,2-Trichloroethane | UG/M3 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U |
| 1,1-Dichloroethane | UG/M3 | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U |
| 1,1-Dichloroethene | UG/M3 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| 1,2,4-Trichlorobenzene | UG/M3 | 3.7 U | 3.7 U | 3.7 U | 3.7 U | 3.7 U | 3.7 U | 3.7 U | 3.7 U |
| 1,2,4-Trimethylbenzene | UG/M3 | 0.98 U | 0.98 U | 0.98 U | 0.98 U | **9.5** | 0.98 U | 0.98 U | 0.98 U |
| 1,2-Dibromoethane (Ethylene Dibromide) | UG/M3 | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U |
| 1,2-Dichlorobenzene | UG/M3 | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U |
| 1,2-Dichloroethane | UG/M3 | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U | 0.81 U |
| 1,2-Dichloropropane | UG/M3 | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U |
| 1,2-Dichlorotetrafluoroethane | UG/M3 | 1.4 U | **2.4** | 1.4 U | 1.4 U | 1.4 U | 1.4 U | **2.9** | **3.3** |
| 1,3,5-Trimethylbenzene (Mesitylene) | UG/M3 | 0.98 U | 0.98 U | 0.98 U | 0.98 U | **1.8** | 0.98 U | 0.98 U | 0.98 U |
| 1,3-Butadiene | UG/M3 | 0.44 U | 0.44 U | 0.44 U | 0.44 U | **0.19 J** | 0.44 U | 0.44 U | 0.44 U |
| 1,3-Dichlorobenzene | UG/M3 | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U |
| 1,4-Dichlorobenzene | UG/M3 | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U |
| 1,4-Dioxane (P-Dioxane) | UG/M3 | 18 U | 18 U | 18 U | 18 U | 18 U | 18 U | 18 U | 18 U |
| 2,2,4-Trimethylpentane | UG/M3 | 0.93 U | 0.93 U | 0.93 U | 0.93 U | **230** | 0.93 U | **0.87 J** | **0.32 J** |
| 2-Chlorotoluene | UG/M3 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 2-Hexanone | UG/M3 | 2.1 U | 2.1 U | **0.79 J** | 2.1 U | 2.1 U | 2.1 U | **0.75 J** | 2.1 U |
| 4-Ethyltoluene | UG/M3 | 0.98 U | 0.98 U | 0.98 U | 0.98 U | **2** | 0.98 U | 0.98 U | 0.98 U |
| Acetone | UG/M3 | **6 J** | **24** | **47** | **49** | **34** | **91 D** | **32** | **25** |
| Allyl Chloride (3-Chloropropene) | UG/M3 | 1.6 U | 1.6 U | 1.6 U | 1.6 U | 1.6 U | 1.6 U | 1.6 U | 1.6 U |
| Benzene | UG/M3 | **0.86** | 0.64 U | **0.54 J** | **0.96** | **0.62 J** | **1.1** | **1.2** | **1.2** |
| Benzyl Chloride | UG/M3 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromodichloromethane | UG/M3 | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U |
| Bromoform | UG/M3 | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U |
| Bromomethane | UG/M3 | 0.78 U | 0.78 U | 0.78 U | 0.78 U | 0.78 U | 0.78 U | 0.78 U | 0.78 U |
| Butane | UG/M3 | **2.6** | **8** | **7.5** | **6.1** | **8** | **12** | **7.3** | **8.3** |
| Carbon Disulfide | UG/M3 | 1.6 U | **0.86 J** | **1.1 J** | **3.8** | **0.76 J** | **1.6** | **3.4** | **4.7** |
| Carbon Tetrachloride | UG/M3 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Chlorobenzene | UG/M3 | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U | 0.92 U |
| Chlorodifluoromethane | UG/M3 | 1.8 U | 1.8 U | 1.8 U | 1.8 U | 1.8 U | 1.8 U | 1.8 U | 1.8 U |
| Chloroethane | UG/M3 | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U |
| Chloroform | UG/M3 | 0.98 U | **0.27 J** | **0.35 J** | **0.35 J** | **2.8** | **0.65 J** | **1.4** | **1.9** |
| Chloromethane | UG/M3 | **0.38 J** | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |

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**Table 13. Summary of Volatile Organic Compounds in Soil Vapor, 310 East 161st Street, Bronx, New York**

| Sample Designation: | | AMB_012926_SV | ETSV-01 | ETSV-02 | ETSV-03 | ETSV-04 | ETSV-05 | ETSV-06 | ETSV-06 |
|---|---|---|---|---|---|---|---|---|---|
| Sample Date: | | 01/29/2026 | 01/29/2026 | 02/13/2026 | 01/29/2026 | 01/29/2026 | 01/29/2026 | 01/29/2026 | 01/29/2026 |
| Normal Sample or Field Duplicate: | | N | N | N | N | N | N | N | FD |
| Parameter | Units | | | | | | | | |
| Cis-1,2-Dichloroethylene | UG/M3 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Cis-1,3-Dichloropropene | UG/M3 | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U |
| Cyclohexane | UG/M3 | 0.69 U | 0.69 U | 0.69 U | **0.68 J** | **41** | **0.76** | **0.8** | **0.88** |
| Cymene | UG/M3 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U |
| Dibromochloromethane | UG/M3 | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U |
| Dichlorodifluoromethane | UG/M3 | **2.4 J** | **5** | **2.6** | **5.5** | **3.4** | **27** | **2.8** | **3** |
| Ethylbenzene | UG/M3 | 0.87 U | 0.87 U | 0.87 U | 0.87 U | **2.9** | 0.87 U | 0.87 U | 0.87 U |
| Hexachlorobutadiene | UG/M3 | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U |
| Isopropanol | UG/M3 | 12 U | 12 U | 12 U | 12 U | 12 U | 12 U | 12 U | 12 U |
| Isopropylbenzene (Cumene) | UG/M3 | 0.98 U | 0.98 U | 0.98 U | 0.98 U | **0.62 J** | 0.98 U | 0.98 U | 0.98 U |
| m,p-Xylene | UG/M3 | 2.2 U | 2.2 U | 2.2 U | 2.2 U | **6.9** | 2.2 U | **0.61 J** | 2.2 U |
| Methyl Ethyl Ketone (2-Butanone) | UG/M3 | 1.5 U | **8.6** | **30** | **72 D** | **66** | **140 D** | **49** | **50** |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | UG/M3 | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U |
| Methyl Methacrylate | UG/M3 | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U | 2.1 U |
| Methylene Chloride | UG/M3 | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U |
| Naphthalene | UG/M3 | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| N-Butylbenzene | UG/M3 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U |
| N-Heptane | UG/M3 | 0.82 U | 0.82 U | 0.82 U | **0.76 J** | **1.8** | **0.78 J** | **0.92** | **0.62 J** |
| N-Hexane | UG/M3 | **0.4 J** | 1.8 U | **0.72 J** | **2** | **2.3** | **3.1** | **2** | **2.7** |
| N-Propylbenzene | UG/M3 | 0.98 U | 0.98 U | 0.98 U | 0.98 U | **1.7** | 0.98 U | 0.98 U | 0.98 U |
| O-Xylene (1,2-Dimethylbenzene) | UG/M3 | 0.87 U | 0.87 U | 0.87 U | 0.87 U | **2.9** | 0.87 U | 0.87 U | 0.87 U |
| Sec-Butylbenzene | UG/M3 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U |
| Styrene | UG/M3 | 0.85 U | 0.85 U | 0.85 U | 0.85 U | 0.85 U | 0.85 U | 0.85 U | 0.85 U |
| T-Butylbenzene | UG/M3 | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U |
| Tert-Butyl Alcohol | UG/M3 | 15 U | 15 U | 15 U | 15 U | 15 U | 15 U | 15 U | 15 U |
| Tert-Butyl Methyl Ether | UG/M3 | 0.72 U | 0.72 U | 0.72 U | 0.72 U | 0.72 U | 0.72 U | 0.72 U | 0.72 U |
| Tetrachloroethylene (PCE) | UG/M3 | 1.4 U | 1.4 U | 1.4 U | 1.4 U | 1.4 U | **5** | **7** | **4.2** |
| Tetrahydrofuran | UG/M3 | 15 U | 15 U | 15 U | 15 U | 15 U | 15 U | 15 U | 15 U |
| Toluene | UG/M3 | **0.67 J** | 0.75 U | **0.46 J** | **1** | **0.88** | **1.2** | **1.2** | **1.5** |
| Trans-1,2-Dichloroethene | UG/M3 | 0.79 U | 0.79 U | 0.79 U | 0.79 U | 0.79 U | 0.79 U | 0.79 U | 0.79 U |
| Trans-1,3-Dichloropropene | UG/M3 | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U | 0.91 U |
| Trichloroethylene (TCE) | UG/M3 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | **5.2** | **3.1** | 0.2 U |
| Trichlorofluoromethane | UG/M3 | **1.1** | **3.4** | **2.1** | **5.5** | **1.9** | **1.7** | **1.1** | **1.1** |
| Vinyl Bromide | UG/M3 | 0.88 U | 0.88 U | 0.88 U | 0.88 U | 0.88 U | 0.88 U | 0.88 U | 0.88 U |
| Vinyl Chloride | UG/M3 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |

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**Table 13. Summary of Volatile Organic Compounds in Soil Vapor, 310 East 161st Street, Bronx, New York**

| Sample Designation: | | RX-23 | RX-3 | RX-5 |
|---|---|---|---|---|
| Sample Date: | | 09/06/2024 | 06/01/2022 | 06/01/2022 |
| Normal Sample or Field Duplicate: | | N | N | N |
| Parameter | Units | | | |
| 1,1,1-Trichloroethane (TCA) | UG/M3 | 1.1 U | 5.5 U | 5.5 U |
| 1,1,2,2-Tetrachloroethane | UG/M3 | 1.4 U | 6.9 U | 6.9 U |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | UG/M3 | 1.5 U | 7.7 U | 7.7 U |
| 1,1,2-Trichloroethane | UG/M3 | 1.1 U | 5.5 U | 5.5 U |
| 1,1-Dichloroethane | UG/M3 | 0.81 U | 4 U | 4 U |
| 1,1-Dichloroethene | UG/M3 | 0.2 U | 1 U | 1 U |
| 1,2,4-Trichlorobenzene | UG/M3 | 3.7 U | 19 U | 19 U |
| 1,2,4-Trimethylbenzene | UG/M3 | **2.4** | **13** | **11** |
| 1,2-Dibromoethane (Ethylene Dibromide) | UG/M3 | 1.5 U | 7.7 U | 7.7 U |
| 1,2-Dichlorobenzene | UG/M3 | 1.2 U | 6 U | 6 U |
| 1,2-Dichloroethane | UG/M3 | 0.81 U | 4 U | 4 U |
| 1,2-Dichloropropane | UG/M3 | 0.92 U | 4.6 U | 4.6 U |
| 1,2-Dichlorotetrafluoroethane | UG/M3 | **1.3 J** | 7 U | 7 U |
| 1,3,5-Trimethylbenzene (Mesitylene) | UG/M3 | **0.62 J** | **4.3 J** | **3.5 J** |
| 1,3-Butadiene | UG/M3 | 0.44 U | 2.2 U | 2.2 U |
| 1,3-Dichlorobenzene | UG/M3 | 1.2 U | 6 U | 6 U |
| 1,4-Dichlorobenzene | UG/M3 | 1.2 U | 6 U | 6 U |
| 1,4-Dioxane (P-Dioxane) | UG/M3 | 18 U | 90 U | 90 U |
| 2,2,4-Trimethylpentane | UG/M3 | **9.9** | 4.7 U | **9.2** |
| 2-Chlorotoluene | UG/M3 | 1 U | 5.2 U | 5.2 U |
| 2-Hexanone | UG/M3 | **0.67 J** | **16** | 10 U |
| 4-Ethyltoluene | UG/M3 | **0.98** | **4.2 J** | **3.2 J** |
| Acetone | UG/M3 | **24** | **28 J** | **150** |
| Allyl Chloride (3-Chloropropene) | UG/M3 | 1.6 U | 7.8 U | 7.8 U |
| Benzene | UG/M3 | **1.7** | **2.4 J** | **5.6** |
| Benzyl Chloride | UG/M3 | 1 U | 5.2 U | 5.2 U |
| Bromodichloromethane | UG/M3 | 1.3 U | 6.7 UT | 6.7 UT |
| Bromoform | UG/M3 | 2.1 U | 10 U | 10 U |
| Bromomethane | UG/M3 | 0.78 U | 3.9 U | 3.9 U |
| Butane | UG/M3 | **2.5** | 5.9 U | **1400 D** |
| Carbon Disulfide | UG/M3 | **8 B** | **7.6 J** | **25** |
| Carbon Tetrachloride | UG/M3 | 0.22 U | 1.1 U | 1.1 U |
| Chlorobenzene | UG/M3 | 0.92 U | 4.6 U | 4.6 U |
| Chlorodifluoromethane | UG/M3 | 1.8 U | 8.8 U | 8.8 U |
| Chloroethane | UG/M3 | 1.3 U | 6.6 U | 6.6 U |
| Chloroform | UG/M3 | **3.4** | 4.9 U | 4.9 U |
| Chloromethane | UG/M3 | 1 U | 5.2 U | 5.2 U |

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**Table 13. Summary of Volatile Organic Compounds in Soil Vapor, 310 East 161st Street, Bronx, New York**

| Sample Designation: | | RX-23 | RX-3 | RX-5 |
|---|---|---|---|---|
| Sample Date: | | 09/06/2024 | 06/01/2022 | 06/01/2022 |
| Normal Sample or Field Duplicate: | | N | N | N |
| Parameter | Units | | | |
| Cis-1,2-Dichloroethylene | UG/M3 | **0.12 J** | 1 U | 1 U |
| Cis-1,3-Dichloropropene | UG/M3 | 0.91 U | 4.5 U | 4.5 U |
| Cyclohexane | UG/M3 | **0.21 J** | 3.4 U | 3.4 U |
| Cymene | UG/M3 | 1.1 U | 5.5 U | 5.5 U |
| Dibromochloromethane | UG/M3 | 1.7 U | 8.5 U | 8.5 U |
| Dichlorodifluoromethane | UG/M3 | **3.3** | 12 U | 12 U |
| Ethylbenzene | UG/M3 | **3.2** | **11** | **3.7 J** |
| Hexachlorobutadiene | UG/M3 | 2.1 U | 11 U | 11 U |
| Isopropanol | UG/M3 | 12 U | 61 U | 61 U |
| Isopropylbenzene (Cumene) | UG/M3 | **0.38 J** | **1.2 J** | **1.2 J** |
| m,p-Xylene | UG/M3 | **11** | **26** | **9.4 J** |
| Methyl Ethyl Ketone (2-Butanone) | UG/M3 | **3.5** | **60** | **27** |
| Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) | UG/M3 | **2.2** | 10 U | 10 U |
| Methyl Methacrylate | UG/M3 | 2 U | 10 U | 10 U |
| Methylene Chloride | UG/M3 | 1.7 U | 8.7 U | 8.7 U |
| Naphthalene | UG/M3 | 2 U | 13 U | 13 U |
| N-Butylbenzene | UG/M3 | 1.1 U | 5.5 U | 5.5 U |
| N-Heptane | UG/M3 | **2** | **2.9 J** | **190** |
| N-Hexane | UG/M3 | **0.98 J** | **18** | **280** |
| N-Propylbenzene | UG/M3 | **0.82 J** | **3.3 J** | **2.8 J** |
| O-Xylene (1,2-Dimethylbenzene) | UG/M3 | **3.2** | **10** | **4.7** |
| Sec-Butylbenzene | UG/M3 | 1.1 U | 5.5 U | **1.6 J** |
| Styrene | UG/M3 | **0.56 J** | 4.3 U | 4.3 U |
| T-Butylbenzene | UG/M3 | 1.1 U | 5.5 U | 5.5 U |
| Tert-Butyl Alcohol | UG/M3 | **7.7 J** | 76 U | 76 U |
| Tert-Butyl Methyl Ether | UG/M3 | 0.72 U | 3.6 U | 3.6 U |
| Tetrachloroethylene (PCE) | UG/M3 | **3.1** | **96** | **2.1 J** |
| Tetrahydrofuran | UG/M3 | 15 U | 74 U | 74 U |
| Toluene | UG/M3 | **9** | **1400 D** | **9.9** |
| Trans-1,2-Dichloroethene | UG/M3 | 0.79 U | 4 U | 4 U |
| Trans-1,3-Dichloropropene | UG/M3 | 0.91 U | 4.5 U | 4.5 U |
| Trichloroethylene (TCE) | UG/M3 | **0.54** | 1 U | 1 U |
| Trichlorofluoromethane | UG/M3 | **6.5** | 5.6 U | 5.6 U |
| Vinyl Bromide | UG/M3 | 0.87 U | 4.4 U | 4.4 U |
| Vinyl Chloride | UG/M3 | 0.2 U | 1 U | 1 U |

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**Table 14. Groundwater Gauging Data, Morrisania East, East 161st Street in Bronx, New York**

| Monitoring Well Identification | Date | Time | Approximate Top of Casing Elevation (ft-NAVD 88) | Depth to Water (ft-btoc) | Depth to Bottom (ft bls) | Groundwater Elevation (ft NAVD 88) |
|---|---|---|---|---|---|---|
| ETMW-01 | 1/29/2026 | 7:15:00 AM | 51.09 | 25.87 | 31.89 | 25.22 |
| ETMW-02 | 1/29/2026 | 7:20:00 AM | 50.59 | 25.28 | 30.25 | 25.31 |
| ETMW-03 | 1/29/2026 | 7:05:00 AM | 49.11 | 25.95 | 33.12 | 23.16 |
| ETMW-04 | 1/29/2026 | 7:30:00 AM | 51.93 | 27.54 | 29.83 | 24.39 |
| ETMW-05 | 1/29/2026 | 7:10:00 AM | 50.16 | 25.80 | 28.59 | 24.36 |
| RX-8G | 1/29/2026 | 7:25:00 AM | 50.92 | 25.42 | 28.09 | 25.50 |

ft = feet
bls = below land surface
btoc = below top of casing
NAVD 88 - North American Vertical Datum of 1988

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**Table 15. Remedial Cost Estimate for Remedial Alternative 1**
**Combined Track 2/4 Restricted Residentaial Use Cleanup**

| Item | Description | | Cost |
|---|---|---|---|
| **Capital Costs** | | | |
| **SITE PREPARATION** | | | |
| | Mobilization/Demobilization | $ | 200,000 |
| | Perimeter Fencing, Site Security, Temporary Facilities, Soil Staging Area, Decon Pad | $ | 100,000 |
| | Clearing and Grubbing/Erosion and Sediment Controls | $ | 100,000 |
| | Permitting | $ | 100,000 |
| **EXCAVATION/BACKFILL** | | | |
| | Support of Excavation | $ | 700,000 |
| | Soil Excavation and Handling | $ | 1,500,000 |
| | Import Certified-Clean Fill | $ | 400,000 |
| | Backfill and Compaction of Certified Clean Fill | $ | 200,000 |
| | Install Dewatering and Treatment System | $ | 300,000 |
| | O&M of Dewatering and Treatment System | $ | 300,000 |
| | Surveying | $ | 100,000 |
| **TRANSPORTATION/DISPOSAL** | | | |
| | Non-Hazardous Solid Waste Transportation and Disposal | $ | 6,400,000 |
| **FIELD SUPERVISION/CONSULTING FEES** | | | |
| | Backfill Sampling for VOCs | $ | 100,000 |
| | Backfill Sampling for all other parameters | $ | 100,000 |
| | Documentation Sampling and Validation | $ | 100,000 |
| | Air Monitoring, Field Oversight, Engineering Support/Disposal Coordination | $ | 400,000 |
| **BCP Reporting/Record Keeping** | | | |
| | Remedial Investigation Work Plan, Remedial Investigation Report, Remedial Action Work Plar | $ | 100,000 |
| | Monthly Reporting, Fact Sheets, Citizen Participation Activities | $ | 100,000 |
| | Final Engineering Report | $ | 100,000 |
| | Contractor General Conditions | $ | 1,040,000 |
| | Subtotal | $ | 11,400,000 |
| | Contingency | $ | 2,280,000 |
| | Sales Tax | $ | 923,000 |
| | **TOTAL CAPITAL COST** | **$** | **15,643,000** |

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**Table 16. Remedial Cost Estimate for Remedial Alternative 2**
**Combined Track 2/4 Restricted Residentaial Use Cleanup**

| Item | Description | | Cost |
|---|---|---|---|
| **Capital Costs** | | | |
| **SITE PREPARATION** | | | |
| | Mobilization/Demobilization | $ | 200,000 |
| | Perimeter Fencing, Site Security, Temporary Facilities, Soil Staging Area, Decon Pad | $ | 100,000 |
| | Clearing and Grubbing/Erosion and Sediment Controls | $ | 100,000 |
| | Permitting | $ | 100,000 |
| **EXCAVATION/BACKFILL** | | | |
| | Support of Excavation | $ | 200,000 |
| | Soil Excavation and Handling | $ | 300,000 |
| | Import Certified-Clean Fill | $ | 100,000 |
| | Backfill and Compaction of Certified Clean Fill | $ | 100,000 |
| | Install Dewatering and Treatment System | $ | 300,000 |
| | O&M of Dewatering and Treatment System | $ | 300,000 |
| | Surveying | $ | 100,000 |
| **TRANSPORTATION/DISPOSAL** | | | |
| | Non-Hazardous Solid Waste Transportation and Disposal | $ | 1,000,000 |
| **FIELD SUPERVISION/CONSULTING FEES** | | | |
| | Backfill Sampling for VOCs | $ | 100,000 |
| | Backfill Sampling for all other parameters | $ | 100,000 |
| | Documentation and Confirmation Sampling and Validation | $ | 200,000 |
| | Air Monitoring, Field Oversight, Engineering Support/Disposal Coordination | $ | 300,000 |
| **BCP Reporting/Record Keeping** | | | |
| | Remedial Investigation Work Plan, Remedial Investigation Report, Remedial Action Work Plan | $ | 100,000 |
| | Monthly Reporting, Fact Sheets, Citizen Participation Activities | $ | 100,000 |
| | Final Engineering Report | $ | 100,000 |
| | Site Management Plan | $ | 100,000 |
| | Contractor General Conditions | $ | 435,000 |
| | Subtotal | $ | 4,000,000 |
| | Contingency | $ | 800,000 |
| | Sales Tax | $ | 257,375 |
| | **TOTAL CAPITAL COST** | **$** | **5,492,375** |
| **Annual Operation, Maintenance and Monitoring (OM&M) Cost** | | | |
| | Annual Inspection of Engineering Controls and Periodic Review Report | $ | 10,000 |
| | Maintenance of Site Cover System | $ | 10,000 |
| | **ANNUAL OM&M COST** | **$** | **20,000** |

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**Table 17. Track 1 and Track 2/4 Soil Cleanup Objectives**
**Morrisania East, East 161st Street in Bronx, New York**

| Parameter | Track 1 Soil Cleanup Objectives[1] | Track 2 Soil Cleanup Objectives[1] | Track 4 Soil Cleanup Objectives[2] |
|---|---|---|---|
| **Volatile Organic Compounds (Concentrations in mg/kg)** | | | |
| 1,1,1-Trichloroethane | 0.68 | 0.68 | 100 |
| 1,1-Dichloroethane | 0.27 | 0.27 | 47 |
| 1,1-Dichloroethene | 0.24 | 0.24 | 0.98 |
| 1,2,4-Trimethylbenzene | 5.9 | 5.9 | 100 |
| 1,3,5-Trimethylbenzene | 3.1 | 3.1 | 100 |
| 1,2-Dichlorobenzene | 1.1 | 1.1 | 100 |
| 1,2-Dichloroethane | 0.02 | 0.02 | 5.8 |
| 1,3-Dichlorobenzene | 2.6 | 2.6 | 38 |
| 1,4-Dichlorobenzene | 1.8 | 1.8 | 24 |
| 2-Butanone (MEK) | 0.1 | 0.1 | 100 |
| Acetone | 0.03 | 0.03 | 100 |
| Benzene | 0.06 | 0.06 | 3.7 |
| n-Butylbenzene | 18 | 18 | 100 |
| Carbon tetrachloride | 0.76 | 0.76 | 7.1 |
| Chlorobenzene | 4.5 | 4.5 | 100 |
| Chloroform | 0.37 | 0.37 | 24 |
| cis-1,2-Dichloroethene | 0.19 | 0.19 | 41 |
| Ethylbenzene | 1 | 1 | 76 |
| Methylene chloride | 0.05 | 0.05 | 81 |
| MTBE | 0.1 | 0.1 | 100 |
| n-Propylbenzene | 5 | 5 | 100 |
| sec-Butylbenzene | 25 | 25 | 100 |
| tert-Butylbenzene | 11 | 11 | 100 |
| Tetrachloroethene | 1.3 | 1.3 | 18 |
| Toluene | 0.7 | 0.7 | 100 |
| trans-1,2-Dichloroethene | 0.19 | 0.19 | 100 |
| Trichloroethene | 0.47 | 0.47 | 18 |
| Vinyl chloride | 0.03 | 0.03 | 0.48 |
| Xylenes (total) | 0.26 | 0.26 | 100 |
| **Semivolatile Organic Compounds (Concentrations in mg/kg)** | | | |
| 1,4-Dioxane | 0.1 | 0.1 | 5.7 |
| 2-Methylphenol | 0.33 | 0.33 | 100 |
| 3&4-Methylphenol | 0.33 | 0.33 | 100 |
| Acenaphthene | 20 | 20 | 100 |
| Acenaphthylene | 100 | 100 | 100 |
| Anthracene | 100 | 100 | 100 |
| Benzo[a]anthracene | 1 | 1 | 1.4 |
| Benzo[a]pyrene | 1 | 1 | 1 |
| Benzo[b]fluoranthene | 1 | 1 | 1.4 |
| Benzo[g,h,i]perylene | 0.64 | 0.64 | 4.9 |
| Benzo[k]fluoranthene | 0.8 | 0.8 | 4.9 |
| Chrysene | 1 | 1 | 4.9 |
| Dibenzo[a,h]anthracene | 0.33 | 0.33 | 0.33 |
| Dibenzofuran | 2.1 | 2.1 | 18 |
| Fluoranthene | 85 | 85 | 100 |
| Fluorene | 30 | 30 | 100 |
| Hexachlorobenzene | 0.33 | 0.33 | 0.33 |
| Indeno[1,2,3-cd]pyrene | 0.5 | 0.5 | 1.4 |
| Naphthalene | 12 | 12 | 100 |
| Pentachlorophenol | 0.8 | 0.8 | 1.3 |
| Phenanthrene | 1.1 | 1.1 | 4.9 |
| Phenol | 0.33 | 0.33 | 100 |
| Pyrene | 64 | 64 | 100 |
| **Metals (Concentrations in mg/kg)** | | | |
| Arsenic | 13 | 13 | 16 |
| Barium | 410 | 410 | 410 |
| Beryllium | 4.4 | 4.4 | 43 |

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**Table 17. Track 1 and Track 2/4 Soil Cleanup Objectives**
**Morrisania East, East 161st Street in Bronx, New York**

| Parameter | Track 1 Soil Cleanup Objectives[1] | Track 2 Soil Cleanup Objectives[1] | Track 4 Soil Cleanup Objectives[2] |
|---|---|---|---|
| Cadmium | 2.5 | 2.5 | 2.5 |
| Chromium, Hexavalent | 1 | 1 | 1 |
| Chromium | 30 | 30 | 110 |
| Copper | 50 | 50 | 280 |
| Cyanide, Total | 2.3 | 2.3 | 13 |
| Lead | 63 | 63 | 400 |
| Manganese | 1600 | 1600 | 2000 |
| Mercury | 0.18 | 0.18 | 0.3 |
| Nickel | 30 | 30 | 320 |
| Selenium | 3.9 | 3.9 | 110 |
| Silver | 2 | 2 | 110 |
| Zinc | 109 | 109 | 6600 |
| **Pesticides (Concentrations in mg/kg)** | | | |
| 4,4'-DDD | 0.0033 | 0.0033 | 3.4 |
| 4,4'-DDE | 0.0033 | 0.0033 | 3.8 |
| 4,4'-DDT | 0.0033 | 0.0033 | 5 |
| Aldrin | 0.0048 | 0.0048 | 0.044 |
| alpha-BHC | 0.02 | 0.02 | 0.18 |
| alpha-Chlordane | 0.014 | 0.014 | 0.65 |
| beta-BHC | 0.021 | 0.021 | 0.18 |
| delta-BHC | 0.04 | 0.04 | 100 |
| Dieldrin | 0.005 | 0.005 | 0.075 |
| Endosulfan I | 4.3 | 4.3 | 35 |
| Endosulfan II | 4.3 | 4.3 | 35 |
| Endosulfan sulfate | 4.3 | 4.3 | 35 |
| Endrin | 0.014 | 0.014 | 5.3 |
| gamma-BHC (Lindane) | 0.025 | 0.025 | 0.21 |
| Heptachlor | 0.013 | 0.013 | 0.53 |
| **Total Polychlorinated Biphenyls (Concentrations in mg/kg)** | | | |
| Total Polychlorinated Biphenyls | 0.1 | 0.1 | 1 |
| **Perfluorinated Alkyl Acids (Concentrations in µg/kg)** | | | |
| Perfluorobutanesulfonic acid | -- | -- | -- |
| Perfluoropentansulfonic acid | -- | -- | -- |
| Perfluorohexanesulfonic acid | -- | -- | -- |
| Perfluoroheptanesulfonic acid | -- | -- | -- |
| Perfluorononanesulfonic acid | -- | -- | -- |
| Perfluorodecanesulfonic acid | -- | -- | -- |
| Perfluorododecanesulfonic acid | -- | -- | -- |
| Perfluorobutanoics acid | -- | -- | -- |
| Perfluoropentanoic acid | -- | -- | -- |
| Perfluorohexanoic acid | -- | -- | -- |
| Perfluoroheptanoic acid | -- | -- | -- |
| Perfluorooctanoic acid | -- | -- | -- |
| Perfluorononanoic acid | -- | -- | -- |
| Perfluorodecanoic acid | -- | -- | -- |
| Perfluoroundecanoic acid | -- | -- | -- |
| Perfluorododecanoic acid | -- | -- | -- |
| Perfluorotridecanoic acid | -- | -- | -- |
| Perfluorotetradecanoic acid | -- | -- | -- |
| Perfluorooctanesulfonic acid | 0.88 [3] | 0.88 [3] | 44 [3] |
| Perfluorooctanoic acid | 0.66 [3] | 0.66 [3] | 33 [3] |
| 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | -- | -- | -- |
| 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | -- | -- | -- |
| 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | -- | -- | -- |
| Perfluroroctanesulfonamide | -- | -- | -- |

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**Table 17. Track 1 and Track 2/4 Soil Cleanup Objectives**
**Morrisania East, East 161st Street in Bronx, New York**

| Parameter | Track 1 Soil Cleanup Objectives[1] | Track 2 Soil Cleanup Objectives[1] | Track 4 Soil Cleanup Objectives[2] |
|---|---|---|---|
| N-methyl perfluorooctanesulfonamide | -- | -- | -- |
| N-ethyl perfluorooctanesulfonamide | -- | -- | -- |
| N-methyl perfluorooctanesulfonamidoacetic acid | -- | -- | -- |
| N-ethyl perfluorooctanesulfonamidoacetic acid | -- | -- | -- |
| N-methyl perfluorooctanesulfonamidoethanol | -- | -- | -- |
| N-ethyl perfluorooctanesulfonamidoethanol | -- | -- | -- |
| Hexafluoropropylene oxide dimer acid | -- | -- | -- |
| 4,8-Dioxa-3H-perfluorononanoic acid | -- | -- | -- |
| Perfluoro-3-methoxypropanoic acid | -- | -- | -- |
| Perfluoro-4-methoxybutanoic acid | -- | -- | -- |
| Nonafluoro-3,6-dioxaheptanoic acid | -- | -- | -- |
| 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | -- | -- | -- |
| 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | -- | -- | -- |
| Perfluoro(2-ethoxyethane)sulfonic acid | -- | -- | -- |
| 3-Perfluoropropyl propanoic acid | -- | -- | -- |
| 2H,2H,3H,3H-Perfluorooctanoic acid | -- | -- | -- |

1- Backfill soil cleanup objectives for the Track 1 remedy are the NYSDEC Part 375 Unrestricted Use SCOs.

2- Backfill soil cleanup objectives for the Track 2/4 remedy are the NYSDEC Part 375 Restricted Residential Use SCOs.

3 - SCOs for PFOS and PFOA not yet final. The guidance values shown are to be used until SCOs are in effect. Soil collected for onsite reuse will not be analyzed for Perfluorinated Alkyl Acids.

µg/kg - Micrograms per kilogram

mg/kg - Milligrams per kilogram

NYSDEC - New York State Department of Environmental Conservation

SCOs - Soil Cleanup Objectives

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**Table 18. List of Required Permits**
**Morrisania East, East 161st Street in Bronx, New York**

| Regulatory Agency | Permit |
|---|---|
| **NYCDEP** | Sewer Certification and Sewer Permit (for new building connection) |
| **NYCDEP** | Fire Hydrant Permit |
| **NYCDEP** | Stormwater Permit and Stormwater Pollution Prevention Plan (SWPPP) |
| **NYCDOB** | New Building (NB) Permit |
| **NYCDOB** | Fence Permit |
| **NYCDOB** | Foundation/Earthwork Permit |
| **NYCDOB** | Builder's Paving Plan |
| **NYCDOB** | Underground Plumbing Permit |
| **NYCDOB** | Underground Electrical Permit |
| **NYCDOT** | Lane Closures, Sidewalk Crossings |

Note: This list only accounts for permits required from the street level and below. Permits for aboveground portions of the building are not listed.

NYCDEP - New York City Department of Environmental Protection

NYCDOB - New York City Department of Buildings

NYCDOT - New York City Department of Transportation

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**Table 19. List of Documentation Endpoint Samples**
**Morrisania East, East 161st Street, Bronx New York**

| Sample Identification | Analyses | Proposed Excavation Depth (ft) | Sample Depth Interval (ft bls) |
|---|---|---|---|
| ***Documentation Endpoint Samples*** | | | |
| BDS-1 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-2 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-3 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-4 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-5 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-6 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-7 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-8 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-9 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-10 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-11 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-12 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-13 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-14 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-15 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-16 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-17 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-18 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-19 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-20 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-21 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-22 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-23 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-24 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-25 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-26 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-27 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-28 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| BDS-29 | Full TCL/TALPart 375and ECs | 2 | 2 - 4 |
| UST-BNDS | Full TCL/TALPart 375and ECs | 6 | 6 - 8 |
| UST-BSDS | Full TCL/TALPart 375and ECs | 6 | 6 - 8 |

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**Table 19. List of Documentation Endpoint Samples**
**Morrisania East, East 161st Street, Bronx New York**

| Sample Identification | Analyses | Proposed Excavation Depth (ft) | Sample Depth Interval (ft bls) |
|---|---|---|---|
| ***Confirmation Endpoint Samples*** | | | |
| BCS-1 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-2 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-3 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-4 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-5 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-6 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-7 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-8 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-9 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-10 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-11 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-12 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-13 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-14 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| BCS-15 | Full TCL/TALPart 375and ECs | 4 | 4 - 6 |
| HS-1-NSWCS | 1,2,4-Trimethylbenzene | 5 | 3 - 5 |
| HS-1-ESWCS | 1,2,4-Trimethylbenzene | 5 | 3 - 5 |
| HS-1-SSWCS | 1,2,4-Trimethylbenzene | 5 | 3 - 5 |
| HS-1-WSWCS | 1,2,4-Trimethylbenzene | 5 | 3 - 5 |
| HS-1-BCS | 1,2,4-Trimethylbenzene | 5 | 5 - 7 |
| HS-2-NSWCS | 1,2,4-Trimethylbenzene | 8 | 6 - 8 |
| HS-2-ESWCS | 1,2,4-Trimethylbenzene | 8 | 6 - 8 |
| HS-2-SSWCS | 1,2,4-Trimethylbenzene | 8 | 6 - 8 |
| HS-2-WSWCS | 1,2,4-Trimethylbenzene | 8 | 6 - 8 |
| HS-2-BCS | 1,2,4-Trimethylbenzene | 8 | 8 - 10 |
| HS-3-NSWCS | Mercury | 5 | 12 - 14 |
| HS-3-ESWCS | Mercury | 5 | 12 - 14 |
| HS-3-SSWCS | Mercury | 5 | 12 - 14 |
| HS-3-WSWCS | Mercury | 5 | 12 - 14 |
| HS-3-BCS | Mercury | 5 | 14 - 16 |

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Notes:

1. Locations are approximate. All endpoint samples will be biased toward impacted soil, if any is observed in the vicinity of the proposed location.
ft - feet
bls - below land surface
BDS - Bottom Documentation Sample
BCS - Bottom Confirmation Sample
HS-1-NSWDS - Hot Spot 1 North Sidewall Documentation Sample
HS-1-BDS - Hot Spot 1 Bottom Documentation Sample
HS-3-NSWCS - Hot Spot 3 North Sidewall Confirmation Sample
HS-3-BCS - Hot Spot 3 Bottom Confirmation Sample
UST-BNDS - Underground Storage Tank Bottom North Documentation Sample

# FIGURES

1. Site Location Map
2. Site Plan
3. Adjacent Landowners
4. Surrounding Land Use and Sensitive Receptors
5. Sample Location Plan
6. Soil Sample Exceedances
7. Groundwater Exceedances
8. Soil Vapor Detections
9. Cross-Sections A-A' and B-B'
10. Groundwater Contour Map, October 30, 2025
11. Remedial Alternative 1: Track 1 Unrestricted Use Cleanup
12. Remedial Alternative 2: Combined Track 2/4 Restricted Residential Use Cleanup
13. Proposed Composite Site Cover Layout System
14. Proposed SSDS Layout
15. Truck Routes
16. Alpha-Numeric Map
17. Post Remediation Monitoring Well Locations

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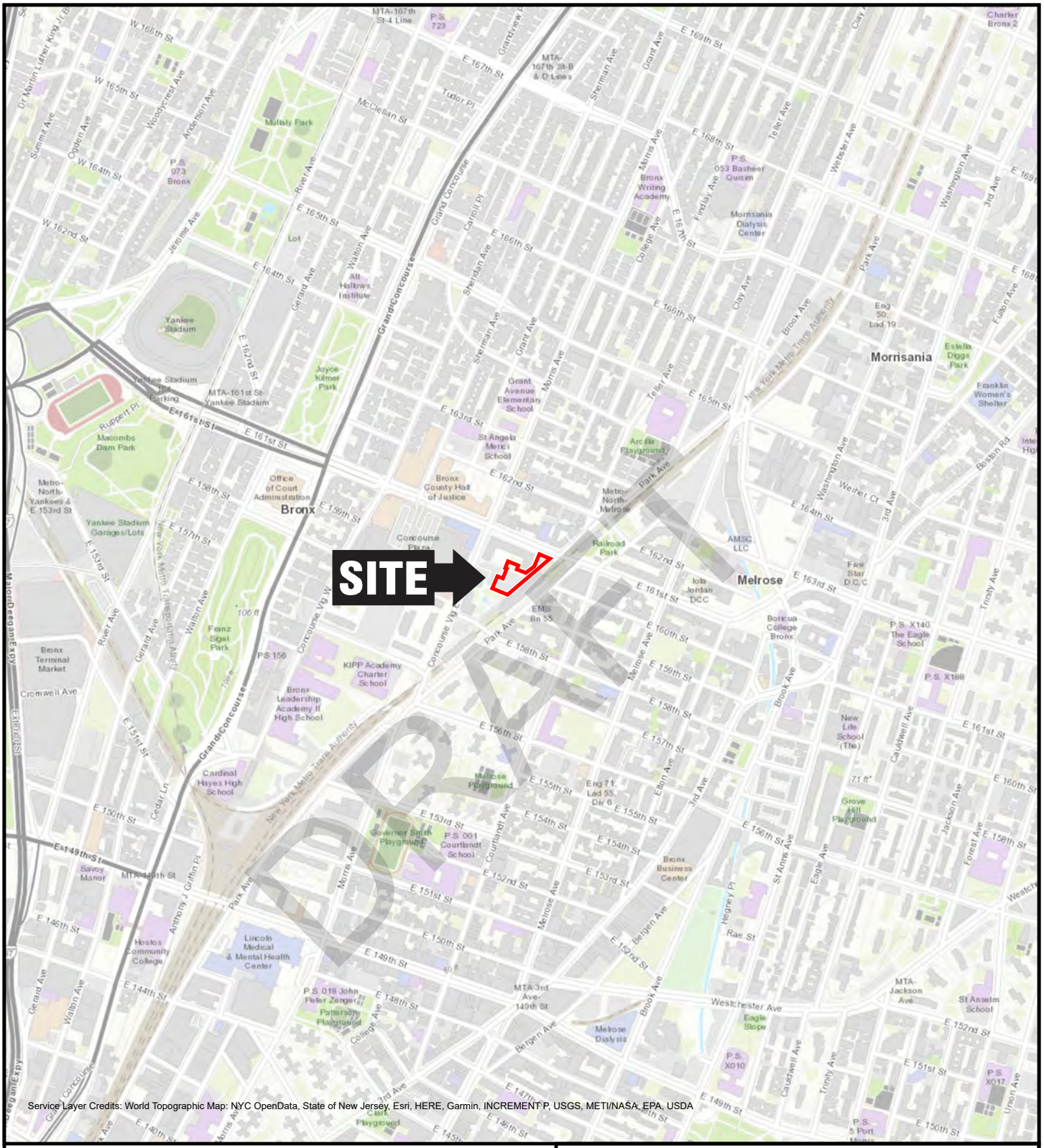
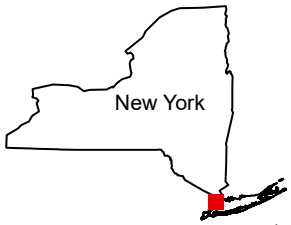



DRAFT

QUADRANGLE LOCATION




LEGEND

SITE BOUNDARY

N

1,000 0 1,000'

Title:

# SITE LOCATION MAP

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | |
|---|---|
| Compiled by: P.P. | Date: 04/07/26 |
| Prepared by: M.S.R. | Scale: AS SHOWN |
| Project Mgr: L.D. | Project: 3868.0005Y000 |
| File: 3868.0005Y106.1.APRX | |

FIGURE 1

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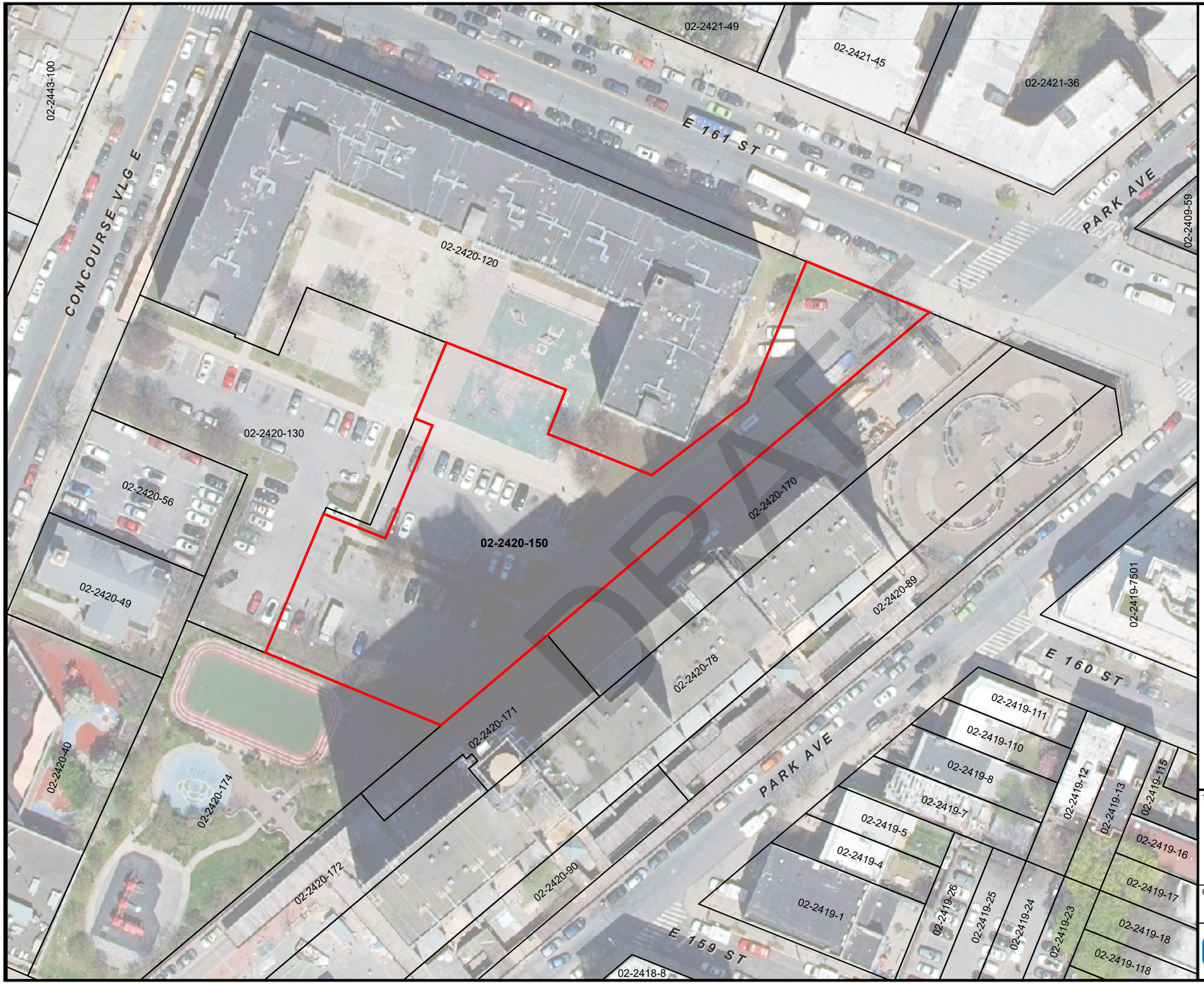



N

LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES

1. TAX MAP SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
2. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)

PARCEL NUMBER
**02-2420-150**
BOROUGH BLOCK LOT

60 0 60'

Title:

# SITE PLAN

310 EAST 161ST STREET
BRONX, NEW YORK 10451

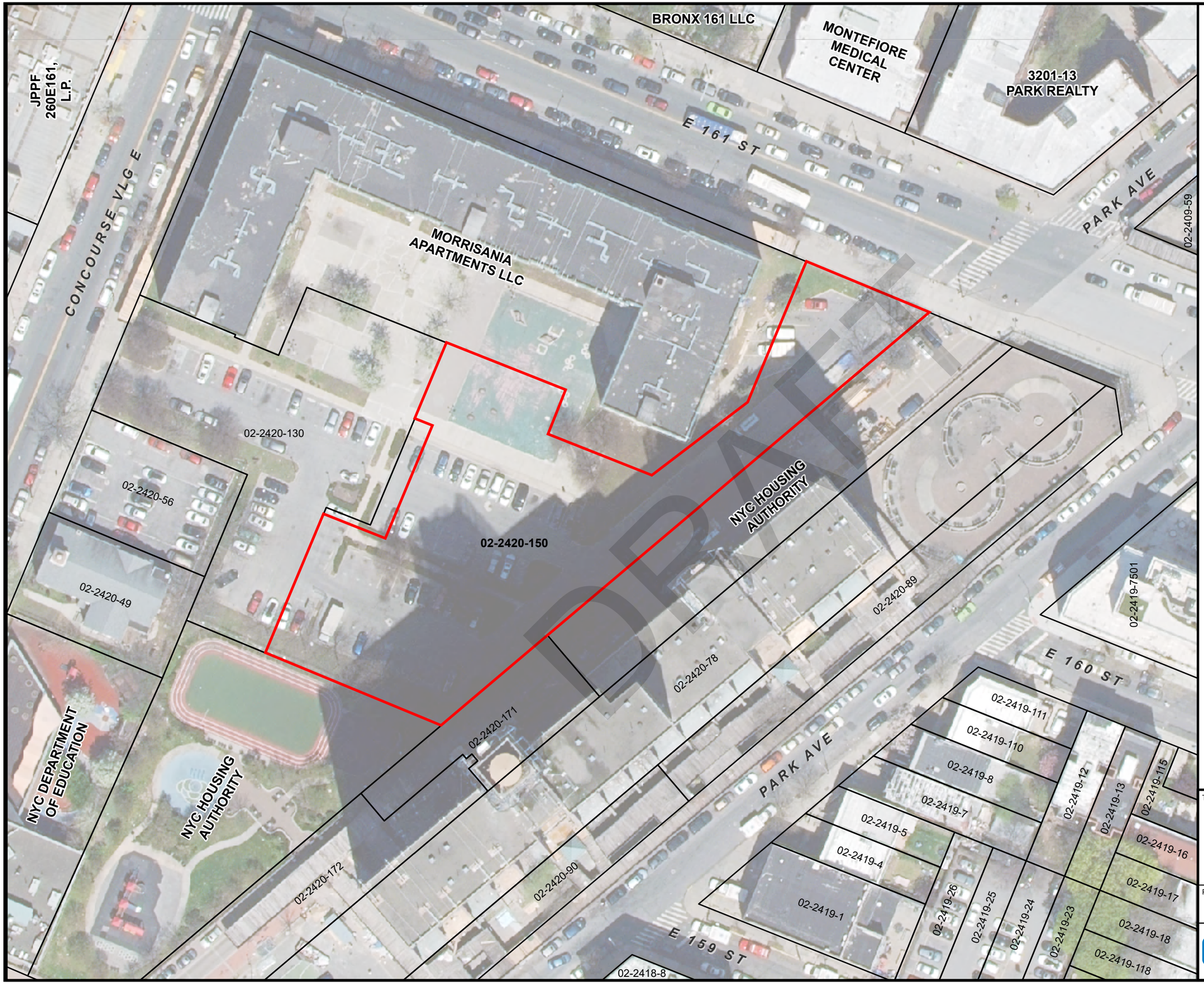
Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 05/12/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 2 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y106.02.APRX | | |

C:\USERS\DMARTIN\ONEDRIVE - ROUX ASSOCIATES INC\DESKTOP\38680005Y.APRX




LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES

1. TAX MAP SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
2. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)

PARCEL NUMBER
**02-2420-150**
BOROUGH BLOCK LOT

60 0 60'

Title:

# ADJACENT LAND OWNERS

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

| | | | |
|---|---|---|---|
| ROUX | Compiled by: P.P. | Date: 05/12/26 | FIGURE 3 |
| | Prepared by: M.S.R. | Scale: AS SHOWN | |
| | Project Mgr: L.D. | Project: 3868.0005Y000 | |
| | File: 3868.0005Y106.03.APRX | | |

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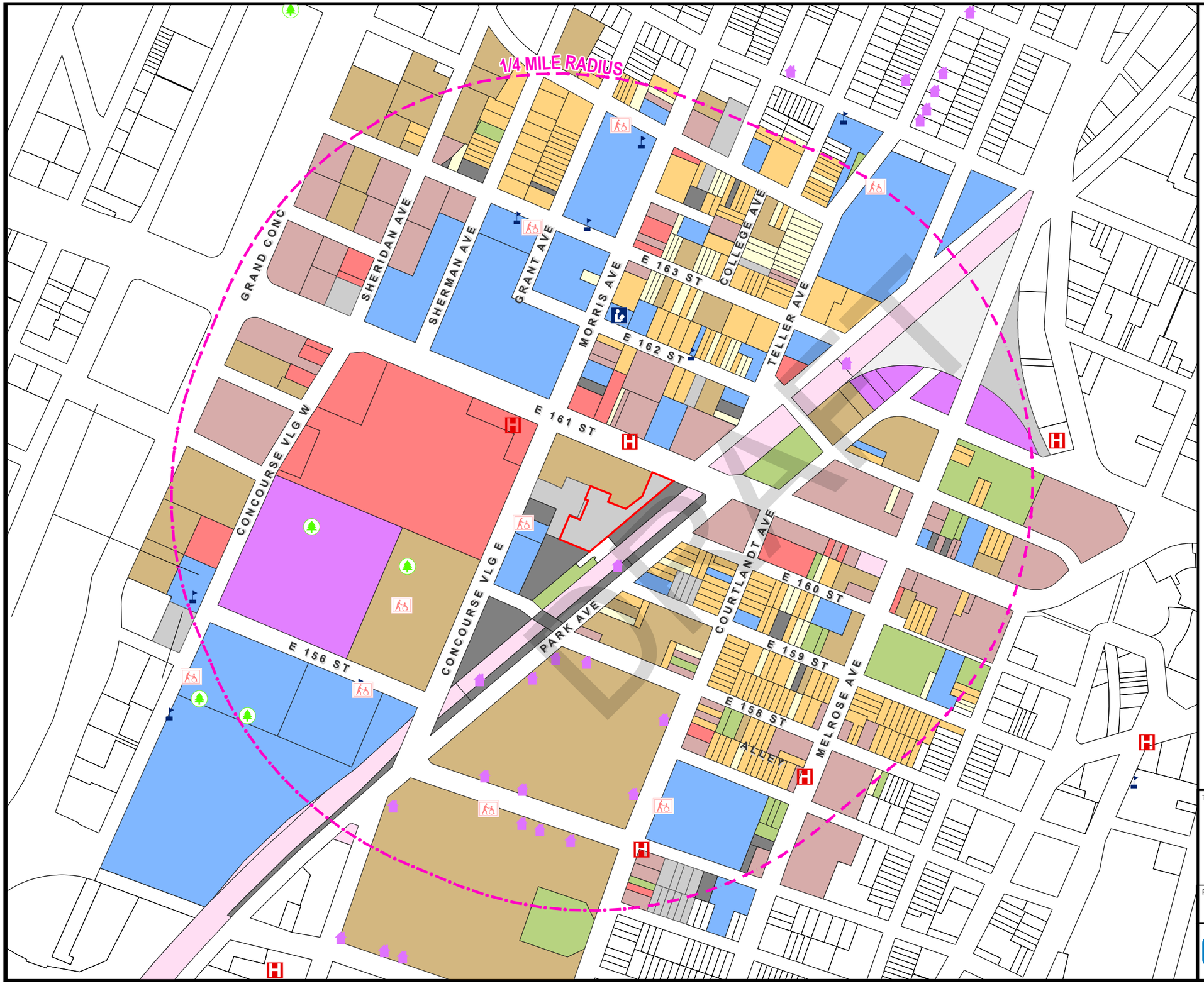



LEGEND

- 1/4 MILE RADIUS AROUND SITE
- SITE BOUNDARY
- PARCEL BOUNDARY

**SENSITIVE RECEPTORS**

- SCHOOLS (K-12)
- PUBLIC HOUSING
- PARKS AND PLAZAS
- LIBRARIES
- HEALTH CARE
- DAY CARE AND PRE-KINDERGARTEN

**DCP LAND USE CATEGORIES**

- ALL OTHERS OR NO DATA
- ONE & TWO FAMILY BUILDINGS
- MULTI-FAMILY WALK-UP BUILDINGS
- MULTI-FAMILY ELEVATOR BUILDINGS
- MIXED COMMERCIAL & RESIDENTIAL BUILDINGS
- COMMERCIAL & OFFICE BUILDINGS
- INDUSTRIAL & MANUFACTURING
- TRANSPORATION & UTILITY
- PUBLIC FACILITIES & INSTITUTIONS
- OPEN SPACE & OUTDOOR RECREATION
- PARKING FACILITIES
- VACANT LAND

N

NOTES

1. TAX MAP SOURCE: LAND USE AND SENSITIVE RECEPTORS DEPARTMENT OF CITY PLANNING NEW YORK- ZOLA

350 0 350'

Title:

# LAND USE AND SENSITIVE RECEPTORS MAP

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

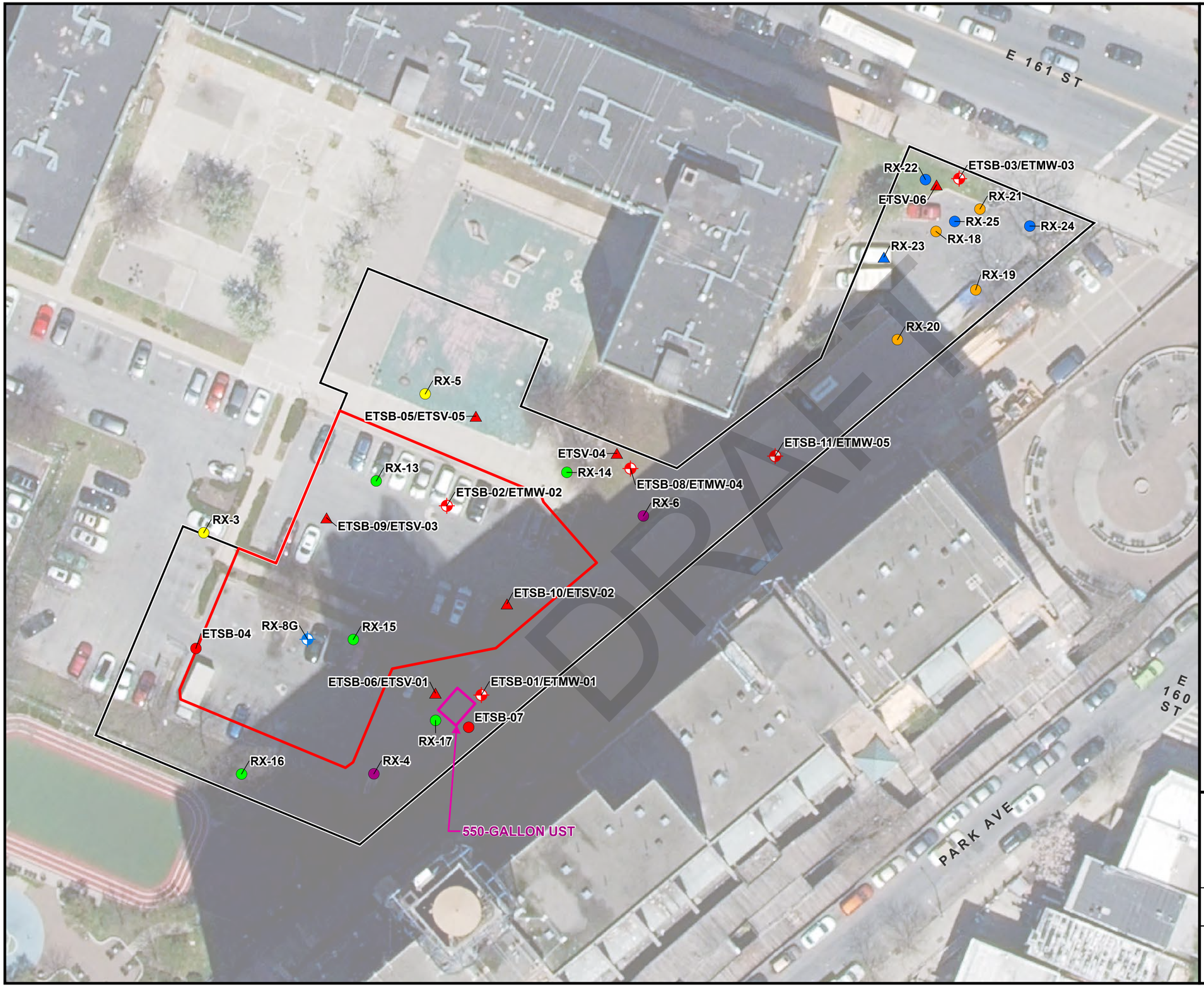
TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | |
|---|---|
| Compiled by: P.P. | Date: 05/12/26 |
| Prepared by: M.S.R. | Scale: AS SHOWN |
| Project Mgr: L.D. | Project: 3868.0005Y000 |
| File: 3868.0005Y106.04.APRX | |

FIGURE 4

C:\USERS\DMARTIN\ONEDRIVE - ROUX ASSOCIATES INC\DESKTOP\3868000S5Y.APRX




LEGEND

- LOCATION AND DESIGNATION OF SOIL BORING LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/SOIL VAPOR POINT LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/PERMANENT MONITORING WELL LOCATION
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL VAPOR POINT
- MONITORING WELL INSTALLED BY MUESER RUTLEDGE
- 2022 PHASE II ESA SOIL BORING
- 2022 PHASE II ESA SOIL BORING AND SOIL VAPOR POINT
- 2023 BCP ELIGIBILITY SOIL BORING
- 2024 SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- SUPPORT OF EXCAVATION BOUNDARY
- APPROXIMATE LOCATION OF 550-GALLON UST
- SITE BOUNDARY

N

NOTES
1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. 550 GALLON UST IS REFERENCED IN THE 1951 AND 1969 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS NOT BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY OR TEST PIT
3. 550 GALLON UST IS REFERENCED IN THE 1951 AND 1969 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY AND TEST PIT

40 0 40'

Title:

# SAMPLE LOCATIONS

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: M.H. | Date: 06/02/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 5 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.05.APRX | | |

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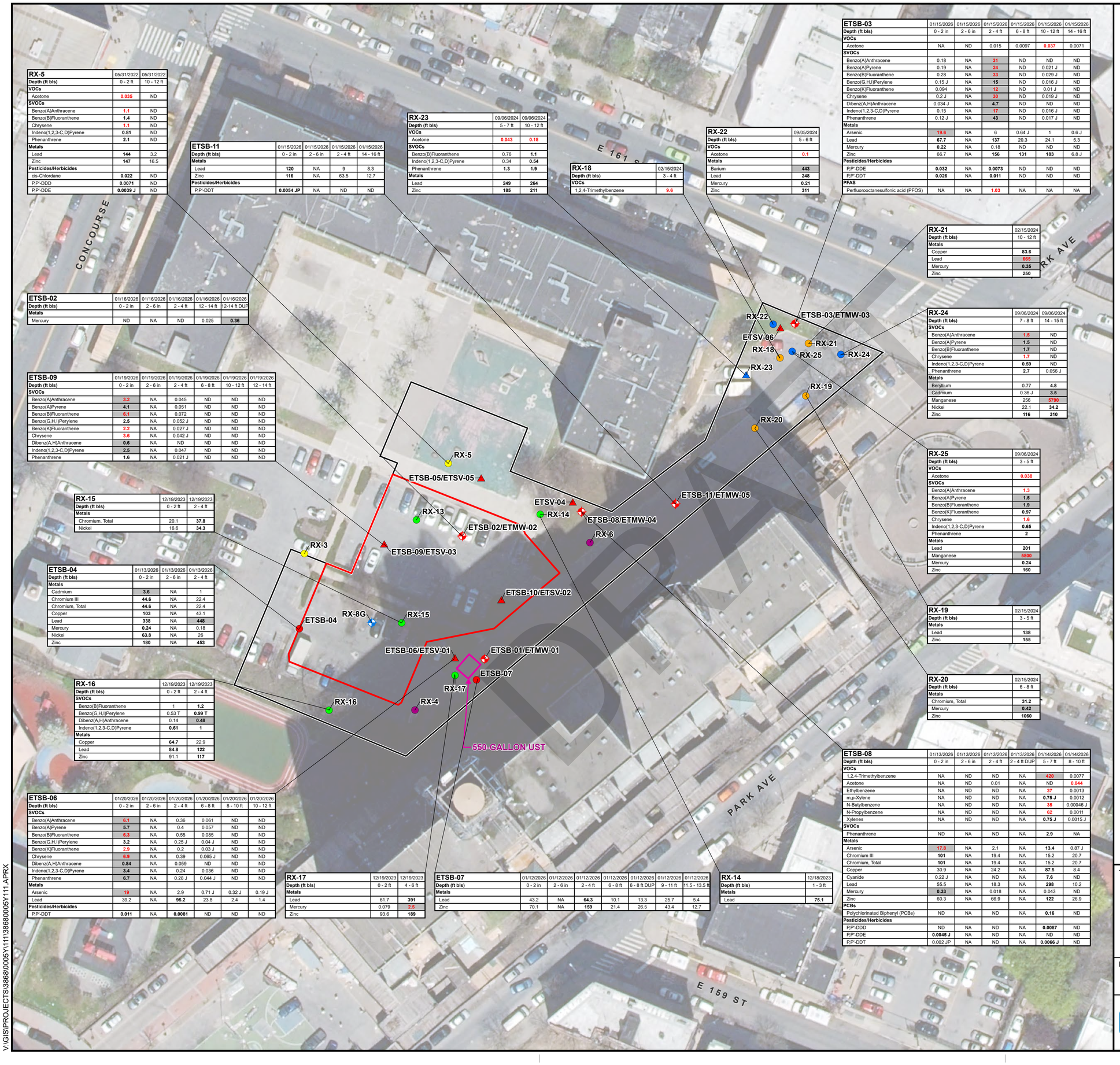



| RX-5 | 05/31/2022 | 05/31/2022 |
|---|---|---|
| **Depth (ft bls)** | 0 - 2 ft | 10 - 12 ft |
| **VOCs** | | |
| Acetone | 0.035 | ND |
| **SVOCs** | | |
| Benzo(A)Anthracene | 1.1 | ND |
| Benzo(B)Fluoranthene | 1.4 | ND |
| Chrysene | 1.1 | ND |
| Indeno(1,2,3-C,D)Pyrene | 0.81 | ND |
| Phenanthrene | 2.1 | ND |
| **Metals** | | |
| Lead | 144 | 3.2 |
| Zinc | 147 | 16.5 |
| **Pesticides/Herbicides** | | |
| cis-Chlordane | 0.022 | ND |
| P,P'-DDD | 0.0071 | ND |
| P,P'-DDE | 0.0039 J | ND |

| ETSB-11 | 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
|---|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft | 14 - 16 ft |
| **Metals** | | | | |
| Lead | 120 | NA | 9 | 8.3 |
| Zinc | 116 | NA | 63.5 | 12.7 |
| **Pesticides/Herbicides** | | | | |
| P,P'-DDT | 0.0054 JP | NA | ND | ND |

| RX-23 | 09/06/2024 | 09/06/2024 |
|---|---|---|
| **Depth (ft bls)** | 5 - 7 ft | 10 - 12 ft |
| **VOCs** | | |
| Acetone | 0.043 | 0.18 |
| **SVOCs** | | |
| Benzo(B)Fluoranthene | 0.76 | 1.1 |
| Indeno(1,2,3-C,D)Pyrene | 0.34 | 0.54 |
| Phenanthrene | 1.3 | 1.9 |
| **Metals** | | |
| Lead | 249 | 264 |
| Zinc | 185 | 211 |

| RX-18 | 02/15/2024 |
|---|---|
| **Depth (ft bls)** | 3 - 4 ft |
| **VOCs** | |
| 1,2,4-Trimethylbenzene | 9.6 |

| RX-22 | 09/05/2024 |
|---|---|
| **Depth (ft bls)** | 5 - 6 ft |
| **VOCs** | |
| Acetone | 0.1 |
| **Metals** | |
| Barium | 443 |
| Lead | 248 |
| Mercury | 0.21 |
| Zinc | 311 |

| ETSB-03 | 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 | 01/15/2026 |
|---|---|---|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft | 6 - 8 ft | 10 - 12 ft | 14 - 16 ft |
| **VOCs** | | | | | | |
| Acetone | NA | ND | 0.015 | 0.0097 | 0.037 | 0.0071 |
| **SVOCs** | | | | | | |
| Benzo(A)Anthracene | 0.18 | NA | 31 | ND | ND | ND |
| Benzo(A)Pyrene | 0.19 | NA | 24 | ND | 0.021 J | ND |
| Benzo(B)Fluoranthene | 0.28 | NA | 33 | ND | 0.029 J | ND |
| Benzo(G,H,I)Perylene | 0.15 J | NA | 15 | ND | 0.016 J | ND |
| Benzo(K)Fluoranthene | 0.094 | NA | 12 | ND | 0.01 J | ND |
| Chrysene | 0.2 J | NA | 30 | ND | 0.019 J | ND |
| Dibenz(A,H)Anthracene | 0.034 J | NA | 4.7 | ND | ND | ND |
| Indeno(1,2,3-C,D)Pyrene | 0.15 | NA | 17 | ND | 0.016 J | ND |
| Phenanthrene | 0.12 J | NA | 43 | ND | 0.017 J | ND |
| **Metals** | | | | | | |
| Arsenic | 19.6 | NA | 6 | 0.64 J | 1 | 0.6 J |
| Lead | 67.7 | NA | 137 | 20.3 | 24.1 | 5.3 |
| Mercury | 0.22 | NA | 0.18 | ND | ND | ND |
| Zinc | 66.7 | NA | 156 | 131 | 183 | 6.8 J |
| **Pesticides/Herbicides** | | | | | | |
| P,P'-DDE | 0.032 | NA | 0.0073 | ND | ND | ND |
| P,P'-DDT | 0.026 | NA | 0.011 | ND | ND | ND |
| **PFAS** | | | | | | |
| Perfluorooctanesulfonic acid (PFOS) | NA | NA | 1.03 | NA | NA | NA |

| RX-21 | 02/15/2024 |
|---|---|
| **Depth (ft bls)** | 10 - 12 ft |
| **Metals** | |
| Copper | 83.6 |
| Lead | 665 |
| Mercury | 0.35 |
| Zinc | 250 |

| ETSB-02 | 01/16/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 | 01/16/2026 |
|---|---|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft | 12 - 14 ft | 12-14 ft DUP |
| **Metals** | | | | | |
| Mercury | ND | NA | ND | 0.025 | 0.36 |

| RX-24 | 09/06/2024 | 09/06/2024 |
|---|---|---|
| **Depth (ft bls)** | 7 - 8 ft | 14 - 15 ft |
| **SVOCs** | | |
| Benzo(A)Anthracene | 1.5 | ND |
| Benzo(A)Pyrene | 1.5 | ND |
| Benzo(B)Fluoranthene | 1.7 | ND |
| Chrysene | 1.7 | ND |
| Indeno(1,2,3-C,D)Pyrene | 0.59 | ND |
| Phenanthrene | 2.7 | 0.056 J |
| **Metals** | | |
| Beryllium | 0.77 | 4.8 |
| Cadmium | 0.36 J | 3.5 |
| Manganese | 256 | 5790 |
| Nickel | 22.1 | 34.2 |
| Zinc | 116 | 310 |

| ETSB-09 | 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 | 01/19/2026 |
|---|---|---|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft | 6 - 8 ft | 10 - 12 ft | 12 - 14 ft |
| **SVOCs** | | | | | | |
| Benzo(A)Anthracene | 3.2 | NA | 0.045 | ND | ND | ND |
| Benzo(A)Pyrene | 4.1 | NA | 0.051 | ND | ND | ND |
| Benzo(B)Fluoranthene | 6.1 | NA | 0.072 | ND | ND | ND |
| Benzo(G,H,I)Perylene | 2.5 | NA | 0.052 J | ND | ND | ND |
| Benzo(K)Fluoranthene | 2.2 | NA | 0.027 J | ND | ND | ND |
| Chrysene | 3.6 | NA | 0.042 J | ND | ND | ND |
| Dibenz(A,H)Anthracene | 0.6 | NA | ND | ND | ND | ND |
| Indeno(1,2,3-C,D)Pyrene | 2.5 | NA | 0.047 | ND | ND | ND |
| Phenanthrene | 1.6 | NA | 0.021 J | ND | ND | ND |

| RX-25 | 09/06/2024 |
|---|---|
| **Depth (ft bls)** | 3 - 5 ft |
| **VOCs** | |
| Acetone | 0.038 |
| **SVOCs** | |
| Benzo(A)Anthracene | 1.3 |
| Benzo(A)Pyrene | 1.5 |
| Benzo(B)Fluoranthene | 1.9 |
| Benzo(K)Fluoranthene | 0.97 |
| Chrysene | 1.6 |
| Indeno(1,2,3-C,D)Pyrene | 0.65 |
| Phenanthrene | 2 |
| **Metals** | |
| Lead | 201 |
| Manganese | 5800 |
| Mercury | 0.24 |
| Zinc | 160 |

| RX-15 | 12/19/2023 | 12/19/2023 |
|---|---|---|
| **Depth (ft bls)** | 0 - 2 ft | 2 - 4 ft |
| **Metals** | | |
| Chromium, Total | 20.1 | 37.8 |
| Nickel | 16.6 | 34.3 |

| ETSB-04 | 01/13/2026 | 01/13/2026 | 01/13/2026 |
|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft |
| **Metals** | | | |
| Cadmium | 3.6 | NA | 1 |
| Chromium III | 44.6 | NA | 22.4 |
| Chromium, Total | 44.6 | NA | 22.4 |
| Copper | 103 | NA | 43.1 |
| Lead | 338 | NA | 448 |
| Mercury | 0.24 | NA | 0.18 |
| Nickel | 63.8 | NA | 26 |
| Zinc | 180 | NA | 453 |

| RX-19 | 02/15/2024 |
|---|---|
| **Depth (ft bls)** | 3 - 5 ft |
| **Metals** | |
| Lead | 138 |
| Zinc | 155 |

| RX-16 | 12/19/2023 | 12/19/2023 |
|---|---|---|
| **Depth (ft bls)** | 0 - 2 ft | 2 - 4 ft |
| **SVOCs** | | |
| Benzo(B)Fluoranthene | 1 | 1.2 |
| Benzo(G,H,I)Perylene | 0.53 T | 0.99 T |
| Dibenz(A,H)Anthracene | 0.14 | 0.48 |
| Indeno(1,2,3-C,D)Pyrene | 0.61 | 1 |
| **Metals** | | |
| Copper | 64.7 | 22.9 |
| Lead | 84.8 | 122 |
| Zinc | 91.1 | 117 |

| RX-20 | 02/15/2024 |
|---|---|
| **Depth (ft bls)** | 6 - 8 ft |
| **Metals** | |
| Chromium, Total | 31.2 |
| Mercury | 0.42 |
| Zinc | 1060 |

| ETSB-08 | 01/13/2026 | 01/13/2026 | 01/13/2026 | 01/13/2026 | 01/14/2026 | 01/14/2026 |
|---|---|---|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft | 2 - 4 ft DUP | 5 - 7 ft | 8 - 10 ft |
| **VOCs** | | | | | | |
| 1,2,4-Trimethylbenzene | NA | ND | ND | NA | 420 | 0.0077 |
| Acetone | NA | ND | 0.01 | NA | ND | 0.044 |
| Ethylbenzene | NA | ND | ND | NA | 37 | 0.0013 |
| m,p-Xylene | NA | ND | ND | NA | 0.75 J | 0.0012 |
| N-Butylbenzene | NA | ND | ND | NA | 35 | 0.00046 J |
| N-Propylbenzene | NA | ND | ND | NA | 92 | 0.0011 |
| Xylenes | NA | ND | ND | NA | 0.75 J | 0.0015 J |
| **SVOCs** | | | | | | |
| Phenanthrene | ND | NA | ND | NA | 2.9 | NA |
| **Metals** | | | | | | |
| Arsenic | 17.8 | NA | 2.1 | NA | 13.4 | 0.87 J |
| Chromium III | 101 | NA | 19.4 | NA | 15.2 | 20.7 |
| Chromium, Total | 101 | NA | 19.4 | NA | 15.2 | 20.7 |
| Copper | 30.9 | NA | 24.2 | NA | 87.5 | 8.4 |
| Cyanide | 0.22 J | NA | ND | NA | 7.6 | ND |
| Lead | 55.5 | NA | 18.3 | NA | 298 | 10.2 |
| Mercury | 0.33 | NA | 0.018 | NA | 0.043 | ND |
| Zinc | 60.3 | NA | 66.9 | NA | 122 | 26.9 |
| **PCBs** | | | | | | |
| Polychlorinated Biphenyl (PCBs) | ND | NA | ND | NA | 0.16 | ND |
| **Pesticides/Herbicides** | | | | | | |
| P,P'-DDD | ND | NA | ND | NA | 0.0087 | ND |
| P,P'-DDE | 0.0045 J | NA | ND | NA | ND | ND |
| P,P'-DDT | 0.002 JP | NA | ND | NA | 0.0066 J | ND |

| ETSB-06 | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/20/2026 | 01/20/2026 |
|---|---|---|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft | 6 - 8 ft | 8 - 10 ft | 10 - 12 ft |
| **SVOCs** | | | | | | |
| Benzo(A)Anthracene | 6.1 | NA | 0.36 | 0.061 | ND | ND |
| Benzo(A)Pyrene | 5.7 | NA | 0.4 | 0.057 | ND | ND |
| Benzo(B)Fluoranthene | 6.3 | NA | 0.55 | 0.085 | ND | ND |
| Benzo(G,H,I)Perylene | 3.2 | NA | 0.25 J | 0.04 J | ND | ND |
| Benzo(K)Fluoranthene | 2.9 | NA | 0.2 | 0.03 J | ND | ND |
| Chrysene | 6.9 | NA | 0.39 | 0.065 J | ND | ND |
| Dibenz(A,H)Anthracene | 0.84 | NA | 0.059 | ND | ND | ND |
| Indeno(1,2,3-C,D)Pyrene | 3.4 | NA | 0.24 | 0.036 | ND | ND |
| Phenanthrene | 6.7 | NA | 0.28 J | 0.044 J | ND | ND |
| **Metals** | | | | | | |
| Arsenic | 19 | NA | 2.9 | 0.71 J | 0.32 J | 0.19 J |
| Lead | 39.2 | NA | 95.2 | 23.8 | 2.4 | 1.4 |
| **Pesticides/Herbicides** | | | | | | |
| P,P'-DDT | 0.011 | NA | 0.0081 | ND | ND | ND |

| RX-17 | 12/19/2023 | 12/19/2023 |
|---|---|---|
| **Depth (ft bls)** | 0 - 2 ft | 4 - 6 ft |
| **Metals** | | |
| Lead | 61.7 | 391 |
| Mercury | 0.079 | 2.5 |
| Zinc | 93.6 | 189 |

| ETSB-07 | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 | 01/12/2026 |
|---|---|---|---|---|---|---|---|
| **Depth (ft bls)** | 0 - 2 in | 2 - 6 in | 2 - 4 ft | 6 - 8 ft | 6 - 8 ft DUP | 9 - 11 ft | 11.5 - 13.5 ft |
| **Metals** | | | | | | | |
| Lead | 43.2 | NA | 64.3 | 10.1 | 13.3 | 25.7 | 5.4 |
| Zinc | 70.1 | NA | 159 | 21.4 | 26.5 | 43.4 | 12.7 |

| RX-14 | 12/18/2023 |
|---|---|
| **Depth (ft bls)** | 1 - 3 ft |
| **Metals** | |
| Lead | 75.1 |

LEGEND

- LOCATION AND DESIGNATION OF SOIL BORING LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/SOIL VAPOR POINT LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/PERMANENT MONITORING WELL LOCATION
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL VAPOR POINT
- MONITORING WELL INSTALLED BY MUESER RUTLEDGE
- 2022 PHASE II ESA SOIL BORING
- 2022 PHASE II ESA SOIL BORING AND SOIL VAPOR POINT
- 2023 BCP ELIGIBILITY SOIL BORING
- 2024 SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- SUPPORT OF EXCAVATION BOUNDARY
- APPROXIMATE LOCATION OF 550-GALLON UST
- SITE BOUNDARY

N

| Parameter | NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives | NYSDEC Part 375 Restricted Residential Soil Cleanup Objectives | NYSDEC Part 375 Protection of Groundwater Soil Cleanup Objectives | Units |
|---|---|---|---|---|
| **VOCs** | | | | |
| 1,2,4-Trimethylbenzene | 5.9 | 100 | 5.9 | mg/kg |
| Acetone | 0.03 | 100 | 0.03 | mg/kg |
| Ethylbenzene | 1 | 76 | 1 | mg/kg |
| m,p-Xylene | 0.26 | 100 | 1.2 | mg/kg |
| N-Butylbenzene | 18 | 100 | 18 | mg/kg |
| N-Propylbenzene | 5 | 100 | 5 | mg/kg |
| Xylenes | 0.26 | 100 | 1.2 | mg/kg |
| **SVOCs** | | | | |
| Benzo(A)Anthracene | 1 | 1.4 | 1 | mg/kg |
| Benzo(A)Pyrene | 1 | 1 | 22 | mg/kg |
| Benzo(B)Fluoranthene | 1 | 1.4 | 2.1 | mg/kg |
| Benzo(G,H,I)Perylene | 0.64 | 4.9 | 1000 | mg/kg |
| Benzo(K)Fluoranthene | 0.8 | 4.9 | 2 | mg/kg |
| Chrysene | 1 | 4.9 | 1 | mg/kg |
| Dibenz(A,H)Anthracene | 0.33 | 0.33 | 1000 | mg/kg |
| Indeno(1,2,3-C,D)Pyrene | 0.5 | 1.4 | 6.6 | mg/kg |
| Phenanthrene | 1.1 | 4.9 | 1000 | mg/kg |
| **Metals** | | | | |
| Arsenic | 13 | 16 | 16 | mg/kg |
| Cadmium | 2.5 | 2.5 | 7.5 | mg/kg |
| Chromium III | 30 | 110 | -- | mg/kg |
| Chromium, Total | 30 | 110 | -- | mg/kg |
| Copper | 50 | 280 | 1720 | mg/kg |
| Cyanide | 2.3 | 13 | 40 | mg/kg |
| Lead | 63 | 400 | 450 | mg/kg |
| Mercury | 0.18 | 0.3 | 0.73 | mg/kg |
| Nickel | 30 | 320 | 130 | mg/kg |
| Zinc | 109 | 6600 | 2480 | mg/kg |
| **PCBs** | | | | |
| Polychlorinated Biphenyl (PCBs) | 0.1 | 1 | 3.2 | mg/kg |
| **Pesticides/Herbicides** | | | | |
| P,P'-DDD | 0.0033 | 5 | 14 | mg/kg |
| P,P'-DDE | 0.0033 | 3.4 | 9.3 | mg/kg |
| P,P'-DDT | 0.0033 | 3.8 | 135 | mg/kg |
| **PFAS** | | | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.88 | 44 | 1 | µg/kg |

NOTES

1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. 550 GALLON UST IS REFERENCED IN THE 1951 AND 1969 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS NOT BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY OR TEST PIT
3. 550 GALLON UST IS REFERENCED IN THE 1951 AND 1969 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY AND TEST PIT

mg/kg - MILLIGRAMS PER KILOGRAM
µg/kg - MICROGRAMS PER KILOGRAM
NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
-- NO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES AVAILABLE
J - ESTIMATED VALUE
DUP - DUPLICATE SAMPLE
VOCs - VOLATILE ORGANIC COMPOUNDS
SVOCs - SEMIVOLATILE ORGANIC COMPOUNDS
PCBs - POLYCHLORINATED BIPHENYLS
PFAS - PER- AND POLYFLUOROALKYL SUBSTANCES
NE - NO EXCEEDANCE
ND - NO DETECTION
NA - COMPOUND WAS NOT ANALYZED BY LABORATORY
ft bls - FEET BELOW LAND SURFACE

40 0 40'

Title:

# SOIL EXCEEDANCES

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

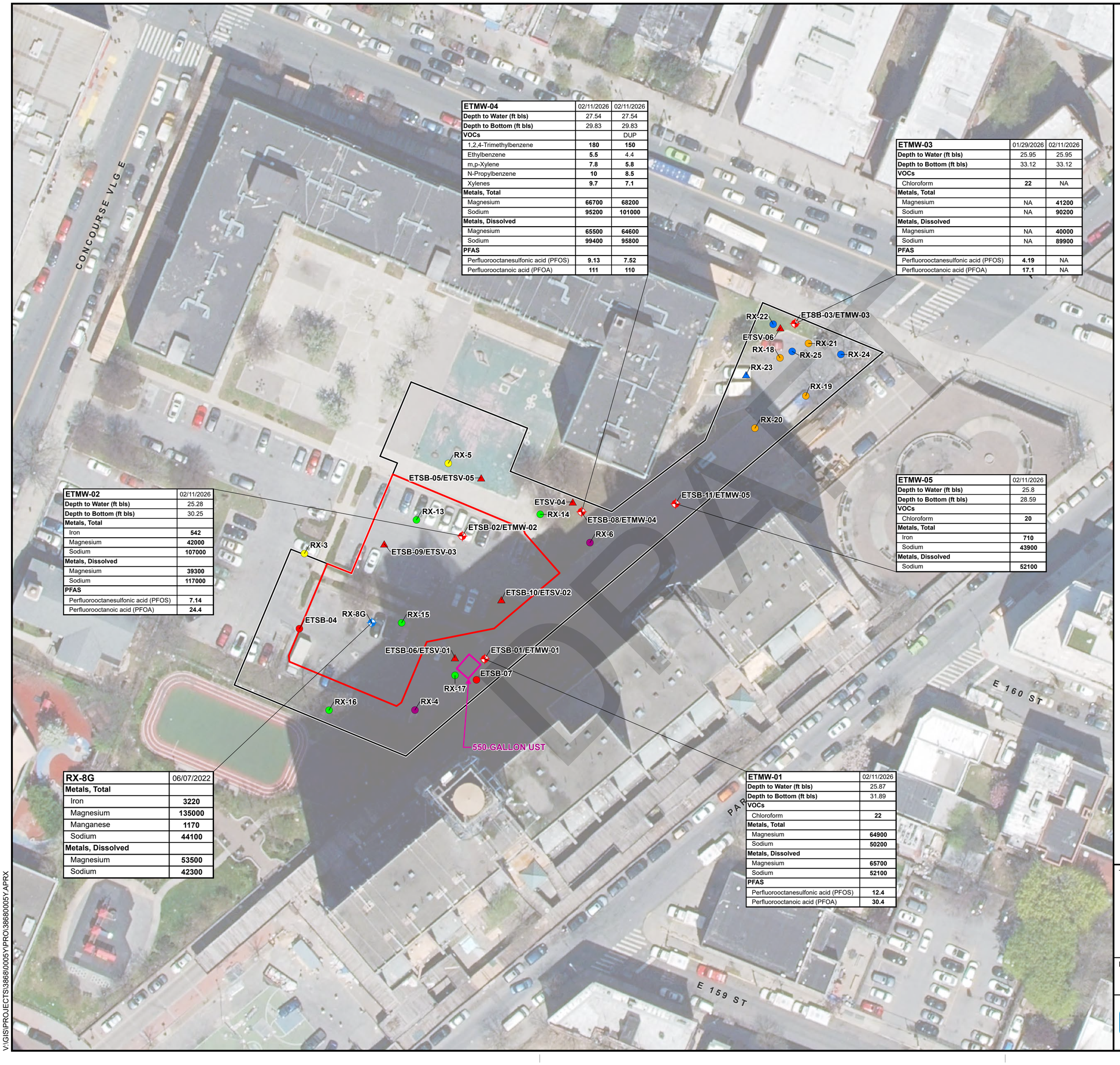
TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | |
|---|---|
| Compiled by: P.P. | Date: 06/08/26 |
| Prepared by: M.S.R. | Scale: AS SHOWN |
| Project Mgr: L.D. | Project: 3868.0005Y000 |
| File: 3868.0005Y111.06 | |

FIGURE 6

V:\GIS\PROJECTS\3868\0005Y\111\3868l0005Y111.APRX




| ETMW-04 | 02/11/2026 | 02/11/2026 |
|---|---|---|
| **Depth to Water (ft bls)** | 27.54 | 27.54 |
| **Depth to Bottom (ft bls)** | 29.83 | 29.83 |
| **VOCs** | | DUP |
| 1,2,4-Trimethylbenzene | **180** | **150** |
| Ethylbenzene | **5.5** | 4.4 |
| m,p-Xylene | **7.8** | **5.8** |
| N-Propylbenzene | **10** | **8.5** |
| Xylenes | **9.7** | **7.1** |
| **Metals, Total** | | |
| Magnesium | **66700** | **68200** |
| Sodium | **95200** | **101000** |
| **Metals, Dissolved** | | |
| Magnesium | **65500** | **64600** |
| Sodium | **99400** | **95800** |
| **PFAS** | | |
| Perfluorooctanesulfonic acid (PFOS) | **9.13** | **7.52** |
| Perfluorooctanoic acid (PFOA) | **111** | **110** |

| ETMW-03 | 01/29/2026 | 02/11/2026 |
|---|---|---|
| **Depth to Water (ft bls)** | 25.95 | 25.95 |
| **Depth to Bottom (ft bls)** | 33.12 | 33.12 |
| **VOCs** | | |
| Chloroform | **22** | NA |
| **Metals, Total** | | |
| Magnesium | NA | **41200** |
| Sodium | NA | **90200** |
| **Metals, Dissolved** | | |
| Magnesium | NA | **40000** |
| Sodium | NA | **89900** |
| **PFAS** | | |
| Perfluorooctanesulfonic acid (PFOS) | **4.19** | NA |
| Perfluorooctanoic acid (PFOA) | **17.1** | NA |

| ETMW-02 | 02/11/2026 |
|---|---|
| **Depth to Water (ft bls)** | 25.28 |
| **Depth to Bottom (ft bls)** | 30.25 |
| **Metals, Total** | |
| Iron | **542** |
| Magnesium | **42000** |
| Sodium | **107000** |
| **Metals, Dissolved** | |
| Magnesium | **39300** |
| Sodium | **117000** |
| **PFAS** | |
| Perfluorooctanesulfonic acid (PFOS) | **7.14** |
| Perfluorooctanoic acid (PFOA) | **24.4** |

| ETMW-05 | 02/11/2026 |
|---|---|
| **Depth to Water (ft bls)** | 25.8 |
| **Depth to Bottom (ft bls)** | 28.59 |
| **VOCs** | |
| Chloroform | **20** |
| **Metals, Total** | |
| Iron | **710** |
| Sodium | **43900** |
| **Metals, Dissolved** | |
| Sodium | **52100** |

| RX-8G | 06/07/2022 |
|---|---|
| **Metals, Total** | |
| Iron | **3220** |
| Magnesium | **135000** |
| Manganese | **1170** |
| Sodium | **44100** |
| **Metals, Dissolved** | |
| Magnesium | **53500** |
| Sodium | **42300** |

| ETMW-01 | 02/11/2026 |
|---|---|
| **Depth to Water (ft bls)** | 25.87 |
| **Depth to Bottom (ft bls)** | 31.89 |
| **VOCs** | |
| Chloroform | **22** |
| **Metals, Total** | |
| Magnesium | **64900** |
| Sodium | **50200** |
| **Metals, Dissolved** | |
| Magnesium | **65700** |
| Sodium | **52100** |
| **PFAS** | |
| Perfluorooctanesulfonic acid (PFOS) | **12.4** |
| Perfluorooctanoic acid (PFOA) | **30.4** |

LEGEND

- LOCATION AND DESIGNATION OF SOIL BORING LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/SOIL VAPOR POINT LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/PERMANENT MONITORING WELL LOCATION
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL VAPOR POINT
- MONITORING WELL INSTALLED BY MUESER RUTLEDGE
- 2022 PHASE II ESA SOIL BORING
- 2022 PHASE II ESA SOIL BORING AND SOIL VAPOR POINT
- 2023 BCP ELIGIBILITY SOIL BORING
- 2024 SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- SUPPORT OF EXCAVATION BOUNDARY
- APPROXIMATE LOCATION OF 550-GALLON UST
- SITE BOUNDARY

N

| Parameter | NYSDEC AWQSGV | Units |
|---|---|---|
| **VOCs** | | |
| 1,2,4-Trimethylbenzene | **5** | µg/L |
| Chloroform | **7** | µg/L |
| Ethylbenzene | **5** | µg/L |
| m,p-Xylene | **5** | µg/L |
| N-Propylbenzene | **5** | µg/L |
| Xylenes | **5** | µg/L |
| **SVOCs** | NE | µg/L |
| **Metals, Total** | | |
| Iron | **300** | µg/L |
| Magnesium | **35000** | µg/L |
| Sodium | **20000** | µg/L |
| **Metals, Dissolved** | | |
| Magnesium | **35000** | µg/L |
| Sodium | **20000** | µg/L |
| **PCBs** | ND | µg/L |
| **Pesticides** | ND | µg/L |
| **PFAS** | | |
| Perfluorooctanesulfonic acid (PFOS) | **2.7** | ng/L |
| Perfluorooctanoic acid (PFOA) | **6.7** | ng/L |

NOTES

1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. ESA - ENVIRONMENTAL SITE ASSESSMENT
3. BCP - BROWNFIELD CLEANUP PROGRAM
4. 550 GALLON UST IS REFERENCED IN THE 1951 AND 1969 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS NOT BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY OR TEST PIT
5. 550 GALLON UST IS REFERENCED IN THE 1951 AND 196 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY AND TEST PIT
6. CONCENTRATIONS IN MG/L

µg/L - MICROGRAMS PER LITER
ng/L - NANOGRAMS PER LITER
NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AWQSGVs - AMBIENT WATER-QUALITY STANDARDS AND GUIDANCE VALUES
-- NO NYSDEC AWQSGV AVAILABLE
B - FOUND IN LABORATORY BLANK
E - EXCEEDS CALIBRATION LIMIT
D - DILUTION
J - ESTIMATED VALUE
DUP - DUPLICATE SAMPLE
VOCs - VOLATILE ORGANIC COMPOUNDS
SVOCs - SEMIVOLATILE ORGANIC COMPOUNDS
PCBs - POLYCHLORINATED BIPHENYLS
PFAS - PER- AND POLYFLUOROALKYL SUBSTANCES
NE - NO EXCEEDANCES
ND - NO DETECTION

40 0 40'

Title:

# GROUNDWATER EXCEEDANCES

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 06/02/26 | FIGURE 7 |
| Prepared by: M.S.R. | Scale: AS SHOWN | |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.07.mxd | | |

V:\GIS\PROJECTS\3868\0005Y\PRO\3868\0005Y.APRX

| RX-5 | 06/01/2022 |
|---|---|
| **Depth (ft bls)** | 9.5 - 10 |
| **VOCs** | |
| 1,2,4-Trimethylbenzene | **11** |
| 1,3,5-Trimethylbenzene (Mesitylene) | **3.5 J** |
| 2,2,4-Trimethylpentane | **9.2** |
| 4-Ethyltoluene | **3.2 J** |
| Acetone | **150** |
| Benzene | **5.6** |
| Butane | **1400 D** |
| Carbon Disulfide | **25** |
| Ethylbenzene | **3.7 J** |
| Isopropylbenzene (Cumene) | **1.2 J** |
| m,p-Xylene | **9.4 J** |
| Methyl Ethyl Ketone (2-Butanone) | **27** |
| N-Heptane | **190** |
| N-Hexane | **280** |
| N-Propylbenzene | **2.8 J** |
| O-Xylene (1,2-Dimethylbenzene) | **4.7** |
| Sec-Butylbenzene | **1.6 J** |
| Tetrachloroethylene (PCE) | **2.1 J** |
| Toluene | **9.9** |

| ETSV-05 | 01/29/2026 |
|---|---|
| **Depth (ft bls)** | 6.5 - 7 |
| **VOCs** | |
| Acetone | **91 D** |
| Benzene | **1.1** |
| Butane | **12** |
| Carbon Disulfide | **1.6** |
| Chloroform | **0.65 J** |
| Cyclohexane | **0.76** |
| Dichlorodifluoromethane | **27** |
| Methyl Ethyl Ketone (2-Butanone) | **140 D** |
| N-Heptane | **0.78 J** |
| N-Hexane | **3.1** |
| Tetrachloroethylene (PCE) | **5** |
| Toluene | **1.2** |
| Trichloroethylene (TCE) | **5.2** |
| Trichlorofluoromethane | **1.7** |

| AMB_012926_SV | 01/29/2026 |
|---|---|
| **VOCs** | |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | **0.48 J** |
| Acetone | **6 J** |
| Benzene | **0.86** |
| Butane | **2.6** |
| Chloromethane | **0.38 J** |
| Dichlorodifluoromethane | **2.4 J** |
| N-Hexane | **0.4 J** |
| Toluene | **0.67 J** |
| Trichlorofluoromethane | **1.1** |

| ETSV-06 | 01/29/2026 | 01/29/2026 |
|---|---|---|
| **Depth (ft bls)** | 13.5 - 14 | 13.5 - 14 DUP |
| **VOCs** | | |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | **0.47 J** | ND |
| 1,2-Dichlorotetrafluoroethane | **2.9** | **3.3** |
| 2,2,4-Trimethylpentane | **0.87 J** | **0.32 J** |
| 2-Hexanone | **0.75 J** | ND |
| Acetone | **32** | **25** |
| Benzene | **1.2** | **1.2** |
| Butane | **7.3** | **8.3** |
| Carbon Disulfide | **3.4** | **4.7** |
| Chloroform | **1.4** | **1.9** |
| Cyclohexane | **0.8** | **0.88** |
| Dichlorodifluoromethane | **2.8** | **3** |
| m,p-Xylene | **0.61 J** | ND |
| Methyl Ethyl Ketone (2-Butanone) | **49** | **50** |
| N-Heptane | **0.92** | **0.62 J** |
| N-Hexane | **2** | **2.7** |
| Tetrachloroethylene (PCE) | **7** | **4.2** |
| Toluene | **1.2** | **1.5** |
| Trichloroethylene (TCE) | **3.1** | ND |
| Trichlorofluoromethane | **1.1** | **1.1** |

| ETSV-03 | 01/29/2026 |
|---|---|
| **Depth (ft bls)** | 11.5 - 12 |
| **VOCs** | |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | **0.45 J** |
| 1,2-Dichlorotetrafluoroethane | ND |
| 2,2,4-Trimethylpentane | ND |
| Acetone | **49** |
| Benzene | **0.96** |
| Butane | **6.1** |
| Carbon Disulfide | **3.8** |
| Chloroform | **0.35 J** |
| Cyclohexane | **0.68 J** |
| Dichlorodifluoromethane | **5.5** |
| Methyl Ethyl Ketone (2-Butanone) | **72 D** |
| N-Heptane | **0.76 J** |
| N-Hexane | **2** |
| Tetrachloroethylene (PCE) | ND |
| Toluene | **1** |
| Trichlorofluoromethane | **5.5** |

| ETSV-04 | 01/29/2026 |
|---|---|
| **Depth (ft bls)** | 10.5 - 11 |
| **VOCs** | |
| 1,2,4-Trimethylbenzene | **9.5** |
| 1,3,5-Trimethylbenzene (Mesitylene) | **1.8** |
| 1,3-Butadiene | **0.19 J** |
| 2,2,4-Trimethylpentane | **230** |
| 4-Ethyltoluene | **2** |
| Acetone | **34** |
| Benzene | **0.62 J** |
| Butane | **8** |
| Carbon Disulfide | **0.76 J** |
| Chloroform | **2.8** |
| Cyclohexane | **41** |
| Dichlorodifluoromethane | **3.4** |
| Ethylbenzene | **2.9** |
| Isopropylbenzene (Cumene) | **0.62 J** |
| m,p-Xylene | **6.9** |
| Methyl Ethyl Ketone (2-Butanone) | **66** |
| N-Heptane | **1.8** |
| N-Hexane | **2.3** |
| N-Propylbenzene | **1.7** |
| O-Xylene (1,2-Dimethylbenzene) | **2.9** |
| Toluene | **0.88** |
| Trichlorofluoromethane | **1.9** |

| RX-3 | 06/01/2022 |
|---|---|
| **Depth (ft bls)** | 11.5 - 12 |
| **VOCs** | |
| 1,2,4-Trimethylbenzene | **13** |
| 1,3,5-Trimethylbenzene (Mesitylene) | **4.3 J** |
| 2-Hexanone | **16** |
| 4-Ethyltoluene | **4.2 J** |
| Acetone | **28 J** |
| Benzene | **2.4 J** |
| Carbon Disulfide | **7.6 J** |
| Ethylbenzene | **11** |
| Isopropylbenzene (Cumene) | **1.2 J** |
| m,p-Xylene | **26** |
| Methyl Ethyl Ketone (2-Butanone) | **60** |
| N-Heptane | **2.9 J** |
| N-Hexane | **18** |
| N-Propylbenzene | **3.3 J** |
| O-Xylene (1,2-Dimethylbenzene) | **10** |
| Tetrachloroethylene (PCE) | **96** |
| Toluene | **1400 D** |

| ETSV-02 | 02/13/2026 |
|---|---|
| **Depth (ft bls)** | 11.5 - 12 |
| **VOCs** | |
| 2-Hexanone | **0.79 J** |
| Acetone | **47** |
| Benzene | **0.54 J** |
| Butane | **7.5** |
| Carbon Disulfide | **1.1 J** |
| Chloroform | **0.35 J** |
| Dichlorodifluoromethane | **2.6** |
| Methyl Ethyl Ketone (2-Butanone) | **30** |
| N-Hexane | **0.72 J** |
| Toluene | **0.46 J** |
| Trichlorofluoromethane | **2.1** |

| ETSV-01 | 01/29/2026 |
|---|---|
| **Depth (ft bls)** | 9.5 - 10 |
| **VOCs** | |
| 1,2-Dichlorotetrafluoroethane | **2.4** |
| Acetone | **24** |
| Butane | **8** |
| Carbon Disulfide | **0.86 J** |
| Chloroform | **0.27 J** |
| Dichlorodifluoromethane | **5** |
| Methyl Ethyl Ketone (2-Butanone) | **8.6** |
| Trichlorofluoromethane | **3.4** |

RX-5
ETSB-05/ETSV-05
RX-13
AMB_012926_SV
ETSB-02/ETMW-02
RX-3
ETSB-09/ETSV-03
ETSV-04
RX-14
ETSB-08/ETMW-04
ETSB-11/ETMW-05
RX-6
ETSB-10/ETSV-02
ETSB-04
RX-8G
RX-15
ETSB-06/ETSV-01
ETSB-01/ETMW-01
ETSB-07
RX-17
RX-16
RX-4
550-GALLON UST
RX-22
ETSB-03/ETMW-03
ETSV-06
RX-18
RX-21
RX-25
RX-24
RX-23
RX-19
RX-20
CONCOURSE
PARK AVE
160 ST
PARK AVE
E 159 ST

LEGEND

- LOCATION AND DESIGNATION OF SOIL BORING LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/SOIL VAPOR POINT LOCATION
- LOCATION AND DESIGNATION OF SOIL BORING/PERMANENT MONITORING WELL LOCATION
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- 2024 EAST TOWER SUPPLEMENTAL BCP ELIGIBILITY SOIL VAPOR POINT
- MONITORING WELL INSTALLED BY MUESER RUTLEDGE
- 2022 PHASE II ESA SOIL BORING
- 2022 PHASE II ESA SOIL BORING AND SOIL VAPOR POINT
- 2023 BCP ELIGIBILITY SOIL BORING
- 2024 SUPPLEMENTAL BCP ELIGIBILITY SOIL BORING
- SUPPORT OF EXCAVATION BOUNDARY
- APPROXIMATE LOCATION OF 550-GALLON UST
- SITE BOUNDARY

N

NOTES

1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. ESA - ENVIRONMENTAL SITE ASSESSMENT
3. BCP - BROWNFIELD CLEANUP PROGRAM
4. 550 GALLON UST IS REFERENCED IN THE 1951 AND 1969 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS NOT BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY OR TEST PIT
5. 550 GALLON UST IS REFERENCED IN THE 1951 AND 196 SANBORN MAP AND THE PRESENCE AND LOCATION OF THE UST HAS BEEN FIELD CONFIRMED VIA GEOPHYSICAL SURVEY AND TEST PIT

CONCENTRATIONS IN µg/m$^3$
µg/m$^3$ - MICROGRAMS PER CUBIC METER
VOCs - VOLATILE ORGANIC COMPOUNDS
ND - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED

40 0 40'

Title:

# SOIL VAPOR DETECTIONS

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | |
|---|---|
| Compiled by: P.P. | Date: 06/02/26 |
| Prepared by: M.S.R. | Scale: AS SHOWN |
| Project Mgr: L.D. | Project: 3868.0005Y000 |
| File: 3868.0005Y111.08.mxd | |

FIGURE 8

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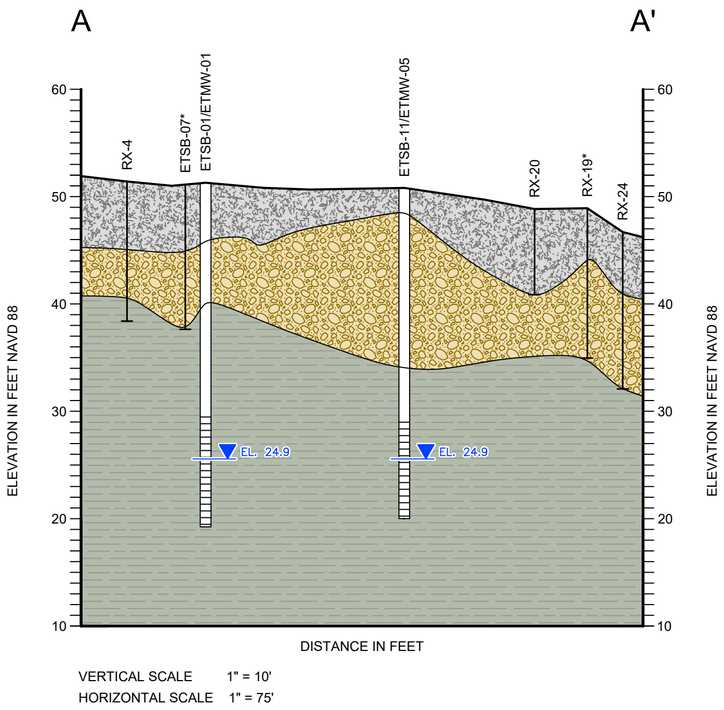
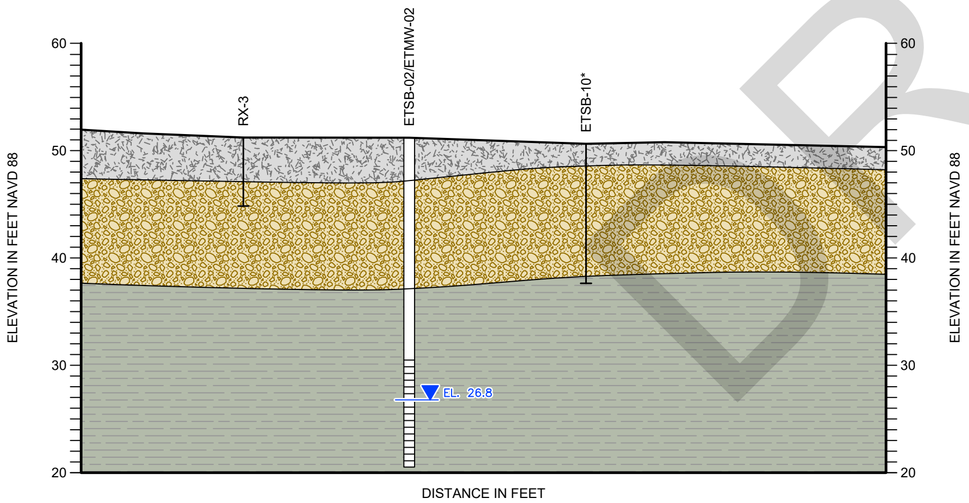


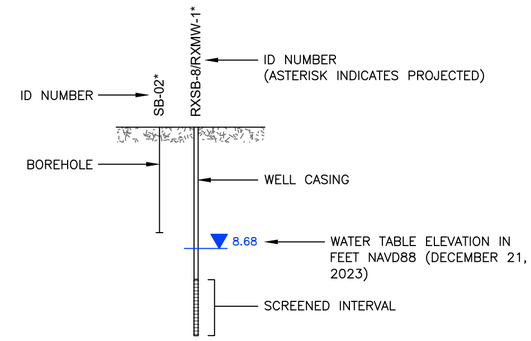

VERTICAL SCALE 1" = 10'
HORIZONTAL SCALE 1" = 75'



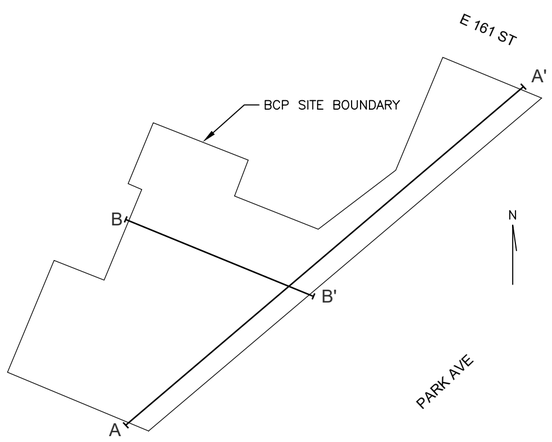

VERTICAL SCALE 1" = 10'
HORIZONTAL SCALE 1" = 20'

LEGEND

- FILL MATERIALS
- BROWN/DARK BROWN SAND WITH SILT/GRAVEL
- WEATHERED BEDROCK




CROSS SECTION LOCATIONS

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Title:

# CROSS SECTIONS A-A' AND B-B'

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 5/29/2026 | FIGURE |
| Prepared by: G.M. | Scale: AS SHOWN | 9 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.01.DWG | | |

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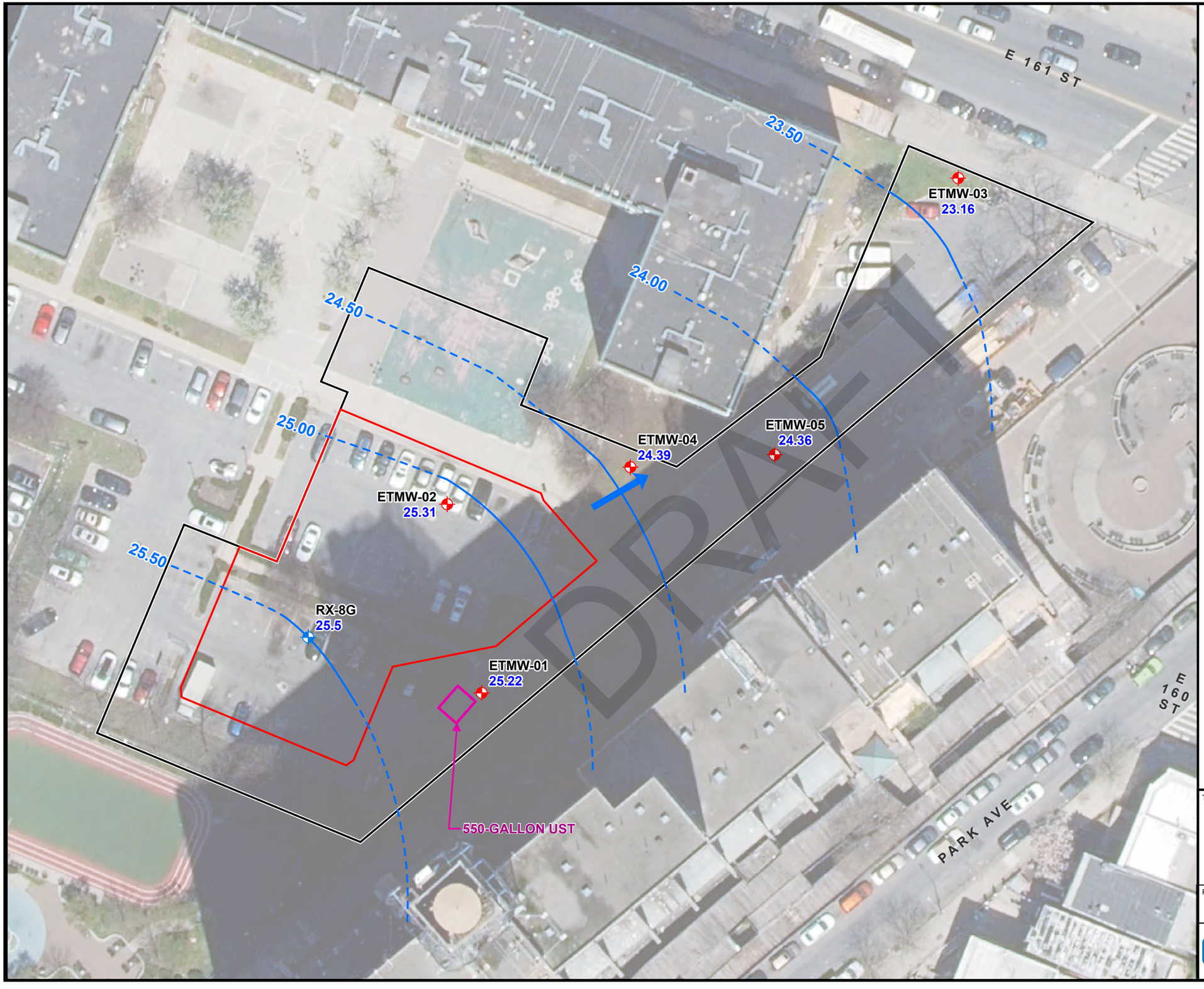


N

LEGEND

- 2026 RI SOIL BORING/PERMANENT MONITORING WELL LOCATION
- MONITORING WELL INSTALLED BY MUESER RUTLEDGE
- 23.16 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (NAVD 88)

**GROUNDWATER CONTOURS**

- LINE OF EQUAL GROUNDWATER ELEVATION (DASHED WHERE CONTOURS ARE INFERRED BASED ON LIMITED AVAILABLE DATA)
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- SUPPORT OF EXCAVATION BOUNDARY
- 550-GALLON UST
- SITE BOUNDARY

NOTES

1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. ESA - ENVIRONMENTAL SITE ASSESSMENT
3. BCP - BROWNFIELD CLEANUP PROGRAM
4. ELEVATIONS MEASURED IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

40 0 40'

Title:

# GROUNDWATER CONTOUR MAP JANUARY 2026

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 06/02/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 10 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.10.APRX | | |

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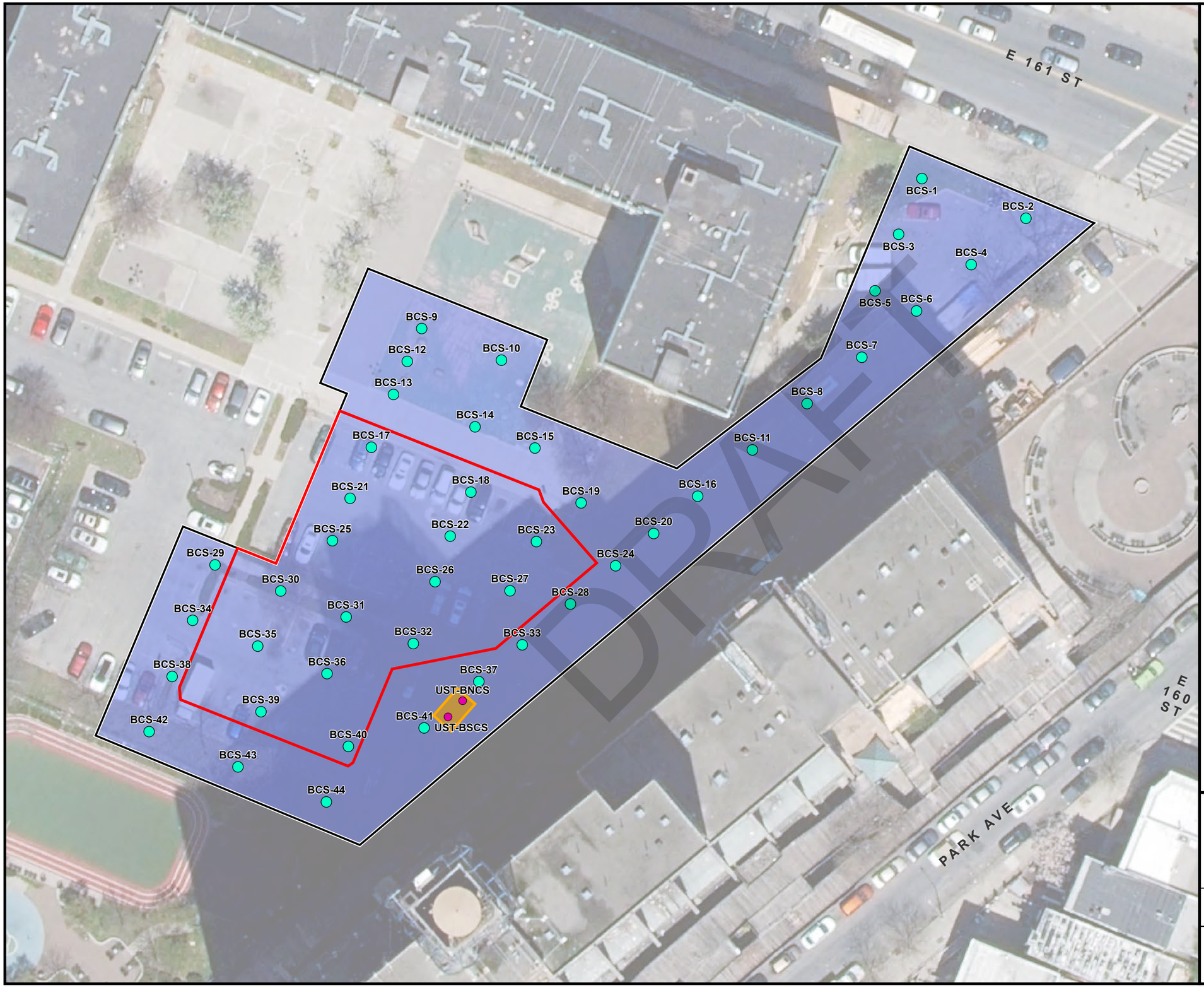


LEGEND

- CONFIRMATION ENDPOINT SAMPLE
- UNDERGROUND STORAGE TANK CONFIRMATION ENDPOINT SAMPLE
- SUPPORT OF EXCAVATION BOUNDARY
- SITE BOUNDARY

**EXCAVATION AREAS**

- 550-GALLON UNDERGROUND STORAGE TANK
- EXCAVATE TO 20 FT BLS - TRACK 1 CLEANUP

N

NOTES

1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. FT BLS - FEET BELOW LAND SURFACE

40 0 40'

Title:

# REMEDIAL ALTERNATIVE 1: TRACK 1 CLEANUP

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 06/11/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 11 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.12 | | |

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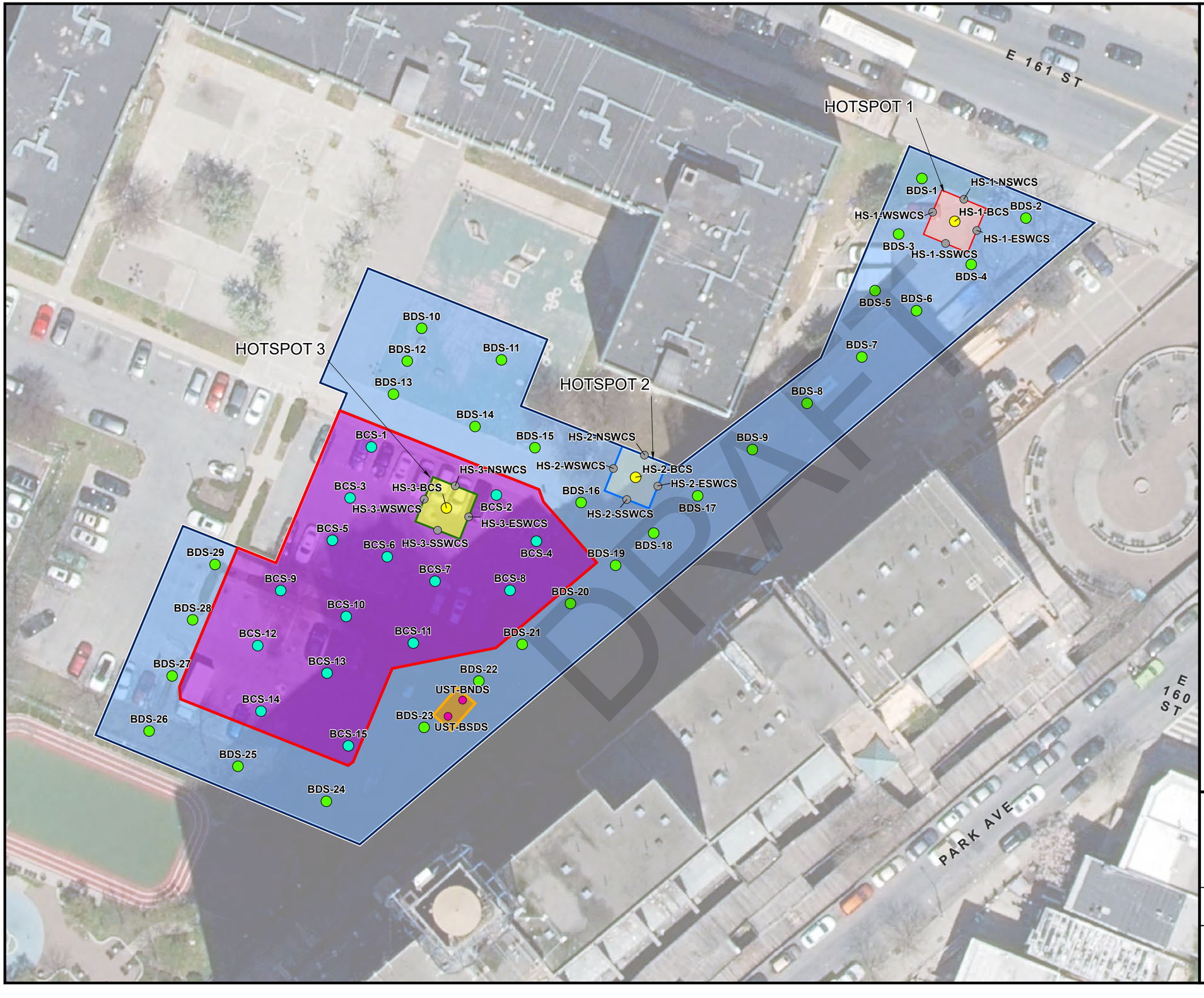


LEGEND

- CONFIRMATION ENDPOINT SAMPLE
- DOCUMENTARY ENDPOINT SAMPLE
- HOT SPOT BOTTOM CONFIRMATION ENDPOINT SAMPLE
- HOT SPOT SIDEWALL CONFIRMATION ENDPOINT SAMPLE
- UNDERGROUND STORAGE TANK DOCUMENTARY ENDPOINT SAMPLE
- SUPPORT OF EXCAVATION BOUNDARY
- SITE BOUNDARY

**EXCAVATION AREAS**

- EXCAVATE 4 FT BLS - TRACK 2 CLEANUP
- EXCAVATE 2 FT BLS - TRACK 4 CLEANUP
- EXCAVATE 6 FT BLS - UNDERGROUND STORAGE TANK REMOVAL
- EXCAVATE TO 5 FT BLS - HOTSPOT 1
- EXCAVATE TO 8 FT BLS - HOTSPOT 2
- EXCAVATE TO 14 FT BLS - HOTSPOT 3

N

NOTES
1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. FT BLS - FEET BELOW LAND SURFACE

40 0 40'

Title:

# REMEDIAL ALTERNATIVE 2: TRACK 2 & TRACK 4 CLEANUP

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 06/11/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 12 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.12 | | |

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LEGEND

- SITE COVER SYSTEM COMPRISED OF CLEAN STONE AND ASPHALT OR CONCRETE PAVING (SEE DETAIL 1) OR CLEAN STONE OF FILL ( SEE DETAIL 3)
- SITE COVER SYSTEM COMPRISED OF CLEAN STONE OR FILL AND TOPSOIL (SEE DETAIL 2) OR CLEAN STONE OR FILL (SEE DETAIL 3)
- TRACK 2 AREA
- TRACK 2/TRACK 4 REMEDIATION AREA BOUNDARY
- SITE BOUNDARY
- PARCEL BOUNDARY

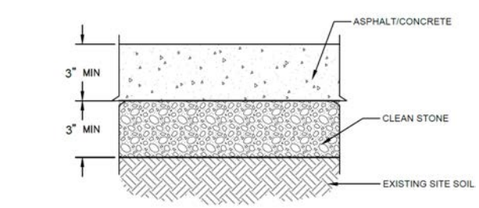
N

NOTES

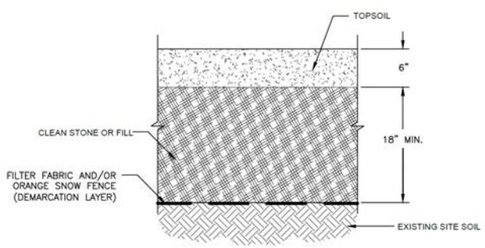
1. TAX MAP SOURCE: NYC DEPARTMENT OF CITY PLANNING, INFORMATION TECHNOLOGY DIVISION
2. BACKFILL FOR ALL PORTIONS OF THE SITE WILL MEET THE LOWER OF PART 375 RRSCOS OR PGWSCOS (WITH THE EXCEPTION OF GRANULAR FILL MATERIALS WITH LESS THAN 10% PASSING THE NUMBER 80 SIEVE). MATERIALS WITH LESS THAN 10% PASSING THE NUMBER 80 SIEVE (I.E., STONE, RCA, GRAVEL, ETC.) DO NOT REQUIRE SAMPLING
3. COVER SYSTEM LOCATIONS BASED ON DRAWINGS Z-002-00 - ZONING PLOT PLAN, DATED JULY 7,2022 AND C-300-DRAINAGE PLAN, DATED NOVEMBER 14,2025.

PARCEL NUMBER
**02-2420-150**
BOROUGH BLOCK LOT

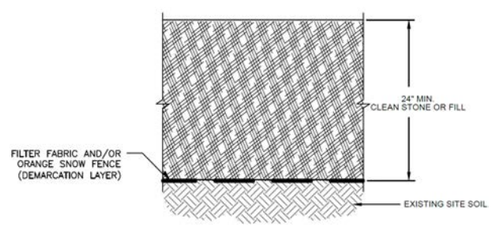
45 0 45'




1 PROPOSED SITE COVER SYSTEM: ASPHALT/CONCRETE PAVING
SCALE: NOT TO SCALE




2 PROPOSED SITE COVER SYSTEM: LANDSCAPED AREAS
SCALE: NOT TO SCALE




3 PROPOSED SITE COVER SYSTEM:
SCALE: NOT TO SCALE

Title:

# PROPOSED SITE COVER SYSTEM

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:
TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | |
|---|---|
| Compiled by: P.P. | Date: 08/03/26 |
| Prepared by: M.S.R. | Scale: AS SHOWN |
| Project Mgr: L.D. | Project: 3868.0005Y000 |
| File: 3868.0005Y111.13 | |

FIGURE
**13**

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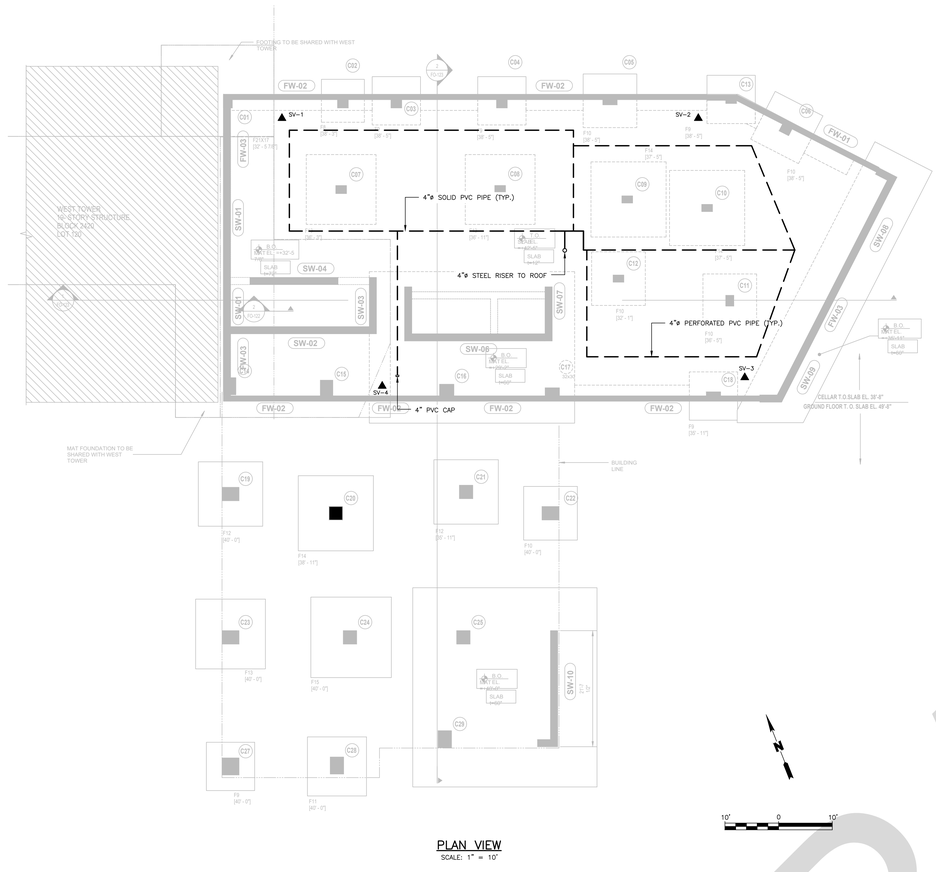
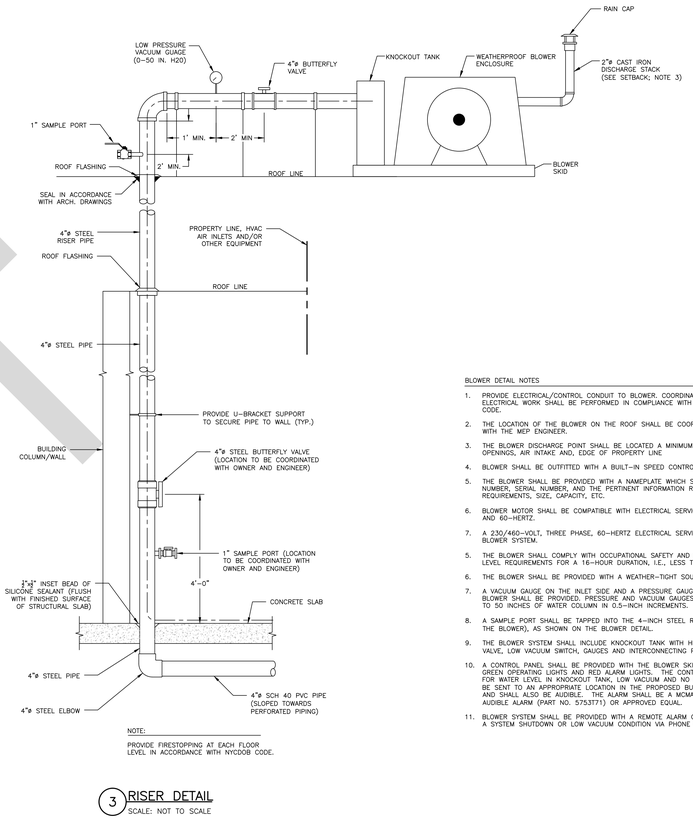



PLAN VIEW
SCALE: 1" = 10'




NOTE:

PROVIDE FIRESTOPPING AT EACH FLOOR LEVEL IN ACCORDANCE WITH NYCDOB CODE.

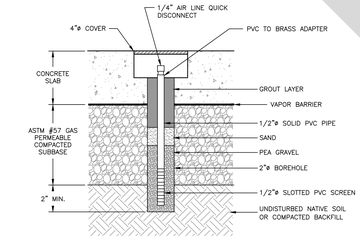
3 RISER DETAIL
SCALE: NOT TO SCALE

BLOWER DETAIL NOTES

1. PROVIDE ELECTRICAL/CONTROL CONDUIT TO BLOWER. COORDINATE WITH ELECTRICAL CONTRACTOR. THE ELECTRICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH LATEST VERSION OF APPLICABLE NYC CODE.
2. THE LOCATION OF THE BLOWER ON THE ROOF SHALL BE COORDINATED WITH THE ARCHITECT AND WITH THE MEP ENGINEER.
3. THE BLOWER DISCHARGE POINT SHALL BE LOCATED A MINIMUM OF 10 FEET FROM ANY OPERABLE OPENINGS, AIR INTAKE AND, EDGE OF PROPERTY LINE
4. BLOWER SHALL BE OUTFITTED WITH A BUILT-IN SPEED CONTROLLER.
5. THE BLOWER SHALL BE PROVIDED WITH A NAMEPLATE WHICH STATES THE MANUFACTURER, MODEL NUMBER, SERIAL NUMBER, AND THE PERTINENT INFORMATION REGARDING THE ELECTRICAL REQUIREMENTS, SIZE, CAPACITY, ETC.
6. BLOWER MOTOR SHALL BE COMPATIBLE WITH ELECTRICAL SERVICE OF 230/460-VOLT, THREE PHASE, AND 60-HERTZ.
7. A 230/460-VOLT, THREE PHASE, 60-HERTZ ELECTRICAL SERVICE SHALL BE PROVIDED FOR THE BLOWER SYSTEM.
5. THE BLOWER SHALL COMPLY WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) NOISE LEVEL REQUIREMENTS FOR A 16-HOUR DURATION, I.E., LESS THAN 85 DBA
6. THE BLOWER SHALL BE PROVIDED WITH A WEATHER-TIGHT SOUND-REDUCING ENCLOSURE.
7. A VACUUM GAUGE ON THE INLET SIDE AND A PRESSURE GAUGE ON THE OUTLET SIDE OF THE BLOWER SHALL BE PROVIDED. PRESSURE AND VACUUM GAUGES SHALL BE CAPABLE OF MEASURING 0 TO 50 INCHES OF WATER COLUMN IN 0.5-INCH INCREMENTS.
8. A SAMPLE PORT SHALL BE TAPPED INTO THE 4-INCH STEEL RISER PIPE (ON THE VACUUM SIDE OF THE BLOWER), AS SHOWN ON THE BLOWER DETAIL.
9. THE BLOWER SYSTEM SHALL INCLUDE KNOCKOUT TANK WITH HIGH LEVEL ALARM, VACUUM RELIEF VALVE, LOW VACUUM SWITCH, GAUGES AND INTERCONNECTING PIPING/FITTINGS.
10. A CONTROL PANEL SHALL BE PROVIDED WITH THE BLOWER SKID. THE CONTROL PANEL SHALL HAVE GREEN OPERATING LIGHTS AND RED ALARM LIGHTS. THE CONTROL PANEL SHALL HAVE AN ALARM FOR WATER LEVEL IN KNOCKOUT TANK, LOW VACUUM AND NO POWER. THE ALARM SIGNAL SHALL BE SENT TO AN APPROPRIATE LOCATION IN THE PROPOSED BUILDING (I.E. SUPERINTENDENT'S OFFICE) AND SHALL ALSO BE AUDIBLE. THE ALARM SHALL BE A MCMASTER-CARR SIGNAL LIGHT WITH AUDIBLE ALARM (PART NO. 5753T71) OR APPROVED EQUAL.
11. BLOWER SYSTEM SHALL BE PROVIDED WITH A REMOTE ALARM CAPABLE OF ALERTING THE OWNER OF A SYSTEM SHUTDOWN OR LOW VACUUM CONDITION VIA PHONE OR TEXT MESSAGE.

SUB-SLAB DEPRESSURIZATION SYSTEM NOTES

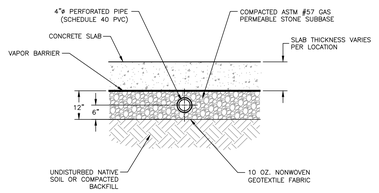
1. CONTRACTOR SHALL COORDINATE WITH PLUMBING, MECHANICAL, CIVIL AND ELECTRICAL CONTRACTORS FOR ALL UTILITY CROSSINGS.
2. THE HEADER/PERFORATED PIPE MAY BE ROUTED AROUND OR UNDERNEATH ANY UTILITY LINES (SEWER, WATER, GAS), AS REQUIRED AND AS APPROVED BY THE ENGINEER.
3. ALL PENETRATIONS THROUGH THE SLAB ON GRADE (SOG) SHALL BE SEALED USING SILICONE BASED WATERPROOF SEALANT OR APPROVED EQUAL.
4. REFER TO ARCHITECT DETAILS FOR SPECIFICATIONS REGARDING VAPOR BARRIER OR APPROVED EQUAL.
5. THIS SUB-SLAB DEPRESSURIZATION SYSTEM WAS DESIGNED TO MINIMIZE FOUNDATION CROSSINGS. FIELD VERIFICATION OF LOCATIONS SHOULD BE MADE TO ENSURE CROSSINGS ARE MINIMIZED.
6. VAPOR BARRIER SYSTEM SHALL CONSIST OF 20-MIL CLASS A VAPOR BARRIER, AS APPROVED BY THE ENGINEER, BELOW THE SLAB THROUGHOUT THE FULL BUILDING AREA. ALL SEAMS WILL BE TAPED. VAPOR BARRIER WILL BE SEALED ALONG BUILDING PERIMETER AS PER MANUFACTURER RECOMMENDATIONS.
7. CONTRACTOR SHALL PROVIDE A MINIMUM OF 4" COVER OVER TOP OF PVC PIPING TO PROTECT FROM DAMAGE.



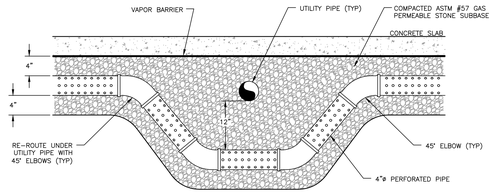

NOTE

DEPICTED LOCATIONS OF SOIL VAPOR MONITORING POINTS ARE APPROXIMATE AND SHALL BE COORDINATED AND CONFIRMED WITH THE CONTRACTOR AND ROUX PRIOR TO CONSTRUCTION.

1 SOIL VAPOR MONITORING POINT DETAIL
SCALE: NOT TO SCALE




2 SUB-SLAB DEPRESSURIZATION SYSTEM PIPE DETAIL
SCALE: NOT TO SCALE




4 TYPICAL UTILITY PIPE CROSSING
SCALE: NOT TO SCALE

DRAFT

| NO. | DATE | REVISION DESCRIPTION | INT. |
|---|---|---|---|
| | | | |

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| PROJ. ENGINEER: | | DRAWN BY: | G.M. |
| DESIGNED BY: | R.F. | CHECKED BY: | R.F. |
| DRAWING SCALE: | AS SHOWN | PLOT SCALE: | 1:1 |
| DRAWING DATE: | 6/12/2026 | PRINT TYPE: | B&W |
| OFFICE: | NY | PAPER SIZE: | ARCH D |
| PROJECT NO.: | 3868.0005Y000 | | |
| DRAWING FILE: | 3868.0005Y111.02.DWG | | |

ROUX
Roux Environmental Engineering and Geology, D.P.C.
209 SHAFTER STREET ISLANDIA NEW YORK 11749
(631) 232-2600

PROJECT NAME:
310 EAST 161ST STREET
BRONX, NY 10451

PROJECT FOR:
TEG MORRISANIA DEVELOPMENT LLC
411 BROADWAY, 28TH FLOOR, NEW YORK, NY 10018

TITLE:
SUB-SLAB DEPRESSURIZATION SYSTEM PLAN AND DETAILS

DRAWING NO.
14
DRAWING

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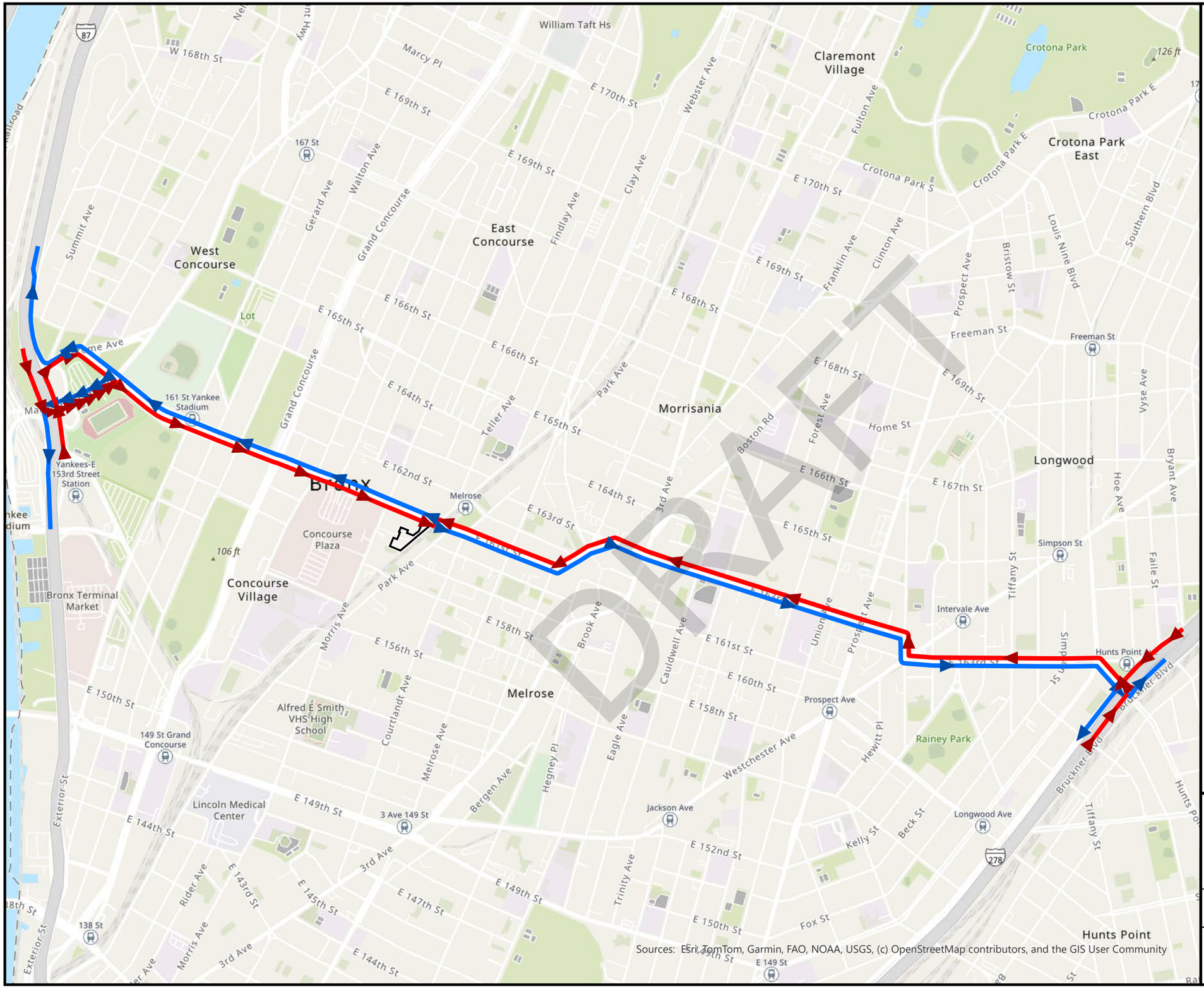



LEGEND

- FROM SITE
- TO SITE
- SITE BOUNDARY

N

1,000 0 1,000'

V:\GIS\PROJECTS\3868\0005Y111\38680005Y111.APRX

Title:

# TRUCKING ROUTE MAP

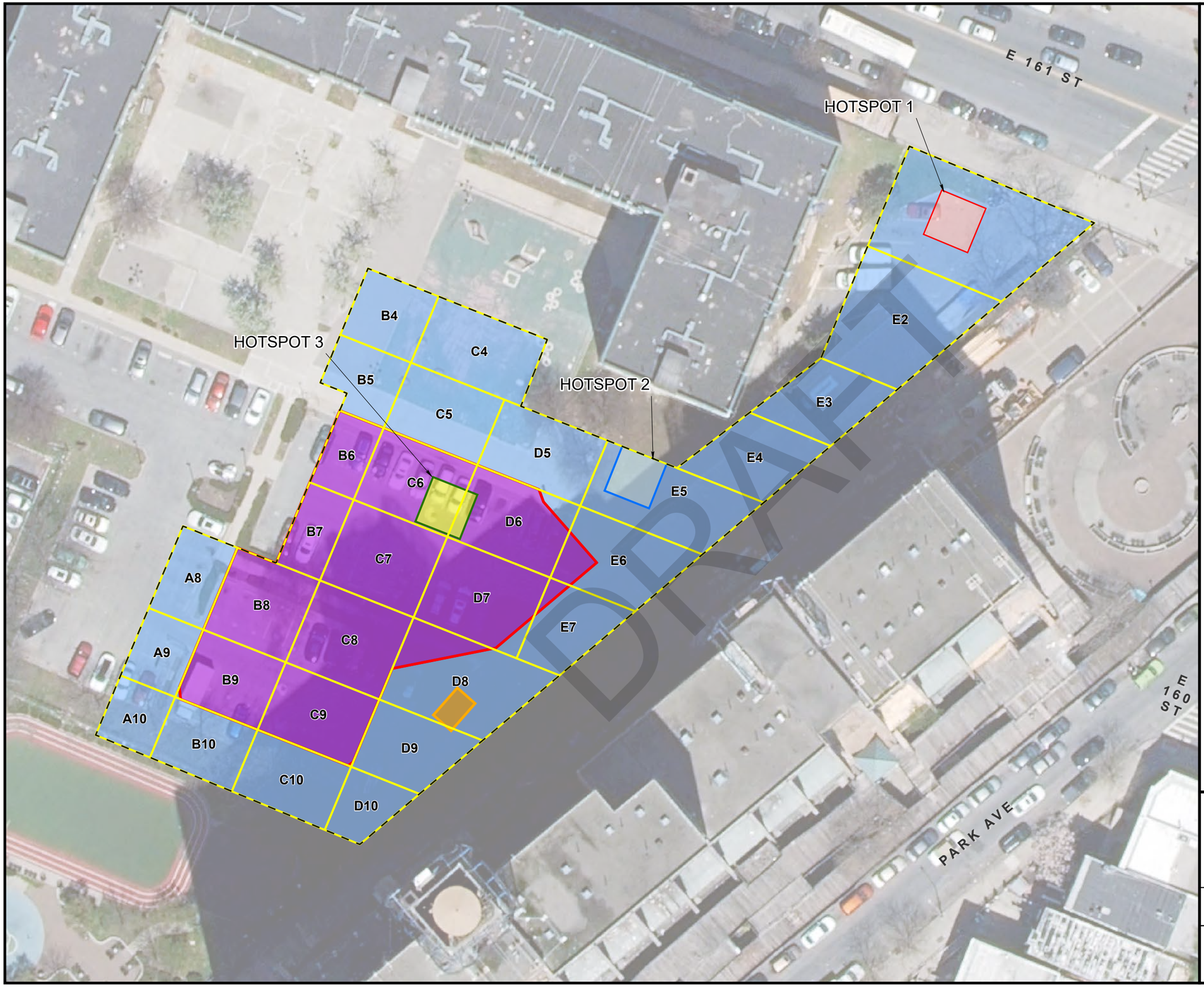
310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 06/08/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 15 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.15 | | |




DRAFT

LEGEND

- ALPHA NUMERIC GRID
- SUPPORT OF EXCAVATION BOUNDARY
- SITE BOUNDARY

**EXCAVATION AREAS**

- EXCAVATE 4 FT BLS - TRACK 2 CLEANUP
- EXCAVATE 2 FT BLS - TRACK 4 CLEANUP
- EXCAVATE 6 FT BLS - UNDERGROUND STORAGE TANK REMOVAL
- EXCAVATE TO 5 FT BLS - HOTSPOT 1
- EXCAVATE TO 8 FT BLS - HOTSPOT 2
- EXCAVATE TO 14 FT BLS - HOTSPOT 3

N

NOTES
1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)

40 0 40'

Title:

# ALPHA NUMERIC MAP

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: M.H. | Date: 06/11/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 16 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.12.APRX | | |

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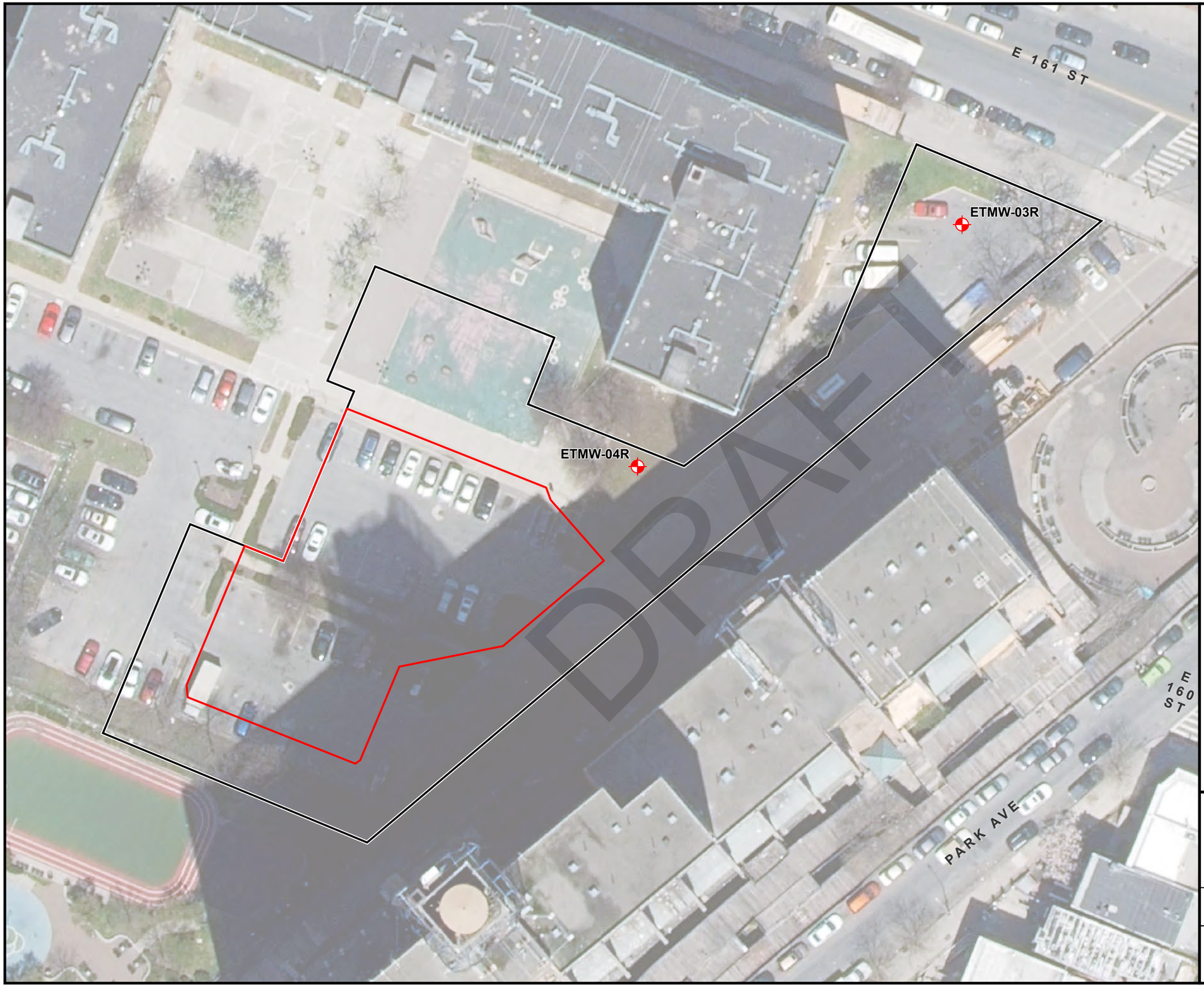


N

LEGEND

- POST REMEDIATION MONITORING WELL LOCATION
- SUPPORT OF EXCAVATION BOUNDARY
- SITE BOUNDARY

NOTES

1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. BCP - BROWNFIELD CLEANUP PROGRAM
3. POST REMEDIATION GROUNDWATER SAMPLING TO BE COMPLETED UNDER THE SMP

40 0 40'

Title:

# POST REMEDIATION MONITORING WELL LOCATIONS

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 08/05/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 17 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.17 | | |

V:\GIS\PROJECTS\3868\0005Y111\38680005Y111.APRX

# APPENDICES

A. Redevelopment Plans
B. Historical Environmental Reports
C. Citizen Participation Plan
D. Health and Safety Plan (and Community Air Monitoring Plan)
E. Quality Assurance Project Plan/Field Sampling Plan
F. Resumes of Key Personnel
G. Request for Import/Reuse Fill Material Form
H. Green and Sustainable Remediation
I. Storm Water Pollution Prevention Plan

DRAFT

# APPENDIX A

Redevelopment Plans

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT

# E 161ST STREET - EAST TOWER

280-330 E. 161ST ST., BRONX, NY 10451

E. 161ST ST NORTH VIEW


Architecture

| | |
|---|---|
| T-001 | COVER SHEET |
| C-001 | SURVEY |
| C-002 | SITE PLAN |
| Z-001 | ZONING |
| Z-002 | ZONING PLOT PLAN |
| Z-003 | ZONING FLOOR AREAS |
| Z-004 | ZONING FLOOR AREAS DEDUCTIONS |
| Z-005 | LOT COVERAGE , PARKING DIAGRAM, AND BASE PLANE CALCULATIONS |
| A-001 | GENERAL SHEETS |
| A-002 | ACESSIBILITY DIAGRAM |
| A-003 | ACESSIBILITY DIAGRAM |
| A-103 | TYPICAL 3RD - 9TH FLOOR PLANS |
| A-104 | TYPICAL 10TH - 15TH FLOOR PLANS |
| A-105 | TYPICAL 16TH - 26TH FLOOR PLANS |
| A-106 | ROOF PLAN |
| A-200 | NORTH & EAST ELEVATIONS |
| A-201 | SOUTH & WEST ELEVATIONS |
| A-210 | BUILDING SECTION A-A |
| A-500 | 0BR APARTMENT PLANS |
| A-502 | 1BR APARTMENT PLANS |
| A-503 | 1BR APARTMENT PLANS |
| A-504 | 2BR APARTMENT PLANS |
| A-505 | 3BR APARTMENT PLAN |
| A-506 | UFAS APARTMENT PLANS |
| A-510 | TYPICAL BATHROOM PLANS & ELEVATIONS |
| A-511 | TYPICAL BATHROOM PLANS & ELEVATIONS |
| A-512 | UFAS BATHROOM PLANS & ELEVATIONS |
| A-513 | PUBLIC BATHROOM PLANS & ELEVATIONS |
| A-514 | PUBLIC BATHROOM PLANS & ELEVATIONS |
| A-517.00 | KITCHEN AND MISCELLANEOUS INTERIOR MILLWORK DETAILS |


APARTMENT DISTRIBUTION - EAST TOWER

| FLOOR | 0BR | 1BR | 2BR | 3BR | TOTAL |
|---|---|---|---|---|---|
| 1 | | | | | 0 |
| 2 | 6 | 7 | 1 | 1 | 15 |
| 3 | 6 | 7 | 1 | 1 | 15 |
| 4 | 6 | 7 | 1 | 1 | 15 |
| 5 | 6 | 7 | 1 | 1 | 15 |
| 6 | 6 | 7 | 1 | 1 | 15 |
| 7 | 6 | 7 | 1 | 1 | 15 |
| 8 | 6 | 7 | 1 | 1 | 15 |
| 9 | 6 | 7 | 1 | 1 | 15 |
| 10 | 4 | 6 | 3 | 1 | 14 |
| 11 | 4 | 6 | 3 | 1 | 14 |
| 12 | 4 | 6 | 3 | 1 | 14 |
| 13 | 4 | 6 | 3 | 1 | 14 |
| 14 | 4 | 6 | 3 | 1 | 14 |
| 15 | 4 | 6 | 3 | 1 | 14 |
| 16 | 1 | 6 | 5 | 1 | 13 |
| 17 | 1 | 6 | 5 | 1 | 13 |
| 18 | 1 | 6 | 5 | 1 | 13 |
| 19 | 1 | 6 | 5 | 1 | 13 |
| 20 | 1 | 6 | 5 | 1 | 13 |
| 21 | 1 | 6 | 5 | 1 | 13 |
| 22 | 1 | 6 | 5 | 1 | 13 |
| 23 | 1 | 6 | 5 | 1 | 13 |
| 24 | 1 | 6 | 5 | 1 | 13 |
| 25 | 1 | 6 | 5 | 1 | 13 |
| 26 | 1 | 6 | 5 | 1 | 13 |
| TOTAL | 83 | 158 | 81 | 25 | 347 |
| % | 23.92% | 45.53% | 23.34% | 7.20% | |

MOBILITY IMPAIRED CHART

| FLOOR | 0BR | 1BR | 2BR | 3BR | TOTAL |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | 209 | | | | 1 |
| 3 | | 301 | | | 1 |
| 4 | | | 413 | | 1 |
| 5 | 509 | | | | 1 |
| 6 | | 601 | | | 1 |
| 7 | | | | | |
| 8 | | | 813 | | 1 |
| 9 | 909 | | | | 1 |
| 10 | | 1001 | | | 1 |
| 11 | | | | 1104 | 1 |
| 12 | | | 1213 | | 1 |
| 13 | | 1301 | | | 1 |
| 14 | | | | | |
| 15 | 1508 | | | | 1 |
| 16 | | 1601 | | | 1 |
| 17 | | | 1711 | | 1 |
| 18 | | | | | |
| 19 | | 1901 | | | 1 |
| 20 | | | | 2005 | 1 |
| 21 | | | | | |
| 22 | | 2201 | | | 1 |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | 2501 | | | 1 |
| 26 | | | | | |
| TOTAL | 4 | 8 | 4 | 2 | 18 |
| % | | | | | 5.19% |

H.V.I. CHART

| FLOOR | 0BR | 1BR | 2BR | 3BR | TOTAL |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | 202 | | | 1 |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | 513 | | 1 |
| 6 | | | | | |
| 7 | 707 | | | | 1 |
| 8 | | | | | |
| 9 | | 902 | | | 1 |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | 1204 | 1 |
| 13 | | | | | |
| 14 | 1406 | | | | 1 |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | 1802 | | | 1 |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | 2311 | | 1 |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| TOTAL | 2 | 3 | 2 | 1 | 8 |
| % | | | | | 2.31% |

AERIAL VIEW

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## COVER SHEET


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SEAL & SIGNATURE

ISSUE DATE: 07/26/22

PROJECT NO: Project Number

DRAWN BY: Author

CHECKED BY: Checker

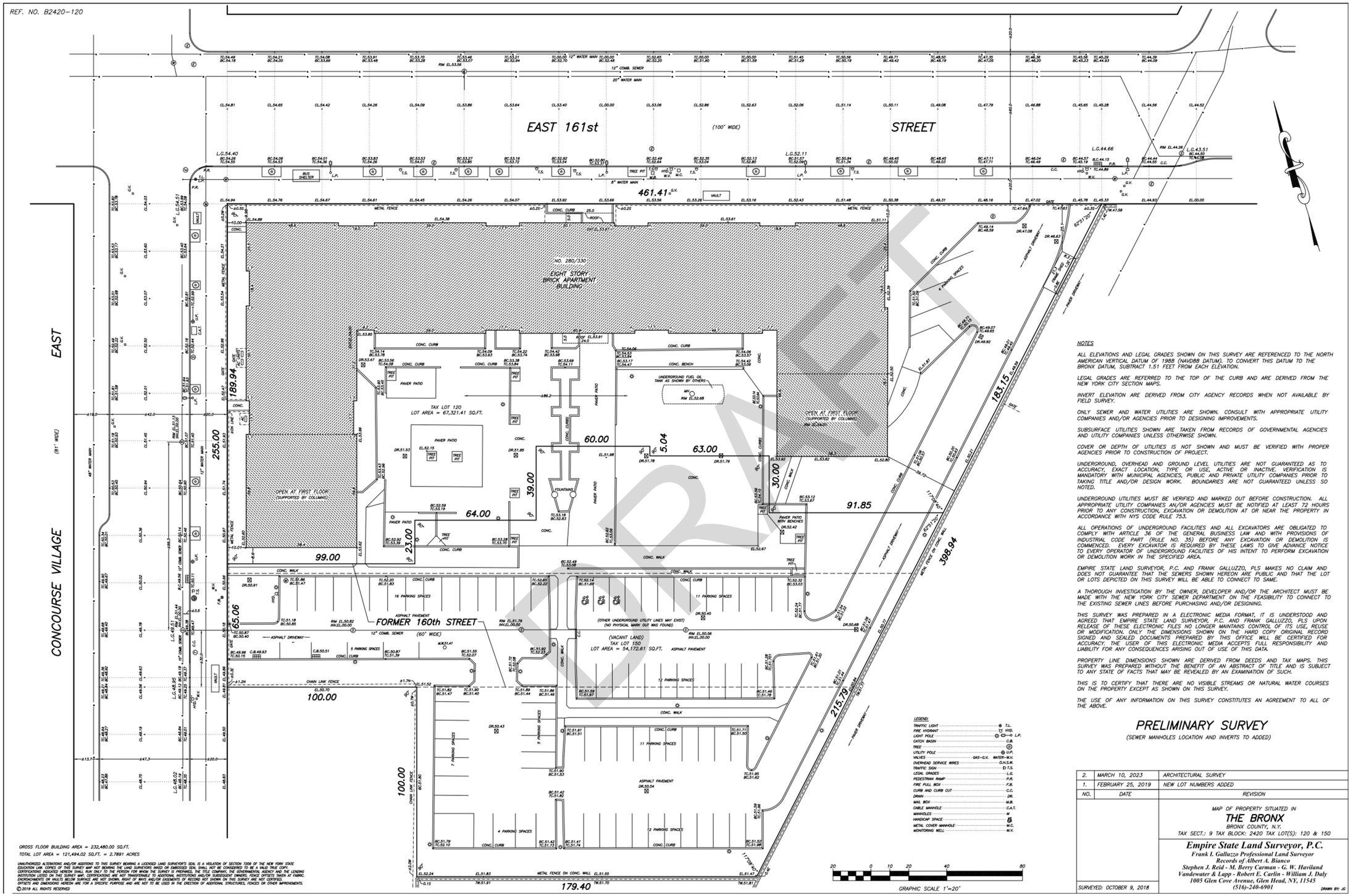
SCALE: 12" = 1'-0"

SHEET NO: OF

DRAWING NO: T-001.00

NYC DOB NUMBER: X00945951-I1

REF. NO. B2420–120




GROSS FLOOR BUILDING AREA = 232,480.00 SQ.FT.

TOTAL LOT AREA = 121,494.02 SQ.FT. = 2.7891 ACRES

UNAUTHORIZED ALTERATIONS AND/OR ADDITIONS TO THIS SURVEY BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW. COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYORS INKED OR EMBOSSED SEAL SHALL NOT BE CONSIDERED TO BE A VALID TRUE COPY. CERTIFICATIONS INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED, THE TITLE COMPANY, THE GOVERNMENTAL AGENCY AND THE LENDING INSTITUTION LISTED ON THIS SURVEY MAP. CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS AND/OR SUBSEQUENT OWNERS. FENCE OFFSETS SHOWN AT TIMES ENCROACHMENTS OR WALKS BELOW SURFACE ARE NOT SHOWN. RIGHT OF WAYS AND/OR EASEMENTS OF RECORD NOT SHOWN ON THIS SURVEY ARE NOT CERTIFIED. OFFSETS AND DIMENSIONS HEREON ARE FOR A SPECIFIC PURPOSE AND ARE NOT TO BE USED IN THE ERECTION OF ADDITIONAL STRUCTURES, FENCES OR OTHER IMPROVEMENTS.

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LEGEND:

| | |
|---|---|
| TRAFFIC LIGHT | T.L. |
| FIRE HYDRANT | HYD. |
| LIGHT POLE | L.P. |
| CATCH BASIN | C.B. |
| TREE | |
| UTILITY POLE | U.P. |
| VALVES GAS–G.V. | WATER–W.V. |
| OVERHEAD SERVICE WIRES | O.H.S.W. |
| TRAFFIC SIGN | T.S. |
| LEGAL GRADES | L.G. |
| PEDESTRIAN RAMP | P.R. |
| FIRE PULL BOX | F.B. |
| CURB AND CURB CUT | C.C. |
| DRAIN | DR. |
| MAIL BOX | M.B. |
| CABLE MANHOLE | C.A.T. |
| MANHOLES | M |
| HANDICAP SPACE | |
| METAL COVER MANHOLE | M.C. |
| MONITORING WELL | M.W. |

GRAPHIC SCALE 1"=20'

NOTES

ALL ELEVATIONS AND LEGAL GRADES SHOWN ON THIS SURVEY ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88 DATUM). TO CONVERT THIS DATUM TO THE BRONX DATUM, SUBTRACT 1.51 FEET FROM EACH ELEVATION.

LEGAL GRADES ARE REFERRED TO THE TOP OF THE CURB AND ARE DERIVED FROM THE NEW YORK CITY SECTION MAPS.

INVERT ELEVATION ARE DERIVED FROM CITY AGENCY RECORDS WHEN NOT AVAILABLE BY FIELD SURVEY.

ONLY SEWER AND WATER UTILITIES ARE SHOWN. CONSULT WITH APPROPRIATE UTILITY COMPANIES AND/OR AGENCIES PRIOR TO DESIGNING IMPROVEMENTS.

SUBSURFACE UTILITIES SHOWN ARE TAKEN FROM RECORDS OF GOVERNMENTAL AGENCIES AND UTILITY COMPANIES UNLESS OTHERWISE SHOWN.

COVER OR DEPTH OF UTILITIES IS NOT SHOWN AND MUST BE VERIFIED WITH PROPER AGENCIES PRIOR TO CONSTRUCTION OF PROJECT.

UNDERGROUND, OVERHEAD AND GROUND LEVEL UTILITIES ARE NOT GUARANTEED AS TO ACCURACY, EXACT LOCATION, TYPE OR USE, ACTIVE OR INACTIVE. VERIFICATION IS MANDATORY WITH MUNICIPAL AGENCIES, PUBLIC AND PRIVATE UTILITY COMPANIES PRIOR TO TAKING TITLE AND/OR DESIGN WORK. BOUNDARIES ARE NOT GUARANTEED UNLESS SO NOTED.

UNDERGROUND UTILITIES MUST BE VERIFIED AND MARKED OUT BEFORE CONSTRUCTION. ALL APPROPRIATE UTILITY COMPANIES AN/OR AGENCIES MUST BE NOTIFIED AT LEAST 72 HOURS PRIOR TO ANY CONSTRUCTION. EXCAVATION OR DEMOLITION AT OR NEAR THE PROPERTY IN ACCORDANCE WITH NYS CODE RULE 753.

ALL OPERATIONS OF UNDERGROUND FACILITIES AND ALL EXCAVATORS ARE OBLIGATED TO COMPLY WITH ARTICLE 36 OF THE GENERAL BUSINESS LAW AND WITH PROVISIONS OF INDUSTRIAL CODE PART (RULE NO. 35) BEFORE ANY EXCAVATION OR DEMOLITION IS COMMENCED. EVERY EXCAVATOR IS REQUIRED BY THESE LAWS TO GIVE ADVANCE NOTICE TO EVERY OPERATOR OF UNDERGROUND FACILITIES OF HIS INTENT TO PERFORM EXCAVATION OR DEMOLITION WORK IN THE SPECIFIED AREA.

EMPIRE STATE LAND SURVEYOR, P.C. AND FRANK GALLUZZO, PLS MAKES NO CLAIM AND DOES NOT GUARANTEE THAT THE SEWERS SHOWN HEREON ARE PUBLIC AND THAT THE LOT OR LOTS DEPICTED ON THIS SURVEY WILL BE ABLE TO CONNECT TO SAME.

A THOROUGH INVESTIGATION BY THE OWNER, DEVELOPER AND/OR THE ARCHITECT MUST BE MADE WITH THE NEW YORK CITY SEWER DEPARTMENT ON THE FEASIBILITY TO CONNECT TO THE EXISTING SEWER LINES BEFORE PURCHASING AND/OR DESIGNING.

THIS SURVEY WAS PREPARED IN A ELECTRONIC MEDIA FORMAT, IT IS UNDERSTOOD AND AGREED THAT EMPIRE STATE LAND SURVEYOR, P.C. AND FRANK GALLUZZO, PLS UPON RELEASE OF THESE ELECTRONIC FILES NO LONGER MAINTAINS CONTROL OF ITS USE, REUSE OR MODIFICATION. ONLY THE DIMENSIONS SHOWN ON THE HARD COPY ORIGINAL RECORD SIGNED AND SEALED DOCUMENTS PREPARED BY THIS OFFICE WILL BE CERTIFIED FOR ACCURACY. THE USER OF THIS ELECTRONIC MEDIA ACCEPTS FULL RESPONSIBILITY AND LIABILITY FOR ANY CONSEQUENCES ARISING OUT OF USE OF THIS DATA.

PROPERTY LINE DIMENSIONS SHOWN ARE DERIVED FROM DEEDS AND TAX MAPS. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN ABSTRACT OF TITLE AND IS SUBJECT TO ANY STATE OF FACTS THAT MAY BE REVEALED BY AN EXAMINATION OF SUCH.

THIS IS TO CERTIFY THAT THERE ARE NO VISIBLE STREAMS OR NATURAL WATER COURSES ON THE PROPERTY EXCEPT AS SHOWN ON THIS SURVEY.

THE USE OF ANY INFORMATION ON THIS SURVEY CONSTITUTES AN AGREEMENT TO ALL OF THE ABOVE.

## PRELIMINARY SURVEY

(SEWER MANHOLES LOCATION AND INVERTS TO ADDED)

| NO. | DATE | REVISION |
|---|---|---|
| 2. | MARCH 10, 2023 | ARCHITECTURAL SURVEY |
| 1. | FEBRUARY 25, 2019 | NEW LOT NUMBERS ADDED |

MAP OF PROPERTY SITUATED IN

**THE BRONX**

BRONX COUNTY, N.Y.

TAX SECT.: 9 TAX BLOCK: 2420 TAX LOT(S): 120 & 150

SURVEYED: OCTOBER 9, 2018

**Empire State Land Surveyor, P.C.**

*Frank I. Galluzzo Professional Land Surveyor*

*Records of Albert A. Bianco*

*Stephen J. Reid - M. Berry Carman - G. W. Haviland*

*Vandewater & Lapp - Robert E. Carlin - William J. Daly*

*1005 Glen Cove Avenue, Glen Head, NY, 11545*

*(516)-240-6901*

DRAWN BY: JC

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

SURVEY

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ISSUE DATE: 07/27/22

PROJECT NO: Project Number

DRAWN BY: Author

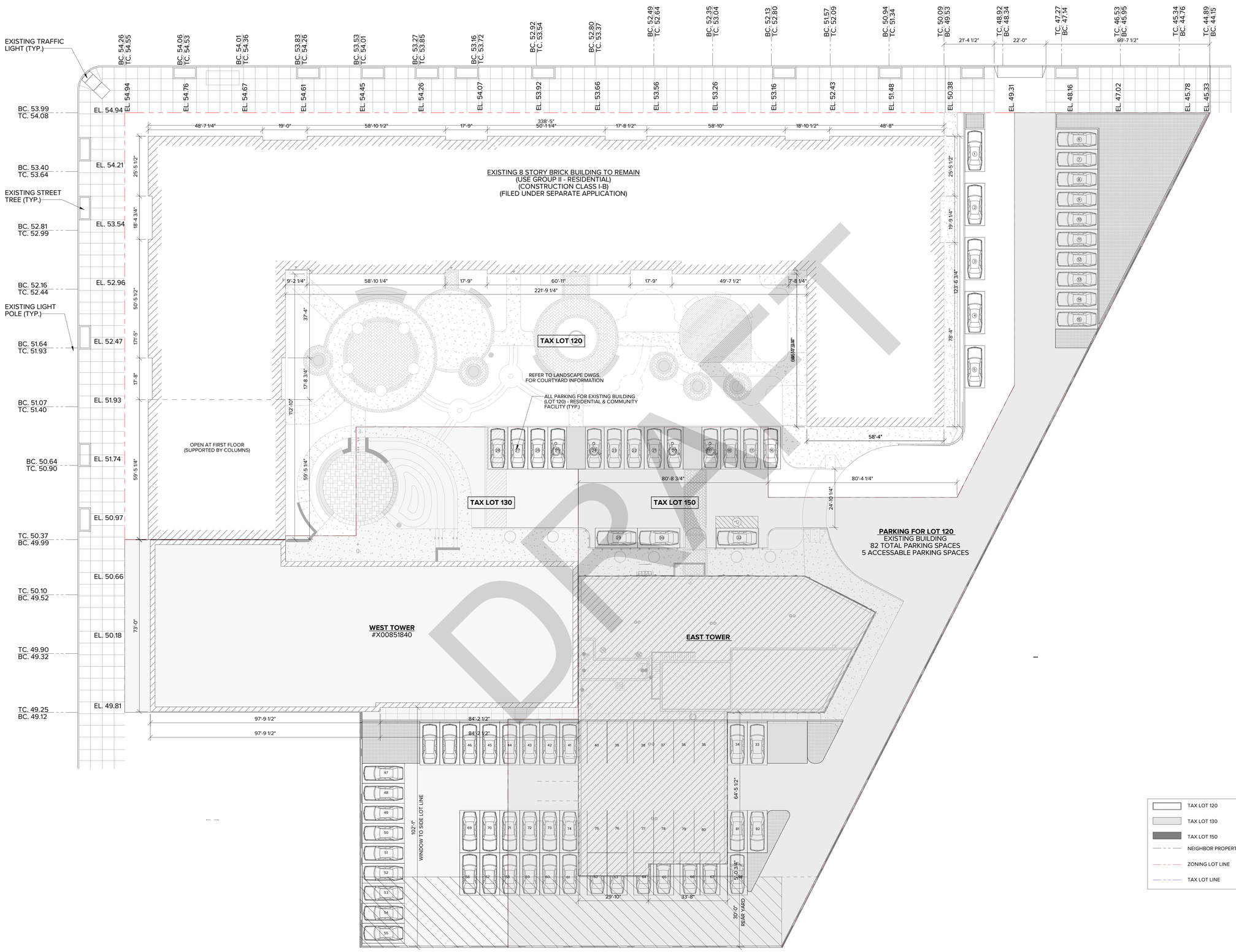
CHECKED BY: Checker

SCALE:

SHEET NO: OF

DRAWING NO: C-001.00

NYC DOB NUMBER: X00945951-I1




PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## SITE PLAN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SEAL & SIGNATURE

ISSUE DATE: 07/26/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/16" = 1'-0"
SHEET NO: OF
DRAWING NO: C-002.00

NYC DOB NUMBER: X00945951-I1

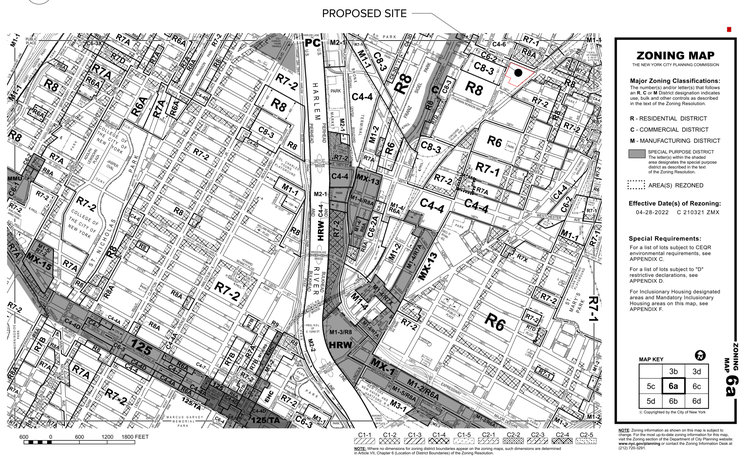
ALL FIGURES ARE PRELIMINARY AND APPROXIMATE. LOT AREAS AND EXISTING FLOOR AREAS ARE SUBJECT TO SURVEY CONFIRMATION. FINAL AREAS AND LOT ANGLES TO BE VERIFIED BY COMPLETE SURVEY

| SITE DATA: | | LIST OF REQUIRED ACTIONS | | HEIGHT FACTOR |
|---|---|---|---|---|
| Block: | 2420 | | CONST. CLASS 1-B 2HR RATED | GREATER TRANSIT ZONE; OUTER TRANSIT ZONE |
| Lots: | 120, 130, & 150 | | BUILDING CODE OCCUPANCY GROUP R-2 | |
| Street Address: | 280-330 E. 161ST STREET | | BUILDING TO BE FULLY SPRINKLERED | |
| Existing Zoning: | R8 | | BUILDING TO BE DESIGNED | |
| Community District: | 4, BRONX | | PER 2022 NYC BUILDING CODE | |
| Zoning Section Map: | 6a | | PER NYC ENERGY CODE | |
| Zoning Lot Area | 121,494.02 | | | |

| ZR - Section | Title | Formulas | Permitted/Required | Existing | Proposed | Total | Compliance / Notes |
|---|---|---|---|---|---|---|---|
| 22-10 | USES | | I, II, III, IIIB | II & III B | II, III A & III B | II, III A & III B | OK |
| | ZONING LOT AREA | | "D" 121,494.02 | | | | OK |
| 23-73 24-163 | OSR | "A" 501,315.45 / "B" 40,908.48 | 12.25 | 30,086.00 "F" | 10,822.48 12 | 40,908.48 | OK |
| 23-73 24-163 | OSR MIN. REQUIRED | HF 12 9.2% | "C" 46,121.02 | | "E" 70,140.62 | | OK |
| 23-73 | FAR - RESIDENTIAL | "HF" 701,651.70 / 40,908.48 | 17.15 | | 17 | | OK |
| 23-73 | FAR - RESIDENTIAL | HF 17 6.02 | 731,394.00 | 230,151.00 | 271,164.45 | 501,315.45 | OK |
| 23-73 24-111(b) | FAR | R8 | | | | | |
| | | RESIDENTIAL | 6.02 | 1.89 | 2.23 | | OK |
| | | COMMUNITY FACILITY - UG IIIA NON-PROFT W/ SLEEPING | 6.02 | | 1.55 | 5.78 | OK |
| | | COMMUNITY FACILITY - UG IIIB AMBULATORY DIAGNOSTIC | 6.50 | 0.04 | 0.06 | | OK |
| 23-151 | RESIDENTIAL FLOOR AREA (USE GROUP II) | FAR 6.02 | 731,394.00 | 230,151.00 | 271,164.45 | "A" 501,315.45 | OK |
| 24-013(b)(2), 24-111(b) | COMMUNITY FACILITY (WEST TOWER - NON-PROFIT W/ SLEEPING) USE GROUP IIIA | FAR 6.02 | 731,394.00 | | 188,002.25 | 188,002.25 | OK - NON PROFIT W/ SLEEPING |
| 24-11 | COMMUNITY FACILITY USE GROUP IIIB (NO SLEEPING ACCOMODATION) FLOOR AREA | FAR 6.50 | 789,711.13 | 4,516.00 | 7,818.00 | 12,334.00 | OK |
| 24-11 | TOTAL FLOOR AREA | FAR 6.50 | 789,711.13 | 234,667.00 | 466,984.70 | "HF" 701,651.70 | OK |
| 23-32 | MIN LOT AREA | CORNER LOT 10,000.00 SQ. FT. INTERIOR LOT 111,494.02 SQ. FT. | | | | | |
| | LOT COVERAGE | | | | | | |
| 24-11 | | CORNER LOT 75% | 7,500.00 | | 0.00 | 0.00 | OK |
| 24-11 | | INTERIOR LOT 65% | 72,471.11 | | 10,822.48 | 10,822.48 | OK |
| 23-22, 23-24 | DENSITY | R8 680 | 867 | 204 | 266 347 | 817 | OK - NON PROFIT W/ SLEEPING OK - RESIDENTIAL |
| | YARD REGULATION | | | | | | |
| 23-45 | | FRONT YARD | NONE | NONE | NONE | | OK |
| 23-462 | | SIDE YARD | NONE | NONE | NONE | | OK |
| 23-47 | | REAR YARD | 30'-0" | 30'-0" | 30'-0" | | OK |
| | HEIGHT & SETBACKS | | | | | | |
| 24-53 | ALTERNATE FRONT OPEN AREA | WIDE STREET | 10'-0" | 10'-0" | 10'-10 1/2" (NONE FOR EAST TOWER) | | OK |
| 24-53 | HEIGHT ABOVE STREET LINE | | 85'-0" | | 85'-0" (NONE FOR EAST TOWER) | | OK |
| 24-53 | SKY EXPOSURE PLANE | WIDE STREET | 7.6 to 1 | | 7.6 to 1 (NONE FOR EAST TOWER) | | OK |
| | PERMITTED OBS | | | | | | |
| 23-62 | | PERMITTED OBSTRUCTIONS | DORMER | | N/A | | OK |
| 23-842 | OUTER COURT REG. | WIDE OUTER COURT | | | N/A | | OK |
| 23-851, 24-641 | INNER COURT REG. | 1,200 SQ. FT. (MIN) AND 30' MIN DIMENSION | | | YES | | OK |
| 23-87 | PERMITTED OBS IN COURTS | FENCE, OPEN TERRACES, SOLAR ENERGY SYSTEMS, ETC. | | | YES | | OK |
| | MIN. DISTANCE | | | | | | |
| 23-711 | | WINDOW TO WINDOW | 60'-0" | | 69'-2" | | OK |
| 23-861 | | WINDOW TO LOT LINE | 30'-0" | | 30'-0" | | OK |
| | ACCESSORY OFF-STREET PARKING | | | | | | |
| 25-64 ( c ) | USE OF OPEN SPACE FOR PARKING | 50% | 23,060.51 | | 14,677.73 | | OK |
| 25-253 | EXISTING RESIDENTIAL | GOVERNMENT-ASSISTED D.U. | 51 | 81 (EXISTING TO REMAIN) | | | OK |
| 25-251 | PROPOSED RESIDENTIAL | 12% (TRANSIT ZONE) | 0 | | 0 | | OK - ALL AFFORDABLE |
| 25-31 | COMM. FAC. - NON-PROFIT INSTITUTION WITH SLEEPING ACCOMMODATIONS | NOT REQUIRED | 0 | | 0 | 81 | OK |
| 25-31 | COMM. FAC. - NON-PROFIT INSTITUTION W/OUT SLEEPING ACCOMMODATIONS | NOT REQUIRED | 0 | | | | OK |
| 25-51, 23-87 | PARKING LOCATION | IN COURTS | NO | | NO | | OK |
| | | ON SITE | YES | | YES | | OK |
| | BICYCLE PARKING | | | | | | |
| 25-811 | | RESIDENTIAL 50% | 329 | | 329 | 349 | OK |
| 25-811 | | COMM. FAC. 1 PER 10,000 SF | 20 | | 20 | | OK |

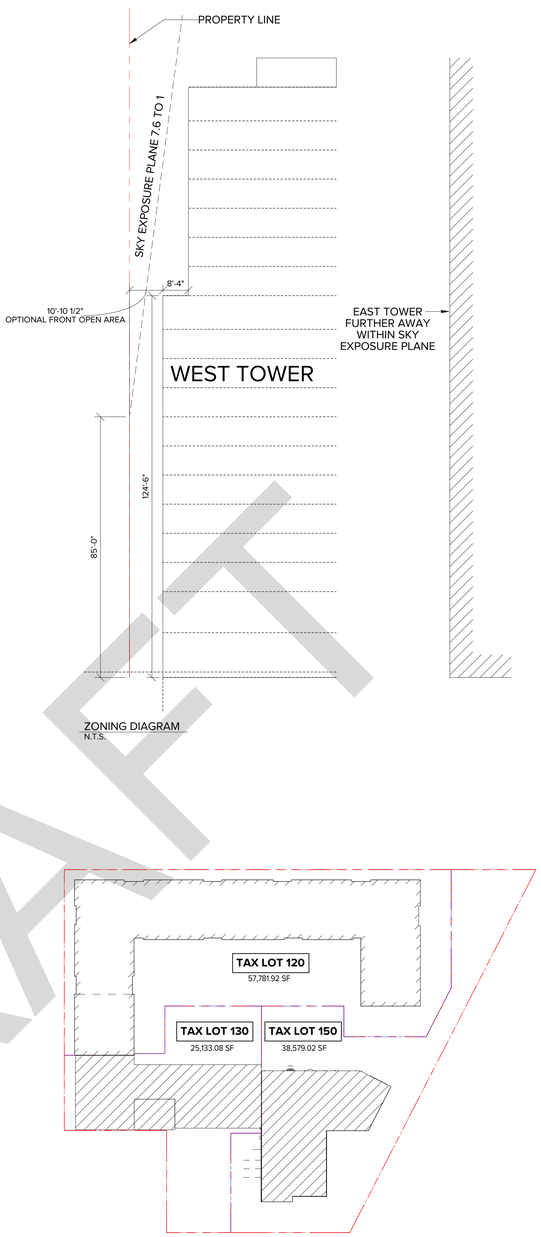


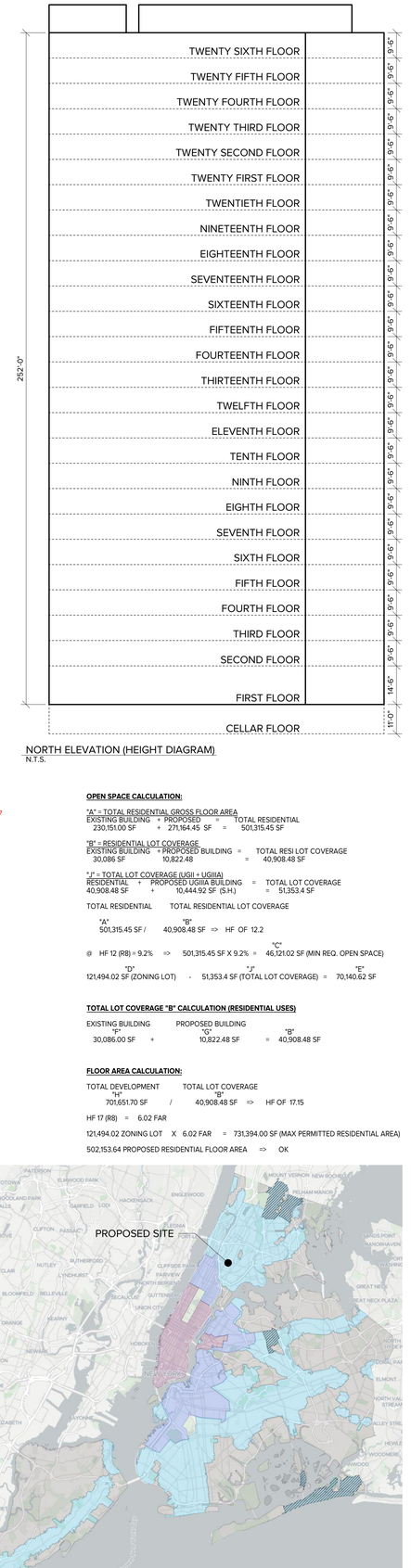

1 Z-001 TAX MAP N.T.S.




2 Z-001 ZONING MAP N.T.S.

3 Z-001 FEMA FLOOD MAP N.T.S.




NORTH ELEVATION (HEIGHT DIAGRAM)
N.T.S.




**OPEN SPACE CALCULATION:**

"A" = TOTAL RESIDENTIAL GROSS FLOOR AREA
EXISTING BUILDING + PROPOSED = TOTAL RESIDENTIAL
230,151.00 SF + 271,164.45 SF = 501,315.45 SF

"B" = RESIDENTIAL LOT COVERAGE
EXISTING BUILDING + PROPOSED BUILDING = TOTAL RESI LOT COVERAGE
30,086 SF 10,822.48 = 40,908.48 SF

"J" = TOTAL LOT COVERAGE (UGII + UGIIA)
RESIDENTIAL + PROPOSED UGIIA BUILDING = TOTAL LOT COVERAGE
40,908.48 SF + 10,444.92 SF (S.H.) = 51,353.4 SF

TOTAL RESIDENTIAL TOTAL RESIDENTIAL LOT COVERAGE
"A" 501,315.45 SF / "B" 40,908.48 SF => HF OF 12.2

@ HF 12 (R8) = 9.2% => 501,315.45 SF X 9.2% = "C" 46,121.02 SF (MIN REQ. OPEN SPACE)

"D" 121,494.02 SF (ZONING LOT) - 51,353.4 SF (TOTAL LOT COVERAGE) = "E" 70,140.62 SF

**TOTAL LOT COVERAGE "B" CALCULATION (RESIDENTIAL USES)**

EXISTING BUILDING + PROPOSED BUILDING
"C" 30,086.00 SF + "D" 10,822.48 SF = "B" 40,908.48 SF

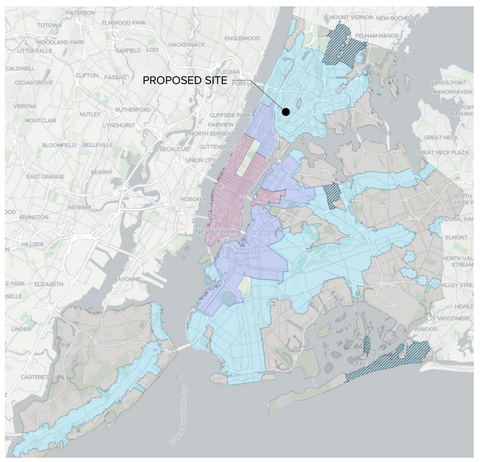
**FLOOR AREA CALCULATION:**

TOTAL DEVELOPMENT TOTAL LOT COVERAGE
"HF" 701,651.70 SF / "B" 40,908.48 SF => HF OF 17.15

HF 17 (R8) = 6.02 FAR

121,494.02 ZONING LOT X 6.02 FAR = 731,394.00 SF (MAX PERMITTED RESIDENTIAL AREA)

502,153.64 PROPOSED RESIDENTIAL FLOOR AREA => OK




4 Z-001 TRANSIT ZONE MAP N.T.S.

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## ZONING

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SEAL & SIGNATURE

ISSUE DATE: PROJECT NO:
07/27/22 Project Number

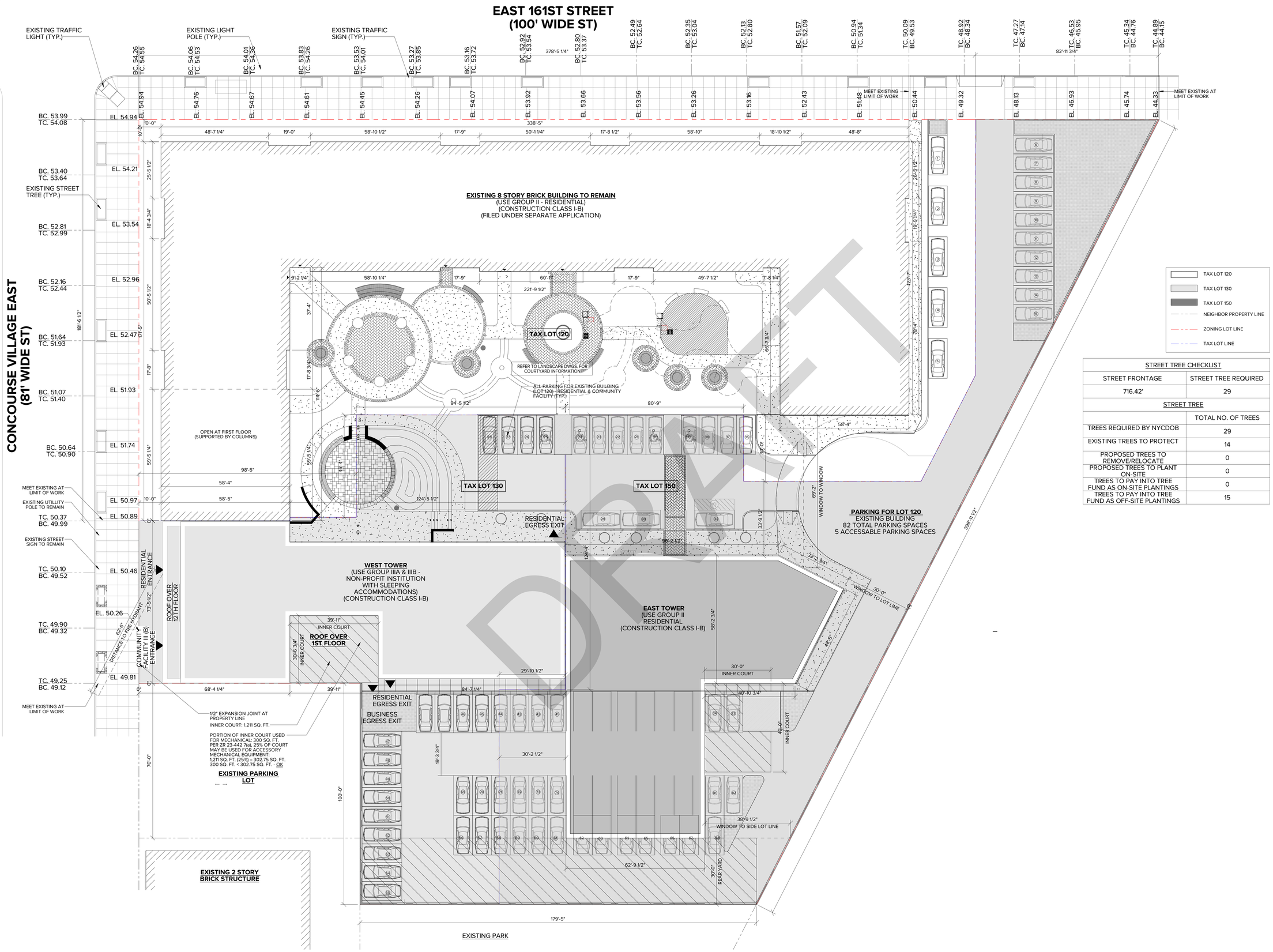
DRAWN BY: Author CHECKED BY: Checker

SCALE: As indicated SHEET NO: OF

DRAWING NO: Z-001.00

NYC DOB NUMBER: X00945951-I1

DRAFT




| STREET TREE CHECKLIST | |
|---|---|
| STREET FRONTAGE | STREET TREE REQUIRED |
| 716.42' | 29 |
| STREET TREE | |
| | TOTAL NO. OF TREES |
| TREES REQUIRED BY NYCDOB | 29 |
| EXISTING TREES TO PROTECT | 14 |
| PROPOSED TREES TO REMOVE/RELOCATE | 0 |
| PROPOSED TREES TO PLANT ON-SITE | 0 |
| TREES TO PAY INTO TREE FUND AS ON-SITE PLANTINGS | 0 |
| TREES TO PAY INTO TREE FUND AS OFF-SITE PLANTINGS | 15 |

1 ZONING PLOT PLAN
Z-002 1/16" = 1'-0"

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## ZONING PLOT PLAN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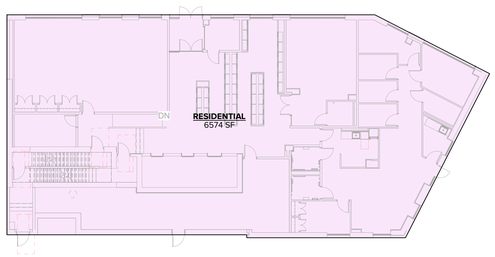
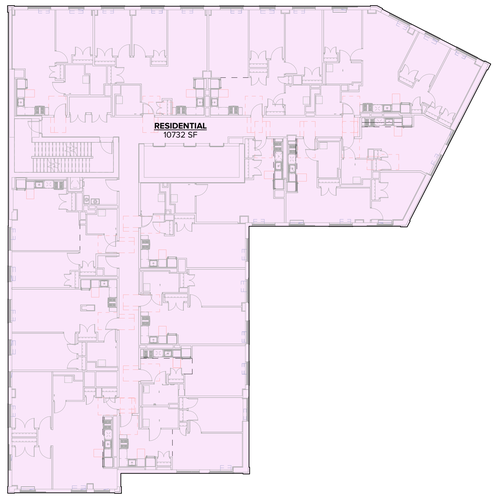
SEAL & SIGNATURE

ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/16" = 1'-0"
SHEET NO: OF
DRAWING NO: Z-002.00

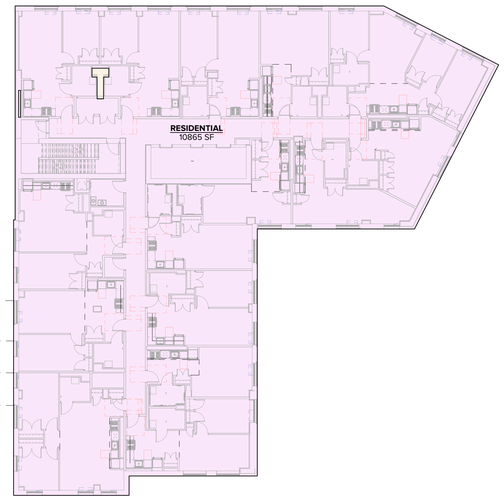
NYC DOB NUMBER: X00945951-I1



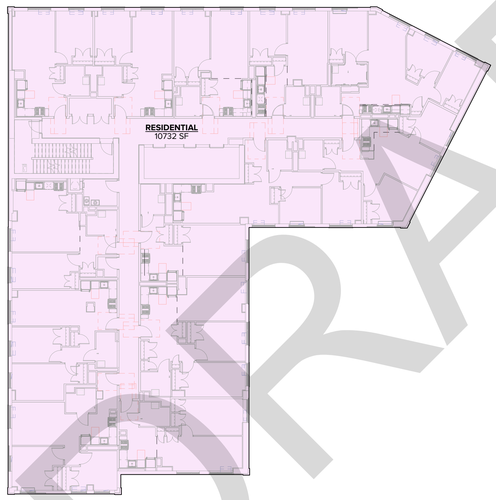

1ST FLOOR - ZONING FLOOR AREA
1/16" = 1'-0"



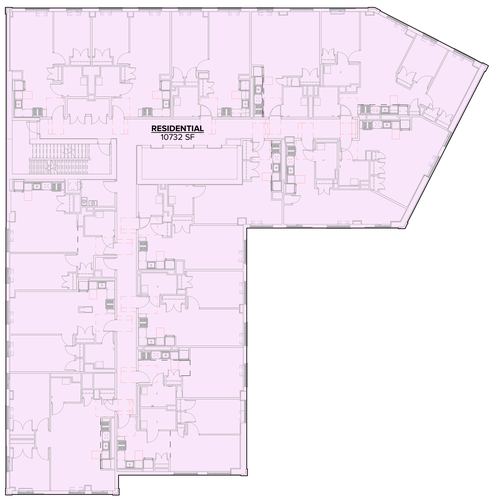

10TH-15TH FLOOR - ZONING FLOOR AREA
1/16" = 1'-0"



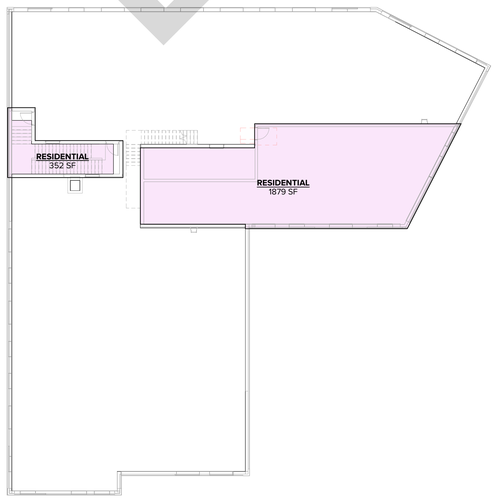

2ND FLOOR - ZONING FLOOR AREA
1/16" = 1'-0"




16TH-26TH FLOOR - ZONING FLOOR AREA
1/16" = 1'-0"




3RD-9TH FLOOR - ZONING FLOOR AREA
1/16" = 1'-0"




ROOF - ZONING FLOOR AREA
1/16" = 1'-0"

| EX. DEVELOPMENT AREA | | | | | | |
|---|---|---|---|---|---|---|
| FLOOR | EXISITNG SF | RESIDENTIAL SF | COMM. FAC. SF | TOTAL RESIDENTIAL | TOTAL COMM. FAC. | TOTAL ZONING AREA |
| C | | | | | | |
| 1 | 24065.00 | 19549.00 | 4516.00 | 19549.00 | 4516.00 | 24065.00 |
| 2 | 30086.00 | 30086.00 | | 30086.00 | | 30086.00 |
| 3 | 30086.00 | 30086.00 | | 30086.00 | | 30086.00 |
| 4 | 30086.00 | 30086.00 | | 30086.00 | | 30086.00 |
| 5 | 30086.00 | 30086.00 | | 30086.00 | | 30086.00 |
| 6 | 30086.00 | 30086.00 | | 30086.00 | | 30086.00 |
| 7 | 30086.00 | 30086.00 | | 30086.00 | | 30086.00 |
| 8 | 30086.00 | 30086.00 | | 30086.00 | | 30086.00 |
| R | 1271.63 | 1271.63 | | 1271.63 | | 1271.63 |
| TOTAL | 235938.63 | 230151.00 | 4516.00 | 230151.00 | 4516.00 | 234667.00 |

| PROPOSED DEVELOPMENT AREA - EAST TOWER (SI #220744005) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| FLOOR | GROSS SF | MECH. SF | STAIRS SF | ZONE GREEN | TOTAL COMM. FAC. UG IIIB | TOTAL COMM. FAC. | TOTAL RESIDENTIAL | TOTAL ZONING AREA |
| C | | | | | | | | |
| 1 | 6,644.45 | 15.00 | 33.00 | | | | 6,596.45 | 6,596.45 |
| 2 | 10,822.48 | 227.00 | 33.00 | | | | 10,562.48 | 10,562.48 |
| 3 | 10,822.48 | 218.00 | 33.00 | | | | 10,571.48 | 10,571.48 |
| 4 | 10,822.48 | 218.00 | 33.00 | | | | 10,571.48 | 10,571.48 |
| 5 | 10,822.48 | 218.00 | 33.00 | | | | 10,571.48 | 10,571.48 |
| 6 | 10,822.48 | 218.00 | 33.00 | | | | 10,571.48 | 10,571.48 |
| 7 | 10,822.48 | 218.00 | 33.00 | | | | 10,571.48 | 10,571.48 |
| 8 | 10,822.48 | 218.00 | 33.00 | | | | 10,571.48 | 10,571.48 |
| 9 | 10,822.48 | 218.00 | 33.00 | | | | 10,571.48 | 10,571.48 |
| 10 | 10,822.48 | 210.00 | 33.00 | | | | 10,579.48 | 10,579.48 |
| 11 | 10,822.48 | 210.00 | 33.00 | | | | 10,579.48 | 10,579.48 |
| 12 | 10,822.48 | 210.00 | 33.00 | | | | 10,579.48 | 10,579.48 |
| 13 | 10,822.48 | 210.00 | 33.00 | | | | 10,579.48 | 10,579.48 |
| 14 | 10,822.48 | 210.00 | 33.00 | | | | 10,579.48 | 10,579.48 |
| 15 | 10,822.48 | 210.00 | 33.00 | | | | 10,579.48 | 10,579.48 |
| 16 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 17 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 18 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 19 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 20 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 21 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 22 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 23 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 24 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 25 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| 26 | 10,822.48 | 196.00 | 33.00 | | | | 10,593.48 | 10,593.48 |
| R | 1,981.12 | | | | | | | |
| TOTAL | 277,206.45 | 5,184.00 | 858.00 | 0.00 | | 0.00 | 271,164.45 | 271,164.45 |

| PROPOSED DEVELOPMENT AREA - WEST TOWER | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| FLOOR | GROSS SF | MECH. SF | STAIRS SF | ZONE GREEN | TOTAL COMM. FAC. UG IIIB | TOTAL COMM. FAC. UG IIIA | TOTAL RESIDENTIAL | TOTAL ZONING AREA |
| C | 11,077.52 | | | | | | | |
| 1 | 11,971.44 | 60.00 | 49.00 | | 3,050.00 | 8,812.44 | | 11,862.44 |
| 2 | 10,795.44 | 113.00 | 49.00 | | 4,768.00 | 5,865.44 | | 10,633.44 |
| 3 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 4 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 5 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 6 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 7 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 8 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 9 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 10 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 11 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 12 | 10,735.92 | 242.00 | 49.00 | | | 10,444.92 | | 10,444.92 |
| 13 | 10,129.31 | 241.00 | 49.00 | | | 9,839.31 | | 9,839.31 |
| 14 | 10,129.31 | 241.00 | 49.00 | | | 9,839.31 | | 9,839.31 |
| 15 | 10,129.31 | 241.00 | 49.00 | | | 9,839.31 | | 9,839.31 |
| 16 | 10,129.31 | 241.00 | 49.00 | | | 9,839.31 | | 9,839.31 |
| 17 | 10,129.31 | 241.00 | 49.00 | | | 9,839.31 | | 9,839.31 |
| 18 | 10,129.31 | 241.00 | 49.00 | | | 9,839.31 | | 9,839.31 |
| 19 | 10,129.31 | 241.00 | 49.00 | | | 9,839.31 | | 9,839.31 |
| R | 2,076.00 | | | | | | | |
| TOTAL | 201,031.25 | 4,280.00 | 931.00 | 0.00 | 7,818.00 | 188,002.25 | 0.00 | 195,820.25 |

| TOTAL DEVELOPMENT AREA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| FLOOR | GROSS SF | MECH. SF | STAIRS SF | ZONE GREEN | TOTAL COMM. FAC. UG IIIB | TOTAL COMM. FAC. UG IIIA | TOTAL RESIDENTIAL | TOTAL ZONING AREA |
| C | 17,721.97 | | | | | | | |
| 1 | 46,858.92 | 287.00 | 82.00 | | 12,334.00 | 8,812.44 | 26,145.45 | 42,523.89 |
| 2 | 51,703.92 | 331.00 | 82.00 | | 4,768.00 | 5,865.44 | 40,648.48 | 51,281.92 |
| 3 | 51,644.40 | 460.00 | 82.00 | | 0.00 | 10,444.92 | 40,657.48 | 51,102.40 |
| 4 | 51,644.40 | 460.00 | 82.00 | | 0.00 | 10,444.92 | 40,657.48 | 51,102.40 |
| 5 | 51,644.40 | 460.00 | 82.00 | | 0.00 | 10,444.92 | 40,657.48 | 51,102.40 |
| 6 | 51,644.40 | 460.00 | 82.00 | | 0.00 | 10,444.92 | 40,657.48 | 51,102.40 |
| 7 | 51,644.40 | 460.00 | 82.00 | | 0.00 | 40,530.92 | 40,657.48 | 51,102.40 |
| 8 | 51,644.40 | 460.00 | 82.00 | | 0.00 | 10,444.92 | 40,657.48 | 51,102.40 |
| 9 | 21,558.40 | 460.00 | 82.00 | | 0.00 | 10,444.92 | 10,571.48 | 21,016.40 |
| 10 | 21,558.40 | 452.00 | 82.00 | | 0.00 | 10,444.92 | 10,579.48 | 21,024.40 |
| 11 | 21,558.40 | 452.00 | 82.00 | | 0.00 | 10,444.92 | 10,579.48 | 21,024.40 |
| 12 | 21,558.40 | 452.00 | 82.00 | | 0.00 | 10,444.92 | 10,579.48 | 21,024.40 |
| 13 | 20,951.79 | 451.00 | 82.00 | | 0.00 | 9,839.31 | 10,579.48 | 20,418.79 |
| 14 | 20,951.79 | 451.00 | 82.00 | | 0.00 | 9,839.31 | 10,579.48 | 20,418.79 |
| 15 | 20,951.79 | 451.00 | 82.00 | | 0.00 | 9,839.31 | 10,579.48 | 20,418.79 |
| 16 | 20,951.79 | 437.00 | 82.00 | | 0.00 | 9,839.31 | 10,593.48 | 20,432.79 |
| 17 | 20,951.79 | 451.00 | 82.00 | | 0.00 | 9,839.31 | 10,593.48 | 20,432.79 |
| 18 | 20,951.79 | 437.00 | 82.00 | | 0.00 | 9,839.31 | 10,593.48 | 20,432.79 |
| 19 | 20,951.79 | 437.00 | 82.00 | | 0.00 | 9,839.31 | 10,593.48 | 20,432.79 |
| 20 | 10,822.48 | 196.00 | 33.00 | | 0.00 | 0.00 | 10,593.48 | 10,593.48 |
| 21 | 10,822.48 | 196.00 | 33.00 | | 0.00 | 0.00 | 10,593.48 | 10,593.48 |
| 22 | 10,822.48 | 196.00 | 33.00 | | 0.00 | 0.00 | 10,593.48 | 10,593.48 |
| 23 | 10,822.48 | 196.00 | 33.00 | | 0.00 | 0.00 | 10,593.48 | 10,593.48 |
| 24 | 10,822.48 | 196.00 | 33.00 | | 0.00 | 0.00 | 10,593.48 | 10,593.48 |
| 25 | 10,822.48 | 196.00 | 33.00 | | 0.00 | 0.00 | 10,593.48 | 10,593.48 |
| 26 | 10,822.48 | 196.00 | 33.00 | | 0.00 | 0.00 | 10,593.48 | 10,593.48 |
| R | 5,328.75 | | | | | | | |
| TOTAL | 717,082.73 | 9,681.00 | 1,789.00 | 0.00 | 17,102.00 | 218,088.25 | 501,315.45 | 701,651.70 |

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St,
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St,
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| | |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |
| DATE | SUBMISSIONS / REVISIONS |

SHEET TITLE:

## ZONING FLOOR AREAS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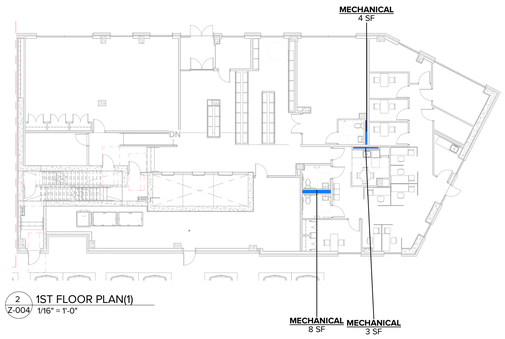
ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/16" = 1'-0"
SHEET NO: OF
DRAWING NO: Z-003.00

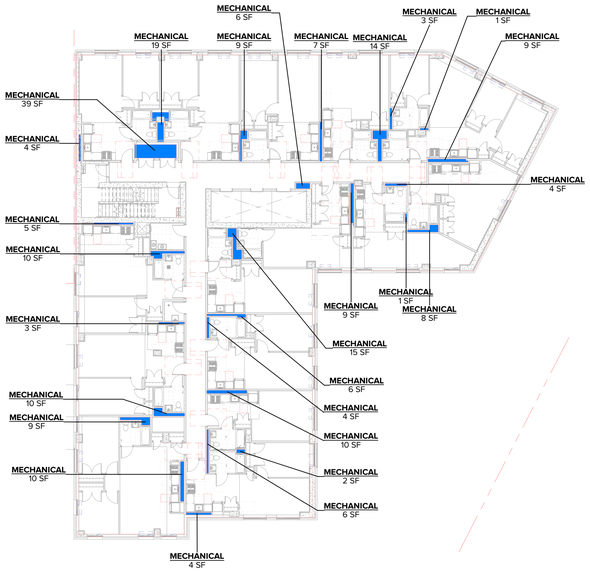
NYC DOB NUMBER: X00945951-I1

DRAFT



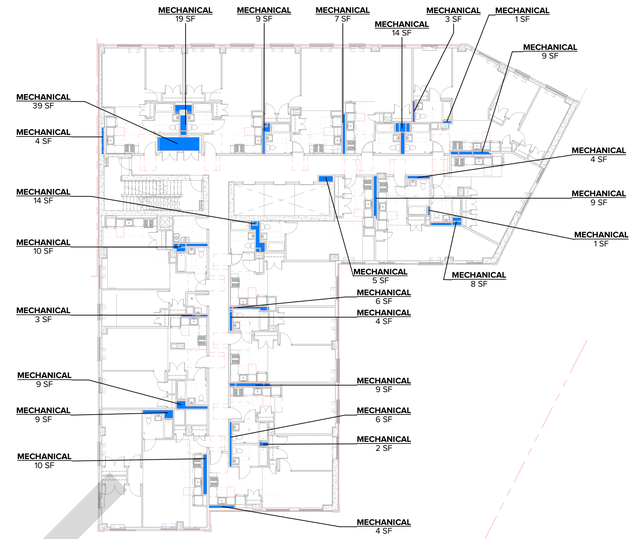

2 Z-004 1ST FLOOR PLAN(1)
1/16" = 1'-0"

| 1st Floor Plan | | |
|---|---|---|
| Level | Name | Area |
| 1ST FLOOR | MECHANICAL | 14 SF |



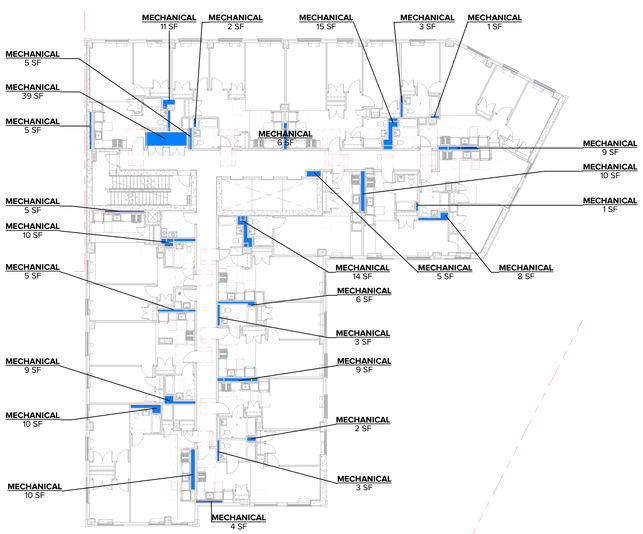

4 Z-004 2nd Floor(1)
1/16" = 1'-0"

| 2nd FLOOR DEDUCTIONS | | |
|---|---|---|
| Level | Name | Area |
| 2nd Floor | MECHANICAL | 227 SF |



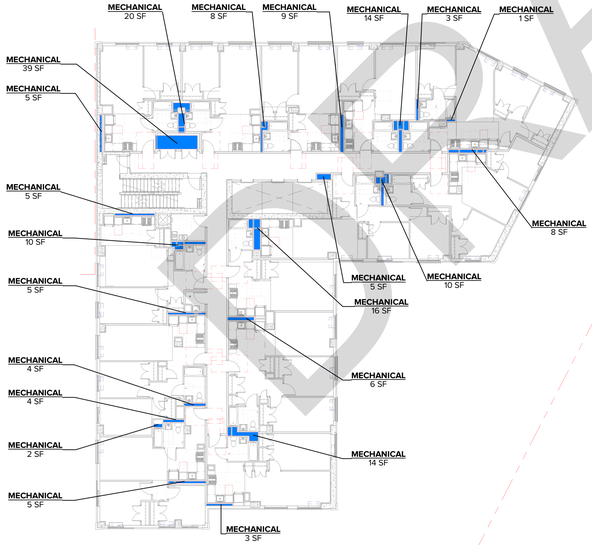

3 Z-004 3rd Floor - 9th floor plans
1/16" = 1'-0"

| 3RD FLOOR -9TH FLOOR PLANS | | |
|---|---|---|
| Level | Name | Area |
| 3rd Floor - 9th floor plans | MECHANICAL | 218 SF |



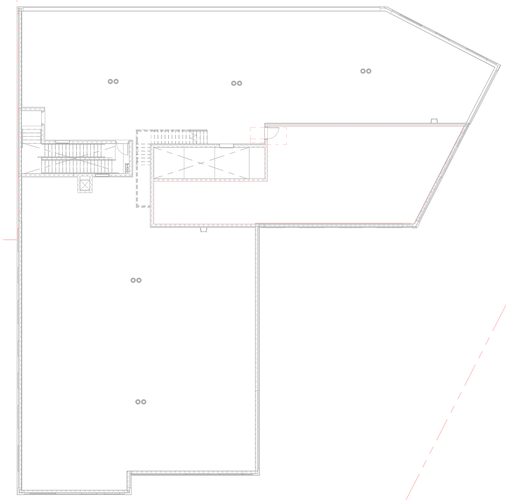

5 Z-004 10th - 15th Floor Plans
1/16" = 1'-0"

| 10TH - 15TH FLOOR PLANS | | |
|---|---|---|
| Level | Name | Area |
| 10th - 15th Floor Plans | MECHANICAL | 210 SF |




6 Z-004 16th Floor to 26th
1/16" = 1'-0"

| 16th -26th Floor Plans | | |
|---|---|---|
| Level | Name | Area |
| 16th Floor to 26th | MECHANICAL | 196 SF |



7 Z-004 Roof
1/16" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

| DATE | SUBMISSIONS / REVISIONS |
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| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## ZONING FLOOR AREAS DEDUCTIONS

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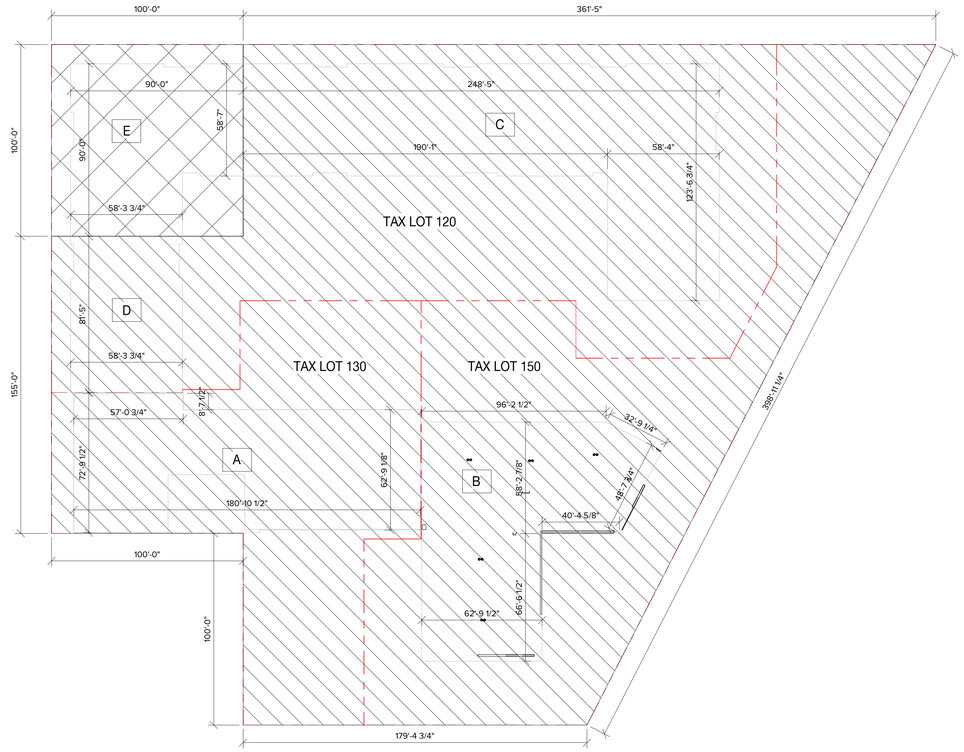
SEAL & SIGNATURE

ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/16" = 1'-0"
SHEET NO: OF
DRAWING NO: Z-004.00

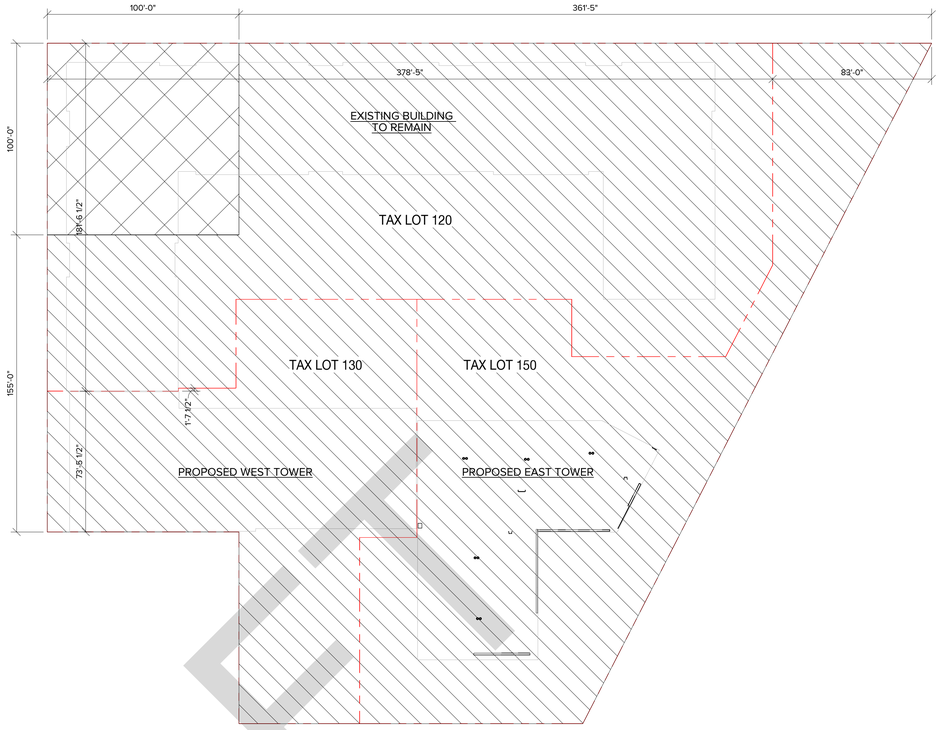
NYC DOB NUMBER: X00945951-I1




CORNER LOT - E = 7,024.62
7,024.62 SF / 10,000 SF = 70.25% COVERAGE
70.25% < 75% OK

INTERIOR LOT - A + B + C + D = 45,645.19 SQ.FT.
45,639.20 SF / 111,494.02 SF = 40.93% COVERAGE
40.93% < 65% OK

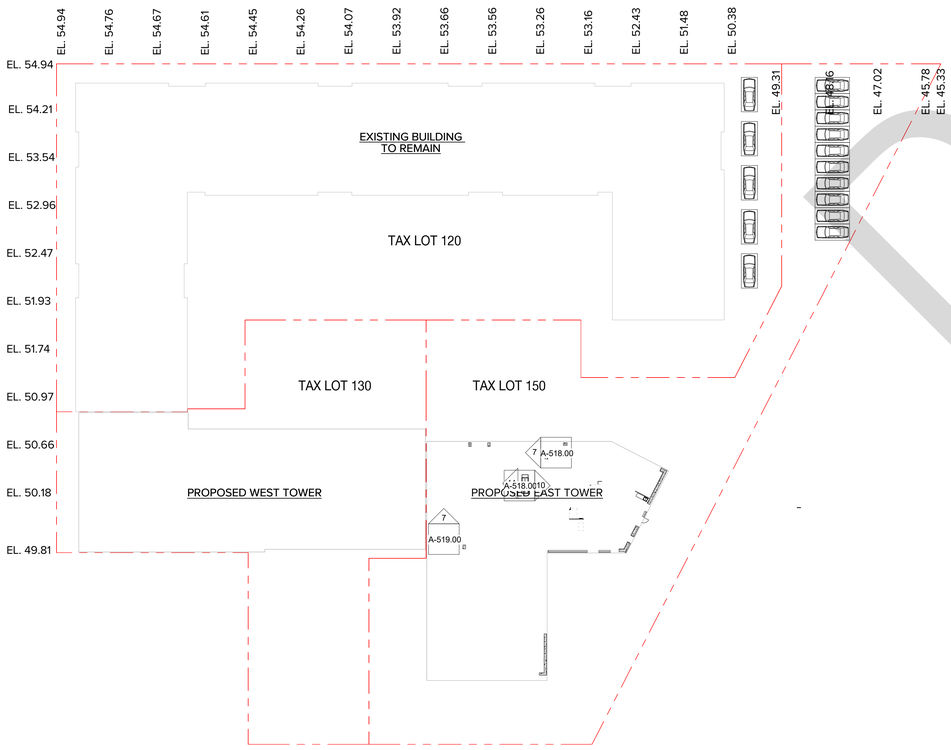
3 Z-005 LOT COVERAGE DIAGRAM 1/32" = 1'-0"



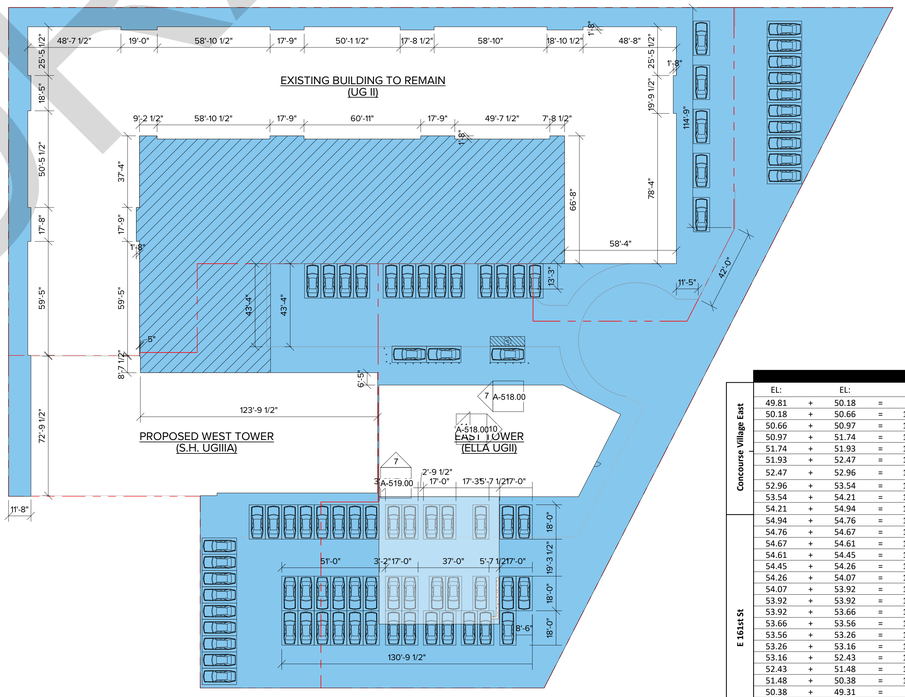

CORNER LOT - 10,000 SQ. FT.

INTERIOR LOT - 111,494.02 SQ. FT.

4 Z-005 LOT PORTION ANALYSIS 1/32" = 1'-0"




1 Z-005 1ST FLOOR 1/32" = 1'-0"




2 Z-005 OPEN SPACE DIAGRAM 1/32" = 1'-0"

| Concourse Village East | EL: | | EL: | | | AVG. EL: | | DIST. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 49.81 | + | 50.18 | = | 99.99 / 2 | = 50.00 | X | 30.00 | = | 1,499.85 |
| | 50.18 | + | 50.66 | = | 100.84 / 2 | = 50.42 | X | 25.00 | = | 1,260.50 |
| | 50.66 | + | 50.97 | = | 101.63 / 2 | = 50.82 | X | 25.00 | = | 1,270.38 |
| | 50.97 | + | 51.74 | = | 102.71 / 2 | = 51.36 | X | 25.00 | = | 1,283.88 |
| | 51.74 | + | 51.93 | = | 103.67 / 2 | = 51.84 | X | 25.00 | = | 1,295.88 |
| | 51.93 | + | 52.47 | = | 104.40 / 2 | = 52.20 | X | 25.00 | = | 1,305.00 |
| | 52.47 | + | 52.96 | = | 105.43 / 2 | = 52.72 | X | 25.00 | = | 1,317.88 |
| | 52.96 | + | 53.54 | = | 106.50 / 2 | = 53.25 | X | 25.00 | = | 1,331.25 |
| | 53.54 | + | 54.21 | = | 107.75 / 2 | = 53.88 | X | 25.00 | = | 1,346.88 |
| | 54.21 | + | 54.94 | = | 109.15 / 2 | = 54.57 | X | 25.00 | = | 1,364.38 |
| E 161st St | 54.94 | + | 54.76 | = | 109.70 / 2 | = 54.85 | X | 25.00 | = | 1,371.25 |
| | 54.76 | + | 54.67 | = | 109.43 / 2 | = 54.72 | X | 25.00 | = | 1,367.88 |
| | 54.67 | + | 54.61 | = | 109.28 / 2 | = 54.64 | X | 25.00 | = | 1,366.00 |
| | 54.61 | + | 54.45 | = | 109.06 / 2 | = 54.53 | X | 25.00 | = | 1,363.25 |
| | 54.45 | + | 54.26 | = | 108.71 / 2 | = 54.36 | X | 25.00 | = | 1,358.88 |
| | 54.26 | + | 54.07 | = | 108.33 / 2 | = 54.17 | X | 25.00 | = | 1,354.13 |
| | 54.07 | + | 53.92 | = | 107.99 / 2 | = 54.00 | X | 25.00 | = | 1,349.88 |
| | 53.92 | + | 53.92 | = | 107.84 / 2 | = 53.92 | X | 25.00 | = | 1,348.00 |
| | 53.92 | + | 53.66 | = | 107.58 / 2 | = 53.79 | X | 25.00 | = | 1,344.75 |
| | 53.66 | + | 53.56 | = | 107.22 / 2 | = 53.61 | X | 25.00 | = | 1,340.25 |
| | 53.56 | + | 53.26 | = | 106.82 / 2 | = 53.41 | X | 25.00 | = | 1,335.25 |
| | 53.26 | + | 53.16 | = | 106.42 / 2 | = 53.21 | X | 25.00 | = | 1,330.25 |
| | 53.16 | + | 52.43 | = | 105.59 / 2 | = 52.80 | X | 25.00 | = | 1,319.88 |
| | 52.43 | + | 51.48 | = | 103.91 / 2 | = 51.96 | X | 25.00 | = | 1,298.88 |
| | 51.48 | + | 50.38 | = | 101.86 / 2 | = 50.93 | X | 25.00 | = | 1,273.25 |
| | 50.38 | + | 49.31 | = | 99.69 / 2 | = 49.85 | X | 25.00 | = | 1,246.13 |
| | 49.31 | + | 48.16 | = | 97.47 / 2 | = 48.74 | X | 25.00 | = | 1,218.38 |
| | 48.16 | + | 47.02 | = | 95.18 / 2 | = 47.59 | X | 25.00 | = | 1,189.75 |
| | 47.02 | + | 45.78 | = | 92.80 / 2 | = 46.40 | X | 25.00 | = | 1,160.00 |
| | 45.78 | + | 47.02 | = | 92.80 / 2 | = 46.40 | X | 11.41 | = | 529.42 |
| | **TOTAL:** | | | | | | | **741.41** | | **38,741.27** |

BASE PLANE ELEV. = 38741.27 / 741.41 = 52.25

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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32nd Floor
New York, NY 10038
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Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
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| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## LOT COVERAGE , PARKING DIAGRAM, AND BASE PLANE CALCULATIONS


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SEAL & SIGNATURE

ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: As indicated
SHEET NO: OF

DRAWING NO: Z-005.00

NYC DOB NUMBER: X00945951-I1

DRAFT

ABBREVIATIONS:

| | | | |
|---|---|---|---|
| & | AND | KTTE | KITCHENETTE |
| @ | AT | KIT | KITCHEN |
| AB | ANCHOR BOLT | KO | KNOCKOUT |
| A/C | AIR CONDITIONING | | |
| ACT | ACOUSTICAL TILE | L | LONG/LENGTH |
| ACU | AIR CONDITIONING UNIT | LAM | LAMINATED |
| ADJ | ADJACENT/ADJOINING | LAV | LAVATORY |
| ADJUST | ADJUSTABLE | LB(S) | POUND(S) |
| AFF | ABOVE FINISH FLOOR | LF | LINEAR FEET |
| AGG | AGGREGATE | LL | LIVE LOAD |
| AHU | AIR HANDLING UNIT | LP | LOW POINT |
| ALT | ALTERNATE | | |
| ALUM | ALUMINUM | MACH | MACHINE |
| APPROX | APPROXIMATE | MANUF | MANUFACTURER |
| ARCH | ARCHITECTURAL | MAX | MAXIMUM |
| AUTO | AUTOMATIC | MECH | MECHANICAL |
| AVE | AVENUE | MEP | MECHANICAL, ELECTRICAL & PLUMBING |
| AVG | AVERAGE | | MEDIUM |
| BD | BOARD | MED | MEMBRANE |
| BLDG | BUILDING | MEMB | METAL |
| BLKG | BLOCKING | MTL | MEZZANINE |
| BM | BEAM | MEZZ | MANHOLE |
| BOT | BOTTOM | MH | MINIMUM |
| BRG | BEARING | MIN | MISCELLANEOUS |
| BTW | BETWEEN | MISC | MASONRY OPENING |
| | | MO | MOUNTED |
| CC | CUBIC CENTIMETER | MTD | |
| C/C | CENTER TO CENTER | N | NORTH |
| CEM | CEMENT | NIC | NOT IN CONTRACT |
| CFM | CUBIC FEET PER MINUTE | NOM | NOMINAL |
| CJ | CONTROL JOINT (SEE EXP JT) | NTS | NOT TO SCALE |
| CLG | CEILING | | |
| CL | CLOSET | OC | ON CENTER(S) |
| CLR | CLEAR/CLEARANCE | OD | OUTSIDE DIAMETER |
| CMU | CONCRETE MASONRY UNIT | OPNG | OPENING |
| COL | COLUMN | OPP | OPPOSITE |
| CONC | CONCRETE | OZ | OUNCE |
| CONN | CONNECTION | | |
| CONST | CONSTRUCT/CONSTRUCTION | PB | PULL BOX |
| CONT | CONTINUOUS | PCF | POUNDS PER CUBIC FOOT |
| CORR | CORRIDOR | PL | PLATE |
| CPT | CARPET | P.LAM | PLASTIC LAMINATE |
| CT | CERAMIC TILE | PR | PAIR |
| CW | COLD WATER | PSF | POUNDS PER SQUARE FOOT |
| | | PSI | POUNDS PER SQUARE INCH |
| DF | DRINKING FOUNTAIN (SEE EWC) | PT | PAINT |
| DIA | DIAMETER | PTD | PAINTED |
| DIM | DIMENSION | PVC | POLYVINYL CHLORIDE |
| DL | DEAD LOAD | | |
| DN | DOWN | QT | QUARRY TILE |
| DTL | DETAIL | QTY | QUANTITY |
| DWG | DRAWING | | |
| | | R | RISER |
| E | EAST | RAD | RADIUS |
| EA | EACH | REBAR | REINFORCING BAR |
| EB | EXPANSION BOLT (SEE AB) | REF | REFERENCE/ REFER TO |
| EIFS | EXTERIOR INSULATED FINISH SYSTEM | REINF | REINFORCE/REINFORCING |
| EJ | EXPANSION JOINT (SEE CJ) | REQ | REQUIRED |
| EL | ELEVATION | REV | REVISION |
| ELEC | ELECTRICAL/ELECTRIC | RM | ROOM |
| ELEV | ELEVATOR | RO | ROUGH OPENING |
| EMER | EMERGENCY | RUB | RUBBER |
| ENCL | ENCLOSURE/ENCLOSED | | |
| ENGR | ENGINEER | S | SOUTH |
| ENTR | ENTRANCE | SCHED | SCHEDULE |
| EQ | EQUAL | SECT | SECTION |
| EQUIP | EQUIPMENT | SHT | SHEET |
| EXIST | EXISTING | SIM | SIMILAR |
| EXH | EXHAUST | SPEC | SPECIFICATION |
| EXP | EXPOSED | SQ | SQUARE |
| EXPAN | EXPANDED/EXPANSION | SF | SQUARE FEET |
| EXT | EXTERIOR | SS | STAINLESS STEEL |
| | | ST | STREET |
| FA | FIRE ALARM | STC | SOUND TRANSMISSION CLASS |
| FAB | FABRICATED | STD | STANDARD |
| FD | LOOR DRAIN | STL | STEEL |
| FE | FIRE EXTINGUISHER | STL DR | STEEL DOOR |
| FHC | FIRE HOSE CABINET | STOR | STORAGE |
| FIN | FINISH | STRUCT | STRUCTURE/STRUCTURAL |
| FIX | FIXTURE | SUSP | SUSPEND/SUSPENDED |
| FL | FLOOR/FLOORING | SYM | SYMMETRICAL |
| FD | FLOOR DRAIN | SYS | SYSTEM |
| FDN | FOUNDATION | | |
| FP | FIREPROOF | T/CONC | TOP OF CONCRETE |
| FT | FOOT/FEET | T/STL | TOP OF STEEL |
| | | T/WALL | TOP OF WALL |
| GA | GAGE (GAUGE) | T&B | TOP AND BOTTOM |
| GAL | GALLON | T&G | TONGUE AND GROOVE |
| GALV | GALVANIZED | TEL | TELEPHONE |
| GC | GENERAL CONTRACTOR | TEMP | TEMPERATURE (IF UNLESS NOTED) |
| GL | GLASS | TEMP GL | TEMPERED GLASS |
| GPM | GALLONS PER MINUTE | TF | TEMPORARY FIXTURE |
| GYP | GYPSUM | THK | THICK/THICKNESS |
| GWB | GYPSUM WALL BOARD | T.O.S. | TOP OF SLAB |
| | | TV | TELEVISION |
| H | HIGH | TYP | TYPICAL |
| HB | HOSE BIB | | |
| HDW | HARDWARE | UR | URINAL |
| HM | HOLLOW METAL (STEEL) | U.O.N. | UNLESS OTHERWISE NOTED |
| HOR | HORIZONTAL | UL | UNDERWRITERS LABORATORIES |
| HP | HIGH POINT | | |
| HR | HOUR | VCB | VINYL COVE BASE |
| HT | HEIGHT | VCT | VINYL COMPOSITION TILE |
| HVAC | HEATING, VENTILATION AND AIR CONDITIONING | VERT | VERTICAL |
| | | VEST | VESTIBULE |
| HW | HOT WATER | VIF | VERIFY IN FIELD |
| HWD | HARDWOOD | VOL | VOLUME |
| ID | INSIDE DIAMETER | W | WEST |
| IN | INCH (ES) | W/ | WITH |
| INCL | INCLUDING/INCLUDED | W/0 | WITHOUT |
| INSUL | INSULATE/INSULATED/INSULATION | WC | WATER CLOSET |
| INT | INTERIOR | WD | WOOD |
| INV | INVERTED/INVERT` | WGL | WIRE GLASS |
| | | WL | WORK LINE |
| JC | JANITORS CLOSET | WP | WORKING POINT |
| JT | JOINT | WT | WEIGHT |
| | | WWF | WELDED WIRE FABRIC |

GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2014 NEW YORK CITY BUILDING CODE, ICC / ANSI A 117.1 - 2009, FIRE DEPARTMENT REGULATIONS, UTILITY COMPANY REQUIREMENTS AND THE BEST TRADE PRACTICES.
2. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FILE ALL REQUIRED CERTIFICATES OF INSURANCE WITH THE DEPARTMENT OF BUILDINGS, OBTAIN ALL REQUIRED PERMITS, AND PAY ALL FEES REQUIRED BY GOVERNING NEW YORK CITY AGENCIES.
3. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD PRIOR TO COMMENCING WORK, AND SHALL REPORT ANY DISCREPANCIES BETWEEN DRAWINGS AND FIELD CONDITIONS TO THE ARCHITECT IMMEDIATELY.
4. THE CONTRACTOR IS NOT TO SCALE DRAWINGS OR DETAILS. ONLY WRITTEN DIMENSIONS ARE TO BE USED.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL CONDITIONS AND MATERIALS WITHIN THE PROPOSED CONSTRUCTION AREA. THE CONTRACTOR SHALL DESIGN AND INSTALL ADEQUATE SHORING AND BRACING FOR ALL STRUCTURAL OR REMOVAL TASKS. THE CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR ANY DAMAGE OR INJURIES CAUSED BY OR DURING THE EXECUTION OF THE WORK.
6. THE CONTRACTOR SHALL LAY OUT HIS OWN WORK, AND SHALL PROVIDE ALL DIMENSIONS REQUIRED FOR OTHER TRADES (PLUMBING, ELECTRICAL, ETC.).
7. PLUMBING AND ELECTRICAL WORK SHALL BE PERFORMED BY PERSONS LICENSED IN THEIR TRADES, WHO SHALL ARRANGE FOR AND OBTAIN INSPECTIONS AND REQUIRED SIGN-OFFS.
8. THE CONTRACTOR SHALL DO ALL CUTTING, PATCHING AND REPAIRING AS REQUIRED TO COMPLETE ALL OF THE WORK INDICATED ON THE DRAWINGS, AND ALL OTHER WORK THAT MAY BE REQUIRED TO COMPLETE THE JOB.
9. TYPES OF CONSTRUCTION SHALL COMPLY WITH THE REQUIREMENTS OF CHAPTER 6 OF N.Y.C. BLDG. CODE. AT LEAST 24 HR. WRITTEN NOTICE SHALL BE GIVEN TO THE COMMISSIONER BEFORE COMMENCEMENT OF WORK.
10. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND SAMPLES ON ALL ITEMS SPECIFIED ON THE CONTRACT DOCUMENTS TO THE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO PURCHASING AND INSTALLATION.
11. ALL DEBRIS ON THE PROPERTY DUE TO CONSTRUCTION SHALL BE REMOVED.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR ARRANGING AND PAYING FOR ALL CONTROLLED INSPECTIONS REQUIRED BY LAW, AND FOR ARRANSING ALL CONSTRUCTION, PLUMBING, ELECTRICAL, OR OTHER INSPECTIONS RELATED TO THE PROPOSED WORK. A PROPOSED SCHEDULE OF THESE INSPECTIONS SHALL BE INCLUDED IN THE PROPOSED WORK SCHEDULE. CONTRACTOR SHALL PROVIDE INSPECTION SIGN-OFF'S TO OWNER AND ARCHITECT.
13. CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS. ALSO HE SHALL NOTIFY THE ARCHITECT OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN ON THESE DRAWINGS PRIOR TO THE START OF WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS.
14. DIMENSIONS SHOWN ON FLOOR PLANS, SECTIONS, ELEVATIONS, AND DETAILS ARE TO FINISH FACE OF WALLS OR CENTER LINE OF COLUMNS TYPICALLY, UNLESS OTHERWISE NOTED.
15. ABBREVIATIONS THROUGHOUT THE PLANS ARE THOSE IN COMMON USE. NOTIFY THE ARCHITECT OF ANY ABBREVIATIONS IN QUESTION.
16. CIVIL, ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS ARE COMPLEMENTARY. ANYTHING SHOWN ON ARCHITECTURAL DRAWINGS AND NOT SHOWN ON CIVIL, STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS, OR SHOWN ON CIVIL, STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS AND NOT SHOWN ON ARCHITECTURAL DRAWINGS SHALL BE INTERPRETED AS BEING SHOWN ON ALL TRADES
17. FINISH FLOOR ELEVATIONS ARE AS ESTABLISHED DATUM LINE. UNLESS OTHERWISE NOTED. THE CONTRACTOR WILL BE RESPONSIBLE FOR VERIFYING FLOOR-TO-FLOOR ELEVATIONS.
18. IN THE CASE OF A CONFLICT BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, SPECIFICATIONS SHALL TAKE PRECEDENCE. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ANY CONFLICT BEFORE PROCEEDING WITH THE WORK.
19. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT AS REQUIRED TO PROPERLY AND FULLY COMPLETE THE WORK AS INDICATED BY THE DRAWINGS AND SPECIFICATIONS.
20. CONTRACTOR SHALL REMOVE, CUT, PATCH AND REFRAMED WALLS, PARTITIONS, FLOORS, FRAMES, DOORS, MOLDINGS, PIPE FIXTURES AND CONDUIT AS REQUIRED TO PROPERLY EXECUTE THE WORK.
21. CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY BRACING AND PROTECTING ALL WORK DURING CONSTRUCTION AGAINST DAMAGE, BREAKS, COLLAPSE, DISTORTIONS, AND OFF-ALIGNMENT ACCORDING TO APPLICABLE STANDARD CODES (INCLUDING CHAPTER 33 OF THE NYC BUILDING CODE) AND GOOD PRACTICE.
22. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE VARIOUS TRADE ITEMS WITHIN THE SPACE ABOVE ALL CEILINGS (INCLUDING, BUT NOT LIMITED TO, STRUCTURAL MEMBERS, MECHANICAL DUCTS AND INSTALLATION, CONDUITS, RACEWAYS, SPRINKLER SYSTEM, LIGHT FIXTURES, CEILING SYSTEMS, AND ANY SPECIAL STRUCTURAL SUPPORTS REQUIRED) AND SHALL BE RESPONSIBLE FOR MAINTAINING THE FINISH CEILING HEIGHT ABOVE THE FINISH FLOOR AS INDICATED ON THE DRAWINGS AND THE FINISH SCHEDULE. (CEILING HEIGHT DIMENSIONS ARE TO THE FINISH SURFACE OF CEILING).
23. THE CONTRACTOR SHALL PROTECT ALL FINISH WORK SURFACES FROM DAMAGE DURING THE COURSE OF CONSTRUCTION AND SHALL REPLACE AND/OR REPAIR ALL DAMAGED SURFACES CAUSED BY CONTRACTOR OR SUBCONTRACTOR PERSONNEL TO THE SATISFACTION OF THE OWNER AND ARCHITECT.
24. CONTRACTOR SHALL PROPERLY PROTECT AND MAKE SAFE ADJACENT PROPERTY AS JOB CONDITIONS REQUIRE IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO ISOLATE ALL WORK AREAS AND CLEARLY DEFINE PATHS OF ACCESS TO THE WORK FOR WORKMEN IN ORDER TO INSURE MINIMIZATION OF DUST INFILTRATION TO OTHER AREAS OF THE BUILDING AND TO PREVENT DAMAGE TO FLOORS, WALLS AND CEILINGS OF PUBLIC AND/OR FREIGHT ACCESS AREAS. IF SUCH DAMAGE SHOULD OCCUR, CONTRACTOR SHALL CORRECT IT IMMEDIATELY AT HIS OWN COST.
25. ALL PRECAUTIONS ARE TO BE TAKEN TO PREVENT DIRT AND DUST FROM PERMEATING INTO OTHER PARTS OF THE BUILDING DURING THE PROGRESS OF THE WORK. MATERIALS AND RUBBISH SHALL BE PLACED IN BARRELS OR BAGS BEFORE BEING TAKEN OUT OF THE IMMEDIATE AREA OF CONSTRUCTION. ALL SUCH BARRELS, BAGS, RUBBISH, RUBBLE, DISCARDED EQUIPMENT, EMPTY PACKING CARTONS AND OTHER MATERIALS WILL BE TAKEN OUT OF THE BUILDING AND PROPERLY REMOVED FROM THE PREMISES AS PART OF THE WORK UNDER THIS CONTRACT.
26. SPECIAL NOTICE TO CONTRACTORS: ALL CONTRACTORS PERFORMING WORK ON THE PREMISES SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING A REASONABLE AND PRUDENT SAFETY PROGRAM INCLUDING BUT NOT LIMITED TO THE ISOLATION OF WORK AREAS AND THE PROMPT REMOVAL OF ANY DEBRIS OR TOOLS WHICH MIGHT ENDANGER VISITORS AND STAFF OF THE OWNER OR ARCHITECT.
27. IF THE CONTRACTOR ASCERTAINS AT ANY TIME THAT REQUIREMENTS OF THIS CONTRACT CONFLICT WITH, OR ARE IN VIOLATION OF, APPLICABLE LAWS, CODES, REGULATIONS AND ORDINANCES, HE SHALL NOT PROCEED WITH WORK IN QUESTION, EXCEPT AT HIS OWN RISK, UNTIL ARCHITECT HAS BEEN NOTIFIED IN WRITING AND WRITTEN DETERMINATION IS MADE BY THE ARCHITECT. WHERE COMPLETED OR PARTIALLY COMPLETED WORK IS DISCOVERED TO BE IN VIOLATION WITH APPLICABLE LAWS, CODES, REGULATIONS AND ORDINANCES, CONTRACTOR SHALL BE REQUIRED TO REMOVE THAT WORK FROM THE PROJECT AND REPLACE SUCH WORK WITH ALL NEW COMPLYING WORK AT NO ADDITIONAL COST TO THE OWNER OR ARCHITECT.
28. ANY WORK INSTALLED IN CONFLICT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT HIS EXPENSE AND AT NO ADDITIONAL EXPENSE TO THE OWNER, ARCHITECT, OR CONSULTANTS.
29. CONTRACTOR SHALL COORDINATE ALL AREAS OF WORK WITH ALL SUB-CONTRACTORS AND OTHER TRADES INVOLVED WITH THE PROJECT.
30. COORDINATE SPACE REQUIREMENTS AND INSTALLATION OF MECHANICAL AND ELECTRICAL WORK INDICATED ON DRAWINGS. VERIFY LOCATION AND REQUIRED OPENING SIZES FOR MECHANICAL EQUIPMENT, LOCATION AND SIZES OF EQUIPMENT FOR PADS AND BASES AND REQUIREMENT, AND LOCATION OF POWER AND WATER OR DRAIN INSTALLATION WITH EQUIPMENT MANUFACTURERS BEFORE PROCEEDING WITH THE WORK.
31. COMPLY WITH INSTALLATION REQUIREMENTS OF MANUFACTURER'S INSTRUCTIONS AND APPROVED SHOP DRAWINGS.
32. CONTRACTOR SHALL ANALYZE ELECTRICAL REQUIREMENTS OF EQUIPMENT TO BE INSTALLED AND ASSIST ARCHITECT IN THE NEED, IF ANY, TO UPGRADE EXISTING POWER SUPPLY PRIOR TO PROCEEDING WITH ELECTRICAL WORK.
33. CONTRACTOR SHALL PROVIDE OWNER WITH ALL MANUALS, MAINTENANCE SCHEDULES, AND OTHER REQUIREMENTS NEEDED FOR THE MAINTENANCE OF EQUIPMENT INSTALLED AS PART OF THIS CONTRACT. ALL MANUFACTURER'S WARRANTIES SHALL BE TRANSFERRED TO OWNER UPON COMPLETION OF WORK.
34. CONTRACTOR SHALL IDENTIFY ALL NEW EXPOSED PIPES, VALVES, AND CONDUIT WITH STAMPED METAL TAGS AND SHALL LABEL ELECTRIC PANEL BOXES WITH CIRCUIT DESIGNATIONS UPON COMPLETION OF WORK.
35. CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP IN THIS CONTRACT FOR A PERIOD OF ONE YEAR FOLLOWING ARCHITECT'S CERTIFICATION OF SUBSTANTIAL COMPLETION, AND SHALL REMEDY ANY DEFECTS IN SUCH WORK THAT ARISES DURING THAT TIME AT NO COST TO THE OWNER.
36. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES BELOW GRADE AND RELATED SERVICE CONNECTIONS WITH THE RESPECTIVE UTILITY COMPANIES.
37. THE CONTRACTOR SHALL COORDINATE THE REMOVAL, ABANDONMENT, AND/OR RELOCATION OF EXISTING UTILITIES ABOVE OR BELOW GRADE WITH THE RESPECTIVE UTILITY COMPANIES.
38. TEMPORARY FACILITIES:
A) THE CONTRACTOR SHALL PROVIDE A STAGING AND MATERIAL STORAGE AREA ADJACENT TO THE AREA OF CONSTRUCTION. LOCATION SHALL BE COORDINATED WITH THE OWNER. IN ACCORDANCE WITH CHAPTER 31 OF THE 2014 NYC BUILDING CODE.

B) THE CONTRACTOR SHALL MAKE NECESSARY CONNECTIONS TO EXISTING UTILITIES FOR TEMPORARY POWER AND WATER SUPPLIES, AND SHALL COORDINATE SUCH USE WITH THE OWNER PRIOR TO CONNECTION. IN ACCORDANCE WITH CHAPTER 33 OF THE NYC BUILDING CODE).

39. C) THE CONTRACTOR SHALL PROVIDE TEMPORARY BARRICADES TO SEPARATE CONSTRUCTION AREAS FOR PUBLIC SAFETY AROUND ENTIRE PERIMETER OF CONSTRUCTION AREA. IN ACCORDANCE WITH CHAPTER 31 & 33 OF THE 2014 NYC BUILDING CODE).
40. FIRE-RATED PARTITION WALLS AND FIRE-RATED OCCUPANCY SEPARATION WALLS SHALL EXTEND FROM CONCRETE FLOOR SLABS UP TO UNDERSIDE OF STRUCTURE ABOVE. ALL OPENINGS SHALL BE PROTECTED IN ACCORDANCE WITH CHAPTER 7 OF THE 2014 NYC BUILDING CODE.
41. ALL PENETRATIONS THRU FIRE-RATED WALLS, FLOORS AND CEILINGS SHALL BE INSTALLED WITH FIRE DAMPERS, FIRE SEAL, ETC., SO AS TO MAINTAIN THE FIRE RESISTIVE RATING AND STRUCTURAL INTEGRITY OF WALL OR CEILING ASSEMBLY. ALL OPENINGS SHALL BE PROTECTED IN ACCORDANCE WITH CHAPTER 7 OF THE 2014 NYC BUILDING CODE.
42. FINAL CLEAN UP AND DISPOSAL: REMOVE DEBRIS, RUBBISH AND WASTE MATERIAL FROM THE OWNER'S PROPERTY TO A LAWFUL DISPOSAL AREA AND PAY ALL HAULING AND DUMPING COSTS. CONFORM TO PERTAINING FEDERAL STATE AND LOCAL LAWS, REGULATIONS AND ORDERS UPON COMPLETION OF WORK, ALL CONSTRUCTION AREAS SHALL BE LEFT VACUUM-CLEAN AND FREE FROM DEBRIS. CLEAN ALL DUST, DIRT, STAINS, HAND MARKS, PAINT SPOTS, DROPPINGS, AND OTHER BLEMISHES FROM ALL FINISHED SURFACES.
43. PROVIDE CONC. LINTELS ABOVE ALL MASONRY OPENINGS (TYP) U.O.N. SEE STRUCTURAL DRAWINGS FOR LINTEL SCHEDULE.
44. PROVIDE CONC. LINTELS ABOVE ALL MECHANICAL OPENINGS IN MASONRY WALLS (TYP).
45. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN CONCRETE FLOOR & ROOF WITH MECHANICAL DRAWINGS & CONC. DECK CONTRACTOR. ALL VERTICAL SHAFT WALLS ENCLOSING HVAC DUCTS SHALL BE 2-HR RATED (TYP) WHERE PENETRATES THREE STORIES OR MORE (BC 707.4) IF SHAFT EXTENDS UP TO THE UNDERSIDE OF A NON-COMBUSTIBLE ROOF AND HAVE A FLOOR AREA EXCEEDING 4 SQ.FT., PROVIDE A SMOKE VENT.
46. ALL DWELLING UNITS ARE HANDICAP ADAPTABLE (BC 1107) (U.O.N. ON PLANS).
47. FOR SIZE & LOCATION OF ALL REQUIRED CONCRETE PADS FOR MECHANICAL EQUIPMENT, SEE MECHANICAL & PLUMBING DRAWINGS.
48. IF A SPRINKLER LINE IS EXPOSED IN A LIVING AREA, ENCLOSE IN A GYP. BD. SOFFIT - SEE SPRINKLER DWGS. AND ARCH SPRINKLER SOFFIT DETAIL.
49. ALL STEEL COLUMNS & BEAMS SHALL BE FIRE PROTECTED W/ SPRAY-ON FIREPROOFING (2 HOUR RATED IN NON HIGH RISE AND 3 HOUR RATED IN HIGH RISE).
50. AS PER NYC BUILDING CODE 403.2.4 THE BOND STRENGTH OF THE SFRM SHALL BE 430 PSF.
51. ALL EXTERIOR WALLS, INCLUDING ROOF BULKHEADS SHALL BE 2 HR RATED.
52. ALL INTERIOR BEARING WALLS, HOIST WAY, SHAFTS, VERTICAL EXITS AND EXIT PASSAGE WAYS SHALL BE 2 HOUR RATED. AS PER BC 403.2.3.1 THRU 403.2.3.4 OF THE 2014 NYC BUILDING CODE.
53. DOORS OPENING INTO INTERIOR STAIR ENCLOSURES SHALL NOT BE LOCKED FROM EITHER SIDE UNLESS THE DOOR IS EQUIPED WITH AN AUTOMATIC FAIL SAVE SYSTEM FOR OPENING IN THE EVENT OF THE ACTIVATION OF FIRE DETECTION SYSTEM. AN APPROVED STAIRWAY COMMUNICATION SYSTEM SHALL BE PROVIDED AT LEAST EVERY 5TH FLOOR IN EACH STAIRWAY WHERE THE DOORS ARE LOCKED. (BC 403.5.3 & BC403.5.3.1 OF NYC BUILDING CODE)
54. PROVIDE NON-COMBUSTIBLE FIRE STOPPING AT THE PERIMETER OF ALL PENETRATIONS THROUGH RATED WALLS, FLOORS, ROOF AND CEILINGS.
55. ALL EXTERIOR CONCRETE BLOCK WALLS ADJACENT TO EXISTING BUILDINGS SHALL HAVE A DRY-BLOCK ADDITIVE (INCLUDING MORTAR) "ACME SHIELD".
56. PROVIDE CONTROL JOINTS IN GYP BD WALLS & CEILING @ 30'-0" O/C MAX. AS MANUF BY U.S.G.
57. PROVIDE CONTROL JOINTS IN BRICK @ 30'-0" O.C. MAX., CONTROL JOINTS IN CMU @ 30'-0" O.C., EXPANSION JOINTS IN CMU @ 60'-0" O/C.
58. MINIMUM ALLOWABLE CEILING HEIGHT IN APARTMENTS (BC 1208.2)
    * HABITABLE ROOMS _ 8'-0".
    * OCCUPIABLE SPACES _ (PUBLIC CORRIDORS & COMMUNITY ROOM) 7'-6".
    * BATHROOMS, KITCHENS, SOFFITS, APT FOYER _ 7'-0".
59. PROVIDE MIN. STC 50 RATING AT PERIMETER WALLS, FLOORS & CEILING OF RESIDENTIAL APARTMENTS (BC 1207).
60. MECHANICAL & PLUMBING CONTRACTORS TO COORDINATE WITH G.C. & CONCRETE MANUFACTURER PENETRATION SIZE & LOCATIONS PRIOR TO DRILLING HOLES IN DECK .
61. ALL WORK TO BE PERFORMED ON THIS PROJECT SHALL BE IN A WORKMEN LIKE MANNER.
62. ENCAPSULATE HORIZONTAL DUCTWORK WITH FYREWRAP EZ 1.5 2 HOUR RATED . NONCOMBUSTIBLE DUCT BLANKET INSULATION (SEE MECHANICAL DRAWINGS).
63. AS PER 2014 NYC BUILDING CODE SECTION 403.4.5, A FIRE COMMAND CENTER SHALL BE LOCATED IN THE MAIN LOBBY OF THE BUILDING AND COMPLYING WITH SECTION 911 OF THE NEW BUILDING CODE AND APPROVED BY THE FIRE DEPARTMENT.
64. PROVIDE FIRE EXTINGUISHER PER NYC BUILDING CODE.
65. INTEGRATED PEST MANAGEMENT- SEAL ALL WALL, FLOOR AND JOINT PENETRATIONS TO PREVENT PEST ENTRY. PROVIDE RODENT AND CORROSION PROOF SCREENS (E.G., COPPER OR STAINLESS STEEL MESH) FOR LARGE OPENINGS.
66. CONTRACTOR SHALL FURNISH AND INSTALL ACCESS PANELS WHERE SHOWN ON THE REFLECTED CEILING PLANS AND AS REQUIRED BY BUILDING CODE OR NORMAL GOOD PRACTICE TO PROVIDE ACCESS TO ALL MECHANICAL OR ELECTRICAL EQUIPTMENT. NO ACCESS PANEL SHALL BE LOCATED, FRAMED, OR INSTALLED WITHOUT THE EXPRESSED APPROVAL OF THE ARCHITECT.

NEW YORK CITY MULTIPLE DWELLING LAW:

1. IN MULTIPLE DWELLINGS BUILDINGS, WALLS, FLOORS, ROOF, STAIRS AND PUBLIC HALLS SHALL BE FIRE PROOFED. (CHAPTER 7).
2. ALL PARTITIONS BETWEEN APARTMENTS SHALL BE FIRE STOPPED AS PER SECTION BC 708
3. SOUND PROOFING BETWEEN APARTMENTS SHALL COMPLY WITH BC 1207.
4. PARTITIONS AND CEILING ENCLOSING KITCHENS & KITCHENETTES SHALL BE FIRE-RETARDED AS PER CHAPTER 7 OF NYC BC & SECTION 33 OF NEW YORK STATE MULTIPLE DWELLING LAW.
5. ALL COMBUSTIBLE MATERIALS UNDER OR WITHIN 1'-0" OF COOKING APPLIANCES SHALL BE FIRE RETARDED. THERE SHALL ALWAYS BE AT LEAST 2 FEET OF CLEAR SPACE ABOVE ANY EXPOSED COOKING SURFACES AS PER SECTION 33 OF NEW YORK STATE MULTIPLE DWELLING LAW.
6. NUMBER OF EXITS REQUIRED ACCORDING TO TABLE 1018.1 - STAIRS SHALL EXTEND FROM THE ENTRANCE STORY UP TO THE ROOF AND BE EQUIPPED WITH ENFORCED SELF-CLOSING DOORS GLAZED WITH WIRE GLASS AND WITHOUT TRANSOMS. THE DOORS GIVING ACCESS TO SUCH STAIRS SHALL NOT BE HELD OPEN BY ANY DEVICE WHATEVER. (CHPTER 10).
7. PROVIDE MIRROR IN SELF-SERVICE PASSENGER ELEVATORS AS PER CHAPTER 30, SECTION BC 3001.6.
8. THE FLOOR OF EVERY BATHROOM OR PUBLIC TOILET SHALL HAVE A SMOOTH, HARD, NONABSORBENT SURFACE THAT EXTENDS UPWARD ONTO THE WALLS AT LEASE 6" OR MORE ABOVE THE FLOOR, EXCEPT AT DOORS, AS PER SECTION BC 1210.
9. EVERY BATHROOM SHALL BE PROVIDED WITH NATURAL VENTILATION IN ACCORDANCE WITH SECTION 1203.4.1.3. UNLESS PROVIDED WITH EXHAUST VENTILATION IN ACCORDANCE WITH THE NEW YORK CITY MECHANICAL CODE . (SECTION 1203.4.1.3).
10. EVERY MULTIPLE DWELLING SHALL COMPLY WITH CHAPTERS 11 & 12 (LIGHTING, GAS METERS, AND GAS APPLIANCES).
11. PROVIDE USPS APPROVED MAILBOXES.
12. PROVIDE INTERCOMMUNICATION SYSTEM IN ENTRANCE LOBBY AS PER CHAPTER 1008.4.4.
13. PROVIDE AND MAINTAIN A PEEPHOLE IN THE ENTRANCE DOOR OF EACH HOUSING UNIT, SUCH PEEPHOLE SHALL BE SO LOCATED AS TO ENABLE A PERSON TO VIEW FROM INSIDE OF THE ENTRANCE DOOR.
14. PROVIDE FRONT, INTERIOR COURT AND REAR YARD LIGHTING AS PER SECTION BC 1206.4.
15. PROVIDE LIGHTING AND VENTILATION OF PUBLIC HALLS AND STAIRS AS PER SECTION BC 1203 & SECTION BC 1205.
16. ANY HABITABLE ROOM IN BASEMENT OR CELLAR SHALL COMPLY WITH CHAPTER 12.
17. ALL STAIRS SHALL COMPLY WITH CHAPTER 10, SECTION BC 1009.
18. EVERY STAIR SHALL BE VENTILATED BY A WINDOW OR BY MOVABLE LOUVERS IN THE SKYLIGHT HAVING AN OPENING OF AT LEAST 3.5% OF THE MAX. SHAFT AREA AT ANY FLOOR, BUT NOT LESS THAN 72 SQ. IN. OF THE TOTAL REQUIRED VENT AREA, AT LEAST 1/3 SHALL BE CLEAR OPENING TO THE EXTERIOR 10'-0" MIN. AWAY FROM ANY OPENING) .

NEW YORK CITY HOUSING MAINTENANCE CODE:

1. BUILDING SHALL COMPLY WITH SECTION 27-2027 - DRAINAGE OF ROOFS AND COURT YARDS.
2. BUILDING SHALL COMPLY WITH SECTION 27-2028 - CENTRAL HEATING.
3. BUILDING SHALL COMPLY WITH SECTION 27-2031 - SUPPLY OF HOT WATER.
4. BUILDING SHALL COMPLY WITH SECTION 27-2040 - LIGHTS NEAR ENTRANCE WAYS AND IN YARDS AND COURTS.
5. BUILDING SHALL COMPLY WITH SECTION 27-2038 & BC 1006 - LIGHTING PUBLIC HALLS AND STAIRS.
6. BUILDING SHALL COMPLY WITH SECTION 27-2041 - PEEPHOLES IN ENTRANCE DOORS TO APARTMENTS.
7. BUILDING SHALL COMPLY WITH SECTION 27-2047 - MAIL SERVICE.
8. BUILDING SHALL COMPLY WITH SECTION 27-2048 - FLOOR SIGNS.
9. BUILDING SHALL COMPLY WITH SECTION 27-2049 - STREET NUMBERS.
10. BUILDING SHALL COMPLY WITH SECTION 27-2050 - INSPECTION OF SPRINKLERS.
11. BUILDING SHALL COMPLY WITH ARTICLE 13 - JANITORIAL SERVICES.
12. BUILDING SHALL COMPLY WITH H.P.D. DESIGN GUIDELINES DATED MAY 1988, REVISED AUGUST 1, 2000 FOR ROOM SIZES.
13. BUILDING SHALL COMPLY WITH SECTION 27-2097 - REGISTRATION: TIME TO FILE.
14. BUILDING SHALL COMPLY WITH SECTION 27-2104 - POSTING OF SERIAL NUMBER.
15. BUILDING SHALL COMPLY WITH SECTION 27-2105 - IDENTIFICATION OF MANAGING AGENT OR OWNER.
16. BUILDING SHALL COMPLY WITH SECTION 27-2021 - RECEPTACLES FOR WASTE MATTER.
17. BUILDING SHALL COMPLY WITH SECTION 27-2022 - FREQUENCY OF COLLECTION OF WASTE MATTER.
18. PROVIDE A HEAVY DUTY LATCH SET AND A HEAVY DUTY DEAD BOLT OPERABLE BY A KEY FROM THE OUTSIDE AND A THUMB-TURN FROM THE INSIDE AT EVERY APARTMENT ENTRANCE (SECTION 27-2043)

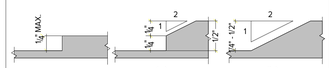
ENERGY CONSERVATION NOTES:

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2014 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE, AS NOTED IN 2014 NEW YORK CITY BUILDING CODE - SECTION BC 1301 -

PLANS MEET ALL APPLICABLE CODES INCLUDING THE FOLLOWING:

- NEW YORK CITY OFFICIAL COMPILATION OF CODES, RULES AND REGULATIONS.
- N.F.P.A. - NATIONAL FIR

# GENERAL ACCESSIBILITY

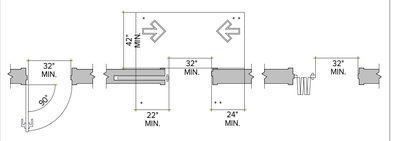



(a) (b)

Fig 303.2 VERTICAL

Fig 303.3 BEVELED

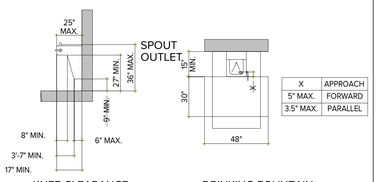
## CHANGES IN ELEVATION




(a) HINGED DOOR

(b) SLIDING POCKET DOOR

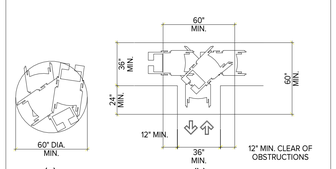
(c) FOLDING DOOR




KNEE CLEARANCE
Fig 306.2 & 306.3

DRINKING FOUNTAIN
Fig 602.5

## DRINKING FOUNTAIN

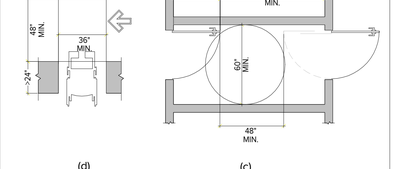



(a) CIRCULAR

(b) T-SHAPED

Fig 304.3

## SIZE OF TURNING SPACE




(d) OPENINGS WITHOUT DOORS

(c) TWO DOORS IN A SERIES

Fig 404.2.2 & 404.2.5

## CLEAR WIDTH OF DOORWAYS

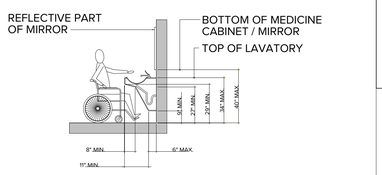
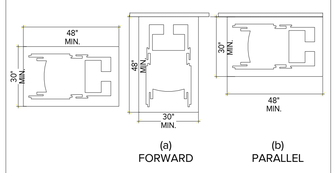



Fig 606.3

## HEIGHT OF LAVATORIES & SINKS

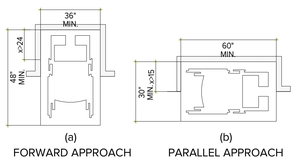



(a) FORWARD

(b) PARALLEL

Fig 305.3 SIZE OF CLEAR FLOOR SPACE

Fig 305.5 APPROACH




(a) FORWARD APPROACH

(b) PARALLEL APPROACH

MANEUVERING CLEARANCE IN AN ALCOVE

Fig 305.7

## CLEAR FLOOR SPACES AND APPROACH

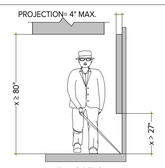
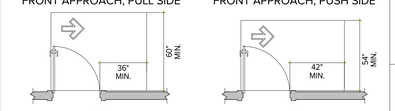



Fig 307.2

## LIMITS OF PROTRUDING OBJECTS

(a) FRONT APPROACH, PULL SIDE

(b) FRONT APPROACH, PUSH SIDE




(d) HINGE APPROACH, PULL SIDE

(e) HINGE APPROACH, PULL SIDE

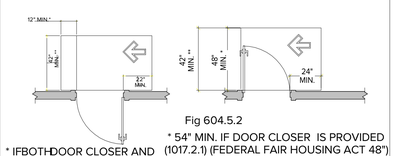


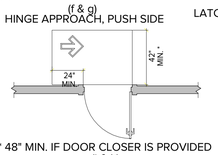

Fig 604.5.2

* IF BOTH DOOR CLOSER AND LATCH ARE PROVIDED
** 48" MIN. IF BOTH DOOR CLOSER AND LATCH PROVIDED (f & g)

HINGE APPROACH, PUSH SIDE

* 54" MIN. IF DOOR CLOSER IS PROVIDED (1017.2.1) (FEDERAL FAIR HOUSING ACT 48")
** 42" MIN. @ TOILET COMP. STALLS (1107.2.1) 4'-0" FAIR HOUSING ACT (h & i)

LATCH APPROACH, PULL SIDE

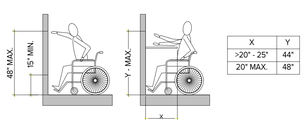



* 48" MIN. IF DOOR CLOSER IS PROVIDED (j & k)

LATCH APPROACH, PUSH SIDE

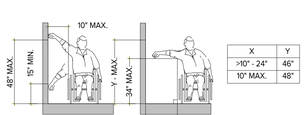
Fig 404.2.3.1

## MANEUVERING CLEARANCE AT MANUAL SWINGING DOORS




UNOBSTRUCTED FORWARD REACH
Fig 308.2.1

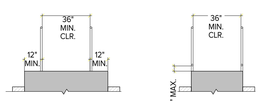
OBSTRUCTED HIGH FORWARD REACH
Fig 308.2.2




UNOBSTRUCTED SIDE REACH
Fig 308.3.1

OBSTRUCTED HIGH SIDE REACH
Fig 308.3.2

## UNOBSTRUCTED & OBSTRUCTED REACHES

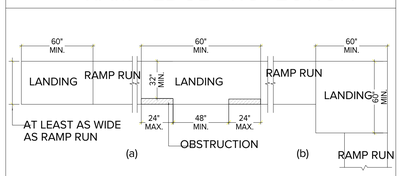



(a) EXTENDED SURFACE

(b) CURB OR BARRIER

Fig 405.9

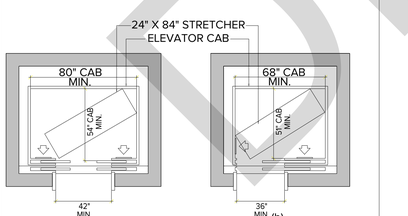
## RAMP EDGE PROTECTION




(a) (b)

Fig 405.7

## RAMP LANDINGS




(a) CENTERED DOOR LOCATION

(b) SIDE (OFF-CENTERED DOOR) LOCATION

ALTERNATE LOCATIONS OF PANEL WITH SIDE OPENING DOOR

3500 # GEARED TRACTION ELEVATOR (MIN.)

2500 # GEARED TRACTION ELEVATOR (MIN.)

Fig 407.4.1

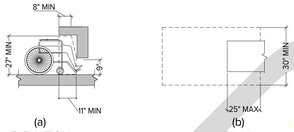
## DIMENSIONS OF ELEVATOR CAB AND PANEL

(a) ELEVATION

(b) PLAN

Fig 306.2

## TOE CLEARANCE

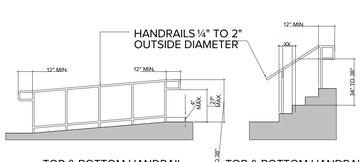



(a) ELEVATION

(b) PLAN

Fig 306.3

## KNEE CLEARANCE




TOP & BOTTOM HANDRAIL EXTENSIONS AT RAMPS

TOP & BOTTOM HANDRAIL EXTENSIONS AT STAIRS

Fig 505.10.1

Fig 505.10.2 & 505.10.3

## HANDRAIL EXTENSION

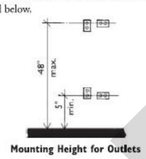
# ICC/ANSI

PROPOSED WORK TO COMPLY WITH APPLICABLE REQUIREMENTS OF ICC / ANSI A 117.1 - 2009
1.PROTRUDING OBJECTS SHALL NOT REDUCE THE CLEAR WIDTH REQUIRED FOR ACCESSIBLE ROUTES. (307.5)
2.RAMPS RUN SHALL HAVE A SLOPE NOT STEEPER THAN 1:12 (405.2) & A CROSS SLOPE SHALL NOT BE STEEPER THAN 1:48 (405.3)
3.MAX RISE = 30" (405.6) HANDRAILS ON BOTH SIDES OF RAMP (505.2)
4.ALL ELEVATOR REQUIREMENTS (CALL BUTTONS, VISIBLE & AUDIBLE SIGNALS, ETC.) SHALL COMPLY WITH SECTION 407 THRU 410.
5.CAR PARKING SPACES SHALL BE 96" WIDE MIN. & VAN PARKING SPACES SHALL BE 132" MIN. IN WIDTH. (502.2)
6.ACCESS AISLE SERVING CAR OR VAN SHALL BE 60" MIN. IN WIDTH (502.4.2)
7. VERTICAL CLEARANCE FOR VAN PARKING SPACES, ACCESS AISLES SERVING THEM AND VEHICULAR ROUTES SHALL BE 98" MIN. (502.6)
8.TREADS AND RISERS SHALL BE UNIFORM ON A STAIR FLIGHT. RISERS 4" MIN. & 7" MAX. - TREADS 11" MIN. (504.2) UNLESS OTHERWISE NOTED IN THE 2014 NEW YORK CITY BUILDING CODE
9.TOP GRIPPING SURFACE OF HANDRAILS SHALL BE AT 34" MIN. & 38" MAX. AFF (505.4) - SHALL HAVE A CLEAR DISTANCE OF 11/2" MIN. FROM THE ADJACENT WALL (505.5) - SHALL HAVE AN OUTSIDE DIAMETER OF 1 1/4" MIN. & 2" MAX. (505.7.1)
10.PROVIDE A HAND HELD SHOWER WITH A HOSE 59" MIN. IN LENGTH AT ACCESSIBLE BATHTUBS (607.6)
11.FOR WASHING MACHINES AND CLOTHES DRYERS PROVIDE A 30" X 48" CLEAR FLOOR SPACE FOR PARALLEL APPROACH WHICH SHALL BE CENTERED ON THE APPLIANCE (611.2)
12.TOP LOADING MACHINES SHALL HAVE THE DOOR COMPARTMENT 36" MAX. AFF & FRONT LOADING MACHINES SHALL HAVE THE BOTTOM OF THE OPENING COMPARTMENT 15" MIN. & 34" MAX. AFF. (611.4) MINIMUM (1) APPLIANCE EACH (4.32.6)
13.MACHINES MOUNTED ON PADS SHALL BE SIDE LOADING (4.25)
14.TOP OF DINING OR WORK SURFACES SHALL BE 28" MIN. & 34" MAX. IN HEIGHT AFF. (902.3)
15.ACCESSIBLE STORAGE ELEMENTS SHALL COMPLY WITH AT LEAST ONE OF THE REACH RANGES SPECIFIED IN SECTION 308 (905.3)
16.THE ACCESSIBLE PRIMARY ENTRANCE SHALL BE ON AN ACCESSIBLE ROUTE FROM PUBLIC AND COMMON AREAS (1004.2) - DOORWAYS SHALL HAVE A CLEAR OPENING OF 32" MIN. (1004.5.2.1)
17.THE LATERAL DISTANCE FROM THE CENTERLINE OF THE WATER CLOSET TO A BATHTUB OR A LAVATORY SHALL BE 18" MIN. ON THE OPPOSITE SIDE OF APPROACH & 15" MIN. ON THE OTHER SIDE. (1004.11.3.1.2)
18.BUILDING SIGNAGE SHALL COMPLY WITH ANSI 703.4.1-5. "BRAILLE SIGNANGE REQUIREMENTS"
19.MARKET RATE APARTMENTS SHALL COMPLY WITH FFH REQUIREMENTS.
20.TOP OF ROOF BULKHEAD FLOOR LANDING DOWN TO TOP OF ROOF = 73/4" MAX (1009.3) @ NON-ADA COMPLAINT AREAS

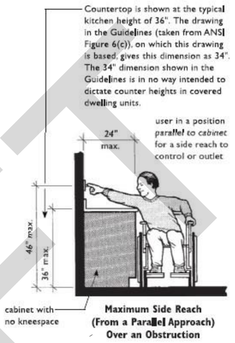
## FHA DESIGN MANUAL (WHERE APPLICABLE)

**Mounting Locations for Outlets**

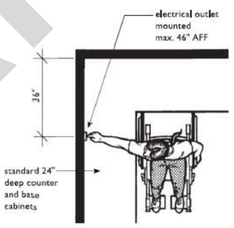
For accessible controls and outlets, all operable parts must be within the ranges specified above. When electrical outlets are installed horizontally or vertically, duplex outlets must have both receptacles within the reach range. Measurements are made as illustrated below.



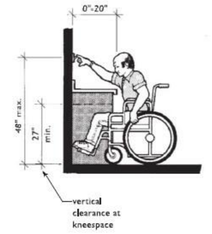

Mounting Height for Outlets

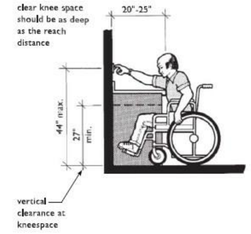


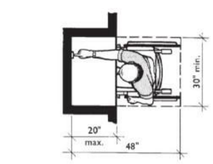

Maximum Side Reach (From a Parallel Approach) Over an Obstruction

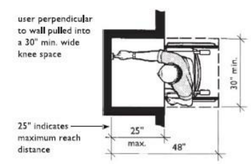



Electrical Outlets on Walls Over Cabinets Must Be a Minimum of 36" from a Corner



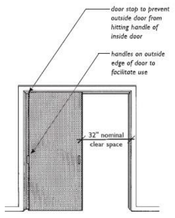



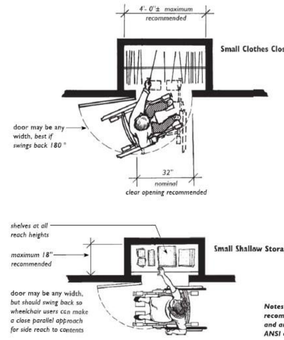




Maximum Forward Reach (From a Perpendicular Approach) over an Obstruction

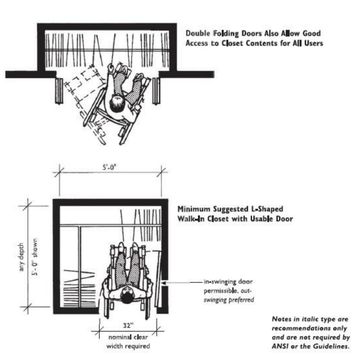
## ELECTRICAL OUTLETS AND SWITHCES




Usable Sliding Door




Notes in italic type are recommendations only and are not required by ANSI or the Guidelines.

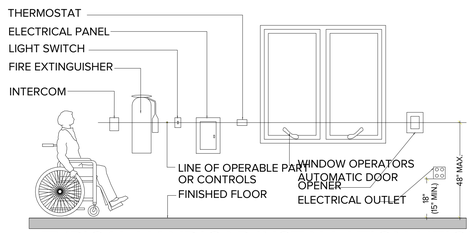



Notes in italic type are recommendations only and are not required by ANSI or the Guidelines.

3.15

## FHA DESIGN MANUAL (WHERE APPLICABLE)

## CLOSETS




## TYPICAL HANDICAP INSTALLATION HEIGHTS

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

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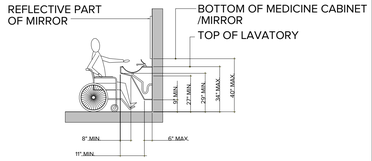
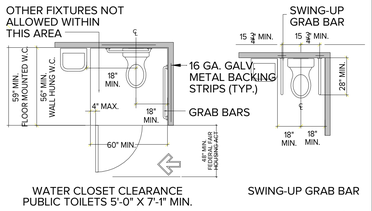



Fig 606.3

## HEIGHT OF LAVATORIES & SINKS



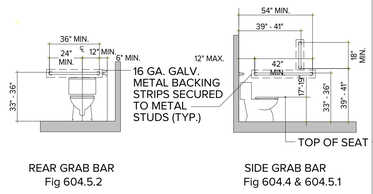

WATER CLOSET CLEARANCE
PUBLIC TOILETS 5'-0" X 7'-1" MIN.

Fig 604.3

SWING-UP GRAB BAR

Fig 604.5.3

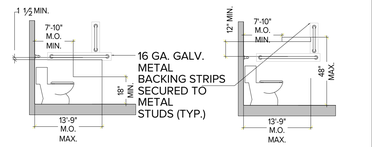
## WATER CLOSET CLEARANCE




REAR GRAB BAR
Fig 604.5.2

SIDE GRAB BAR
Fig 604.4 & 604.5.1

## GRAB BAR FOR WATER CLOSET

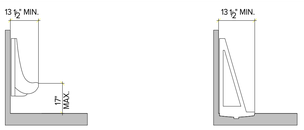



(a) BELOW GRAB BAR

(b) ABOVE GRAB BAR

Fig 604.7

## DISPENSER LOCATION

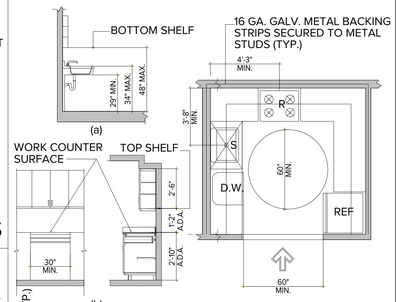



(a) WALL HUNG TYPE

(b) STALL TYPE

Fig 605.2

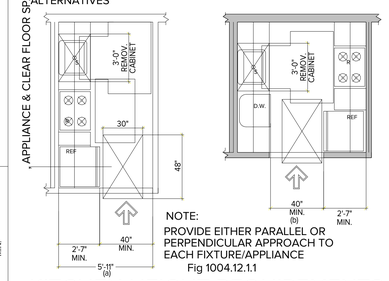
## HEIGHT OF URINALS




APPLIANCE & CLEAR FLOOR SPACE (TYP.)

CABINETS AND BASE REMOVED AND CHEIGHT ALTERNATIVES

Fig 1004.12.1.2




NOTE:
PROVIDE EITHER PARALLEL OR PERPENDICULAR APPROACH TO EACH FIXTURE/APPLIANCE

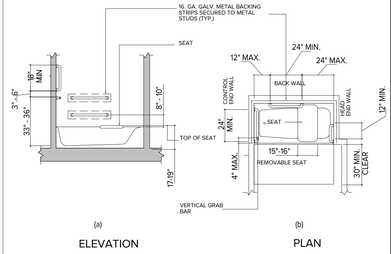
Fig 1004.12.1.1

## KITCHEN HEIGHT REQUIREMENTS & MINIMUM KITCHEN CLEARANCE




Fig 607.4.1

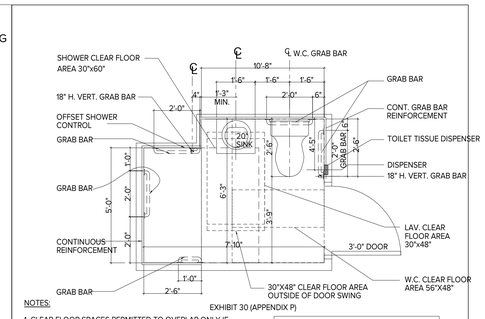
## GRAB BARS FOR BATHTUBS WITH PERMANENT SEATS




GRAB BARS FOR BATHTUBS WITHOUT PERMANENT SEATS

Fig 607.4.2/610.2

## BATHTUB SEATS & GRAB BARS



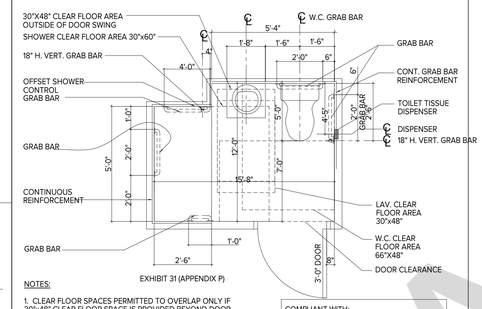

NOTES:

1. CLEAR FLOOR SPACES PERMITTED TO OVERLAP ONLY IF 30"x48" CLEAR FLOOR SPACE IS PROVIDED BEYOND DOOR SWING. - (B.C. 1004.11.3) - BUT DOOR CANNOT SWING INTO CLEAR FLOOR SPACE OF ANY FIXTURE IF 30"x48" CLEAR FLOOR SPACE IS NOT PROVIDED BEYOND DOOR SWING (603.2.2)
2. MORTISE HINGE & BLANK LATCH (IF REVERSIBLE DOOR SWING USED)

EXHIBIT 30 (APPENDIX P)

| COMPLIANT WITH: | |
|---|---|
| TYPE B | |
| DWELLING UNIT - | B.C. 1107.6.2.1.1 |
| APPENDIX P - | B.C. P101.1 |
| ANSI A117.1-2009 - | 1004.11.3.1 |

## TYPE "B" ADAPTABLE TOILET SIDE APPROACH



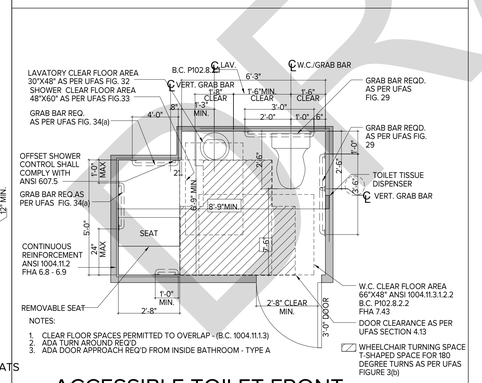

NOTES:

1. CLEAR FLOOR SPACES PERMITTED TO OVERLAP ONLY IF 30"x48" CLEAR FLOOR SPACE IS PROVIDED BEYOND DOOR SWING. - (B.C. 1004.11.3) - BUT DOOR CANNOT SWING INTO CLEAR FLOOR SPACE OF ANY FIXTURE IF 30"x48" CLEAR FLOOR SPACE IS NOT PROVIDED BEYOND DOOR SWING (603.2.2)

EXHIBIT 31 (APPENDIX P)

| COMPLIANT WITH: | |
|---|---|
| TYPE B | |
| DWELLING UNIT - | B.C. 1107.6.2.1.1 |
| APPENDIX P - | B.C. P101.1 |
| ANSI A117.1-2009 - | 1004.11.3.1 |

## TYPE "B" ADAPTABLE TOILET FRONT APPROACH




NOTES:

1. CLEAR FLOOR SPACES PERMITTED TO OVERLAP - (B.C. 1004.11.1.3)
2. ADA TURN AROUND REQ'D
3. ADA DOOR APPROACH REQ'D FROM INSIDE BATHROOM - TYPE A

## ACCESSIBLE TOILET FRONT APPROACH (UFAS)




DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
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SHEET TITLE:

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ISSUE DATE: 07/27/22

PROJECT NO: Project Number

DRAWN BY: Author

CHECKED BY: Checker

SCALE: As indicated

SHEET NO: OF

DRAWING NO: A-003.00

NYC DOB NUMBER: X00945951-I1

## FIRE PROTECTION:

BUILDING IS FULLY SPRINKLERED AND EQUIPPED WITH AN ALTERNATIVE FIRE EXTINGUISHING SYSTEM, A STAND PIPE SYSTEM, SMOKE VENTS, A FIRE ALARM AND DETECTION SYSTEM & A FIRE COMMAND CENTER. IN COMPLIANCE WITH THE NYC BUILDING CODE (2022), NYC FIRE CODE & LOCAL FIRE DEPARTMENT REQUIREMENTS .

## EGRESS NOTES: CHAPTER 10 AND OTHER SECTIONS RELEVANT BUT NO LIMITED TO EGRESS REQUIREMENTS AS FOLLOWS:

**BC 1003.2** CEILING HEIGHT. THE MEANS OF EGRESS SHALL HAVE A CEILING HEIGHT OF NOT LESS THAN 7 FEET,6 INCHES.

**BC 1003.3.1** PROTRUDING OBJECTS ARE PERMITTED TO EXTEND BELOW THE MINIMUM CEILING HEIGHT FOR MINIMUM HEADROOM OF 84 INCHES (7'-0"), NOT MORE THAN 50 PERCENT OF THE CEILING AREA OF A MEANS OF EGRESS SHALL BE REDUCED IN HEIGHT BY PROTRUDING OBJECTS. A BARRIER SHALL BE PROVIDED WHERE THE VERTICAL CLEARANCE IS LESS THAN 80 INCHES (6'-8") HIGH.

**TABLE BC 1004.1.3** MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT. OCCUPANT LOAD FOR SPACES AS DETERMINED BY THIS TABLE.

**BC 1005.1** ALL PORTIONS OF THE MEANS OF EGRESS SYSTEM SHALL BE SIZED IN ACCORDANCE WITH SECTION BC 1005.

**BC 1005.3.1** THE CAPACITY OF MEANS OF EGRESS STAIRWAYS SHALL BE CALCULATED BY MULTIPLYING THE OCCUPANT LOAD SERVED BY SUCH STAIRWAYS BY A MEANS OF EGRESS FACTOR OF 0.3 INCH PER OCCUPANT.

**BC 1005.3.2** THE CAPACITY OF MEANS OF EGRESS COMPONENTS, OTHER THAN STAIRWAYS, SHALL BE CALCULATED BY MULTIPLYING THE OCCUPANT LOAD BY A MEANS OF EGRESS FACTOR OF 0.2 INCH PER OCCUPANT.

**BC 1005.4** THE MINIMUM WIDTH OF THE MEANS OF EGRESS REQUIRED FROM ANY STORY OF A BUILDING SHALL NOT BE REDUCED ALONG THE PATH OF EGRESS TRAVEL UNTIL ARRIVAL AT THE PUBLIC WAY.

**BC 1005.7.1** DOORS, WHEN FULLY OPENED, SHALL NOT REDUCE THE REQUIRED EGRESS WIDTH BY MORE THAN 7 INCHES. DOORS IN ANY POSITION SHALL NOT REDUCE THE REQUIRED WIDTH BY MORE THAN ONE-HALF.

**BC 1006.1** THE NUMBER OF EXITS OR EXIT ACCESS DOORWAYS REQUIRED WITHIN THE MEANS OF EGRESS SYSTEM SHALL COMPLY WITH THE PROVISIONS OF SECTION BC 1006.

**BC 1007.1.1** EXITS SHALL BE PLACED A DISTANCE APART NO LESS THAN ONE-HALF OF THE LENGTH OF THE MAXIMUM DIAGONAL DIMENSION OF THE BUILDING OR AREA SERVED. STAIRS SHARING COMMON WALL SHALL BE COUNTED AS ONE EXIT STAIR. IN GROUP R-2 OCCUPANCIES, STAIRS ENCLOSED IN WALLS HAVING 2-HOUR FIRE RATING CONSTRUCTED OF MASONRY OR MASONRY EQUIVALENT, EXIT DOORS SHALL BE PLACED NO LESS THAN 15 FEET APART; SUCH STAIRS MAY SHARE COMMON WALLS, FLOORS, CEILINGS OR SCISSOR STAIRS ASSEMBLIES.

**BC 1008.2** EXITS, EXIT DISCHARGES AND PUBLIC CORRIDORS SHALL BE ILLUMINATED AT ALL TIMES BY EITHER DAYLIGHT OR ELECTRIC LIGHTING FIXTURES.

**BC 1008.2.1** THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL BE NOT LESS THAN 1 FOOT-CANDLE AT THE WALKING SURFACE.

**BC 1008.2.3** SENSORS AND CONTROLS. AUTOMATIC, OCCUPANT SENSOR OR PHOTO-SENSOR LIGHTING CONTROLS SHALL BE PERMITTED WITHIN MEANS OF EGRESS.

**BC 1008.3** EMERGENCY POWER FOR ILLUMINATION. THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISE'S ELECTRICAL SUPPLY.

**BC 1008.3.4** THE EMERGENCY POWER SYSTEM SHALL PROVIDE POWER FOR A DURATION OF NOT LESS THAN 90 MINUTES AND SHALL CONSIST OF STORAGE BATTERIES, UNIT EQUIPMENT OR AN ON-SITE GENERATOR.

**BC 1009** ACCESSIBLE MEANS OF EGRESS. ELEVATORS AND PLATFORM LIFTS PERMITTED AS ACCESSIBLE MEANS OF EGRESS SHALL COMPLY WITH THIS SECTION. ANSI ICC A117.1, CHAPTER 11 OF NYC BUILDING CODE.

**BC 1010.1** MEANS OF EGRESS DOORS SHALL BE READILY DISTINGUISHABLE FROM THE ADJACENT CONSTRUCTION AND FINISHES SUCH THAT THE DOORS ARE EASILY RECOGNIZABLE AS DOORS. MIRRORS OR SIMILAR REFLECTING MATERIALS SHALL NOT BE USED ON MEANS OF EGRESS DOORS. MEANS OF EGRESS DOORS SHALL NOT BE CONCEALED BY CURTAINS, DRAPES, DECORATIONS OR SIMILAR MATERIALS.

**BC 1010.1.1.1** THE REQUIRED CAPACITY OF EACH DOOR OPENING SHALL BE SUFFICIENT FOR THE OCCUPANT LOAD AND SHALL PROVIDE A MINIMUM CLEAR WIDTH OF 32 INCHES MEASURED BETWEEN THE FACE OF THE DOOR AND THE STOP, WITH THE DOOR OPEN 90 DEGREES. DOUBLE DOORS AT LEAST ONE LEAF SHALL COMPLY WITH THIS SECTION. THE MAX. WIDTH OF A SWINGING DOOR LEAF SHALL BE 48 INCHES NOMINAL.

**BC 1010.1.1.3** THE HEIGHT OF DOORS SHALL BE NOT LESS THAN 80 INCHES (6'-8").

**BC 1010.1.2.2** DOORS SHALL SWING IN THE DIRECTION OF EGRESS TRAVEL WHERE SERVING SPACES WITH AN OCCUPANT LOAD OF 75 OR MORE PERSONS AND SPACES REQUIRING MORE THAN ONE EXIT DOOR. DOORS NEED NOT SWING IN THE DIRECTION OF EGRESS TRAVEL FOR EXTERIOR STREET FLOOR EXIT DOORS FROM LOBBIES SERVING GROUP R-2 OCCUPANCIES.

**BC 1010.1.3** THE FORCE FOR PUSHING OR PULLING OPEN INTERIOR SWINGING EGRESS DOORS, OTHER THAN FIRE DOORS, SHALL NOT EXCEED 5-POUNDS.

**BC 1010.1.4** SPECIAL DOORS AND SECURITY GRILLES SHALL COMPLY WITH THE REQUIREMENTS OF SECTIONS 1010.1.4.1 THROUGH 1010.1.4.4.

**BC 1010.1.5** THERE SHALL BE A FLOOR OR LANDING ON EACH SIDE OF A DOOR. SUCH FLOOR OR LANDING SHALL BE AT THE SAME ELEVATION ON EACH SIDE OF THE DOOR. LANDINGS SHALL BE LEVEL EXCEPT FOR EXTERIOR LANDINGS, WHICH ARE PERMITTED TO HAVE A SLOPE NOT TO EXCEED 0.25 UNIT VERTICAL IN 12 UNITS HORIZONTAL (2-PERCENT SLOPE).

**BC 1010.1.6** LANDINGS SHALL HAVE A WIDTH NOT LESS THAN THE WIDTH OF THE STAIRWAY. DOORS IN THE FULLY OPEN POSITION SHALL NOT REDUCE A REQUIRED DIMENSION BY MORE THAN 7 INCHES. STAIRWAY LANDING DOORS SHALL NOT REDUCE THE LANDING TO LESS THAN 75 PERCENT OF ITS REQUIRED WIDTH. LANDINGS SHALL HAVE A LENGTH MEASURED IN THE DIRECTION OF TRAVEL NO LESS THAN 44 INCHES (3'-8").

**BC 1010.1.8** SPACE BETWEEN TWO DOORS IN A SERIES SHALL BE 48 INCHES (1220MM) MINIMUM PLUS THE WIDTH OF A DOOR SWINGING INTO THE SPACE.

**BC 1010.1.9** EXCEPT AS SPECIFICALLY PERMITTED BY THIS SECTION, EGRESS DOORS SHALL BE READILY OPEN-ABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT.

**BC 1010.1.9.11** STAIRWAY DISCHARGE DOORS SHALL BE OPEN-ABLE FROM THE EGRESS SIDE AND SHALL ONLY BE LOCKED FROM THE OPPOSITE SIDE.

**BC 1010.1.10** DOORS SERVING THE FOLLOWING SHALL BE PROVIDED WITH PANIC HARDWARE OR FIRE EXIT HARDWARE: A ROOM OR SPACE WITH AN OCCUPANT LOAD OF 75 OR MORE IN A GROUP A OR E OCCUPANCY; A SPACE USED FOR ASSEMBLY PURPOSES CLASSIFIED AS A GROUP B OCCUPANCY OR AS PART OF THE OCCUPANCY IT IS ACCESSORY TO.

**BC 1010.4.1** BUILDING ENTRANCE DOORS AND OTHER EXTERIOR EXIT DOORS TO BE EQUIPPED WITH HEAVY DUTY LOCK SETS TO PREVENT THE LATCH FROM BEING MANIPULATED BY MEANS OTHER THAN A KEY. OUTSIDE MAIN ENTRANCE DOORS OPERATED BY THE TENANTS' KEY SHALL NOT BE KEYED TO ALSO OPEN THE TENANTS' APARTMENT. LIGHT TO BE PROVIDED AT ENTRANCEWAY PROVIDING 5-FTCANDLES.

**BC 1011.2** THE REQUIRED CAPACITY OF STAIRWAYS SHALL BE DETERMINED AS SPECIFIED IN SECTION 1005, BUT THE MINIMUM WIDTH SHALL BE NOT LESS THAN 44 INCHES (3'-8").

**BC 1011.3** STAIRWAYS HEADROOM NOT LESS THAN 84 INCHES (7'-0") FROM A LINE AT THE EDGE OF THE NOSING. THE MINIMUM CLEARANCE SHALL BE MAINTAINED THE FULL WIDTH OF THE STAIRWAY AND LANDINGS. IN GROUP R-2 OCCUPANCIES STAIRWAYS SHALL HAVE A HEADROOM CLEARANCE OF NOT LESS THAN 80 INCHES (6'-8").

**BC 1011.5.2** STAIR RISERS SHALL BE 7 INCHES MAXIMUM AND 4 INCHES MINIMUM. TREAD DEPTHS SHALL BE 11 INCHES MINIMUM MEASURED HORIZONTALLY FROM TREAD NOSING. DIFFERENCE IN TREAD DEPTH WITHIN A FLIGHT OF STAIRS SHALL NOT EXCEED ⅜ INCH. IN GROUP R-2 OCCUPANCIES: THE SUM OF TWO RISERS PLUS ONE TREAD SHALL BE NOT LESS THAN 24 INCHES NOR MORE THAN 25½ INCHES.

**BC 1011.6** THERE SHALL BE A FLOOR OR LANDING AT THE TOP AND BOTTOM OF EACH STAIRWAY. THE WIDTH OF LANDINGS SHALL BE THE WIDTH OF STAIRWAYS SERVED. DOORS OPENING AT LANDINGS SHALL NOT REDUCE THE LANDING TO LESS THAN ONE-HALF THE REQUIRED WIDTH.

**BC 1011.7** STAIRWAYS SHALL BE BUILT OF MATERIALS CONSISTENT WITH THE TYPES PERMITTED FOR THE TYPE OF CONSTRUCTION OF THE BUILDING.
**BC 1011.8** A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE GREATER THAN 12 FEET BETWEEN FLOOR LEVELS OR LANDINGS.

**BC 1011.11** STAIRWAYS SHALL HAVE HANDRAILS ON EACH SIDE. HANDRAIL HEIGHT SHALL BE NOT LESS THAN 34 INCHES AND NOT MORE THAN 38 INCHES.

**BC 1011.12** IN BUILDINGS FOUR OR MORE STORIES OR MORE THAN 40 FEET IN HEIGHT, AT LEAST ONE STAIRWAY SHALL EXTEND TO THE ROOF SURFACE THROUGH A STAIRWAY BULKHEAD.

**BC 1011.12.1** IN BUILDINGS IN OCCUPANCY GROUP R-2 TWO STORIES OR MORE IN HEIGHT, WITH ROOFS HAVING A SLOPE OF 15 DEGREES OR LESS, ALL INTERIOR EXIT STAIRWAYS SHALL EXTEND TO THE ROOF.

**BC 1012.2** RAMPS USED AS ACCESSIBLE ROUTE SHALL HAVE A SLOPE NOT STEEPER THAN ONE IN 12 (8%). GARAGE RAMPS WITH A MAXIMUM SLOPE OF ONE IN SEVEN (14%) MAY SERVE AS PART OF A NON-ACCESSIBLE MEANS OF EGRESS IF A PEDESTRIAN PATH IS PROVIDED. PEDESTRIAN PATH MAY BE PAINTED.

**BC 1012.4** THE RISE FOR ANY ACCESSIBLE RAMP RUN SHALL BE 30 INCHES (2'-6") MAXIMUM.

**BC 1012.6** RAMPS SHALL HAVE LANDINGS AT THE BOTTOM AND TOP OF EACH RAMP, POINTS OF TURNING, ENTRANCE, EXITS AND AT DOORS.

**BC 1012.6.3** THE LANDING LENGTH SHALL BE 60 INCHES (1525 MM) MINIMUM.

**BC 1012.6.4** WHERE CHANGES IN DIRECTION OF TRAVEL OCCUR AT LANDINGS PROVIDED BETWEEN RAMP RUNS, THE LANDING SHALL BE 60 INCHES BY 60 INCHES MIN.

**BC 1012.8** RAMPS WITH A RISE GREATER THAN 6 INCHES (152.4 MM) SHALL HAVE HANDRAILS ON BOTH SIDES.

**BC 1014.6** RETURN HANDRAILS TO WALL, GUARD, WALKING SURFACE OR CONTINUE THE HANDRAIL TO ADJACENT FLIGHT OF STAIRS OR RAMP. EXTEND STAIR HANDRAILS 12 INCHES FROM THE TOP RISER AND CONTINUE TO SLOPE BY ONE TREAD AT THE BOTTOM RISER. EXTEND RAMP HANDRAILS 12 INCHES BEYOND THE TOP AND BOTTOM. HORIZONTAL EXTENSIONS TO BE IN THE DIRECTION OF THE STAIR AND RAMP.

**BC 1014.9** STAIRWAYS SHALL HAVE INTERMEDIATE HANDRAILS LOCATED SO ALL PORTIONS OF THE STAIRWAY ARE WITHIN 30 INCHES OF A HANDRAIL. LOCATE MONUMENTAL STAIRS HANDRAILS ALONG THE MOST DIRECT PATH OF EGRESS.

**BC 1023.8** INTERIOR EXIT STAIRWAYS AND RAMPS SHALL NOT CONTINUE BELOW LEVEL OF EXIT DISCHARGE. PARTITIONS AND DOORS MUST SEPARATE THE EXIT STAIRWAY EGRESS FROM THE PORTION BELOW. DOORS SHALL BE SELF-CLOSING AND PROVIDED WITH LANDINGS. DIRECTIONAL EXIT SIGNS TO BE PROVIDED.

**BC 1023.9.1** A STAIRWAY IDENTIFICATION SIGN INDICATING EACH STAIR BY ALPHABETIC LETTER SHALL BE POSTED ON BOTH SIDES OF EACH STAIR DOOR.

**BC 1023.9.2** A FLOOR IDENTIFICATION SIGN SHALL BE PROVIDED AT EACH FLOOR LANDING IN AN INTERIOR EXIT STAIRWAY AND RAMP CONNECTING MORE THAN THREE STORIES.

**BC 403.4.8.4.2** GROUP R-2 OCCUPANCIES IN BUILDINGS GREATER THAN 125 FEET IN HEIGHT SHALL BE REQUIRED TO PROVIDE AN EMERGENCY AND STAND-BY POWER SYSTEM.

**BC 713.7** OPENINGS IN A SHAFT ENCLOSURE SHALL BE PROTECTED IN ACCORDANCE WITH SECTION BC 716 AS REQUIRED FOR FIRE-BARRIERS. DOORS SHALL BE SELF-CLOSING IN ACCORDANCE WITH THIS SECTION.

**BC 713.12.1** ALL CLOSED SHAFTS, INCLUDING VERTICAL EXIT ENCLOSURES, HAVING A FLOOR AREA EXCEEDING 4 SQUARE FEET SHALL BE PROVIDED WITH A SMOKE VENT IN ACCORDANCE WITH SECTIONS 713.12.1.1 THROUGH 713.12.1.3. INTERIOR VERTICAL EXIT SHAFT ENCLOSURES SHALL ALSO COMPLY WITH CHAPTER 10.

**713.12.1.1** SMOKE VENTS MAY BE CONSTRUCTED AS WINDOWS, LOUVERS, SKYLIGHTS, VENT DUCTS OR SIMILAR DEVICES. VENT DUCTS SHALL BE CONSTRUCTION HAVING THE SAME FIRE-RESISTANCE RATING AS THE SHAFT ENCLOSURE.

**713.12.1.2** THE EFFECTIVE VENTING AREA SHALL BE NOT LESS THAN 3½ PERCENT OF THE MAXIMUM SHAFT AREA AT ANY FLOOR, BUT IN NO EVENT LESS THAN 72 SQUARE INCHES.

**713.12.1.3.1** WHERE A SHAFT PENETRATES THROUGH THE ROOF, THE SHAFT VENT SHALL BE LOCATED NOT LESS THAN 8 INCHES ABOVE A NONCOMBUSTIBLE ROOF ASSEMBLY OR NOT LESS THAN 36 INCHES ABOVE A COMBUSTIBLE ROOF. THE VENT SHALL BE LOCATED NOT LESS THAN 10 FEET FROM ANY WINDOW, DOOR, EXTERIOR STAIRWAY, OR INTERIOR LOT LINE. THE VENT MAY BE LOCATED NOT LESS THAN 5 FEET FROM ANY WINDOW OR DOOR IF LOCATED HIGHER THAN THE TOP OF SUCH WINDOW OR DOOR. IF THE VENT IS CONSTRUCTED AS A WINDOW OR LOUVER, THE SILL OF THE SUCH SHALL BE LOCATED NOT LESS THAN 36 INCHES ABOVE THE ROOF.

## HIGH RISE NOTES: CHAPTER 4 AND OTHER SECTIONS RELEVANT BUT NO LIMITED TO HIGH RISE REQUIREMENTS AS FOLLOWS:

**BC 403.4.4** AN EMERGENCY VOICE/ALARM COMMUNICATION SYSTEM SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 907.5.2.2.

**BC 403.4.8.4** AN EMERGENCY POWER SYSTEM COMPLYING WITH SECTION 2702 SHALL BE PROVIDED FOR EMERGENCY POWER LOADS

**BC 403.5.3** STAIRWAYS SHALL BE PROVIDED WITH THE REQUIRED DOOR OPERATION BASED ON BC 403.5.3

**BC 1009.2.1** IN HIGH-RISE BUILDINGS SUBJECT TO SECTION 403, AT LESAT ONE REQUIRED ACCESSIBLE MEANS OF EGRESS SHALL BE AN ELEVATOR COMPLYING WITH SECTION 1009.4.

**BC 1009.4** ELEVATOR SHALL COMPLY WITH EMERGENCY OPERATION AND SIGNALING DEVICE REQUIREMENTS OF SECTION 2.27 OF ASME A17.1 AND SECTION 1109.7. EMERGENCY POWER SHALL BE PROVIDED IN ACCORDANCE WITH CHAPTER 27 AND SECTION 3003.

**BC 1023.11** EACH OF THE EXITS OF A BUILDING THAT SERVES STORIES WHERE THE FLOOR SURFACE IS LOCATED MORE THAN 75 FEET ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS SHALL BE A SMOKEPROOF ENCLOSURE OR PRESSURIZED STAIRWAY IN ACCORDANCE WITH SECTION 909.20

BC 713.4 FIRE-RESISTANCE RATING.SHAFT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING OF NOT LESSTHAN 2 HOURS WHERE PENETRATING THREESTORIES OR MORE, AND NOT LESS THAN 1 HOUR WHERE PENETRATING FEWERTHAN THREESTORIES. THE NUMBER OF STORIES CONNECTED BY THE SHAFT ENCLOSURE SHALL INCLUDE ANY BASEMENTS OR CELLARS, BUT NOT ANY MEZZANINES. SHAFT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THE FLOOR ASSEMBLY PENETRATED, BUT NEED NOT EXCEED 2 HOURS. SHAFT ENCLOSURES SHALL MEET THE REQUIREMENTS OF SECTION703.2.1

BC 712.1.9 TWO-STORY OPENINGS. IN OTHER THAN GROUPS I-2 AND I-3, A VERTICAL OPENING THAT IS NOT USED AS ONE OF THE APPLICATIONS LISTED IN THIS SECTION SHALL BE PERMITTED IF THE OPENING COMPLIES WITH ALL OF THE ITEMS BELOW:

1.DOES NOT CONNECT MORE THAN TWO STORIES.

2.DOES NOT PENETRATE A HORIZONTAL ASSEMBLY THAT SEPARATES FIRE AREAS OR SMOKE BARRIERS THAT SEPARATE SMOKE COMPARTMENTS.

3.IS NOT CONCEALED WITHIN THE CONSTRUCTION OF A WALLOR A FLOOR/CEILING ASSEMBLY.

4.IS NOT OPEN TO A CORRIDOR IN GROUP I AND R OCCUPANCIES, WHERE SUCH CORRIDOR IS REQUIRED TO BE FIRE-RESISTANCE-RATED IN ACCORDANCE WITH TABLE 1020.1.1 OR 1020.1.2.

5.IS NOT OPEN TO A CORRIDOR ON NONSPRINKLERED FLOORS, WHERE SUCH CORRIDOR IS REQUIRED TO BE FIRE-RESISTANCE-RATED IN ACCORDANCE WITH

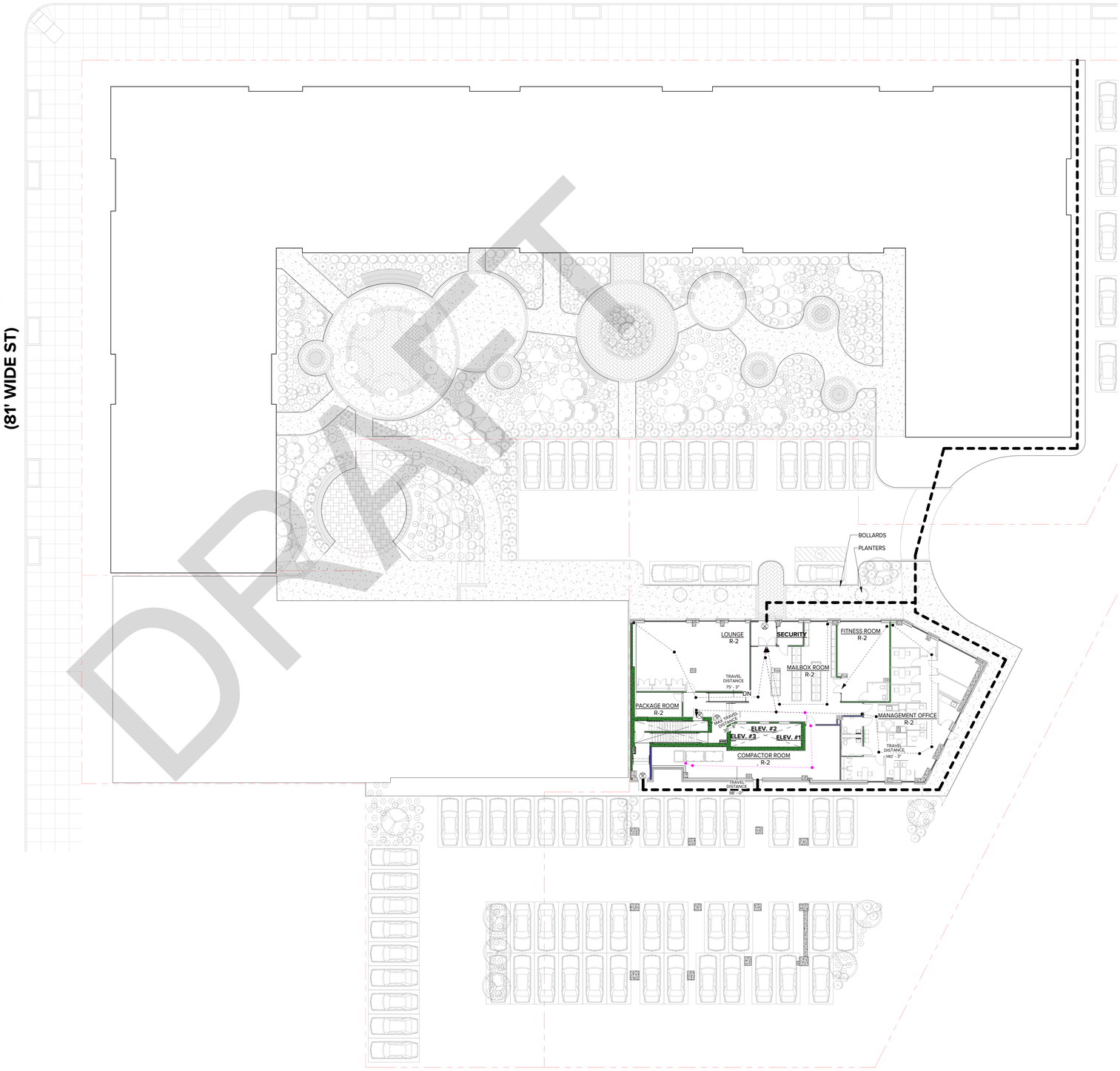
TABLE 1020.1.1 OR 1020.1.2

BC 1019.3 OCCUPANCIES OTHER THAN GROUPS H, I-2 AND I-3. IN OTHER THAN GROUP H, I-2 AND I-3 OCCUPANCIES, EXIT ACCESS STAIRWAYS OR RAMPS SHALL BE ENCLOSED WITH A SHAFT ENCLOSURE CONSTRUCTED IN ACCORDANCE WITH SECTION 713.

EXCEPTION:

IN OTHER THAN GROUP H, I-2 AND I-3 OCCUPANCIES, EXIT ACCESS STAIRWAYS OR RAMPS THAT COMPLY WITH ONE OF THE FOLLOWING CONDITIONS NEED NOT BE ENCLOSED:

2. IN BUILDINGS EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION 903.3.1.1, EXIT ACCESS STAIRWAYS AND RAMPS THAT SERVE BETWEEN ONLY THE FIRST AND SECOND STORIES ABOVE GRADE, PROVIDED THE FIRST AND SECOND STORIES HAVE ACCESS TO THE MINIMUM NUMBER OF APPROVED INDEPENDENT EXITS AS REQUIRED BY SECTION 1006, AND IN NO CASE BE LESS THAN TWO MEANS OF EGRESS. SUCH INTERCONNECTED STORIES SHALL NOT BE OPEN TO OTHER STORIES. UNENCLOSED EXIT ACCESS STAIRWAYS AND RAMPS SHALL BE REMOTELY LOCATED IN ACCORDANCE WITH SECTION 1007.




DRAFT

2 A-005 1ST FLOOR
1/16" = 1'-0"

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
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140 Broadway
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MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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32nd Floor
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Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
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| 10/17/2025 | ISSUED FOR 100% DD |
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SHEET TITLE:

# EGRESS


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CHECKED BY: Checker
SCALE: As indicated
SHEET NO: OF

DRAWING NO: A-005.00

NYC DOB NUMBER: X00945951-I1

## FIRE PROTECTION:

BUILDING IS FULLY SPRINKLERED AND EQUIPPED WITH AN ALTERNATIVE FIRE EXTINGUISHING SYSTEM, A STAND PIPE SYSTEM, SMOKE VENTS, A FIRE ALARM AND DETECTION SYSTEM & A FIRE COMMAND CENTER. IN COMPLIANCE WITH THE NYC BUILDING CODE (2022), NYC FIRE CODE & LOCAL FIRE DEPARTMENT REQUIREMENTS .

## EGRESS NOTES: CHAPTER 10 AND OTHER SECTIONS RELEVANT BUT NO LIMITED TO EGRESS REQUIREMENTS AS FOLLOWS:

**BC 1003.2** CEILING HEIGHT. THE MEANS OF EGRESS SHALL HAVE A CEILING HEIGHT OF NOT LESS THAN 7 FEET,6 INCHES.

**BC 1003.3.1** PROTRUDING OBJECTS ARE PERMITTED TO EXTEND BELOW THE MINIMUM CEILING HEIGHT FOR MINIMUM HEADROOM OF 84 INCHES (7'-0"). NOT MORE THAN 50 PERCENT OF THE CEILING AREA OF A MEANS OF EGRESS SHALL BE REDUCED IN HEIGHT BY PROTRUDING OBJECTS. A BARRIER SHALL BE PROVIDED WHERE THE VERTICAL CLEARANCE IS LESS THAN 80 INCHES (6'-8") HIGH.

**TABLE BC 1004.1.3** MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT. OCCUPANT LOAD FOR SPACES AS DETERMINED BY THIS TABLE.

**BC 1005.1** ALL PORTIONS OF THE MEANS OF EGRESS SYSTEM SHALL BE SIZED IN ACCORDANCE WITH SECTION BC 1005.

**BC 1005.3.1** THE CAPACITY OF MEANS OF EGRESS STAIRWAYS SHALL BE CALCULATED BY MULTIPLYING THE OCCUPANT LOAD SERVED BY SUCH STAIRWAYS BY A MEANS OF EGRESS FACTOR OF 0.3 INCH PER OCCUPANT.

**BC 1005.3.2** THE CAPACITY OF MEANS OF EGRESS COMPONENTS, OTHER THAN STAIRWAYS, SHALL BE CALCULATED BY MULTIPLYING THE OCCUPANT LOAD BY A MEANS OF EGRESS FACTOR OF 0.2 INCH PER OCCUPANT.

**BC 1005.4** THE MINIMUM WIDTH OF THE MEANS OF EGRESS REQUIRED FROM ANY STORY OF A BUILDING SHALL NOT BE REDUCED ALONG THE PATH OF EGRESS TRAVEL UNTIL ARRIVAL AT THE PUBLIC WAY.

**BC 1005.7.1** DOORS, WHEN FULLY OPENED, SHALL NOT REDUCE THE REQUIRED EGRESS WIDTH BY MORE THAN 7 INCHES. DOORS IN ANY POSITION SHALL NOT REDUCE THE REQUIRED WIDTH BY MORE THAN ONE-HALF.

**BC 1006.1** THE NUMBER OF EXITS OR EXIT ACCESS DOORWAYS REQUIRED WITHIN THE MEANS OF EGRESS SYSTEM SHALL COMPLY WITH THE PROVISIONS OF SECTION BC 1006.

**BC 1007.1.1** EXITS SHALL BE PLACED A DISTANCE APART NO LESS THAN ONE-HALF OF THE LENGTH OF THE MAXIMUM DIAGONAL DIMENSION OF THE BUILDING OR AREA SERVED. STAIRS SHARING COMMON WALL SHALL BE COUNTED AS ONE EXIT STAIR. IN GROUP R-2 OCCUPANCIES, STAIRS ENCLOSED IN WALLS HAVING 2-HOUR FIRE RATING CONSTRUCTED OF MASONRY OR MASONRY EQUIVALENT, EXIT DOORS SHALL BE PLACED NO LESS THAN 15 FEET APART; SUCH STAIRS MAY SHARE COMMON WALLS, FLOORS, CEILINGS OR SCISSOR STAIRS ASSEMBLIES.

**BC 1008.2** EXITS, EXIT DISCHARGES AND PUBLIC CORRIDORS SHALL BE ILLUMINATED AT ALL TIMES BY EITHER DAYLIGHT OR ELECTRIC LIGHTING FIXTURES.

**BC 1008.2.1** THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL BE NOT LESS THAN 1 FOOT-CANDLE AT THE WALKING SURFACE.

**BC 1008.2.3** SENSORS AND CONTROLS. AUTOMATIC, OCCUPANT SENSOR OR PHOTO-SENSOR LIGHTING CONTROLS SHALL BE PERMITTED WITHIN MEANS OF EGRESS.

**BC 1008.3** EMERGENCY POWER FOR ILLUMINATION. THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISE'S ELECTRICAL SUPPLY.

**BC 1008.3.4** THE EMERGENCY POWER SYSTEM SHALL PROVIDE POWER FOR A DURATION OF NOT LESS THAN 90 MINUTES AND SHALL CONSIST OF STORAGE BATTERIES, UNIT EQUIPMENT OR AN ON-SITE GENERATOR.

**BC 1009** ACCESSIBLE MEANS OF EGRESS. ELEVATORS AND PLATFORM LIFTS PERMITTED AS ACCESSIBLE MEANS OF EGRESS SHALL COMPLY WITH THIS SECTION. ANSI ICC A117.1, CHAPTER 11 OF NYC BUILDING CODE.

**BC 1010.1** MEANS OF EGRESS DOORS SHALL BE READILY DISTINGUISHABLE FROM THE ADJACENT CONSTRUCTION AND FINISHES SUCH THAT THE DOORS ARE EASILY RECOGNIZABLE AS DOORS. MIRRORS OR SIMILAR REFLECTING MATERIALS SHALL NOT BE USED ON MEANS OF EGRESS DOORS. MEANS OF EGRESS DOORS SHALL NOT BE CONCEALED BY CURTAINS, DRAPES, DECORATIONS OR SIMILAR MATERIALS.

**BC 1010.1.1.1** THE REQUIRED CAPACITY OF EACH DOOR OPENING SHALL BE SUFFICIENT FOR THE OCCUPANT LOAD AND SHALL PROVIDE A MINIMUM CLEAR WIDTH OF 32 INCHES MEASURED BETWEEN THE FACE OF THE DOOR AND THE STOP, WITH THE DOOR OPEN 90 DEGREES. DOUBLE DOORS AT LEAST ONE LEAF SHALL COMPLY WITH THIS SECTION. THE MAX. WIDTH OF A SWINGING DOOR LEAF SHALL BE 48 INCHES NOMINAL.

**BC 1010.1.1.3** THE HEIGHT OF DOORS SHALL BE NOT LESS THAN 80 INCHES (6'-8").

**BC 1010.1.2.2** DOORS SHALL SWING IN THE DIRECTION OF EGRESS TRAVEL WHERE SERVING SPACES WITH AN OCCUPANT LOAD OF 75 OR MORE PERSONS AND SPACES REQUIRING MORE THAN ONE EXIT DOOR. DOORS NEED NOT SWING IN THE DIRECTION OF EGRESS TRAVEL FOR EXTERIOR STREET FLOOR EXIT DOORS FROM LOBBIES SERVING GROUP R-2 OCCUPANCIES.

**BC 1010.1.3** THE FORCE FOR PUSHING OR PULLING OPEN INTERIOR SWINGING EGRESS DOORS, OTHER THAN FIRE DOORS, SHALL NOT EXCEED 5-POUNDS.

**BC 1010.1.4** SPECIAL DOORS AND SECURITY GRILLES SHALL COMPLY WITH THE REQUIREMENTS OF SECTIONS 1010.1.4.1 THROUGH 1010.1.4.4.

**BC 1010.1.5** THERE SHALL BE A FLOOR OR LANDING ON EACH SIDE OF A DOOR. SUCH FLOOR OR LANDING SHALL BE AT THE SAME ELEVATION ON EACH SIDE OF THE DOOR. LANDINGS SHALL BE LEVEL EXCEPT FOR EXTERIOR LANDINGS, WHICH ARE PERMITTED TO HAVE A SLOPE NOT TO EXCEED 0.25 UNIT VERTICAL IN 12 UNITS HORIZONTAL (2-PERCENT SLOPE).

**BC 1010.1.6** LANDINGS SHALL HAVE A WIDTH NOT LESS THAN THE WIDTH OF THE STAIRWAY. DOORS IN THE FULLY OPEN POSITION SHALL NOT REDUCE A REQUIRED DIMENSION BY MORE THAN 7 INCHES. STAIRWAY LANDING DOORS SHALL NOT REDUCE THE LANDING TO LESS THAN 75 PERCENT OF ITS REQUIRED WIDTH. LANDINGS SHALL HAVE A LENGTH MEASURED IN THE DIRECTION OF TRAVEL NO LESS THAN 44 INCHES (3'-8").

**BC 1010.1.8** SPACE BETWEEN TWO DOORS IN A SERIES SHALL BE 48 INCHES (1220MM) MINIMUM PLUS THE WIDTH OF A DOOR SWINGING INTO THE SPACE.

**BC 1010.1.9** EXCEPT AS SPECIFICALLY PERMITTED BY THIS SECTION, EGRESS DOORS SHALL BE READILY OPEN-ABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT.

**BC 1010.1.9.11** STAIRWAY DISCHARGE DOORS SHALL BE OPEN-ABLE FROM THE EGRESS SIDE AND SHALL ONLY BE LOCKED FROM THE OPPOSITE SIDE.

**BC 1010.1.10** DOORS SERVING THE FOLLOWING SHALL BE PROVIDED WITH PANIC HARDWARE OR FIRE EXIT HARDWARE: A ROOM OR SPACE WITH AN OCCUPANT LOAD OF 75 OR MORE IN A GROUP A OR E OCCUPANCY; A SPACE USED FOR ASSEMBLY PURPOSES CLASSIFIED AS A GROUP B OCCUPANCY OR AS PART OF THE OCCUPANCY IT IS ACCESSORY TO.

**BC 1010.4.1** BUILDING ENTRANCE DOORS AND OTHER EXTERIOR EXIT DOORS TO BE EQUIPPED WITH HEAVY DUTY LOCK SETS TO PREVENT THE LATCH FROM BEING MANIPULATED BY MEANS OTHER THAN A KEY. OUTSIDE MAIN ENTRANCE DOORS OPERATED BY THE TENANTS' KEY SHALL NOT BE KEYED TO ALSO OPEN THE TENANTS' APARTMENT. LIGHT TO BE PROVIDED AT ENTRANCEWAY PROVIDING 5-FTCANDLES.

**BC 1011.2** THE REQUIRED CAPACITY OF STAIRWAYS SHALL BE DETERMINED AS SPECIFIED IN SECTION 1005, BUT THE MINIMUM WIDTH SHALL BE NOT LESS THAN 44 INCHES (3'-8").

**BC 1011.3** STAIRWAYS HEADROOM NOT LESS THAN 84 INCHES (7'-0") FROM A LINE AT THE EDGE OF THE NOSING. THE MINIMUM CLEARANCE SHALL BE MAINTAINED THE FULL WIDTH OF THE STAIRWAY AND LANDINGS. IN GROUP R-2 OCCUPANCIES STAIRWAYS SHALL HAVE A HEADROOM CLEARANCE OF NOT LESS THAN 80 INCHES (6'-8").

**BC 1011.5.2** STAIR RISERS SHALL BE 7 INCHES MAXIMUM AND 4 INCHES MINIMUM. TREAD DEPTHS SHALL BE 11 INCHES MINIMUM MEASURED HORIZONTALLY FROM TREAD NOSING. DIFFERENCE IN TREAD DEPTH WITHIN A FLIGHT OF STAIRS SHALL NOT EXCEED ⅜ INCH. IN GROUP R-2 OCCUPANCIES: THE SUM OF TWO RISERS PLUS ONE TREAD SHALL BE NOT LESS THAN 24 INCHES NOR MORE THAN 25½ INCHES.

**BC 1011.6** THERE SHALL BE A FLOOR OR LANDING AT THE TOP AND BOTTOM OF EACH STAIRWAY. THE WIDTH OF LANDINGS SHALL BE THE WIDTH OF STAIRWAYS SERVED. DOORS OPENING AT LANDINGS SHALL NOT REDUCE THE LANDING TO LESS THAN ONE-HALF THE REQUIRED WIDTH.

**BC 1011.7** STAIRWAYS SHALL BE BUILT OF MATERIALS CONSISTENT WITH THE TYPES PERMITTED FOR THE TYPE OF CONSTRUCTION OF THE BUILDING.

**BC 1011.8** A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE GREATER THAN 12 FEET BETWEEN FLOOR LEVELS OR LANDINGS.

**BC 1011.11** STAIRWAYS SHALL HAVE HANDRAILS ON EACH SIDE. HANDRAIL HEIGHT SHALL BE NOT LESS THAN 34 INCHES AND NOT MORE THAN 38 INCHES.

**BC 1011.12** IN BUILDINGS FOUR OR MORE STORIES OR MORE THAN 40 FEET IN HEIGHT, AT LEAST ONE STAIRWAY SHALL EXTEND TO THE ROOF SURFACE THROUGH A STAIRWAY BULKHEAD.

**BC 1011.12.1** IN BUILDINGS IN OCCUPANCY GROUP R-2 TWO STORIES OR MORE IN HEIGHT, WITH ROOFS HAVING A SLOPE OF 15 DEGREES OR LESS, ALL INTERIOR EXIT STAIRWAYS SHALL EXTEND TO THE ROOF.

**BC 1012.2** RAMPS USED AS ACCESSIBLE ROUTE SHALL HAVE A SLOPE NOT STEEPER THAN ONE IN 12 (8%). GARAGE RAMPS WITH A MAXIMUM SLOPE OF ONE IN SEVEN (14%) MAY SERVE AS PART OF A NON-ACCESSIBLE MEANS OF EGRESS IF A PEDESTRIAN PATH IS PROVIDED. PEDESTRIAN PATH MAY BE PAINTED.

**BC 1012.4** THE RISE FOR ANY ACCESSIBLE RAMP RUN SHALL BE 30 INCHES (2'-6") MAXIMUM.

**BC 1012.6** RAMPS SHALL HAVE LANDINGS AT THE BOTTOM AND TOP OF EACH RAMP, POINTS OF TURNING, ENTRANCE, EXITS AND AT DOORS.

**BC 1012.6.3** THE LANDING LENGTH SHALL BE 60 INCHES (1525 MM) MINIMUM.

**BC 1012.6.4** WHERE CHANGES IN DIRECTION OF TRAVEL OCCUR AT LANDINGS PROVIDED BETWEEN RAMP RUNS, THE LANDING SHALL BE 60 INCHES BY 60 INCHES MIN.

**BC 1012.8** RAMPS WITH A RISE GREATER THAN 6 INCHES (152.4 MM) SHALL HAVE HANDRAILS ON BOTH SIDES.

**BC 1014.6** RETURN HANDRAILS TO WALL, GUARD, WALKING SURFACE OR CONTINUE THE HANDRAIL TO ADJACENT FLIGHT OF STAIRS OR RAMP. EXTEND STAIR HANDRAILS 12 INCHES FROM THE TOP RISER AND CONTINUE TO SLOPE BY ONE TREAD AT THE BOTTOM RISER. EXTEND RAMP HANDRAILS 12 INCHES BEYOND THE TOP AND BOTTOM. HORIZONTAL EXTENSIONS TO BE IN THE DIRECTION OF THE STAIR AND RAMP.

**BC 1014.9** STAIRWAYS SHALL HAVE INTERMEDIATE HANDRAILS LOCATED SO ALL PORTIONS OF THE STAIRWAY ARE WITHIN 30 INCHES OF A HANDRAIL. LOCATE MONUMENTAL STAIRS HANDRAILS ALONG THE MOST DIRECT PATH OF EGRESS.

**BC 1023.8** INTERIOR EXIT STAIRWAYS AND RAMPS SHALL NOT CONTINUE BELOW LEVEL OF EXIT DISCHARGE. PARTITIONS AND DOORS MUST SEPARATE THE EXIT STAIRWAY EGRESS FROM THE PORTION BELOW. DOORS SHALL BE SELF-CLOSING AND PROVIDED WITH LANDINGS. DIRECTIONAL EXIT SIGNS TO BE PROVIDED.

**BC 1023.9.1** A STAIRWAY IDENTIFICATION SIGN INDICATING EACH STAIR BY ALPHABETIC LETTER SHALL BE POSTED ON BOTH SIDES OF EACH STAIR DOOR.

**BC 1023.9.2** A FLOOR IDENTIFICATION SIGN SHALL BE PROVIDED AT EACH FLOOR LANDING IN AN INTERIOR EXIT STAIRWAY AND RAMP CONNECTING MORE THAN THREE STORIES.

**BC 403.4.8.4.2** GROUP R-2 OCCUPANCIES IN BUILDINGS GREATER THAN 125 FEET IN HEIGHT SHALL BE REQUIRED TO PROVIDE AN EMERGENCY AND STAND-BY POWER SYSTEM.

**BC 713.7** OPENINGS IN A SHAFT ENCLOSURE SHALL BE PROTECTED IN ACCORDANCE WITH SECTION BC 716 AS REQUIRED FOR FIRE-BARRIERS. DOORS SHALL BE SELF-CLOSING IN ACCORDANCE WITH THIS SECTION.

**BC 713.12.1** ALL CLOSED SHAFTS, INCLUDING VERTICAL EXIT ENCLOSURES, HAVING A FLOOR AREA EXCEEDING 4 SQUARE FEET SHALL BE PROVIDED WITH A SMOKE VENT IN ACCORDANCE WITH SECTIONS 713.12.1.1 THROUGH 713.12.1.3. INTERIOR VERTICAL EXIT SHAFT ENCLOSURES SHALL ALSO COMPLY WITH CHAPTER 10.

**713.12.1.1** SMOKE VENTS MAY BE CONSTRUCTED AS WINDOWS, LOUVERS, SKYLIGHTS, VENT DUCTS OR SIMILAR DEVICES. VENT DUCTS SHALL BE CONSTRUCTION HAVING THE SAME FIRE-RESISTANCE RATING AS THE SHAFT ENCLOSURE.

**713.12.1.2** THE EFFECTIVE VENTING AREA SHALL BE NOT LESS THAN 3½ PERCENT OF THE MAXIMUM SHAFT AREA AT ANY FLOOR, BUT IN NO EVENT LESS THAN 72 SQUARE INCHES.

**713.12.1.3.1** WHERE A SHAFT PENETRATES THROUGH THE ROOF, THE SHAFT VENT SHALL BE LOCATED NOT LESS THAN 8 INCHES ABOVE A NONCOMBUSTIBLE ROOF ASSEMBLY OR NOT LESS THAN 36 INCHES ABOVE A COMBUSTIBLE ROOF. THE VENT SHALL BE LOCATED NOT LESS THAN 10 FEET FROM ANY WINDOW, DOOR, EXTERIOR STAIRWAY, OR INTERIOR LOT LINE. THE VENT MAY BE LOCATED NOT LESS THAN 5 FEET FROM ANY WINDOW OR DOOR IF LOCATED HIGHER THAN THE TOP OF SUCH WINDOW OR DOOR. IF THE VENT IS CONSTRUCTED AS A WINDOW OR LOUVER, THE SILL OF THE SUCH SHALL BE LOCATED NOT LESS THAN 36 INCHES ABOVE THE ROOF.

## HIGH RISE NOTES: CHAPTER 4 AND OTHER SECTIONS RELEVANT BUT NO LIMITED TO HIGH RISE REQUIREMENTS AS FOLLOWS:

**BC 403.4.4** AN EMERGENCY VOICE/ALARM COMMUNICATION SYSTEM SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 907.5.2.2.

**BC 403.4.8.4** AN EMERGENCY POWER SYSTEM COMPLYING WITH SECTION 2702 SHALL BE PROVIDED FOR EMERGENCY POWER LOADS

**BC 403.5.3** STAIRWAYS SHALL BE PROVIDED WITH THE REQUIRED DOOR OPERATION BASED ON BC 403.5.3

**BC 1009.2.1** IN HIGH-RISE BUILDINGS SUBJECT TO SECTION 403, AT LESAT ONE REQUIRED ACCESSIBLE MEANS OF EGRESS SHALL BE AN ELEVATOR COMPLYING WITH SECTION 1009.4.

**BC 1009.4** ELEVATOR SHALL COMPLY WITH EMERGENCY OPERATION AND SIGNALING DEVICE REQUIREMENTS OF SECTION 2.27 OF ASME A17.1 AND SECTION 1109.7. EMERGENCY POWER SHALL BE PROVIDED IN ACCORDANCE WITH CHAPTER 27 AND SECTION 3003.

**BC 1023.11** EACH OF THE EXITS OF A BUILDING THAT SERVES STORIES WHERE THE FLOOR SURFACE IS LOCATED MORE THAN 75 FEET ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS SHALL BE A SMOKEPROOF ENCLOSURE OR PRESSURIZED STAIRWAY IN ACCORDANCE WITH SECTION 909.20

BC 713.4 FIRE-RESISTANCE RATING.SHAFT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING OF NOT LESSTHAN 2 HOURS WHERE PENETRATING THREESTORIES OR MORE, AND NOT LESS THAN 1 HOUR WHERE PENETRATING FEWERTHAN THREESTORIES. THE NUMBER OF STORIES CONNECTED BY THE SHAFT ENCLOSURE SHALL INCLUDE ANY BASEMENTS OR CELLARS, BUT NOT ANY MEZZANINES. SHAFT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THE FLOOR ASSEMBLY PENETRATED, BUT NEED NOT EXCEED 2 HOURS. SHAFT ENCLOSURES SHALL MEET THE REQUIREMENTS OF SECTION703.2.1

BC 712.1.9 TWO-STORY OPENINGS. IN OTHER THAN GROUPS I-2 AND I-3, A VERTICAL OPENING THAT IS NOT USED AS ONE OF THE APPLICATIONS LISTED IN THIS SECTION SHALL BE PERMITTED IF THE OPENING COMPLIES WITH ALL OF THE ITEMS BELOW:

1.DOES NOT CONNECT MORE THAN TWO STORIES.

2.DOES NOT PENETRATE A HORIZONTAL ASSEMBLY THAT SEPARATES FIRE AREAS OR SMOKE BARRIERS THAT SEPARATE SMOKE COMPARTMENTS.

3.IS NOT CONCEALED WITHIN THE CONSTRUCTION OF A WALLOR A FLOOR/CEILING ASSEMBLY.

4.IS NOT OPEN TO A CORRIDOR IN GROUP I AND R OCCUPANCIES, WHERE SUCH CORRIDOR IS REQUIRED TO BE FIRE-RESISTANCE-RATED IN ACCORDANCE WITH TABLE 1020.1.1 OR 1020.1.2.

5.IS NOT OPEN TO A CORRIDOR ON NONSPRINKLERED FLOORS, WHERE SUCH CORRIDOR IS REQUIRED TO BE FIRE-RESISTANCE-RATED IN ACCORDANCE WITH

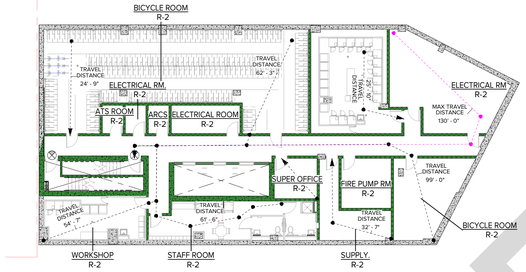
TABLE 1020.1.1 OR 1020.1.2

BC 1019.3 OCCUPANCIES OTHER THAN GROUPS H, I-2 AND I-3. IN OTHER THAN GROUP H, I-2 AND I-3 OCCUPANCIES, EXIT ACCESS STAIRWAYS OR RAMPS SHALL BE ENCLOSED WITH A SHAFT ENCLOSURE CONSTRUCTED IN ACCORDANCE WITH SECTION 713.

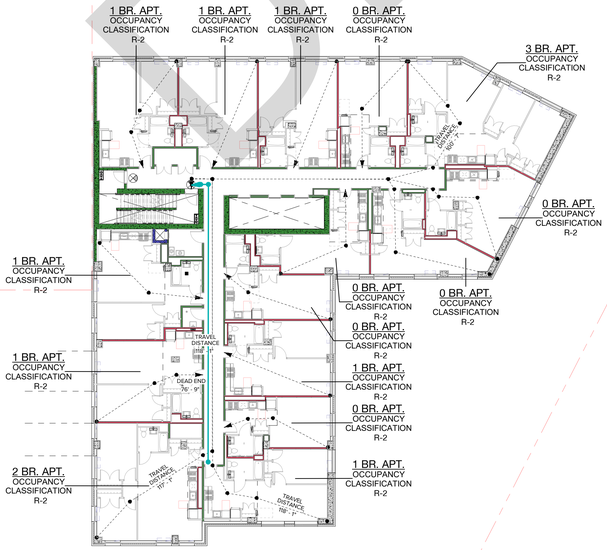
EXCEPTION:

IN OTHER THAN GROUP H, I-2 AND I-3 OCCUPANCIES, EXIT ACCESS STAIRWAYS OR RAMPS THAT COMPLY WITH ONE OF THE FOLLOWING CONDITIONS NEED NOT BE ENCLOSED:

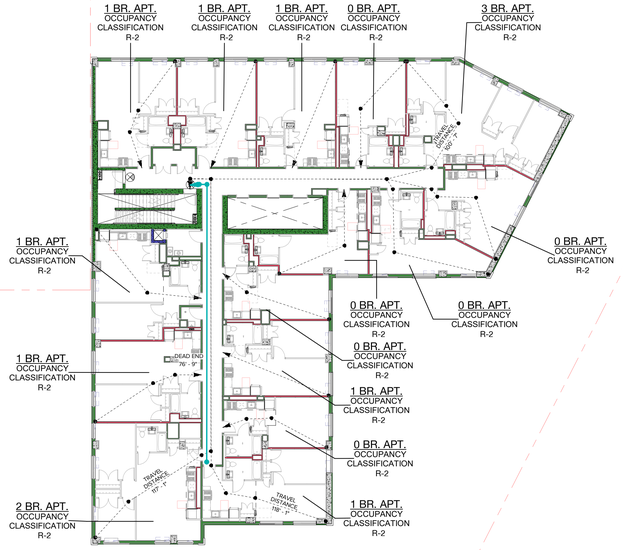
2. IN BUILDINGS EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION 903.3.1.1, EXIT ACCESS STAIRWAYS AND RAMPS THAT SERVE BETWEEN ONLY THE FIRST AND SECOND STORIES ABOVE GRADE, PROVIDED THE FIRST AND SECOND STORIES HAVE ACCESS TO THE MINIMUM NUMBER OF APPROVED INDEPENDENT EXITS AS REQUIRED BY SECTION 1006, AND IN NO CASE BE LESS THAN TWO MEANS OF EGRESS. SUCH INTERCONNECTED STORIES SHALL NOT BE OPEN TO OTHER STORIES. UNENCLOSED EXIT ACCESS STAIRWAYS AND RAMPS SHALL BE REMOTELY LOCATED IN ACCORDANCE WITH SECTION 1007.




3 A-006 Cellar
1/16" = 1'-0"




1 A-006 2nd Floor
1/16" = 1'-0"




2 A-006 3rd Floor - 9th floor plans
1/16" = 1'-0"

| SYMBOL LEGEND | |
|---|---|
| SYMBOL | DESCRIPTION |
| | 3 HR RATED WALL |
| | 2 HR RATED WALL |
| | 1 HR RATED WALL |
| | CEILING MOUNTED EXIT SIGN |
| | WALL MOUNTED EXIT SIGN |
| SIGN | SIGN AT ELEVATOR LANDING |
| 1 | 3'-0" WIDE DOOR (1 LEAF) EXIT CAPACITY = 34" / 0.2 = 170 |
| 2 | 3'-0" WIDE DOOR (2 LEAFS) EXIT CAPACITY = 68" / 0.2 = 340 |
| S | SMOKE DETECTOR |
| H | HEAT DETECTOR |
| SCM | SMOKE / CARBON MONOXIDE DETECTOR |

| MINIMUM WIDTH OF EGRESS | | | |
|---|---|---|---|
| | NYC BUILDING CODE SECTION | MIN REQUIRED (in.) | PROVIDED (in) |
| STAIRWAYS | 1011.2 | 44" | 44" |
| CORRIDORS | 1020.2 | 44" | 48" - 60" |

| MAXIMUM TRAVEL DISTANCE (W/ SPRINKLERS) TABLE 1017.2 (*) | | | |
|---|---|---|---|
| OCCUPANCY GROUP | | MAXIMUM PERMITTED (FT.) | PROVIDED (FT.) |
| RESIDENTIAL | R-2 | 200'-0" | 118'-1" FROM UNIT #01 @ 3RD-19TH FLOORS |

* DEAD END IN R-2 OCCUPANCY SHALL NOT EXCEED 80' ALL FLOORS COMPLY - BC 1020.4 EXCEPTION 4

| Area Schedule (Egress) | | | | |
|---|---|---|---|---|
| Name | Occupancy Class | Area | Net Floor Area Per Occupant (SQ. FT) | Max # of Occ |
| Cellar | | | | |
| ARCS | R-2 | 39 SF | 300 SF | 0 |
| ATS ROOM | R-2 | 39 SF | 300 SF | 0 |
| BICYCLE ROOM | R-2 | 1920 SF | 300 SF | 6 |
| ELECTRICAL RM | R-2 | 574 SF | 300 SF | 2 |
| ELECTRICAL RM. | R-2 | 39 SF | 300 SF | 0 |
| ELECTRICAL ROOM | R-2 | 131 SF | 300 SF | 0 |
| FIRE PUMP RM | R-2 | 169 SF | 300 SF | 1 |
| STAFF ROOM | R-2 | 401 SF | 300 SF | 1 |
| SUPER OFFICE | R-2 | 118 SF | 300 SF | 0 |
| SUPPLY. | R-2 | 213 SF | 300 SF | 1 |
| WORKSHOP | R-2 | 309 SF | 300 SF | 1 |
| 1ST FLOOR | | | | |
| COMPACTOR ROOM | R-2 | 733 SF | 300 SF | 2 |
| FITNESS ROOM | R-2 | 501 SF | 50 SF | 10 |
| LOUNGE | R-2 | 982 SF | 200 SF | 5 |
| MAILBOX ROOM | R-2 | 414 SF | 200 SF | 2 |
| MANAGEMENT OFFICE | R-2 | 1601 SF | 200 SF | 8 |
| PACKAGE ROOM | R-2 | 144 SF | 300 SF | 0 |
| 2nd Floor | | | | |
| RESIDENTIAL | R-2 | 9209 SF | 200 SF | 46 |
| 3rd Floor - 9th floor plans | | | | |
| RESIDENTIAL | R-2 | 9066 SF | 200 SF | 45 |
| 10th - 15th Floor Plans | | | | |
| RESIDENTIAL | R-2 | 9055 SF | 200 SF | 45 |
| 16th Floor to 26th | | | | |
| RESIDENTIAL | R-2 | 9081 SF | 200 SF | 45 |

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| | |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |
| DATE | SUBMISSIONS / REVISIONS |

SHEET TITLE:

# EGRESS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SCALE: As indicated SHEET NO: OF

DRAWING NO: A-006.00

NYC DOB NUMBER: X00945951-I1

DRAFT

## FIRE PROTECTION:

BUILDING IS FULLY SPRINKLERED AND EQUIPPED WITH AN ALTERNATIVE FIRE EXTINGUISHING SYSTEM, A STAND PIPE SYSTEM, SMOKE VENTS, A FIRE ALARM AND DETECTION SYSTEM & A FIRE COMMAND CENTER. IN COMPLIANCE WITH THE NYC BUILDING CODE (2022), NYC FIRE CODE & LOCAL FIRE DEPARTMENT REQUIREMENTS .

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**TABLE BC 1004.1.3** MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT. OCCUPANT LOAD FOR SPACES AS DETERMINED BY THIS TABLE.

**BC 1005.1** ALL PORTIONS OF THE MEANS OF EGRESS SYSTEM SHALL BE SIZED IN ACCORDANCE WITH SECTION BC 1005.

**BC 1005.3.1** THE CAPACITY OF MEANS OF EGRESS STAIRWAYS SHALL BE CALCULATED BY MULTIPLYING THE OCCUPANT LOAD SERVED BY SUCH STAIRWAYS BY A MEANS OF EGRESS FACTOR OF 0.3 INCH PER OCCUPANT.

**BC 1005.3.2** THE CAPACITY OF MEANS OF EGRESS COMPONENTS, OTHER THAN STAIRWAYS, SHALL BE CALCULATED BY MULTIPLYING THE OCCUPANT LOAD BY A MEANS OF EGRESS FACTOR OF 0.2 INCH PER OCCUPANT.

**BC 1005.4** THE MINIMUM WIDTH OF THE MEANS OF EGRESS REQUIRED FROM ANY STORY OF A BUILDING SHALL NOT BE REDUCED ALONG THE PATH OF EGRESS TRAVEL UNTIL ARRIVAL AT THE PUBLIC WAY.

**BC 1005.7.1** DOORS, WHEN FULLY OPENED, SHALL NOT REDUCE THE REQUIRED EGRESS WIDTH BY MORE THAN 7 INCHES. DOORS IN ANY POSITION SHALL NOT REDUCE THE REQUIRED WIDTH BY MORE THAN ONE-HALF.

**BC 1006.1** THE NUMBER OF EXITS OR EXIT ACCESS DOORWAYS REQUIRED WITHIN THE MEANS OF EGRESS SYSTEM SHALL COMPLY WITH THE PROVISIONS OF SECTION BC 1006.

**BC 1007.1.1** EXITS SHALL BE PLACED A DISTANCE APART NO LESS THAN ONE-HALF OF THE LENGTH OF THE MAXIMUM DIAGONAL DIMENSION OF THE BUILDING OR AREA SERVED. STAIRS SHARING COMMON WALL SHALL BE COUNTED AS ONE EXIT STAIR. IN GROUP R-2 OCCUPANCIES, STAIRS ENCLOSED IN WALLS HAVING 2-HOUR FIRE RATING CONSTRUCTED OF MASONRY OR MASONRY EQUIVALENT, EXIT DOORS SHALL BE PLACED NO LESS THAN 15 FEET APART; SUCH STAIRS MAY SHARE COMMON WALLS, FLOORS, CEILINGS OR SCISSOR STAIRS ASSEMBLIES.

**BC 1008.2** EXITS, EXIT DISCHARGES AND PUBLIC CORRIDORS SHALL BE ILLUMINATED AT ALL TIMES BY EITHER DAYLIGHT OR ELECTRIC LIGHTING FIXTURES.

**BC 1008.2.1** THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL BE NOT LESS THAN 1 FOOT-CANDLE AT THE WALKING SURFACE.

**BC 1008.2.3** SENSORS AND CONTROLS. AUTOMATIC, OCCUPANT SENSOR OR PHOTO-SENSOR LIGHTING CONTROLS SHALL BE PERMITTED WITHIN MEANS OF EGRESS.

**BC 1008.3** EMERGENCY POWER FOR ILLUMINATION. THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISE'S ELECTRICAL SUPPLY.

**BC 1008.3.4** THE EMERGENCY POWER SYSTEM SHALL PROVIDE POWER FOR A DURATION OF NOT LESS THAN 90 MINUTES AND SHALL CONSIST OF STORAGE BATTERIES, UNIT EQUIPMENT OR AN ON-SITE GENERATOR.

**BC 1009** ACCESSIBLE MEANS OF EGRESS. ELEVATORS AND PLATFORM LIFTS PERMITTED AS ACCESSIBLE MEANS OF EGRESS SHALL COMPLY WITH THIS SECTION, ANSI ICC A117.1, CHAPTER 11 OF NYC BUILDING CODE.

**BC 1010.1** MEANS OF EGRESS DOORS SHALL BE READILY DISTINGUISHABLE FROM THE ADJACENT CONSTRUCTION AND FINISHES SUCH THAT THE DOORS ARE EASILY RECOGNIZABLE AS DOORS. MIRRORS OR SIMILAR REFLECTING MATERIALS SHALL NOT BE USED ON MEANS OF EGRESS DOORS. MEANS OF EGRESS DOORS SHALL NOT BE CONCEALED BY CURTAINS, DRAPES, DECORATIONS OR SIMILAR MATERIALS.

**BC 1010.1.1.1** THE REQUIRED CAPACITY OF EACH DOOR OPENING SHALL BE SUFFICIENT FOR THE OCCUPANT LOAD AND SHALL PROVIDE A MINIMUM CLEAR WIDTH OF 32 INCHES MEASURED BETWEEN THE FACE OF THE DOOR AND THE STOP, WITH THE DOOR OPEN 90 DEGREES. DOUBLE DOORS AT LEAST ONE LEAF SHALL COMPLY WITH THIS SECTION. THE MAX. WIDTH OF A SWINGING DOOR LEAF SHALL BE 48 INCHES NOMINAL.

**BC 1010.1.1.3** THE HEIGHT OF DOORS SHALL BE NOT LESS THAN 80 INCHES (6'-8").

**BC 1010.1.2.2** DOORS SHALL SWING IN THE DIRECTION OF EGRESS TRAVEL WHERE SERVING SPACES WITH AN OCCUPANT LOAD OF 75 OR MORE PERSONS AND SPACES REQUIRING MORE THAN ONE EXIT DOOR. DOORS NEED NOT SWING IN THE DIRECTION OF EGRESS TRAVEL FOR EXTERIOR STREET FLOOR EXIT DOORS FROM LOBBIES SERVING GROUP R-2 OCCUPANCIES.

**BC 1010.1.3** THE FORCE FOR PUSHING OR PULLING OPEN INTERIOR SWINGING EGRESS DOORS, OTHER THAN FIRE DOORS, SHALL NOT EXCEED 5-POUNDS.

**BC 1010.1.4** SPECIAL DOORS AND SECURITY GRILLES SHALL COMPLY WITH THE REQUIREMENTS OF SECTIONS 1010.1.4.1 THROUGH 1010.1.4.4.

**BC 1010.1.5** THERE SHALL BE A FLOOR OR LANDING ON EACH SIDE OF A DOOR. SUCH FLOOR OR LANDING SHALL BE AT THE SAME ELEVATION ON EACH SIDE OF THE DOOR. LANDINGS SHALL BE LEVEL EXCEPT FOR EXTERIOR LANDINGS, WHICH ARE PERMITTED TO HAVE A SLOPE NOT TO EXCEED 0.25 UNIT VERTICAL IN 12 UNITS HORIZONTAL (2-PERCENT SLOPE).

**BC 1010.1.6** LANDINGS SHALL HAVE A WIDTH NOT LESS THAN THE WIDTH OF THE STAIRWAY. DOORS IN THE FULLY OPEN POSITION SHALL NOT REDUCE A REQUIRED DIMENSION BY MORE THAN 7 INCHES. STAIRWAY LANDING DOORS SHALL NOT REDUCE THE LANDING TO LESS THAN 75 PERCENT OF ITS REQUIRED WIDTH. LANDINGS SHALL HAVE A LENGTH MEASURED IN THE DIRECTION OF TRAVEL NO LESS THAN 44 INCHES (3'-8").

**BC 1010.1.8** SPACE BETWEEN TWO DOORS IN A SERIES SHALL BE 48 INCHES (1220MM) MINIMUM PLUS THE WIDTH OF A DOOR SWINGING INTO THE SPACE.

**BC 1010.1.9** EXCEPT AS SPECIFICALLY PERMITTED BY THIS SECTION, EGRESS DOORS SHALL BE READILY OPEN-ABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT.

**BC 1010.1.9.11** STAIRWAY DISCHARGE DOORS SHALL BE OPEN-ABLE FROM THE EGRESS SIDE AND SHALL ONLY BE LOCKED FROM THE OPPOSITE SIDE.

**BC 1010.1.10** DOORS SERVING THE FOLLOWING SHALL BE PROVIDED WITH PANIC HARDWARE OR FIRE EXIT HARDWARE: A ROOM OR SPACE WITH AN OCCUPANT LOAD OF 75 OR MORE IN A GROUP A OR E OCCUPANCY; A SPACE USED FOR ASSEMBLY PURPOSES CLASSIFIED AS A GROUP B OCCUPANCY OR AS PART OF THE OCCUPANCY IT IS ACCESSORY TO.

**BC 1010.4.1** BUILDING ENTRANCE DOORS AND OTHER EXTERIOR EXIT DOORS TO BE EQUIPPED WITH HEAVY DUTY LOCK SETS TO PREVENT THE LATCH FROM BEING MANIPULATED BY MEANS OTHER THAN A KEY. OUTSIDE MAIN ENTRANCE DOORS OPERATED BY THE TENANTS' KEY SHALL NOT BE KEYED TO ALSO OPEN THE TENANTS' APARTMENT. LIGHT TO BE PROVIDED AT ENTRANCEWAY PROVIDING 5-FTCANDLES.

**BC 1011.2** THE REQUIRED CAPACITY OF STAIRWAYS SHALL BE DETERMINED AS SPECIFIED IN SECTION 1005, BUT THE MINIMUM WIDTH SHALL BE NOT LESS THAN 44 INCHES (3'-8").

**BC 1011.3** STAIRWAYS HEADROOM NOT LESS THAN 84 INCHES (7'-0") FROM A LINE AT THE EDGE OF THE NOSING. THE MINIMUM CLEARANCE SHALL BE MAINTAINED THE FULL WIDTH OF THE STAIRWAY AND LANDINGS. IN GROUP R-2 OCCUPANCIES STAIRWAYS SHALL HAVE A HEADROOM CLEARANCE OF NOT LESS THAN 80 INCHES (6'-8").

**BC 1011.5.2** STAIR RISERS SHALL BE 7 INCHES MAXIMUM AND 4 INCHES MINIMUM. TREAD DEPTHS SHALL BE 11 INCHES MINIMUM MEASURED HORIZONTALLY FROM TREAD NOSING. DIFFERENCE IN TREAD DEPTH WITHIN A FLIGHT OF STAIRS SHALL NOT EXCEED ⅜ INCH. IN GROUP R-2 OCCUPANCIES: THE SUM OF TWO RISERS PLUS ONE TREAD SHALL BE NOT LESS THAN 24 INCHES NOR MORE THAN 25½ INCHES.

**BC 1011.6** THERE SHALL BE A FLOOR OR LANDING AT THE TOP AND BOTTOM OF EACH STAIRWAY. THE WIDTH OF LANDINGS SHALL BE THE WIDTH OF STAIRWAYS SERVED. DOORS OPENING AT LANDINGS SHALL NOT REDUCE THE LANDING TO LESS THAN ONE-HALF THE REQUIRED WIDTH.

**BC 1011.7** STAIRWAYS SHALL BE BUILT OF MATERIALS CONSISTENT WITH THE TYPES PERMITTED FOR THE TYPE OF CONSTRUCTION OF THE BUILDING.

**BC 1011.8** A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE GREATER THAN 12 FEET BETWEEN FLOOR LEVELS OR LANDINGS.

**BC 1011.11** STAIRWAYS SHALL HAVE HANDRAILS ON EACH SIDE. HANDRAIL HEIGHT SHALL BE NOT LESS THAN 34 INCHES AND NOT MORE THAN 38 INCHES.

**BC 1011.12** IN BUILDINGS FOUR OR MORE STORIES OR MORE THAN 40 FEET IN HEIGHT, AT LEAST ONE STAIRWAY SHALL EXTEND TO THE ROOF SURFACE THROUGH A STAIRWAY BULKHEAD.

**BC 1011.12.1** IN BUILDINGS IN OCCUPANCY GROUP R-2 TWO STORIES OR MORE IN HEIGHT, WITH ROOFS HAVING A SLOPE OF 15 DEGREES OR LESS, ALL INTERIOR EXIT STAIRWAYS SHALL EXTEND TO THE ROOF.

**BC 1012.2** RAMPS USED AS ACCESSIBLE ROUTE SHALL HAVE A SLOPE NOT STEEPER THAN ONE IN 12 (8%). GARAGE RAMPS WITH A MAXIMUM SLOPE OF ONE IN SEVEN (14%) MAY SERVE AS PART OF A NON-ACCESSIBLE MEANS OF EGRESS IF A PEDESTRIAN PATH IS PROVIDED. PEDESTRIAN PATH MAY BE PAINTED.

**BC 1012.4** THE RISE FOR ANY ACCESSIBLE RAMP RUN SHALL BE 30 INCHES (2'-6") MAXIMUM.

**BC 1012.6** RAMPS SHALL HAVE LANDINGS AT THE BOTTOM AND TOP OF EACH RAMP, POINTS OF TURNING, ENTRANCE, EXITS AND AT DOORS.

**BC 1012.6.3** THE LANDING LENGTH SHALL BE 60 INCHES (1525 MM) MINIMUM.

**BC 1012.6.4** WHERE CHANGES IN DIRECTION OF TRAVEL OCCUR AT LANDINGS PROVIDED BETWEEN RAMP RUNS, THE LANDING SHALL BE 60 INCHES BY 60 INCHES MIN.

**BC 1012.8** RAMPS WITH A RISE GREATER THAN 6 INCHES (152.4 MM) SHALL HAVE HANDRAILS ON BOTH SIDES.

**BC 1014.6** RETURN HANDRAILS TO WALL, GUARD, WALKING SURFACE OR CONTINUE THE HANDRAIL TO ADJACENT FLIGHT OF STAIRS OR RAMP. EXTEND STAIR HANDRAILS 12 INCHES FROM THE TOP RISER AND CONTINUE TO SLOPE BY ONE TREAD AT THE BOTTOM RISER. EXTEND RAMP HANDRAILS 12 INCHES BEYOND THE TOP AND BOTTOM. HORIZONTAL EXTENSIONS TO BE IN THE DIRECTION OF THE STAIR AND RAMP.

**BC 1014.9** STAIRWAYS SHALL HAVE INTERMEDIATE HANDRAILS LOCATED SO ALL PORTIONS OF THE STAIRWAY ARE WITHIN 30 INCHES OF A HANDRAIL. LOCATE MONUMENTAL STAIRS HANDRAILS ALONG THE MOST DIRECT PATH OF EGRESS.

**BC 1023.8** INTERIOR EXIT STAIRWAYS AND RAMPS SHALL NOT CONTINUE BELOW LEVEL OF EXIT DISCHARGE. PARTITIONS AND DOORS MUST SEPARATE THE EXIT STAIRWAY EGRESS FROM THE PORTION BELOW. DOORS SHALL BE SELF-CLOSING AND PROVIDED WITH LANDINGS. DIRECTIONAL EXIT SIGNS TO BE PROVIDED.

**BC 1023.9.1** A STAIRWAY IDENTIFICATION SIGN INDICATING EACH STAIR BY ALPHABETIC LETTER SHALL BE POSTED ON BOTH SIDES OF EACH STAIR DOOR.

**BC 1023.9.2** A FLOOR IDENTIFICATION SIGN SHALL BE PROVIDED AT EACH FLOOR LANDING IN AN INTERIOR EXIT STAIRWAY AND RAMP CONNECTING MORE THAN THREE STORIES.

**BC 403.4.8.4.2** GROUP R-2 OCCUPANCIES IN BUILDINGS GREATER THAN 125 FEET IN HEIGHT SHALL BE REQUIRED TO PROVIDE AN EMERGENCY AND STAND-BY POWER SYSTEM.

**BC 713.7** OPENINGS IN A SHAFT ENCLOSURE SHALL BE PROTECTED IN ACCORDANCE WITH SECTION BC 716 AS REQUIRED FOR FIRE-BARRIERS. DOORS SHALL BE SELF-CLOSING IN ACCORDANCE WITH THIS SECTION.

**BC 713.12.1** ALL CLOSED SHAFTS, INCLUDING VERTICAL EXIT ENCLOSURES, HAVING A FLOOR AREA EXCEEDING 4 SQUARE FEET SHALL BE PROVIDED WITH A SMOKE VENT IN ACCORDANCE WITH SECTIONS 713.12.1.1 THROUGH 713.12.1.3. INTERIOR VERTICAL EXIT SHAFT ENCLOSURES SHALL ALSO COMPLY WITH CHAPTER 10.

**713.12.1.1** SMOKE VENTS MAY BE CONSTRUCTED AS WINDOWS, LOUVERS, SKYLIGHTS, VENT DUCTS OR SIMILAR DEVICES. VENT DUCTS SHALL BE CONSTRUCTION HAVING THE SAME FIRE-RESISTANCE RATING AS THE SHAFT ENCLOSURE.

**713.12.1.2** THE EFFECTIVE VENTING AREA SHALL BE NOT LESS THAN 3½ PERCENT OF THE MAXIMUM SHAFT AREA AT ANY FLOOR, BUT IN NO EVENT LESS THAN 72 SQUARE INCHES.

**713.12.1.3.1** WHERE A SHAFT PENETRATES THROUGH THE ROOF, THE SHAFT VENT SHALL BE LOCATED NOT LESS THAN 8 INCHES ABOVE A NONCOMBUSTIBLE ROOF ASSEMBLY OR NOT LESS THAN 36 INCHES ABOVE A COMBUSTIBLE ROOF. THE VENT SHALL BE LOCATED NOT LESS THAN 10 FEET FROM ANY WINDOW, DOOR, EXTERIOR STAIRWAY, OR INTERIOR LOT LINE. THE VENT MAY BE LOCATED NOT LESS THAN 5 FEET FROM ANY WINDOW OR DOOR IF LOCATED HIGHER THAN THE TOP OF SUCH WINDOW OR DOOR. IF THE VENT IS CONSTRUCTED AS A WINDOW OR LOUVER, THE SILL OF THE SUCH SHALL BE LOCATED NOT LESS THAN 36 INCHES ABOVE THE ROOF.

## HIGH RISE NOTES: CHAPTER 4 AND OTHER SECTIONS RELEVANT BUT NO LIMITED TO HIGH RISE REQUIREMENTS AS FOLLOWS:

**BC 403.4.4** AN EMERGENCY VOICE/ALARM COMMUNICATION SYSTEM SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 907.5.2.2.

**BC 403.4.8.4** AN EMERGENCY POWER SYSTEM COMPLYING WITH SECTION 2702 SHALL BE PROVIDED FOR EMERGENCY POWER LOADS

**BC 403.5.3** STAIRWAYS SHALL BE PROVIDED WITH THE REQUIRED DOOR OPERATION BASED ON BC 403.5.3

**BC 1009.2.1** IN HIGH-RISE BUILDINGS SUBJECT TO SECTION 403, AT LESAT ONE REQUIRED ACCESSIBLE MEANS OF EGRESS SHALL BE AN ELEVATOR COMPLYING WITH SECTION 1009.4.

**BC 1009.4** ELEVATOR SHALL COMPLY WITH EMERGENCY OPERATION AND SIGNALING DEVICE REQUIREMENTS OF SECTION 2.27 OF ASME A17.1 AND SECTION 1109.7. EMERGENCY POWER SHALL BE PROVIDED IN ACCORDANCE WITH CHAPTER 27 AND SECTION 3003.

**BC 1023.11** EACH OF THE EXITS OF A BUILDING THAT SERVES STORIES WHERE THE FLOOR SURFACE IS LOCATED MORE THAN 75 FEET ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS SHALL BE A SMOKEPROOF ENCLOSURE OR PRESSURIZED STAIRWAY IN ACCORDANCE WITH SECTION 909.20

BC 713.4 FIRE-RESISTANCE RATING.SHAFT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING OF NOT LESSTHAN 2 HOURS WHERE PENETRATING THREESTORIES OR MORE, AND NOT LESS THAN 1 HOUR WHERE PENETRATING FEWERTHAN THREESTORIES. THE NUMBER OF STORIES CONNECTED BY THE SHAFT ENCLOSURE SHALL INCLUDE ANY BASEMENTS OR CELLARS, BUT NOT ANY MEZZANINES. SHAFT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THE FLOOR ASSEMBLY PENETRATED, BUT NEED NOT EXCEED 2 HOURS. SHAFT ENCLOSURES SHALL MEET THE REQUIREMENTS OF SECTION703.2.1

BC 712.1.9 TWO-STORY OPENINGS. IN OTHER THAN GROUPS I-2 AND I-3, A VERTICAL OPENING THAT IS NOT USED AS ONE OF THE APPLICATIONS LISTED IN THIS SECTION SHALL BE PERMITTED IF THE OPENING COMPLIES WITH ALL OF THE ITEMS BELOW:

1.DOES NOT CONNECT MORE THAN TWO STORIES.

2.DOES NOT PENETRATE A HORIZONTAL ASSEMBLY THAT SEPARATES FIRE AREAS OR SMOKE BARRIERS THAT SEPARATE SMOKE COMPARTMENTS.

3.IS NOT CONCEALED WITHIN THE CONSTRUCTION OF A WALLOR A FLOOR/CEILING ASSEMBLY.

4.IS NOT OPEN TO A CORRIDOR IN GROUP I AND R OCCUPANCIES, WHERE SUCH CORRIDOR IS REQUIRED TO BE FIRE-RESISTANCE-RATED IN ACCORDANCE WITH TABLE 1020.1.1 OR 1020.1.2.

5.IS NOT OPEN TO A CORRIDOR ON NONSPRINKLERED FLOORS, WHERE SUCH CORRIDOR IS REQUIRED TO BE FIRE-RESISTANCE-RATED IN ACCORDANCE WITH

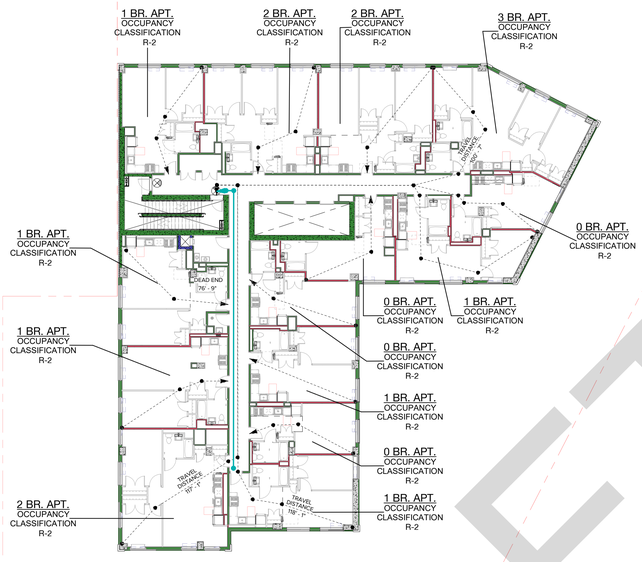
TABLE 1020.1.1 OR 1020.1.2

BC 1019.3 OCCUPANCIES OTHER THAN GROUPS H, I-2 AND I-3. IN OTHER THAN GROUP H, I-2 AND I-3 OCCUPANCIES, EXIT ACCESS STAIRWAYS OR RAMPS SHALL BE ENCLOSED WITH A SHAFT ENCLOSURE CONSTRUCTED IN ACCORDANCE WITH SECTION 713.

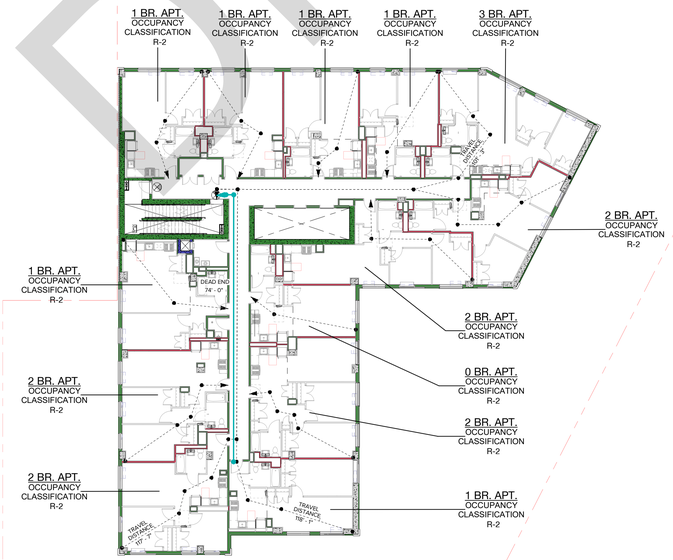
EXCEPTION:

IN OTHER THAN GROUP H, I-2 AND I-3 OCCUPANCIES, EXIT ACCESS STAIRWAYS OR RAMPS THAT COMPLY WITH ONE OF THE FOLLOWING CONDITIONS NEED NOT BE ENCLOSED:

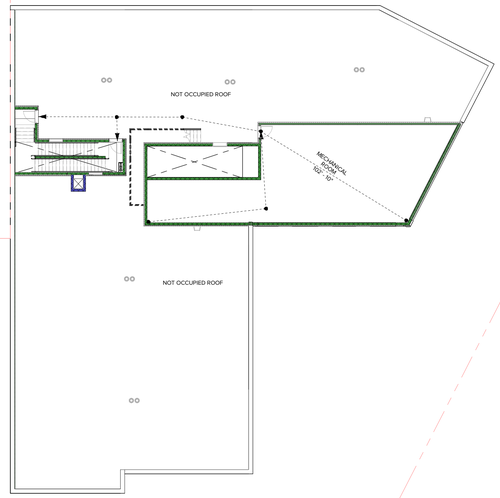
2. IN BUILDINGS EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION 903.3.1.1. EXIT ACCESS STAIRWAYS AND RAMPS THAT SERVE BETWEEN ONLY THE FIRST AND SECOND STORIES ABOVE GRADE, PROVIDED THE FIRST AND SECOND STORIES HAVE ACCESS TO THE MINIMUM NUMBER OF APPROVED INDEPENDENT EXITS AS REQUIRED BY SECTION 1006, AND IN NO CASE BE LESS THAN TWO MEANS OF EGRESS. SUCH INTERCONNECTED STORIES SHALL NOT BE OPEN TO OTHER STORIES. UNENCLOSED EXIT ACCESS STAIRWAYS AND RAMPS SHALL BE REMOTELY LOCATED IN ACCORDANCE WITH SECTION 1007.




1 A-007 10th - 15th Floor Plans 1/16" = 1'-0"




2 A-007 16th Floor to 26th 1/16" = 1'-0"




3 A-007 Roof 1/16" = 1'-0"

| SYMBOL LEGEND | |
|---|---|
| SYMBOL | DESCRIPTION |
| | 3 HR RATED WALL |
| | 2 HR RATED WALL |
| | 1 HR RATED WALL |
| | CEILING MOUNTED EXIT SIGN |
| | WALL MOUNTED EXIT SIGN |
| SIGN | SIGN AT ELEVATOR LANDING |
| 1 | 3'-0" WIDE DOOR (1 LEAF) EXIT CAPACITY = 34" / 0.2 = 170 |
| 2 | 3'-0" WIDE DOOR (2 LEAFS) EXIT CAPACITY = 68" / 0.2 = 340 |
| S | SMOKE DETECTOR |
| H | HEAT DETECTOR |
| SCM | SMOKE / CARBON MONOXIDE DETECTOR |

| MINIMUM WIDTH OF EGRESS | | | |
|---|---|---|---|
| | NYC BUILDING CODE SECTION | MIN REQUIRED (in.) | PROVIDED (in) |
| STAIRWAYS | 1011.2 | 44" | 44" |
| CORRIDORS | 1020.2 | 44" | 48" - 60" |

| MAXIMUM TRAVEL DISTANCE (W/ SPRINKLERS) TABLE 1017.2 (*) | | | |
|---|---|---|---|
| OCCUPANCY GROUP | | MAXIMUM PERMITTED (FT.) | PROVIDED (FT.) |
| RESIDENTIAL | R-2 | 200'-0" | 118'-1" FROM UNIT #01 @ 3RD-19TH FLOORS |

* DEAD END IN R-2 OCCUPANCY SHALL NOT EXCEED 80' ALL FLOORS COMPLY - BC 1020.4 EXCEPTION 4

| Area Schedule (Egress) | | | | |
|---|---|---|---|---|
| Name | Occupancy Class | Area | Net Floor Area Per Occupant (SQ. FT) | Max # of Occ |
| Cellar | | | | |
| ARCS | R-2 | 39 SF | 300 SF | 0 |
| ATS ROOM | R-2 | 39 SF | 300 SF | 0 |
| BICYCLE ROOM | R-2 | 1920 SF | 300 SF | 6 |
| ELECTRICAL RM | R-2 | 574 SF | 300 SF | 2 |
| ELECTRICAL RM | R-2 | 39 SF | 300 SF | 0 |
| ELECTRICAL ROOM | R-2 | 131 SF | 300 SF | 0 |
| FIRE PUMP RM | R-2 | 169 SF | 300 SF | 1 |
| STAFF ROOM | R-2 | 401 SF | 300 SF | 1 |
| SUPER OFFICE | R-2 | 118 SF | 300 SF | 0 |
| SUPPLY. | R-2 | 213 SF | 300 SF | 1 |
| WORKSHOP | R-2 | 309 SF | 300 SF | 1 |
| 1ST FLOOR | | | | |
| COMPACTOR ROOM | R-2 | 733 SF | 300 SF | 2 |
| FITNESS ROOM | R-2 | 501 SF | 50 SF | 10 |
| LOUNGE | R-2 | 982 SF | 200 SF | 5 |
| MAILBOX ROOM | R-2 | 414 SF | 200 SF | 2 |
| MANAGEMENT OFFICE | R-2 | 1601 SF | 200 SF | 8 |
| PACKAGE ROOM | R-2 | 144 SF | 300 SF | 0 |
| 2nd Floor | | | | |
| RESIDENTIAL | R-2 | 9209 SF | 200 SF | 46 |
| 3rd Floor - 9th floor plans | | | | |
| RESIDENTIAL | R-2 | 9066 SF | 200 SF | 45 |
| 10th Floor Plans | | | | |
| RESIDENTIAL | R-2 | 9055 SF | 200 SF | 45 |
| 16th Floor to 26th | | | | |
| RESIDENTIAL | R-2 | 9081 SF | 200 SF | 45 |

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

# EGRESS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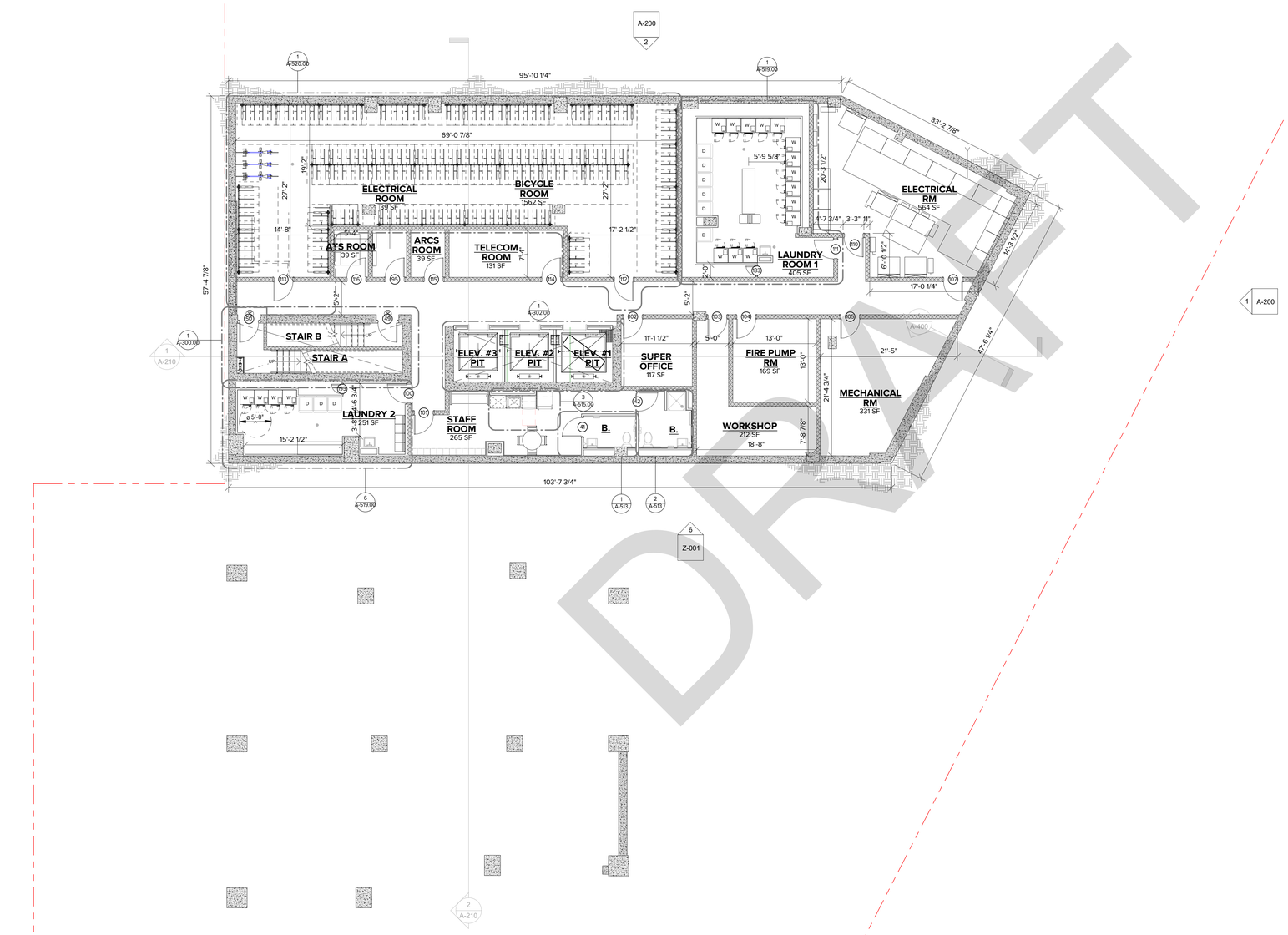


1 CELLAR PLAN
A-100 1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)-1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| | |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. 5 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| | |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULFu907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULRU914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- MIH- INCLUSIONARY/SUPPORTIVE UNIT
- MI- MOBILITY UNIT
- HVI - HEARING/ VISUAL UNIT
- APARTMENT TYPE

TYPE-B1 1BR 525 SF

- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- "T" FLOOR TURNING SPACE
- 5'-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET. 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:
1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR.
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(606)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117.1 - 2009 SEC 904.3.1

* ALL SPACES TO BE FILED UNDER SEPARATE APPLICATION

PLUMBING FIXTURE CALCULATION TABLE 403.1

| SPACE | OCCUPANCY | TOILET | LAVATORIES | DRINKING FOUNTAIN | SERVICE SINK |
|---|---|---|---|---|---|
| COMM SPACE #1 | 46 | 2 | 2 | 1 | 1 |
| COMM SPACE #2 | 85 | 2 | 2 | 1 | 1 |

* ALL PLUMBING CALCULATIONS TO BE REVIEWED AND LOCATIONS DETERMINED DURING TENANT FIT-OUT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## CELLAR PLAN


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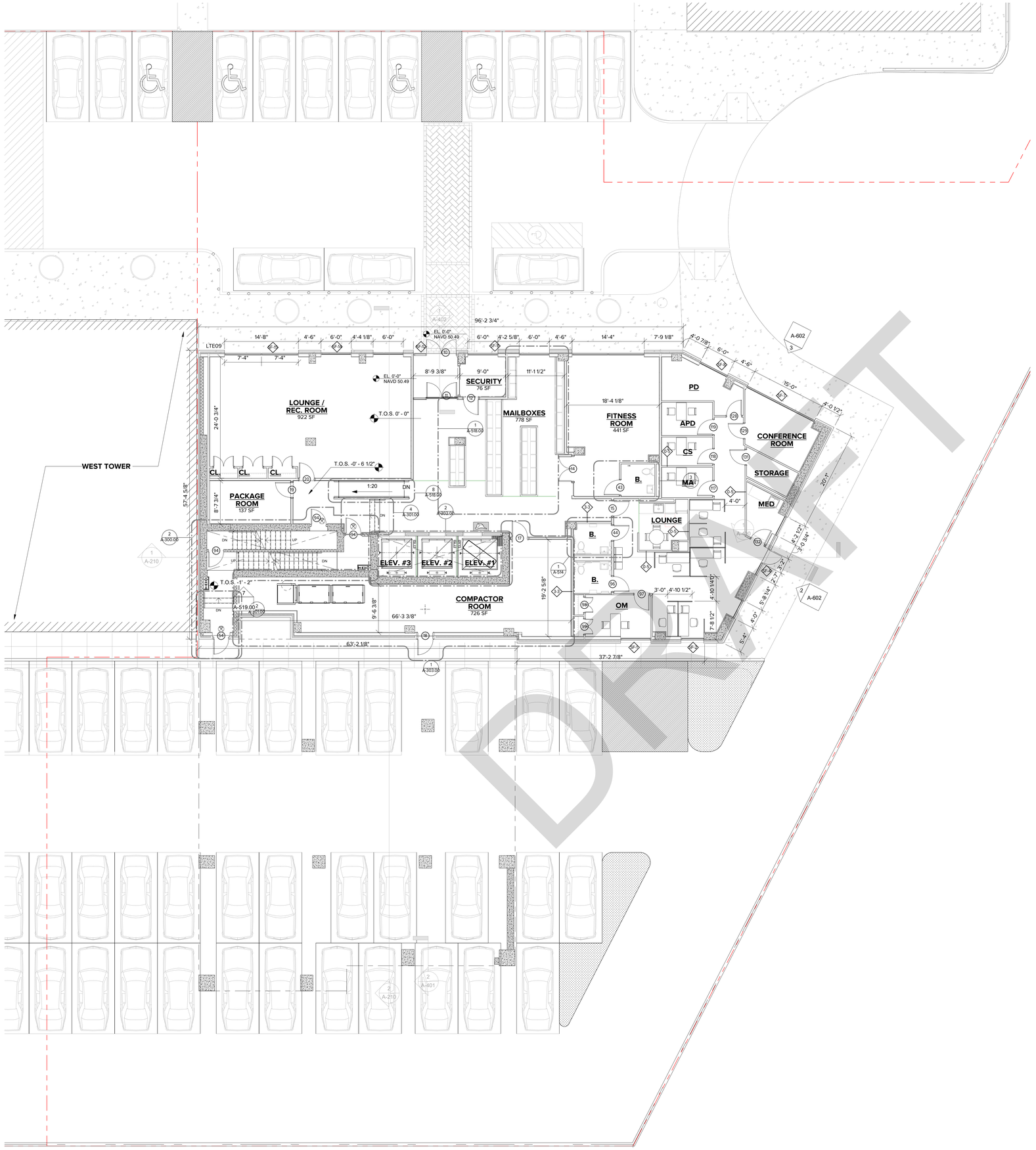


1 A-101 1ST FLOOR PLAN
1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)/1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. 5 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULR907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULR1914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- TYPE-B1 / 1BR / 525 SF — MIH- INCLUSIONARY/SUPPORTIVE UNIT; MI- MOBILITY UNIT; HVI - HEARING/ VISUAL UNIT; APARTMENT TYPE
- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- "T" FLOOR TURNING SPACE
- 5'-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET. 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:

1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR.
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(306)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117-1 - 2009 SEC 904.3.1

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
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Structural Engineer
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MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
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6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## 1ST FLOOR PLAN


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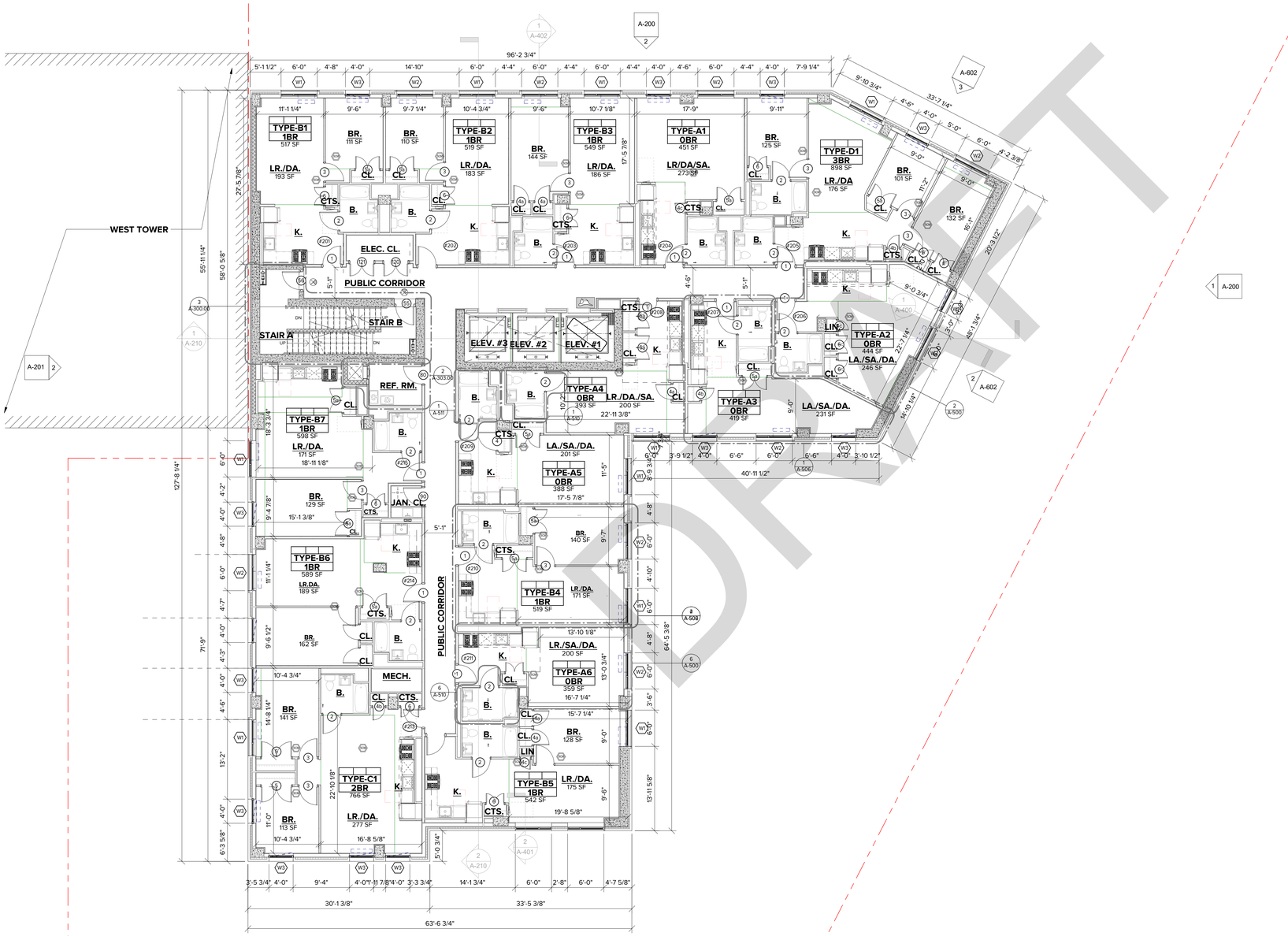
SEAL & SIGNATURE

ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/8" = 1'-0"
SHEET NO: OF
DRAWING NO: A-101.00

NYC DOB NUMBER: X00945951-I1




1 TYPICAL 2ND FLOOR PLAN
A-102 1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)-1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| | |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. S 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| | |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD., SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#U907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#U914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- MIH - INCLUSIONARY/SUPPORTIVE UNIT
- MI - MOBILITY UNIT
- HVI - HEARING/ VISUAL UNIT
- APARTMENT TYPE
- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- 11" FLOOR TURNING SPACE
- 5'-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET, 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:
1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR.
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(306)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117-1 - 2009 SEC 904.3.1

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
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Owner/Developer
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Civil Engineer
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6th Floor
New York, NY 10016
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| | |
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| 11/08/2024 | ISSUED FOR 100% SD |
| DATE | SUBMISSIONS / REVISIONS |

SHEET TITLE:

# TYPICAL 2ND FLOOR PLAN


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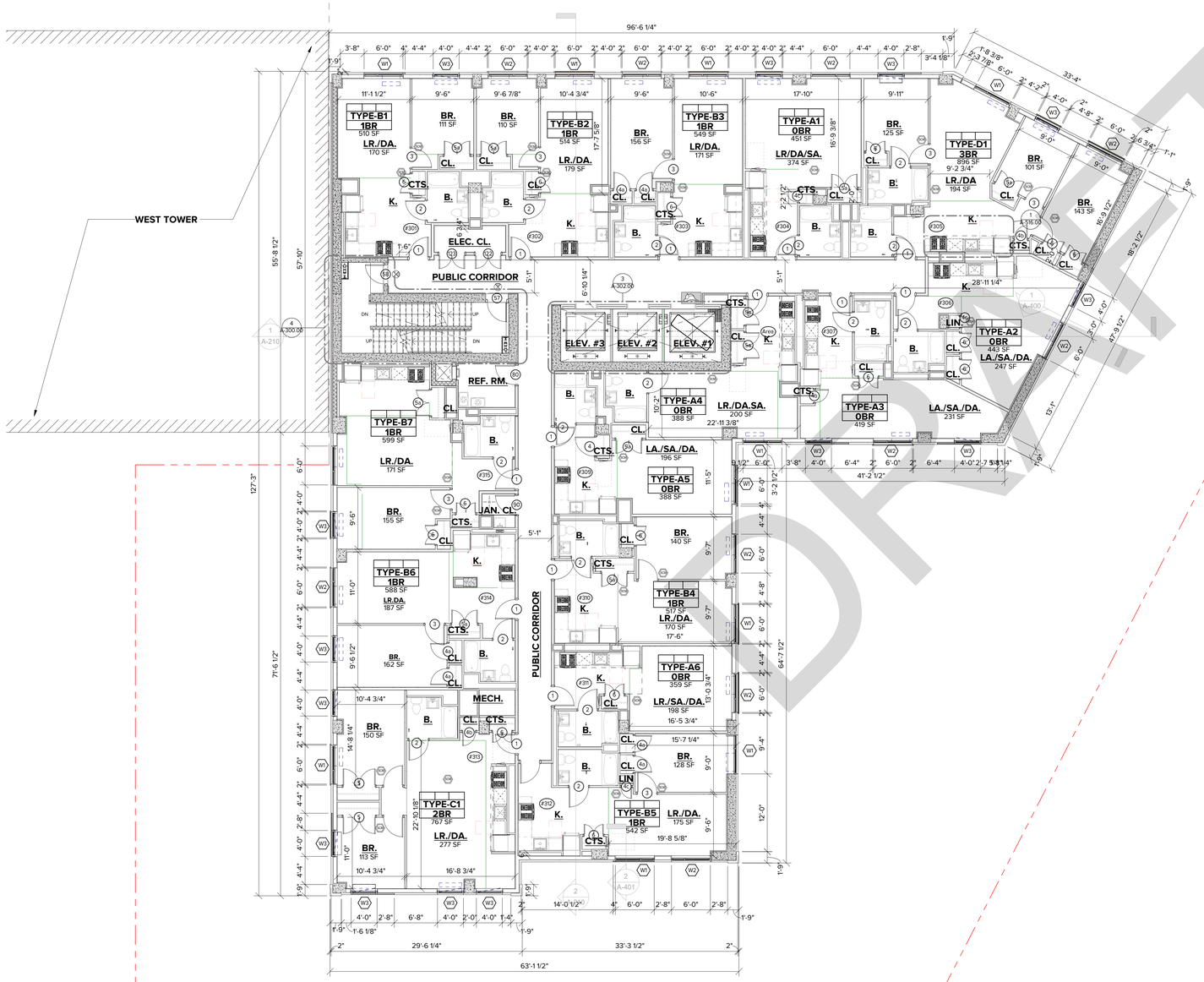
SEAL & SIGNATURE

ISSUE DATE: 05/03/23
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/8" = 1'-0"
SHEET NO: OF
DRAWING NO: A-102.00

NYC DOB NUMBER: X00945951-I1

DRAFT




1 TYPICAL 3RD - 9TH FLOOR PLANS
A-103 1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)-1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| | |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK, SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. S 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| | |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#U907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#U914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- MIH- INCLUSIONARY/SUPPORTIVE UNIT
- MI- MOBILITY UNIT
- HVI - HEARING/ VISUAL UNIT
- APARTMENT TYPE
- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- "T" FLOOR TURNING SPACE
- 5'-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET. 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:
1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR.
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(606)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117.1 - 2009 SEC 904.3.1

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St,
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St,
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## TYPICAL 3RD - 9TH FLOOR PLANS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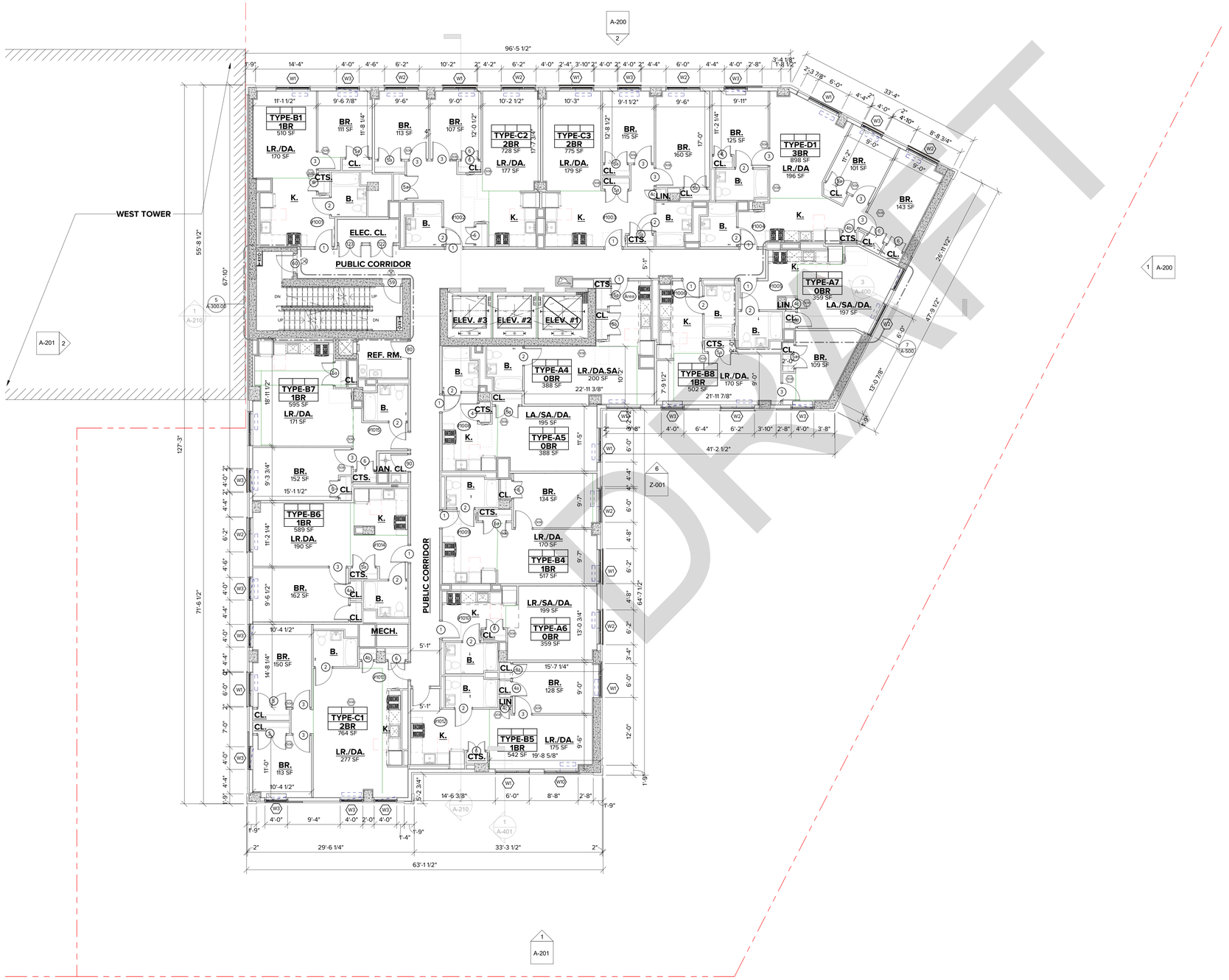
SEAL & SIGNATURE

ISSUE DATE: 05/03/23
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/8" = 1'-0"
SHEET NO: OF
DRAWING NO: A-103.00

NYC DOB NUMBER: X00945951-I1

DRAFT




1 TYPICAL 10TH - 15TH FLOOR PLANS
A-104 1/8" = 1'-0"

**WALL TYPE LEGEND**

**NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.**

| | |
|---|---|
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)-1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| | |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. 5 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| | |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2, FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#U907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#U914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOORDECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- TYPE-B1 1BR 525 SF — MH- INCLUSIONARY/SUPPORTIVE UNIT; MI- MOBILITY UNIT; HVI - HEARING/ VISUAL UNIT; APARTMENT TYPE
- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- T" FLOOR TURNING SPACE
- 5-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET, 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:

1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR.
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION.
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(306)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117-1 - 2009 SEC 904.3.1

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## TYPICAL 10TH - 15TH FLOOR PLANS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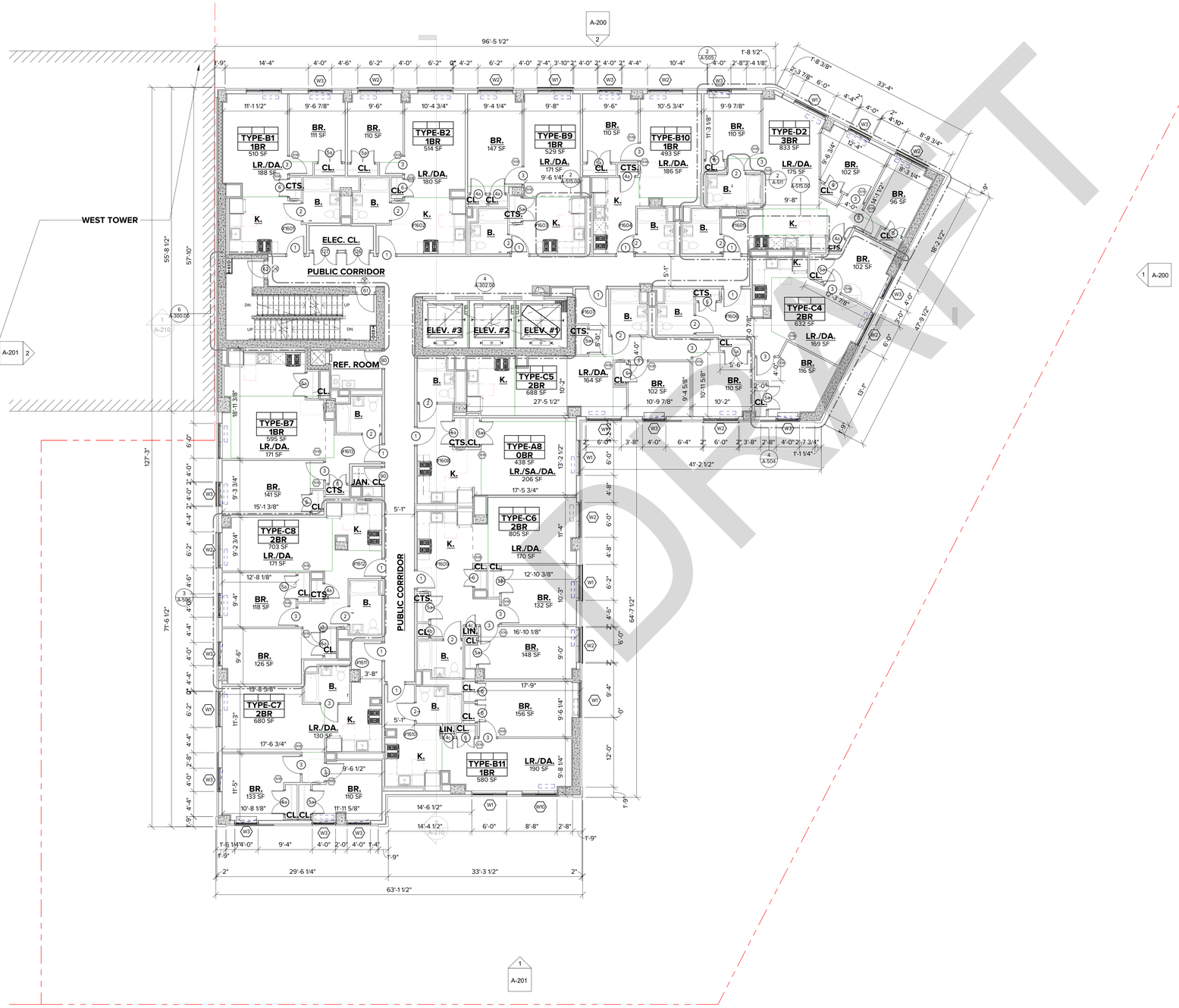
SEAL & SIGNATURE

ISSUE DATE: 05/03/23
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/8" = 1'-0"
SHEET NO: OF
DRAWING NO: A-104.00

NYC DOB NUMBER: X00945951-I1




1 A-105 TYPICAL 16TH - 26TH FLOOR PLANS 1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)-1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| | |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. S 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| | |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO. 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2, FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULFu907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULFu914) PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- TYPE-B1 1BR 525 SF — APARTMENT TYPE
- MIH- INCLUSIONARY/SUPPORTIVE UNIT
- MI- MOBILITY UNIT
- HVI - HEARING/ VISUAL UNIT
- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- "T" FLOOR TURNING SPACE
- 5'-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET. 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:
1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.).
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR.
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(306)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117-1 - 2009 SEC 904.3.1

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

# TYPICAL 16TH - 26TH FLOOR PLANS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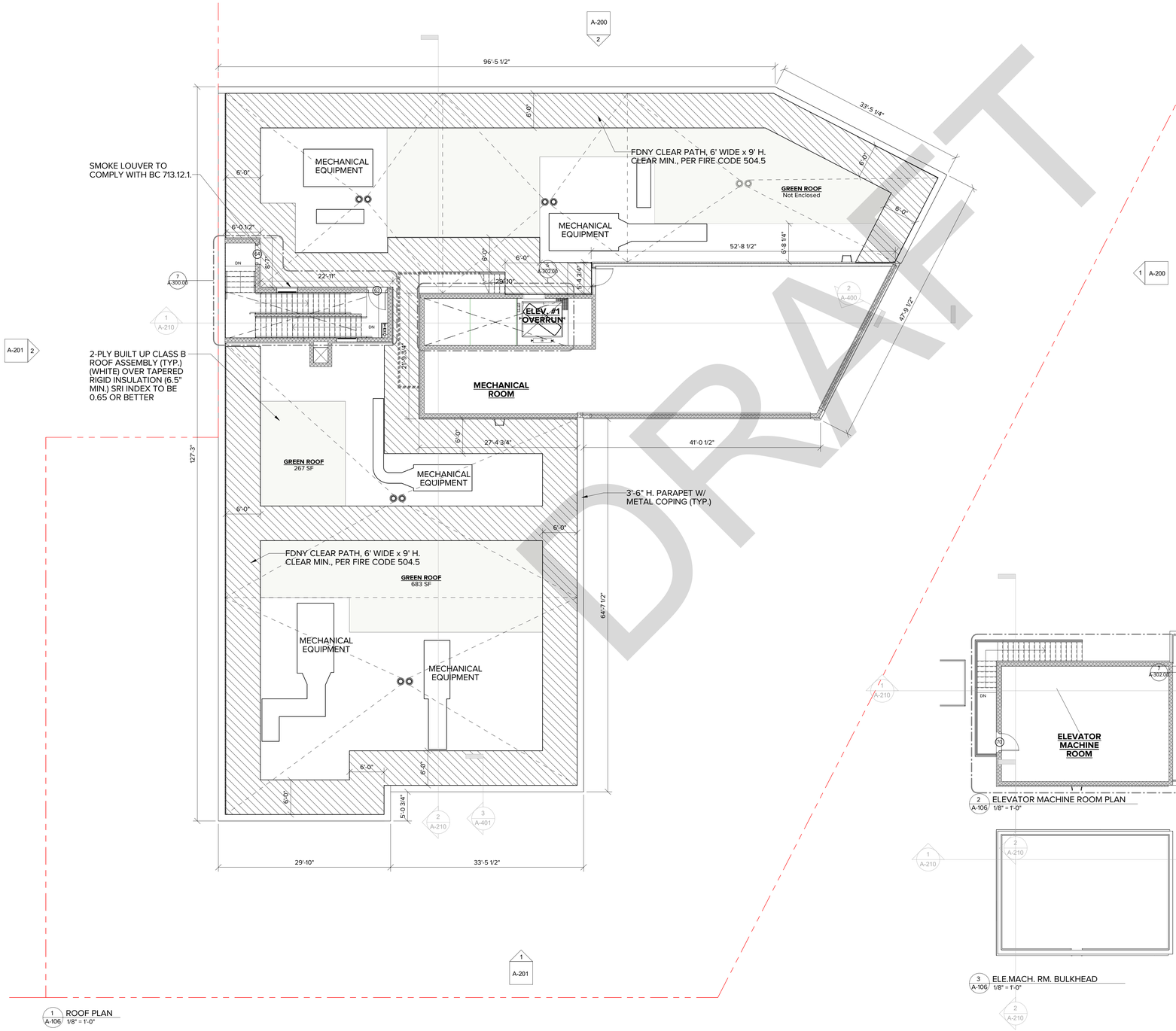
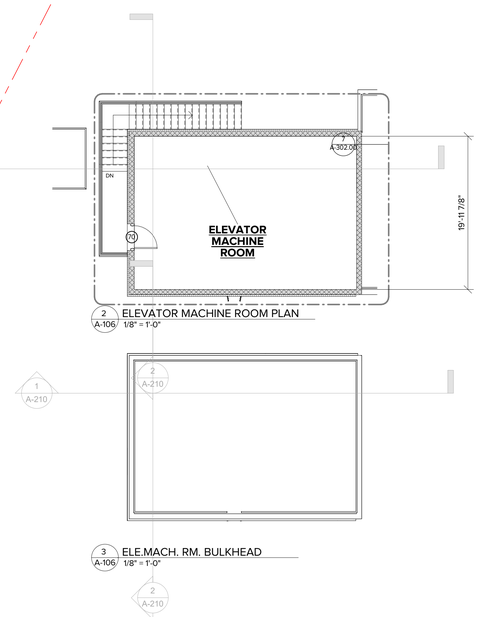
SEAL & SIGNATURE

ISSUE DATE: 05/03/23
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/8" = 1'-0"
SHEET NO: OF
DRAWING NO: A-105.00
NYC DOB NUMBER: X00945951-I1




1 ROOF PLAN
A-106 1/8" = 1'-0"




2 ELEVATOR MACHINE ROOM PLAN
A-106 1/8" = 1'-0"




3 ELE.MACH. RM. BULKHEAD
A-106 1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)-1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| | |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. 5 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| | |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#u907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#U914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- TYPE-B1 1BR 525 SF — MIH- INCLUSIONARY/SUPPORTIVE UNIT; MI- MOBILITY UNIT; HVI - HEARING/ VISUAL UNIT; APARTMENT TYPE
- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- "T" FLOOR TURNING SPACE
- 5-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET. 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:
1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(306)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117-1 - 2009 SEC 904.3.1

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
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845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
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## ROOF PLAN


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SCALE: 1/8" = 1'-0"
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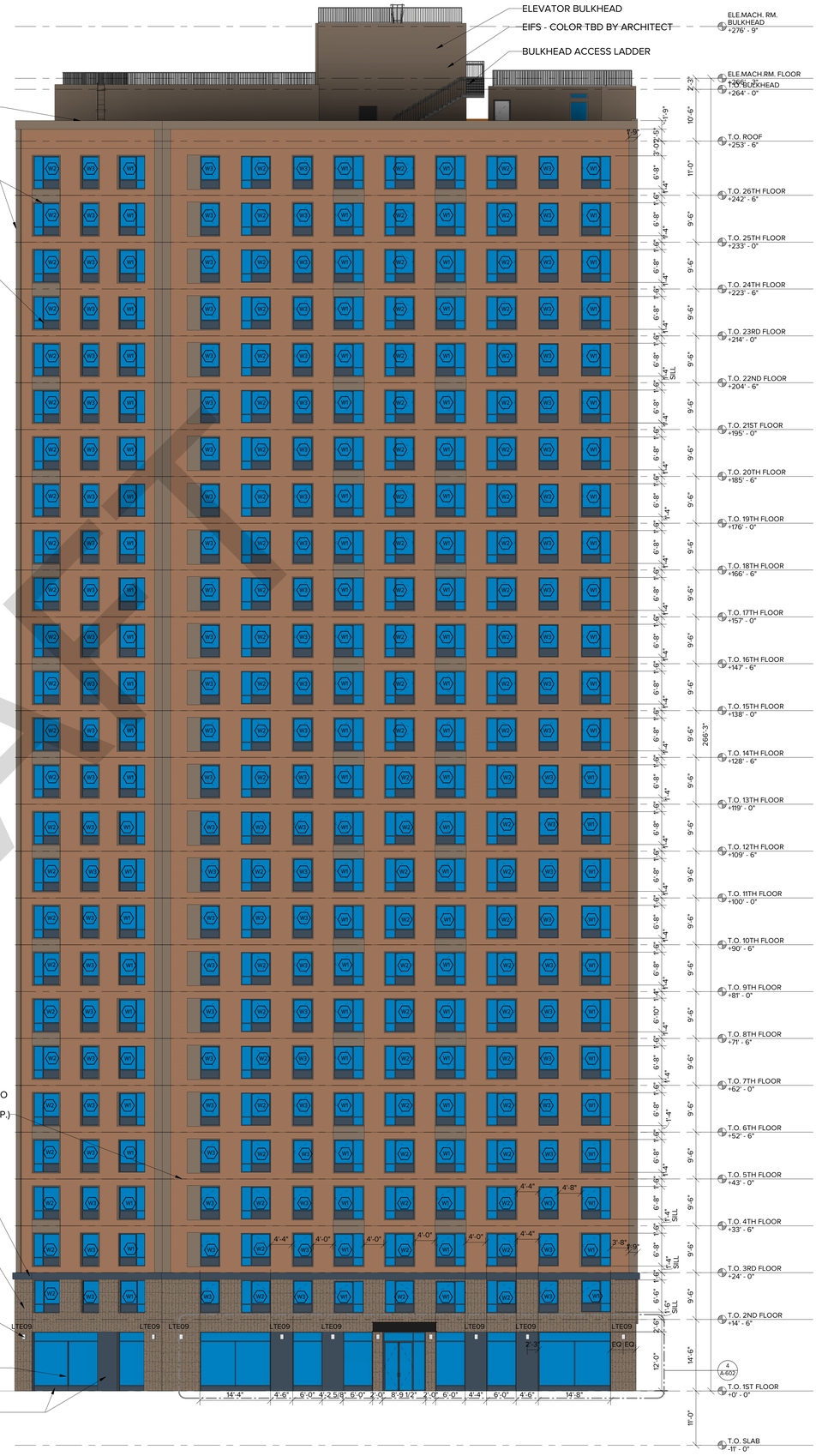
DRAWING NO: A-106.00

NYC DOB NUMBER: X00945951-I1

DRAFT

1 EAST ELEVATION
A-200 3/32" = 1'-0"




2 NORTH ELEVATION
A-200 3/32" = 1'-0"

DRAFT

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## NORTH & EAST ELEVATIONS

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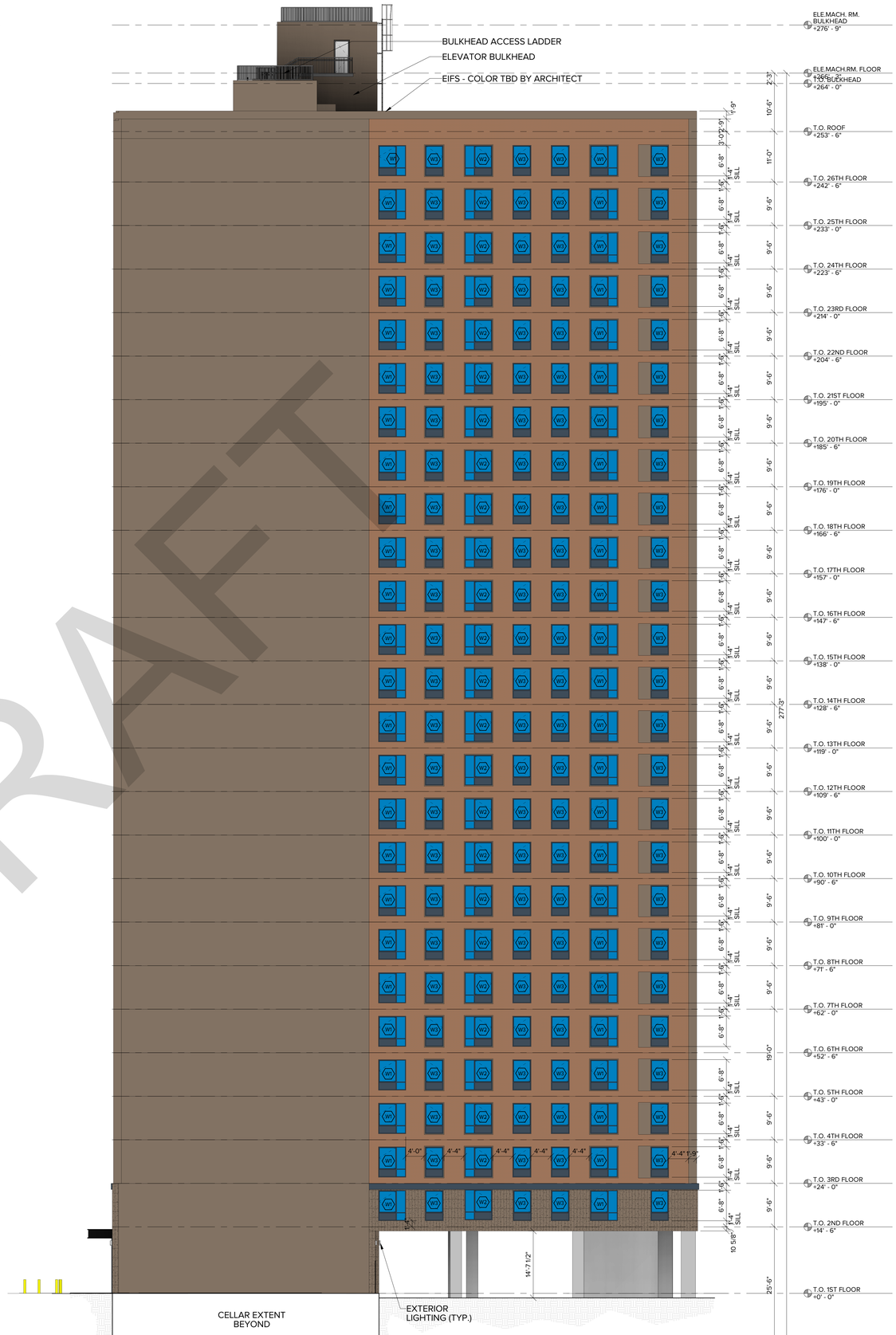
SHEET NO: OF
DRAWING NO: A-200.00

NYC DOB NUMBER: X00945951-I1

1 A-201 SOUTH ELEVATION
3/32" = 1'-0"




2 A-201 WEST ELEVATION
3/32" = 1'-0"

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BRONX, NY 10451

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## SOUTH & WEST ELEVATIONS


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# A-201.00

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## Renderings

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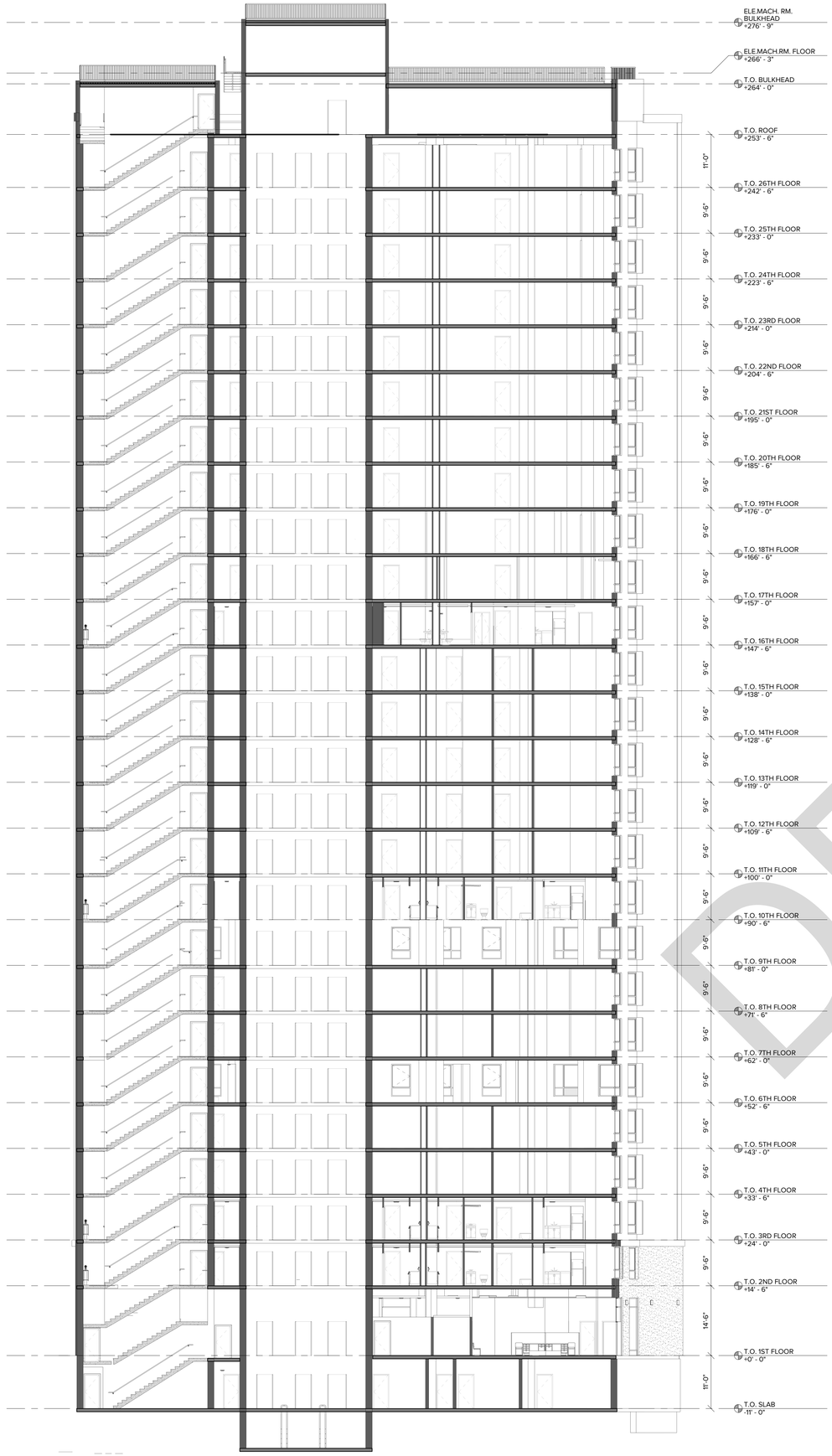
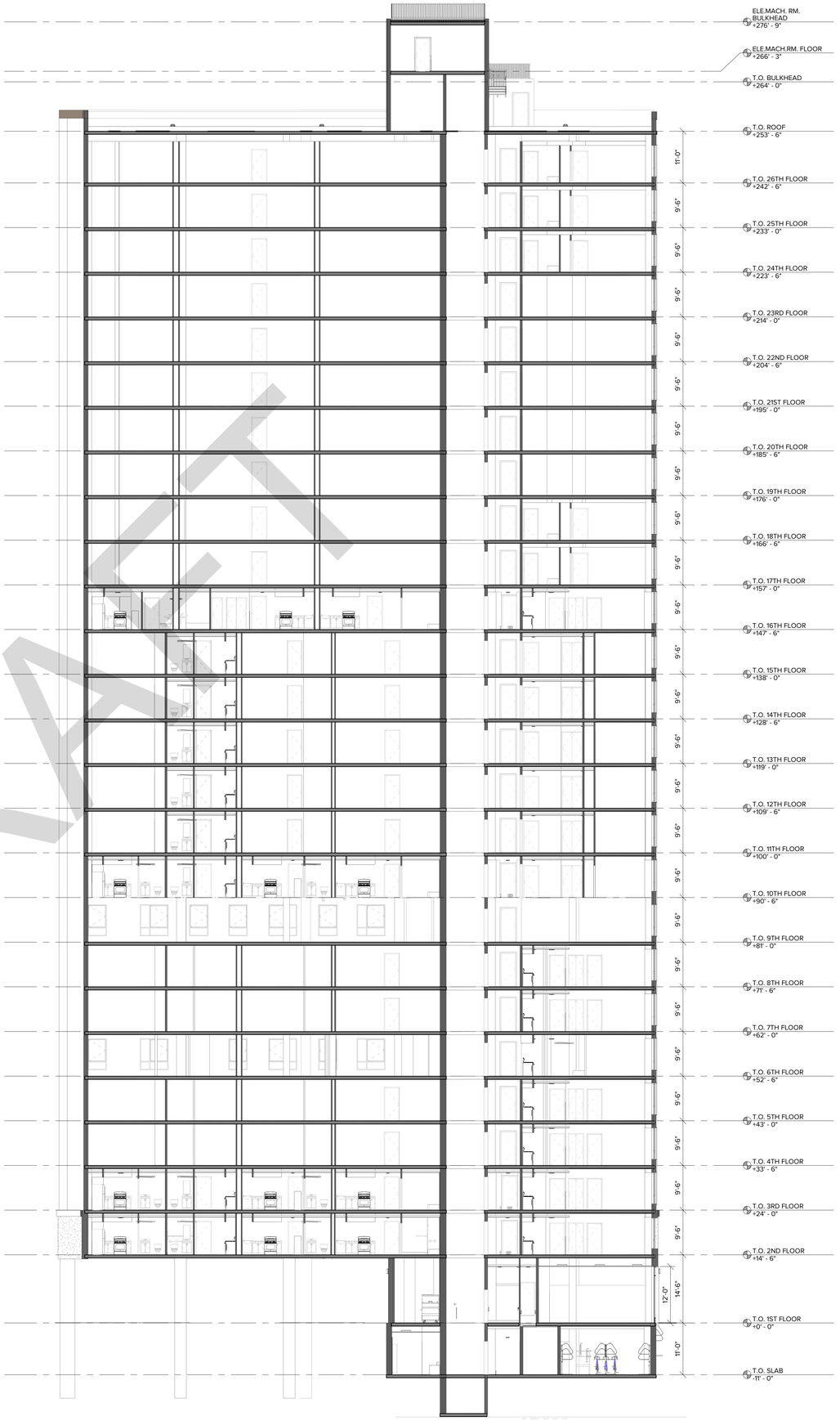



1 A-210 CROSS SECTION 1
3/32" = 1'-0"




2 A-210 CROSS SECTION 2
3/32" = 1'-0"

DRAFT

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BRONX, NY 10451

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## BUILDING SECTION A-A

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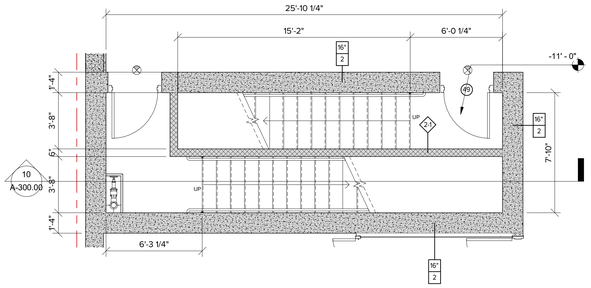
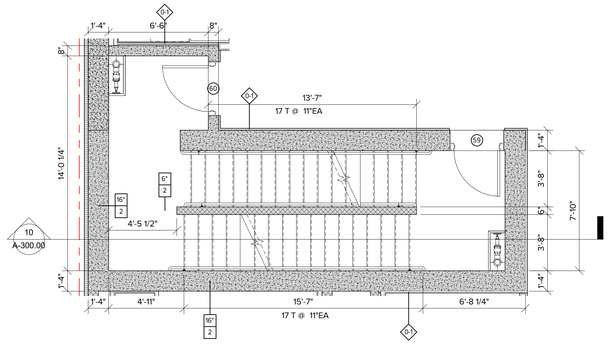
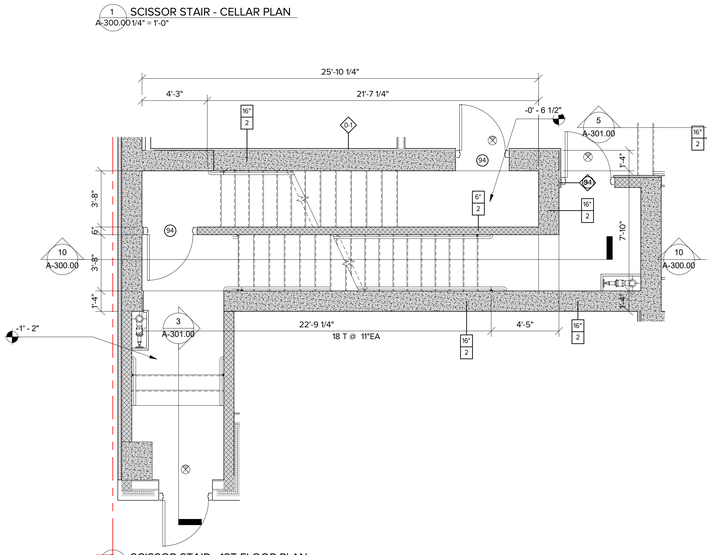


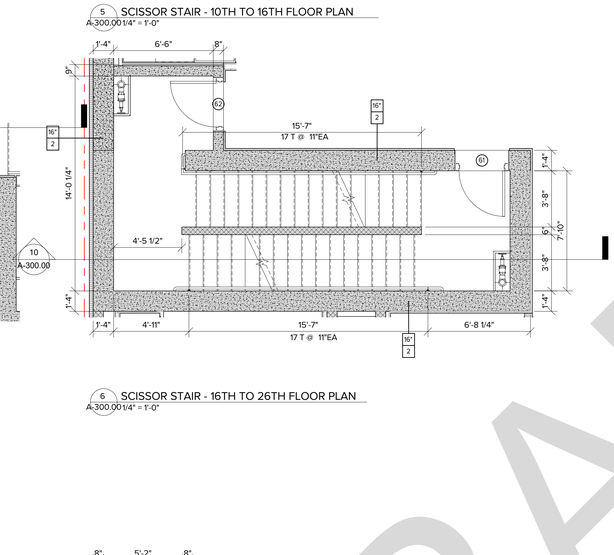

1 SCISSOR STAIR - CELLAR PLAN
A-300.00 1/4" = 1'-0"



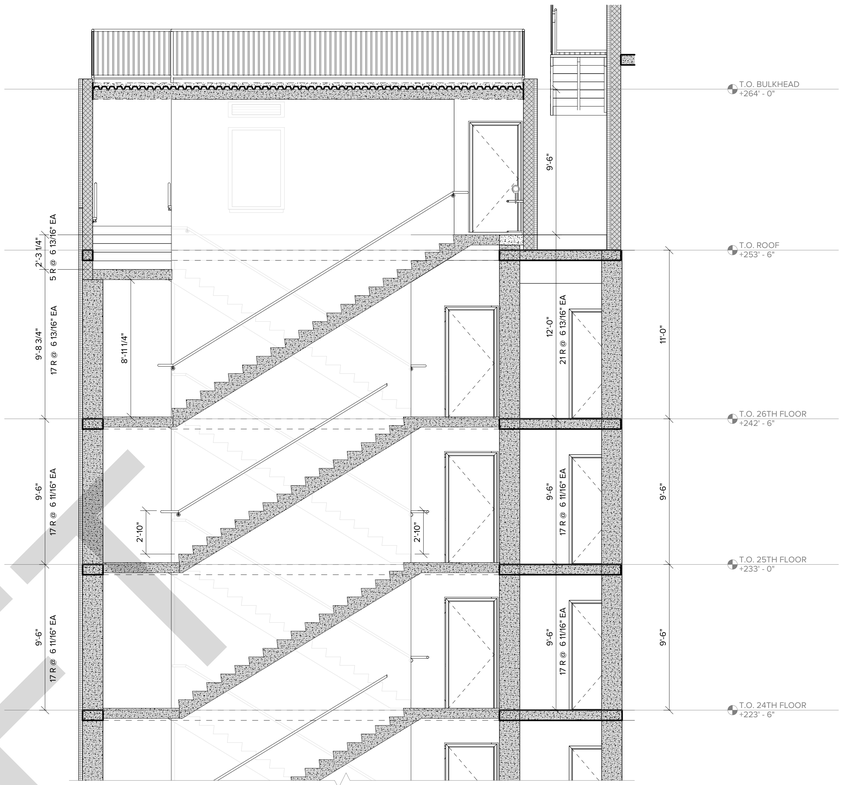

5 SCISSOR STAIR - 10TH TO 16TH FLOOR PLAN
A-300.00 1/4" = 1'-0"

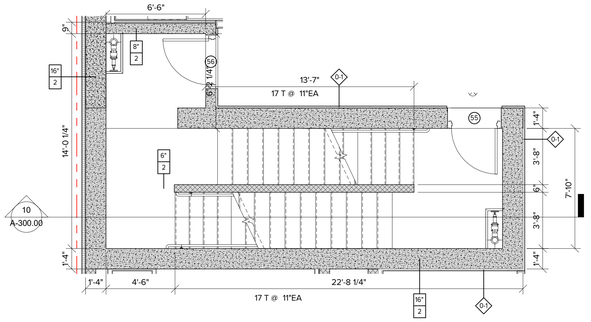



2 SCISSOR STAIR - 1ST FLOOR PLAN
A-300.00 1/4" = 1'-0"

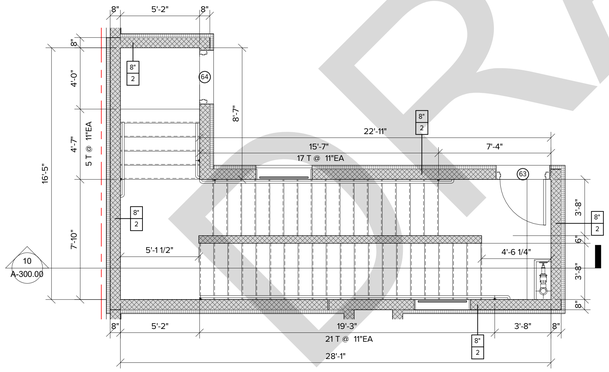



6 SCISSOR STAIR - 16TH TO 26TH FLOOR PLAN
A-300.00 1/4" = 1'-0"

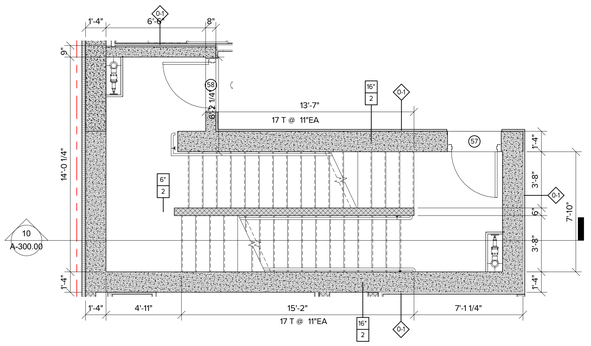



3 SCISSOR STAIR - 2ND FLOOR PLAN
A-300.00 1/4" = 1'-0"

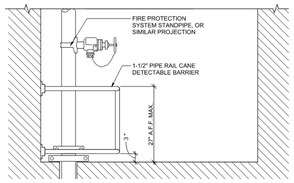



7 SCISSOR STAIR - ROOF PLAN
A-300.00 1/4" = 1'-0"

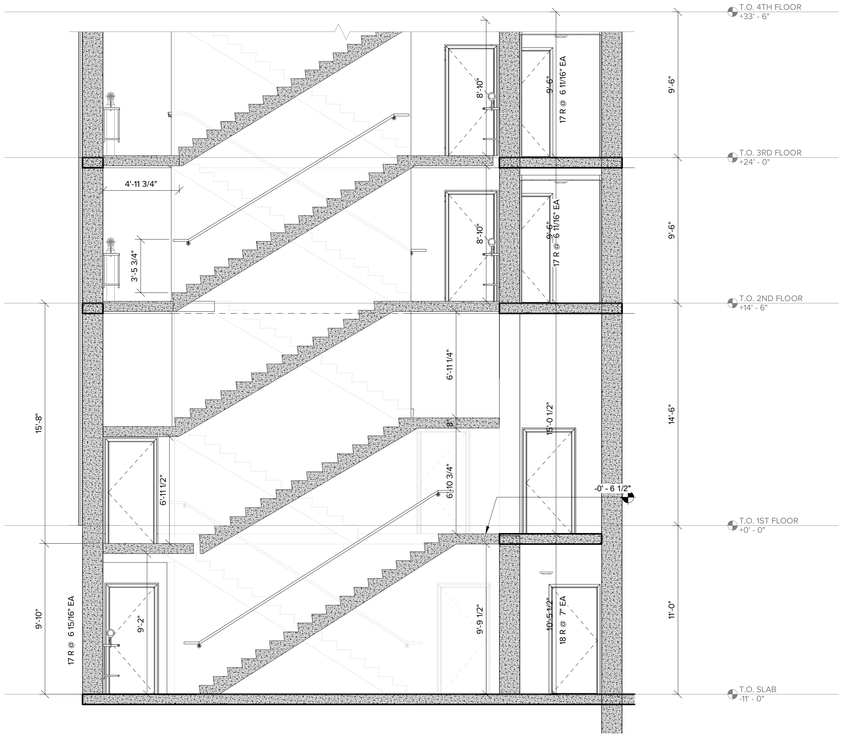



4 SCISSOR STAIR - 3RD TO 9TH FLOOR PLAN
A-300.00 1/4" = 1'-0"

STAIR NOTES:
- GC TO VERIFY TOP OF STAIR LANDING ELEVATION WITH TOP OF FINISHED FLOOR ON THE PUBLIC CORRIDOR SIDE. MAX DIFFERENCE IN ELEVATION BETWEEN TOP OF LANDING AND TOP OF FINISHED FLOOR ON THE PUBLIC CORRIDORS SIDE SHALL BE 1/4"
- PROVIDE SELF-LUMINOUS ERESS PATH MARKING PAINT ON STEPS AND LANDINGS: A SOLID AND CONTINUOUS STRIPE SHALL BE APPLIED TO THE HORIZONTAL LEADING EDGE OF EACH STEP AND SHALL EXTEND FOR THE FULL LENGTH OF THE STEP. OUTLINING STRIPES SHALL HAVE A MINIMUM HORIZONTAL WIDTH OF 1 INCH AND MAXIMUM WIDTH OF 2 INCHES. THE LEADING EDGE OF THE STRIPE SHALL BE PLACED AT A MAXIMUM OF 1/2 INCH FROM THE LEADING EDGE OF STEP AND THE STRIPE SHALL OVERLAP THE LEADING EDGE OF THE STEP BY NOT MORE THAN 1/2 INCH DOWN TO VERTICAL FACE OF THE STEP. ON LANDINGS THE LEADING EDGE SHALL BE MARKED WITH A STRIPE CONSISTENT WITH THE DIMENSIONAL REQUIREMENTS FOR STEPS
- ALL STEEL TO SUPPORT THE STAIR PLATFORM TO BE PAINTED




NOTE:
IN COMPLIANCE WITH ANSI A117.1 SECTION 307.2, A CANE DETCTETABLE BARRIER SHALL BE PROVIDED FOR OBJECTS WITH LEADING EDGES MORE THAN 27" AND LESS THAN 80" A.F.FD AND PROTRUDING MORE THAN 4" HORIZONTALLY INTO THE CIRCULATION PATH.




10 SCISSOR STAIR SECTION
A-300.00 1/4" = 1'-0"

DRAFT

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## STAIR - FLOOR PLANS AND SECTION

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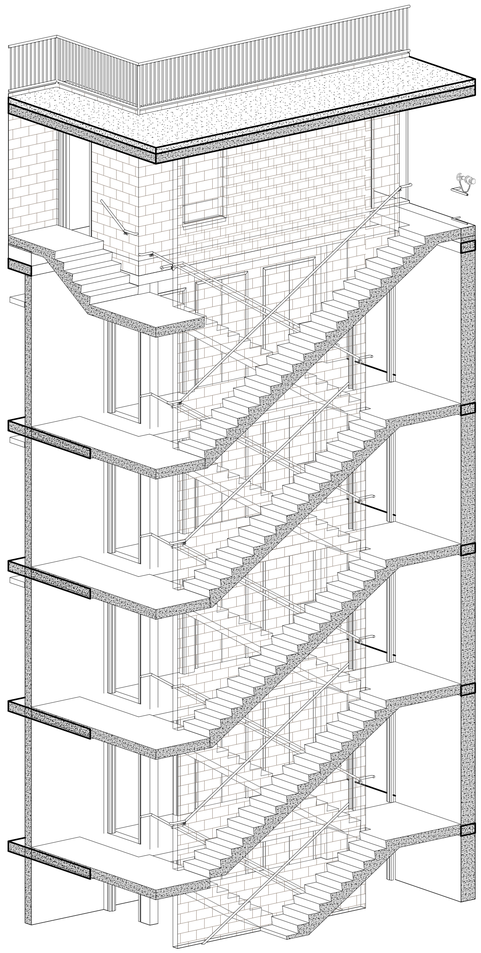
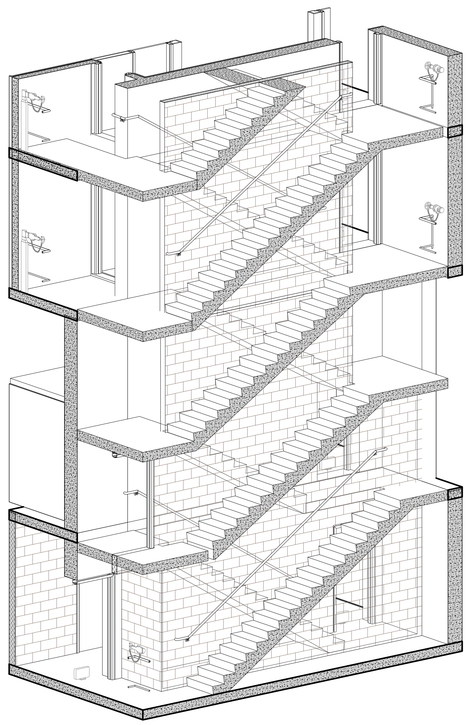
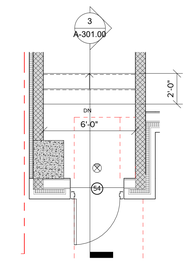
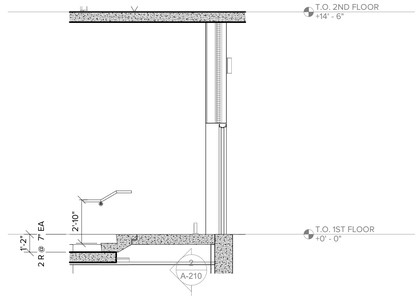


1 SCISSOR STAIR - AXONOMETRIC
A-301.00

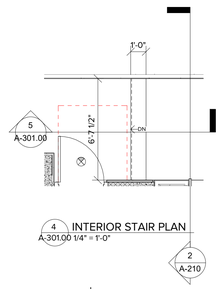




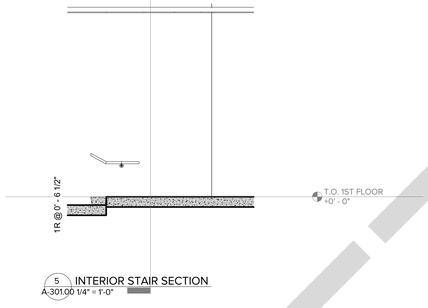

2 STAIR @ EXIT - PLAN
A-301.00 1/4" = 1'-0"



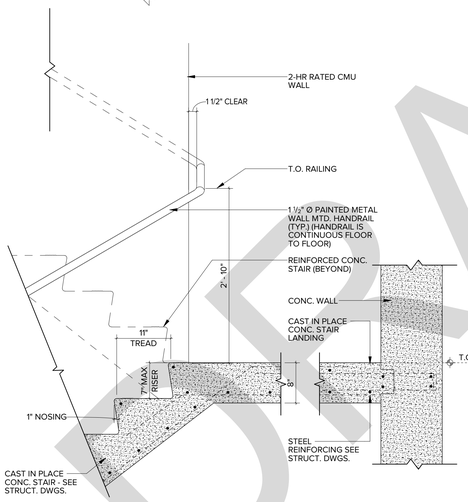

3 STAIR @ EXIT - SECTION
A-301.00 1/4" = 1'-0"



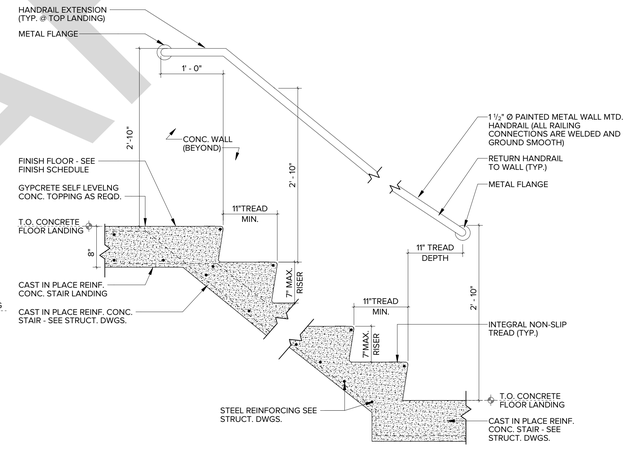

4 INTERIOR STAIR PLAN
A-301.00 1/4" = 1'-0"



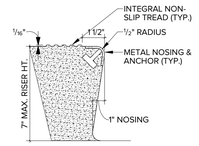

5 INTERIOR STAIR SECTION
A-301.00 1/4" = 1'-0"



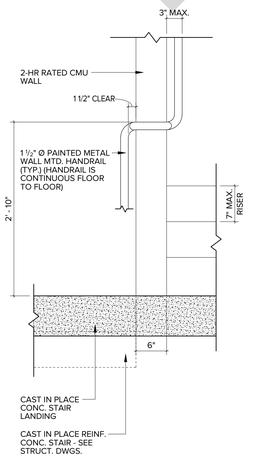

6 CONCRETE STAIRS TYPICAL SECTION AT INTERMEDIATE LANDINGS
A-301.00 1" = 1'-0"



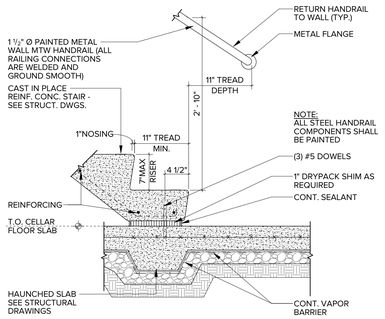

7 CONCRETE STAIRS TYPICAL TOP AND BOTTOM STAIR LANDINGS
A-301.00 1" = 1'-0"



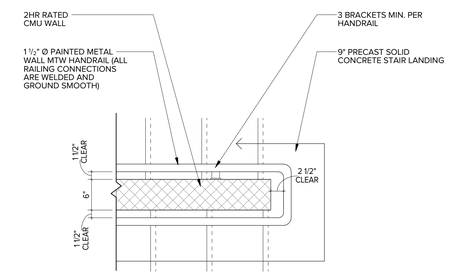

10 TYPICAL STAIR NOSING DETAIL
A-301.00 3" = 1'-0"




8 STAIR DETAIL @ INTERMEDIATE LANDING
A-301.00 1" = 1'-0"




22 CONCRETE STAIRS - SLAB ON GRADE STAIR LANDING
A-301.00 1" = 1'-0"




9 STAIR RAILING - PLAN AT LANDINGS
A-301.00 1" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

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| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

## STAIR - FLOOR PLANS AND SECTIONS

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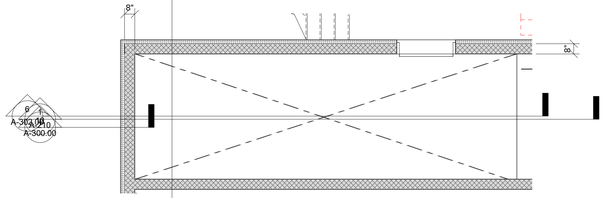
SEAL & SIGNATURE

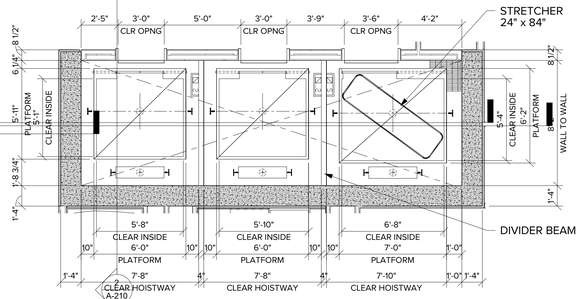
ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: As indicated
SHEET NO: OF

DRAWING NO:
# A-301.00

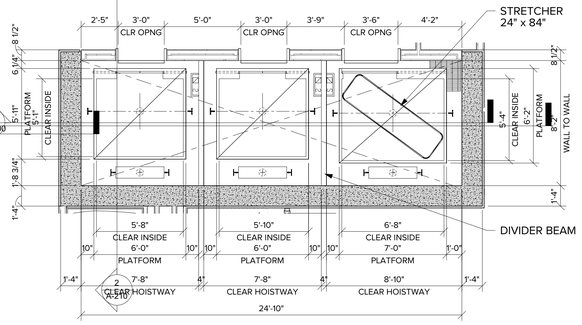
NYC DOB NUMBER: X00945951-I1



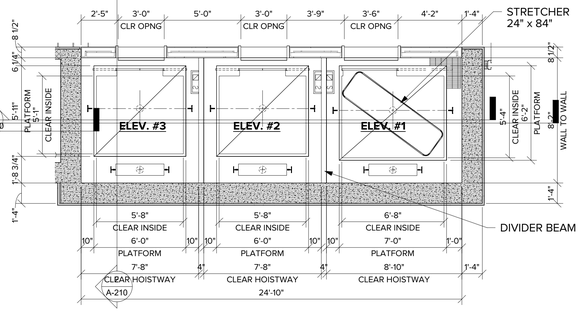

5 ELEVATOR #1, #2, & #3 @ ROOF FLOOR
A-302.00 1/4" = 1'-0"




4 ELEVATOR #1, #2, & #3 @ 16TH TO 26TH FLOOR
A-302.00 1/4" = 1'-0"




3 ELEVATOR #1, #2, & #3 @ 3RD TO 9TH FLOOR
A-302.00 1/4" = 1'-0"




2 ELEVATOR #1, #2, & #3 @ 1ST FLOOR
A-302.00 1/4" = 1'-0"




1 ELEVATOR #1, #2, & #3 @ PIT DEPTH
A-302.00 1/4" = 1'-0"




6 ELEVATOR #1, #2, & #3 SECTION
A-302.00 1/4" = 1'-0"

## ENERGY CODE SECT. C405.9.1 ELEVATOR CABS

ELEVATOR MUST MEET STANDARDS AS INDICATED IN THIS SECTION;

1. FOR THE LUMINARIES IN EACH ELEVATOR CAB, NOT INCLUDING SIGNALS AND DISPLAYS, THE SUM OF THE LUMENS DIVIDED BY THE SUM OF THE WATTS SHALL BE NOT LESS THAN 35 LUMENS PER WATT.
2. VENTILATION FANS IN ELEVATORS THAT DO NOT HAVE THEIR OWN AIR-CONDITIONING SYSTEM SHALL NOT CONSUME MORE THAN 0.33 WATTS/ CFM AT THE MAXIMUM RATED SPEED OF THE FAN.
3. CONTROLS SHALL BE PROVIDED THAT WILL DE-ENERGIZE VENTILATION FANS AND LIGHTING SYSTEMS WHEN THE ELEVATOR IS STOPPED, UNOCCUPIED AND WITH ITS DOORS CLOSED FOR OVER 15 MINUTES.

GENERAL NOTES:

1. ELEVATOR ENCLOSURE ARE COMPLIANT WITH B.C. 43.2.3
2. HOIST WAY ENCLOSURE LIGHTING PROVIDED AS PER B.C. 30007.7
3. FLOOR DRAINS SHALL BE PROVIDED AT ALL ELEVATOR LOBBIES TO COMPLY WITH B.C. 3007.3 - SEE PLUMBING DWG'S
4. ELEVATORS ARE COMPLAINT WITH ICC A 117.1-2009 FOR MINIMUM INTERIOR DIMENSIONS AND PROVIDE APPROPRIATE CLEARANCE TO ACCOMMODATE A 24"X84" AMBULANCE STRETCHER IN THE OPEN POSITIONS AS PER NYC B.C. 3002.4.2
5. ELEVATOR CAB FLOOR AND CEILING FINISHES SHALL BE DURABLE AND WEAR RESISTANT.
6. ELEVATOR CABSHALL BE EQUIPPED WITH STAINLESS STEEL HANDRAILS AND SHATTERPROOF MIRROR IN COMPLIANCE WITH THE HCR DESIGN GUIDELINES - ACCESSIBILITY / VISIBILITY CRITERIA (BUILDING)

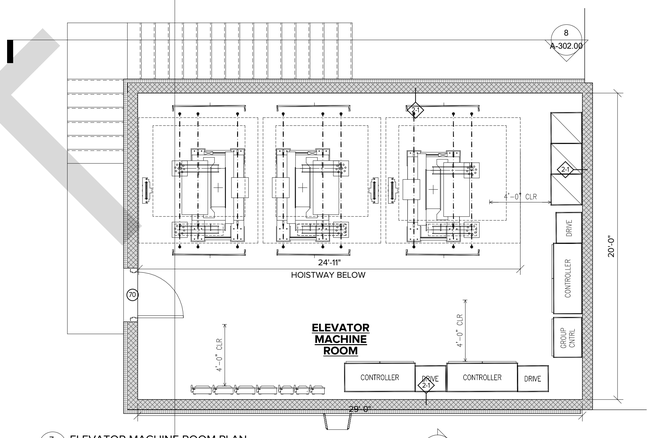
## ELEVATOR BASIS OF DESIGN

- 3500 LBS CAPACITY
- 200 FPM SPEED
- 9'-2"W X 6'-4"D (SEISMIC INCLUDED)
- 8'-0" CLEAR INSIDE CAB HT
- 3'-6" DOOR WIDTH
- 12'-8" MIN OVERHEAD
- 5'-0" PIT DEPTH
- 3-10"W (MIN.) X 6'-4"D X 7'-6" HT CLR MIN. MACHINE ROOM

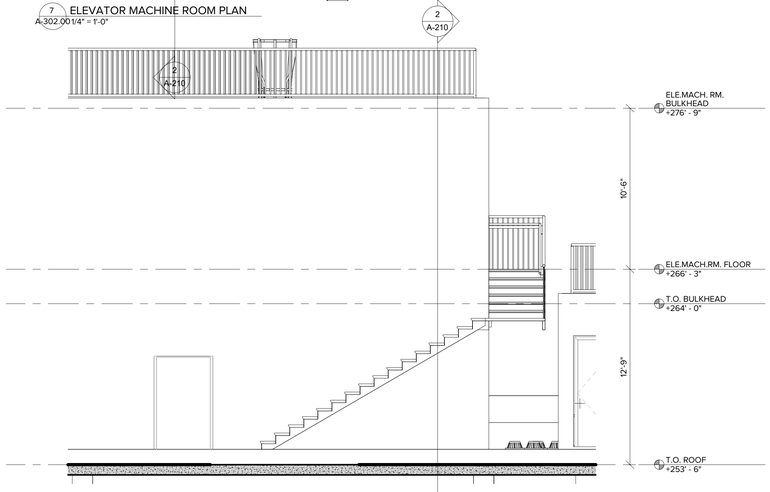
## ELEVATOR FINISH SCHEDULE

| CAR | FLOORING | BASE | WALLS | CEILING |
|---|---|---|---|---|
| | 1 1/4" TILE | BRUSHED STAINLESS STEEL | PANEL FINISH | BRUSHED STEEL FINISH |

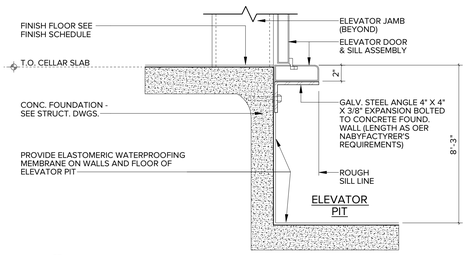
NOTE: CAR HANDRAIL TO BE BRUSHED STAINLESS STEEL FINISH




7 ELEVATOR MACHINE ROOM PLAN
A-302.00 1/4" = 1'-0"




8 EMR EXTERIOR STAIR SECTION
A-302.00 1/4" = 1'-0"




9 ELEVATOR SILL DETAIL @ ELEVATOR PIT
A-302.00 1 1/2" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
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Suffern, NY 10901
845.368.0004
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**BRONX PARK GTAH II LLC:**
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Bronx, NY 10451

Structural Engineer
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25th Floor
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## ELEVATORS #1, 2 & 3 - FLOOR PLANS AND SECTION

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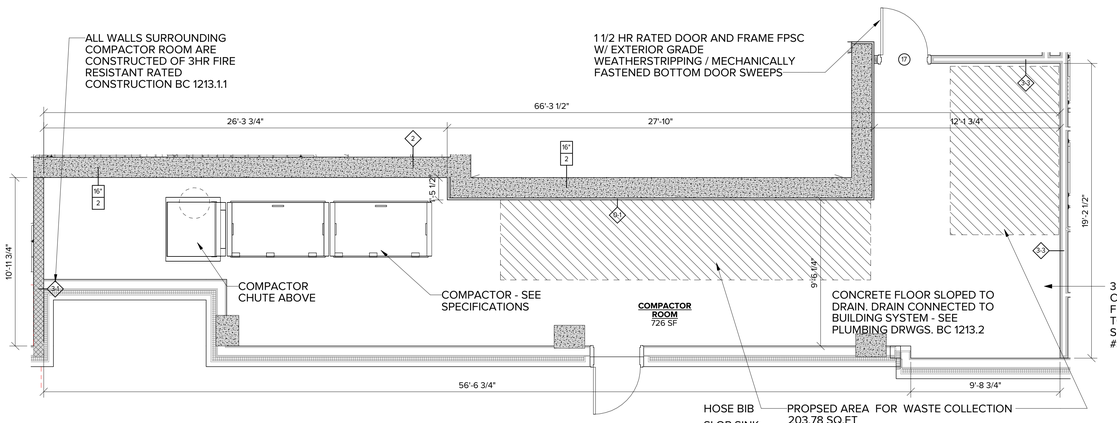
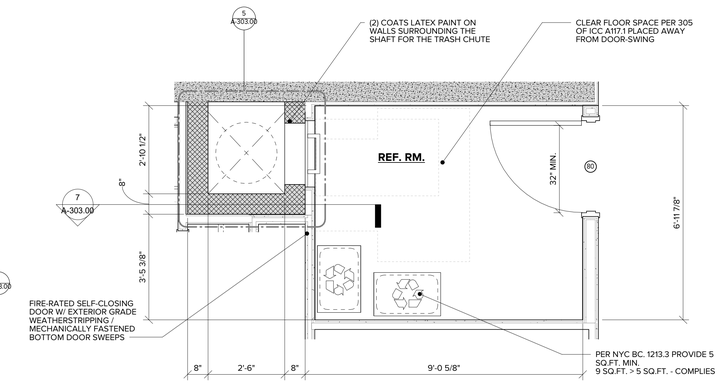
SCALE: As indicated
SHEET NO: OF

DRAWING NO: A-302.00.00

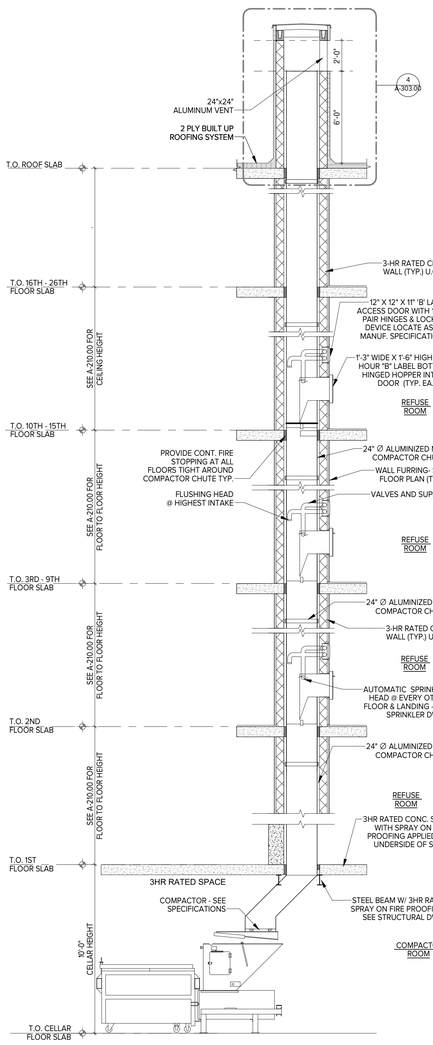
NYC DOB NUMBER: X00945951-I1



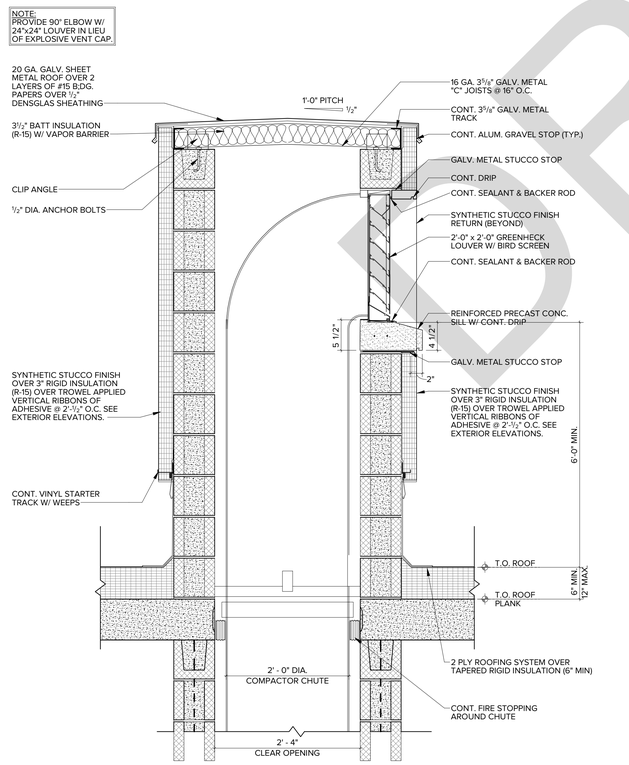

1 TRASH COMPACTOR ROOM PLAN
A-303.00 1/4" = 1'-0"



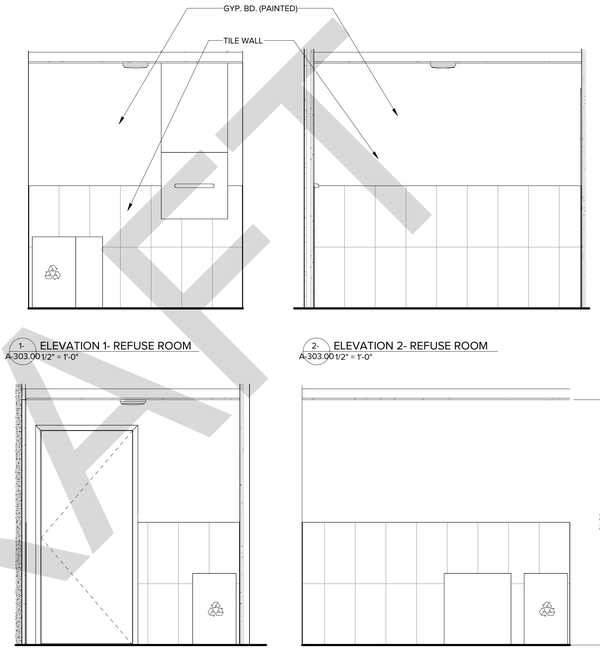

2 REFUSE ROOM - TYPICAL 2ND - 26TH FLOOR PLAN
A-303.00 1/2" = 1'-0"




7 SECTION THRU COMPACTOR CHUTE
A-303.00 1/4" = 1'-0"




4 TRASH CHUTE TOP VENT DETAIL (FLAT ROOF)
A-303.00 1" = 1'-0"




1 ELEVATION 1- REFUSE ROOM
A-303.00 1/2" = 1'-0"



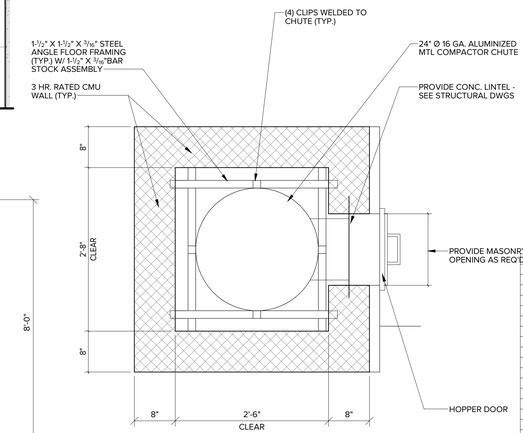
2 ELEVATION 2- REFUSE ROOM
A-303.00 1/2" = 1'-0"



9 ELEVATION 3- REFUSE ROOM
A-303.00 1/2" = 1'-0"




11 ELEVATION 4- REFUSE ROOM
A-303.00 1/2" = 1'-0"




5 TYPICAL TRASH CHUTE FRAMING DETAIL
A-303.00 1" = 1'-0"

*version 4/1/2022*

## DSNY Waste Calculator for New Residential Buildings

| Unit Size | # of Units | # of Residents | Estimated Occupancy Per Unit |
|---|---|---|---|
| Studio & 1 Bedroom | 241 | 482 | 2 Residents |
| 2 Bedroom | 81 | 243 | 3 Residents |
| 3 Bedroom | 25 | 100 | 4 Residents |
| **Total Units** | **347** | **825** | |

**Weekly Waste Weight** (3.5 lb/person/day)

| | Total Waste | Trash | Paper/ Cardboard | Metal/Glass/ Plastic/Cartons |
|---|---|---|---|---|
| Pounds | 20,213 | 15,362 | 2,426 | 2,426 |
| Tons | **10.11** | **7.68** | **1.21** | **1.21** |

**Weekly Waste Volume**

| | Trash | | Paper/ Cardboard | Metal/Glass/ Plastic/Cartons |
|---|---|---|---|---|
| | Loose | Compacted | Loose | Loose |
| **Number of Bags** | | | | |
| Generated Weekly | 673.75 | 336.88 | 60.64 | 60.64 |
| If Picked Up Bi-Weekly | 336.88 | 168.44 | **Curbside Recycling 1x / Week** | |
| If Picked Up Tri-Weekly | 224.58 | 112.29 | | |

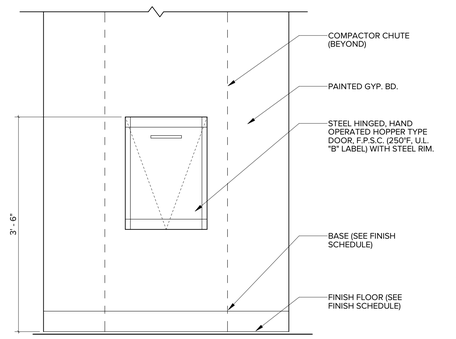
**Space taken up by curbside set-out along a building's frontage** (assumes bags are stacked two high)

| | | | | |
|---|---|---|---|---|
| Height - Feet | 4 | 4 | 4 | 4 |
| Width - Feet | 2 | 4 | 2 | 2 |
| Length - Feet | 477.24 | 94.33 | 30.32 | 30.32 |
| Total Square Feet | 954.48 | 377.30 | 60.64 | 60.64 |

*For reference: average car length is 16 feet, football field length is 300 feet*

**Containerization Recommendations** (receives on-call service up to 3x week when full)

| | Trash | Bulk Items | Paper/ Cardboard | Metal/Glass/ Plastic/Cartons |
|---|---|---|---|---|
| Recommended # of Roll On / Roll Off Compacting Containers | **2** | **0** | **0** | **0** |




6 TRASH CHUTE HOPPER DOOR ELEVATION
A-303.00 1" = 1'-0"

**APARTMENT BUILDING GUIDELINES AS PROVIDED BY DSNY**
READ HOW TO SET UP YOUR RECYCLING AREAS IN APARTMENT BUILDINGS.

1. LOCATE THE MAIN RECYCLING AREA IN THE SAME PLACE WHERE GARBAGE IS DISCARDED. IF THIS ISN'T POSSIBLE, POST A SIGN ABOVE TRASH BINS DIRECTING RESIDENTS TO THE RECYCLING AREA.

2. CLEARLY LABEL ALL RECYCLING BINS — USE GREEN DECALS FOR MIXED PAPER AND BLUE DECALS FOR METAL, GLASS, PLASTIC AND CARTONS. POST SIGNS ABOVE THE RECYCLING BINS AND REPLACE SIGNS WHEN WORN OR RIPPED. ORDER FREE DECALS AND SIGNS HERE.

3. LINE RECYCLING BINS WITH CLEAR PLASTIC BAGS (NOT COLORED BAGS); USE BLACK BAGS ONLY FOR GARBAGE.

4. DO NOT MIX PAPER AND CARDBOARD WITH METAL, GLASS, PLASTIC, AND CARTONS IN THE SAME BAG.

5. BREAK CARDBOARD INTO SMALL PIECES BEFORE PUTTING IT INTO BAGS. BUNDLES OF FLATTENED CARDBOARD, NEWSPAPERS AND MAGAZINES SHOULD BE NO MORE THAN 18 INCHES HIGH AND SHOULD BE SECURED WITH STURDY TWINE — DON'T USE TAPE.

6. PLACE ADDITIONAL RECYCLING BINS EVERYWHERE WHERE RECYCLABLES MIGHT BE DISCARDED, SUCH AS NEAR MAILBOXES, AND IN LAUNDRY ROOMS AND COMMON AREAS.

7. PROVIDE BUILDING STAFF AND RESIDENTS WITH CURRENT RECYCLING INFORMATION. PROVIDE RECYCLING INFORMATION TO NEW RESIDENTS AND WITH EVERY LEASE RENEWAL. REVIEW RECYCLING PROCEDURES WITH BUILDING STAFF AND DISCUSS WHAT IS WORKING AND WHAT CAN BE IMPROVED.

8. HELP MOTIVATE COMPLIANCE WITH RECYCLING RULES BY ATTACHING A RECYCLING RIDER ON LEASES, AGREEMENTS, AND RENEWAL NOTICES. DOWNLOAD A TEXT FILE WITH SUGGESTED LANGUAGE FOR A RECYCLING RIDER. BE SURE TO ADAPT THE DETAILS FOR YOUR OWN APARTMENT BUILDING
.
9. REGULARLY POST RECYCLING TIPS ON NOTICE BOARDS. WHEN YOU SEE INCORRECT RECYCLING PRACTICES, SEND OUT REMINDERS.

**COMPACTOR ROOM COMPLIANCE CALCULATION (B.C. 1213.1)**

1.5 SQ. FT./ DWELLING UNITS REQ. OR
350 SQ. FT. MIN. WHICHEVER IS LESS. (NET)

347 X 1.5 = 520
520 > 350

350 SQ. FT. MIN. REQUIRED
778 SQ. FT. PROVIDED

**COMPACTOR ROOM COMPLIANCE CALCULATION FOR QUALITY HOUSING: (ZR- 28-12)**

2.9 CU. FT./DWELLING UNIT REQ.

347 X 2.9 = 1006.03 CU. FT.

771.40 CU. FT. MIN. RQUIRED

1006.03 SQ. FT. X 10'-4" H = 10,465.52 CU. FT.
10,465.52 CU.FT. PROVIDED
10,465.52 > 771.40 OK

**REFUSE STORAGE FOR WASTE BASED ON DSNY WASTE CALCULATOR**

COMPACTED TRASH - 336.88 CU. FT. X 150% =
505.32 CU. FT. REQ STORAGE AREA REQUIRED

PAPER/CARBORD - 60.64 CU. FT. X 150% =
90.96 CU. FT. REQ STORAGE AREA REQUIRED

MATAL / GLASS/ PLASTIC/ CARTONS - 60.64 CU. FT. X 150% =
90.96 CU. FT. REQ STORAGE AREA REQUIRED

TOTAL REQUIRED = 687.24 CU.FT
PROVIDE = 815.12.FT
COMPLIES

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
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New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


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PROJECT NO: Project Number
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SCALE: As indicated
SHEET NO: OF

DRAWING NO:
# A-303.00

NYC DOB NUMBER: X00945951-I1

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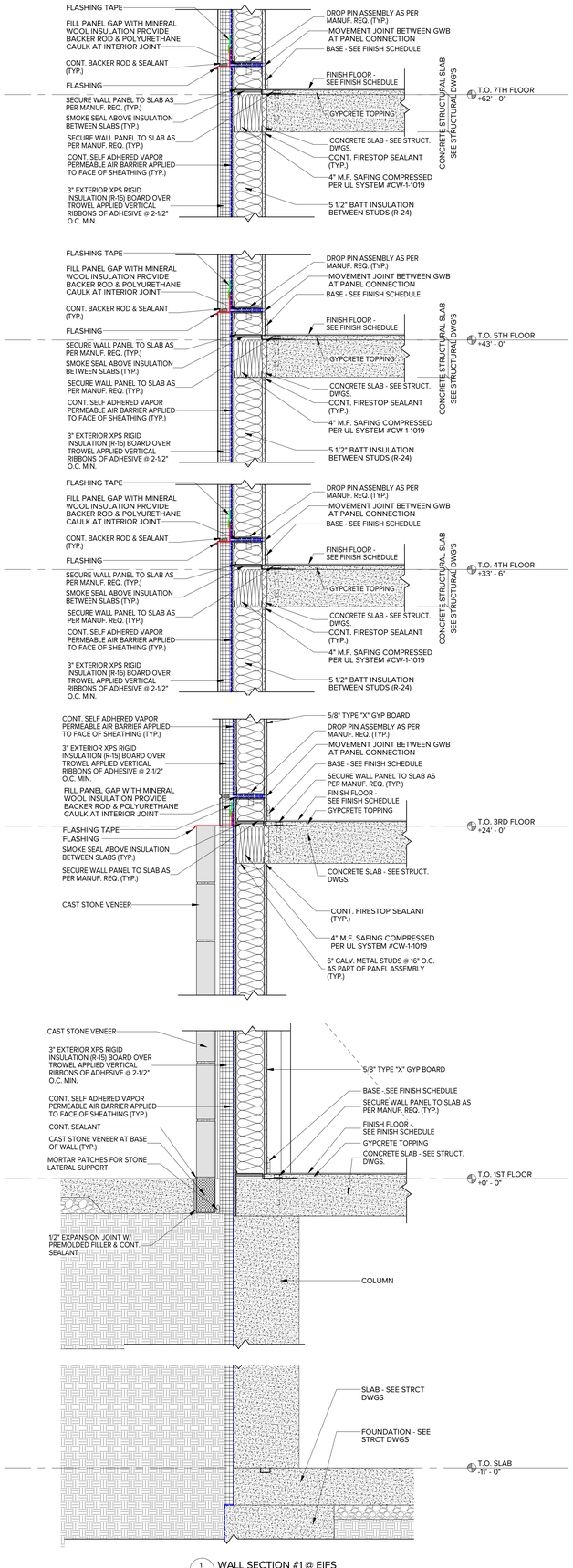


1 A-400 WALL SECTION #1 @ EIFS
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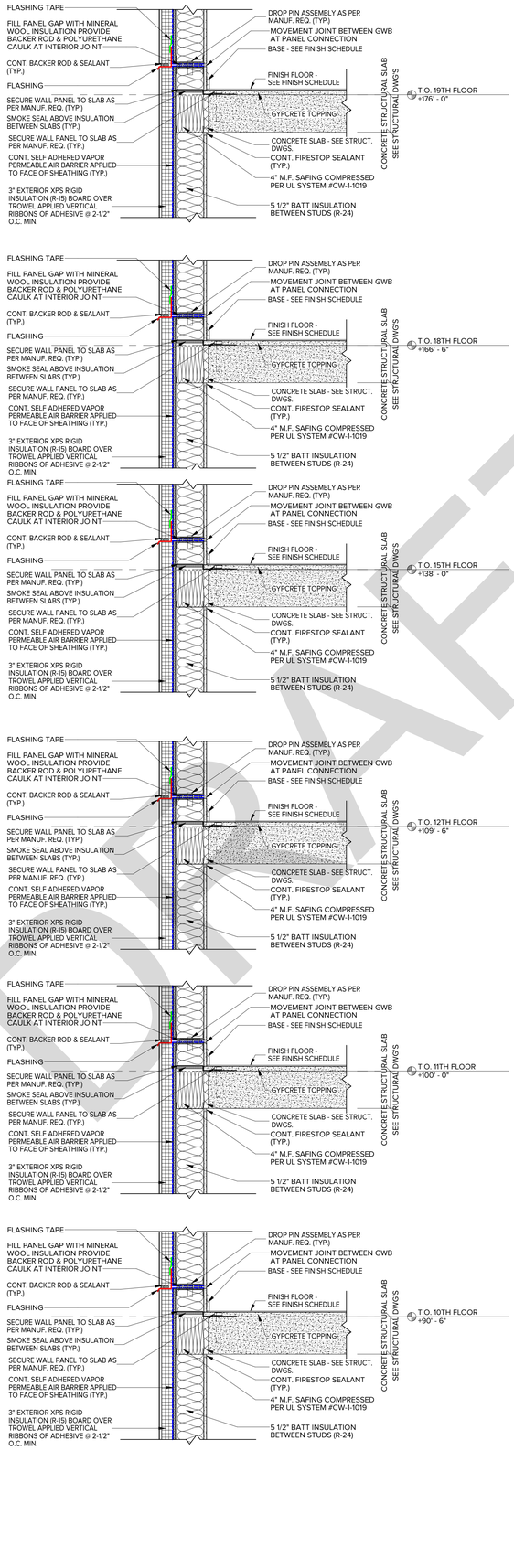


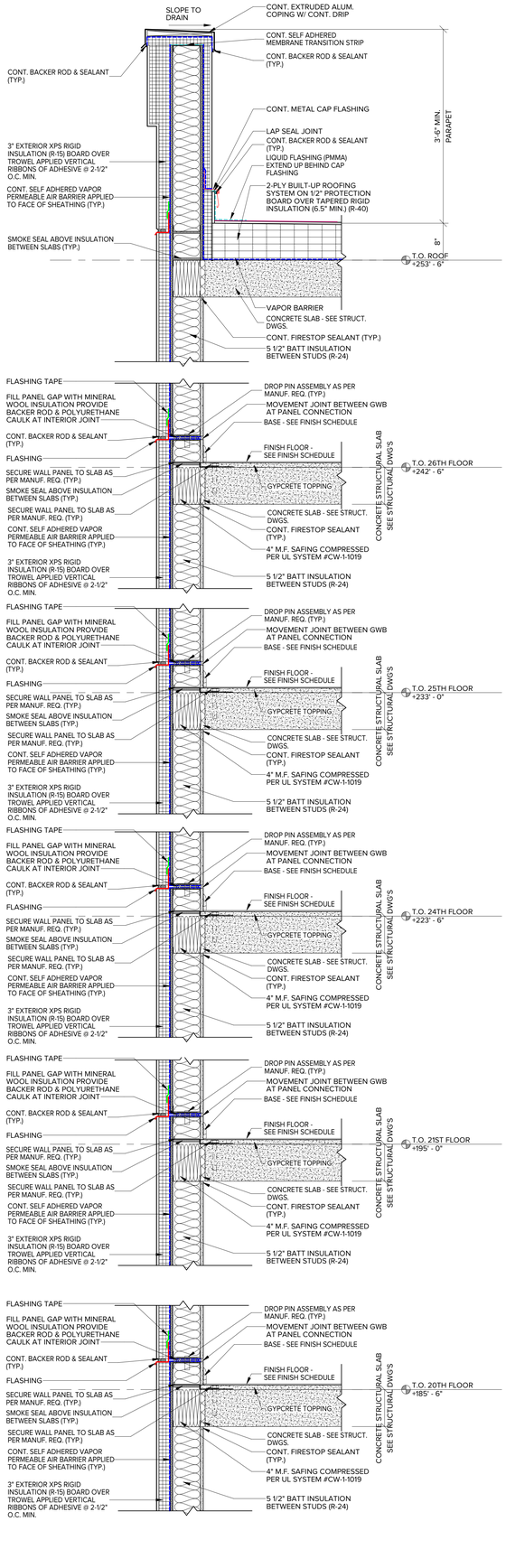


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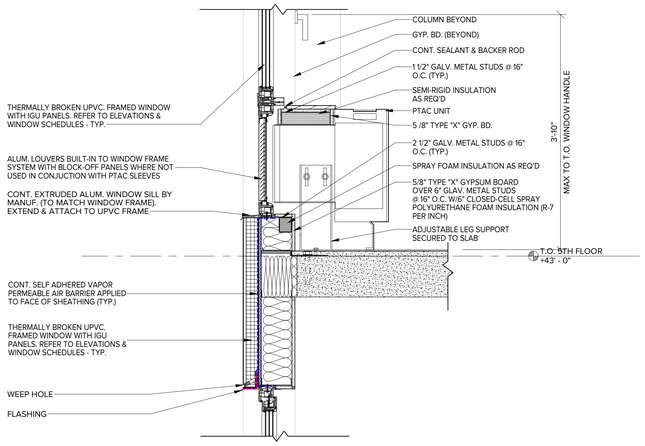
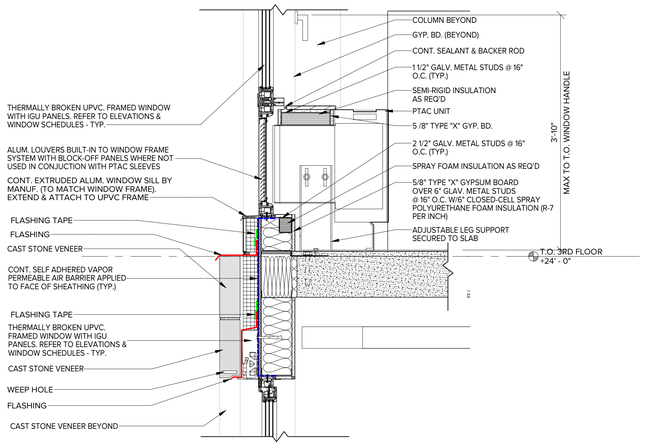
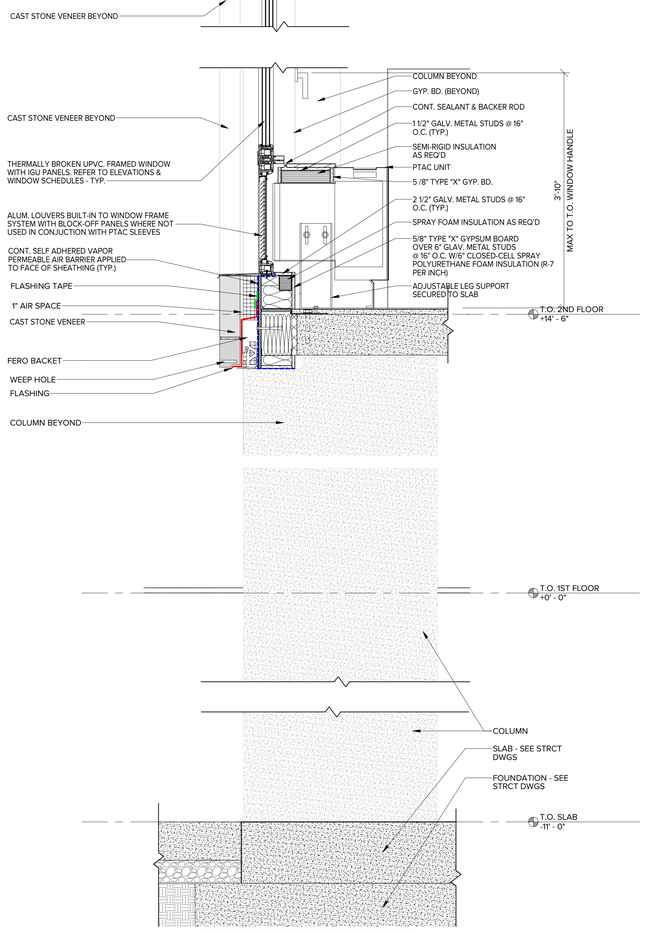
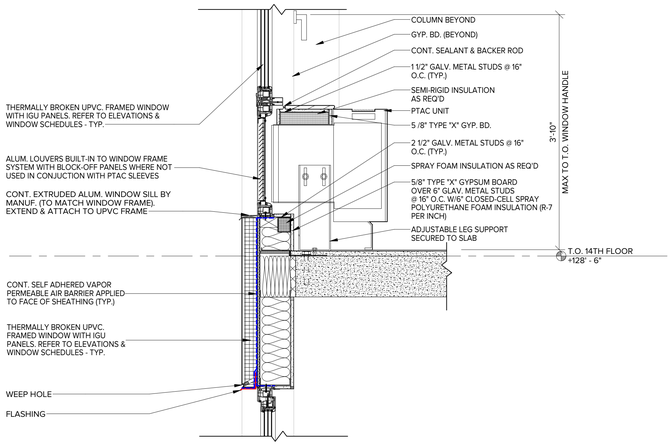
SCALE: 1" = 1'-0"
SHEET NO: OF
DRAWING NO: A-400

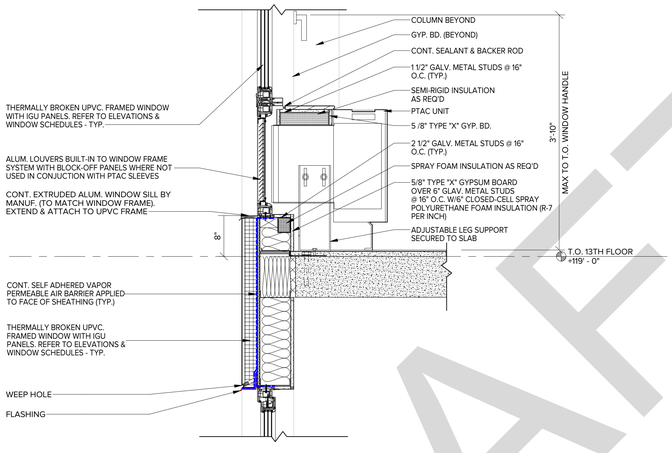
NYC DOB NUMBER: X00945951-I1

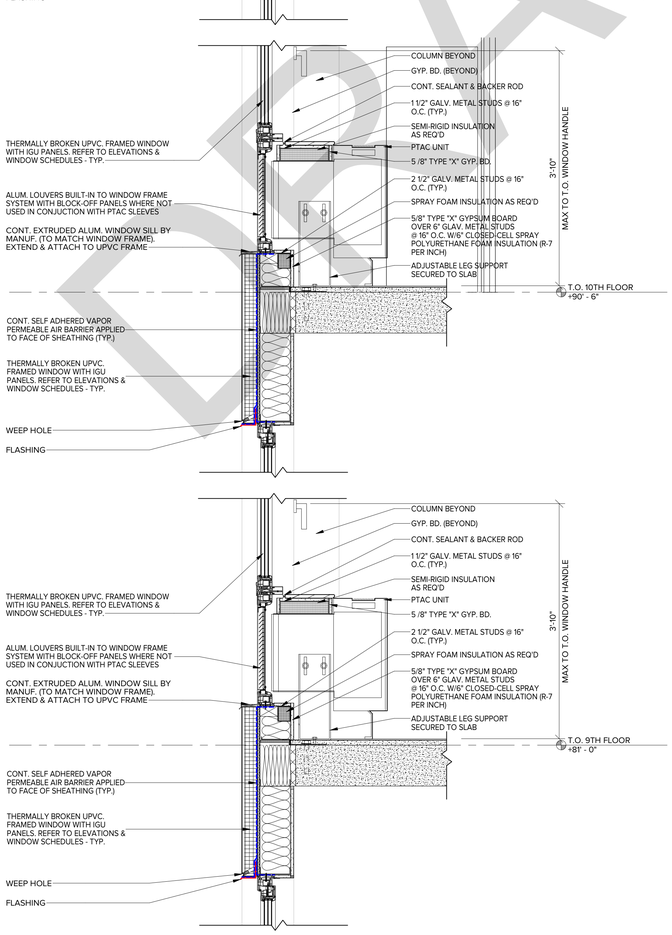


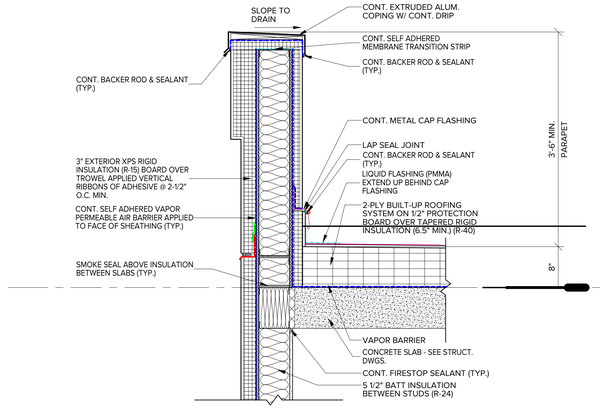



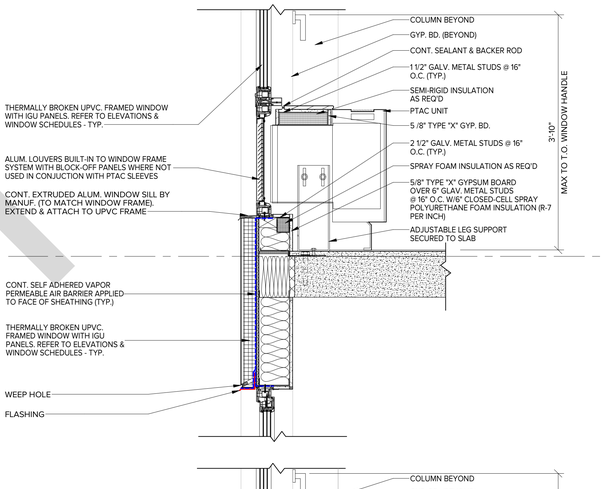



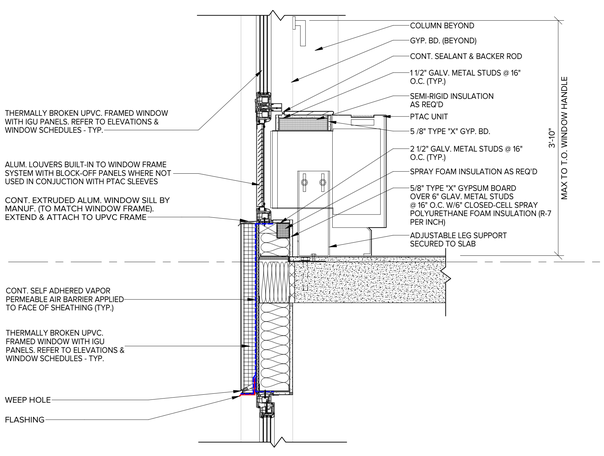



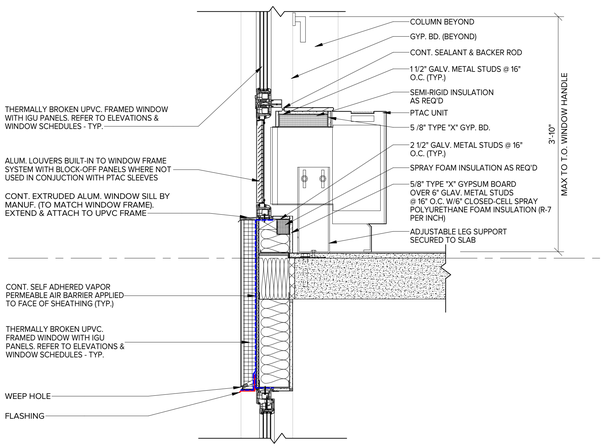

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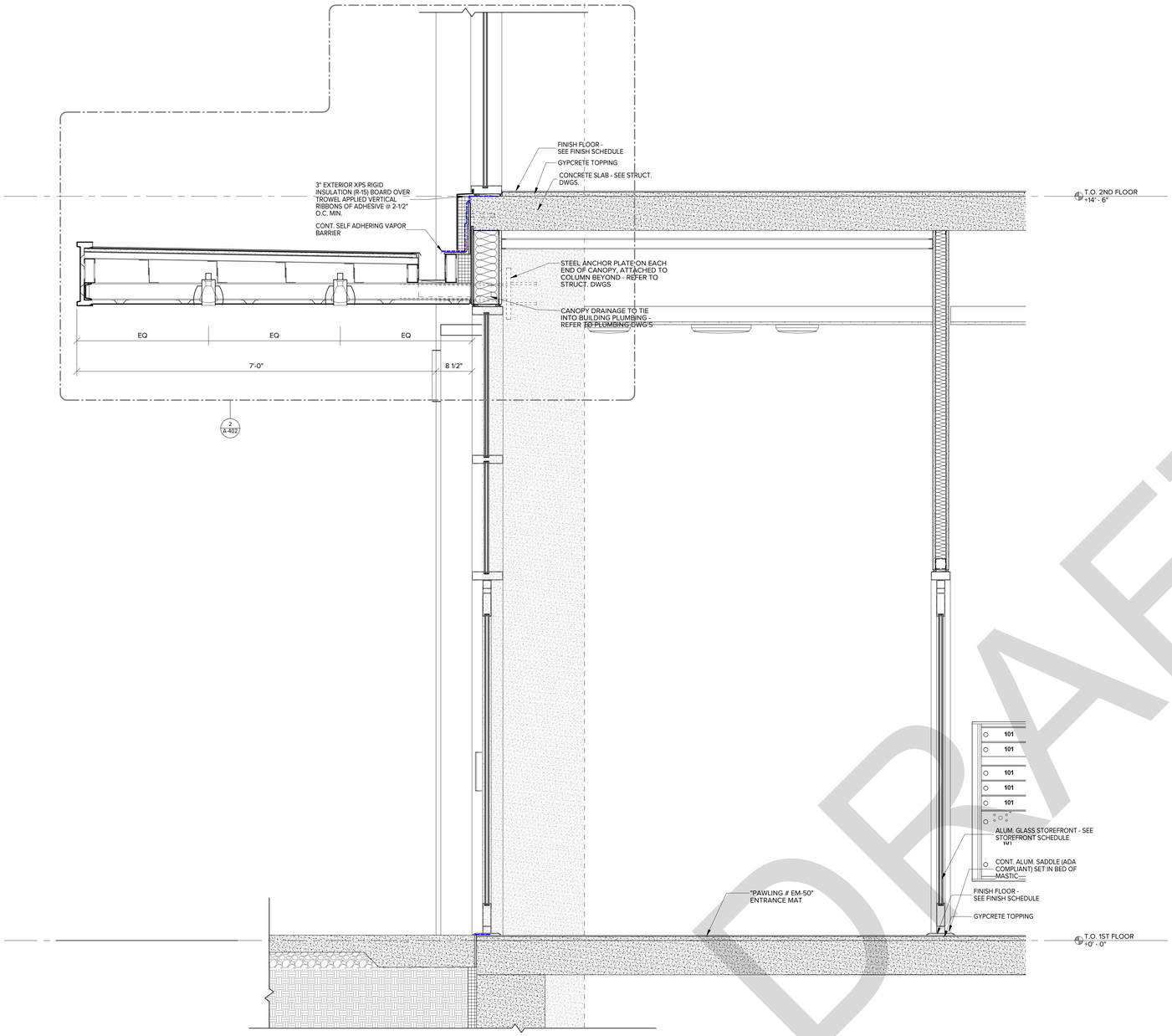
SCALE: 1" = 1'-0"

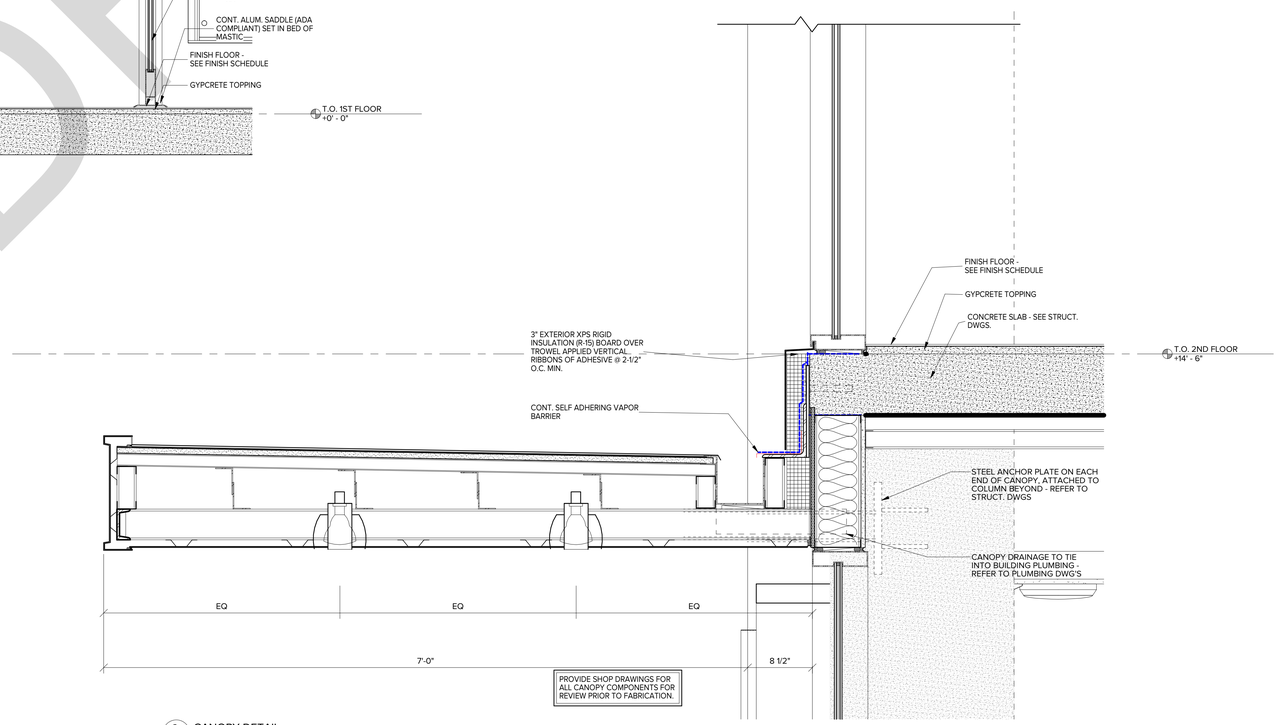
SHEET NO: OF

DRAWING NO: A-401

NYC DOB NUMBER: X00945951-I1




1 A-402 WALL SECTION @ STOREFRONT
1" = 1'-0"




2 A-402 CANOPY DETAIL
1 1/2" = 1'-0"

DRAFT

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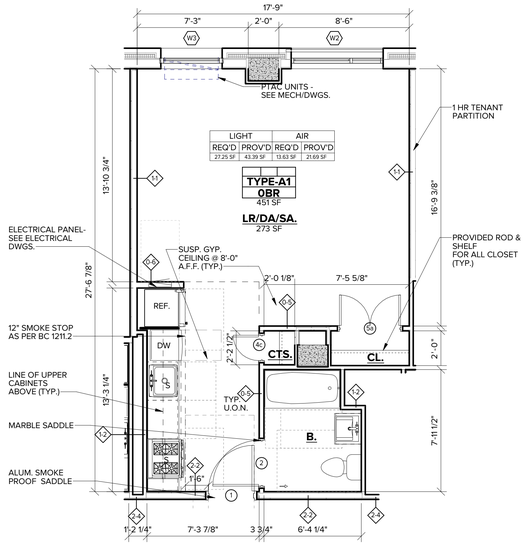
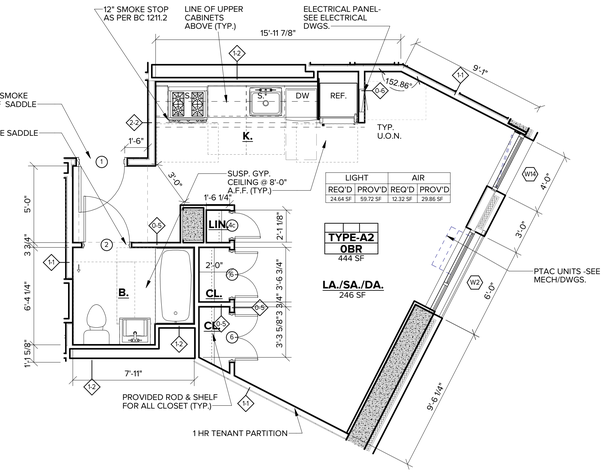
DRAWING NO: A-402

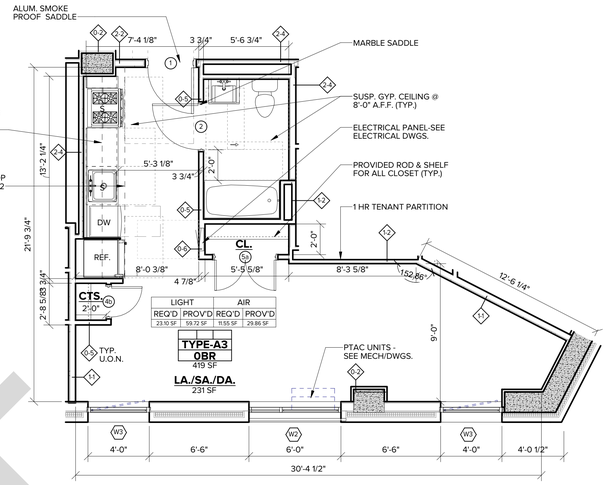
NYC DOB NUMBER: X00945951-I1




1 APT TYPE A1
A-500 1/4" = 1'-0"




2 APT TYPE A2
A-500 1/4" = 1'-0"




3 APT TYPE A3
A-500 1/4" = 1'-0"




4 APT TYPE A4
A-500 1/4" = 1'-0"




5 APT TYPE A5
A-500 1/4" = 1'-0"




6 APT TYPE A6
A-500 1/4" = 1'-0"




7 APT TYPE A7
A-500 1/4" = 1'-0"




8 APT TYPE A8
A-500 1/4" = 1'-0"

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DRAWING NO: A-500.00

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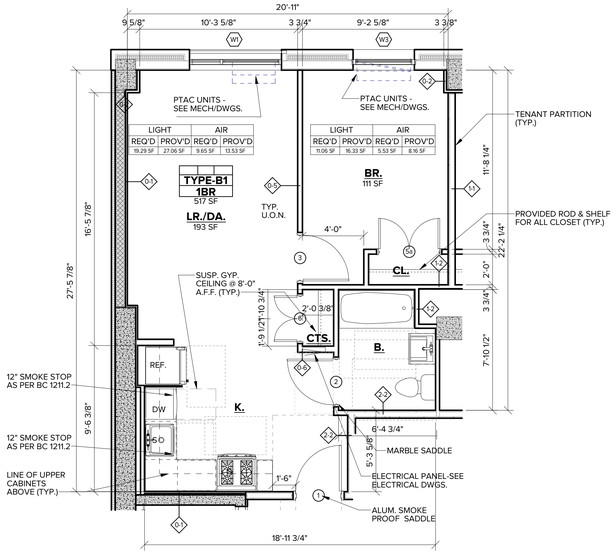
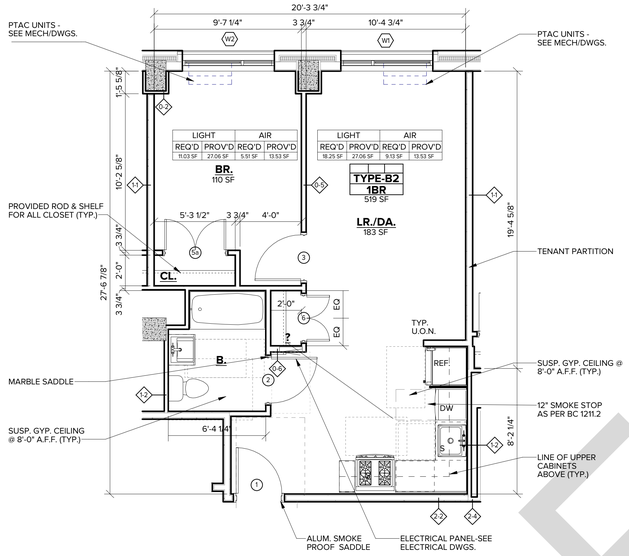
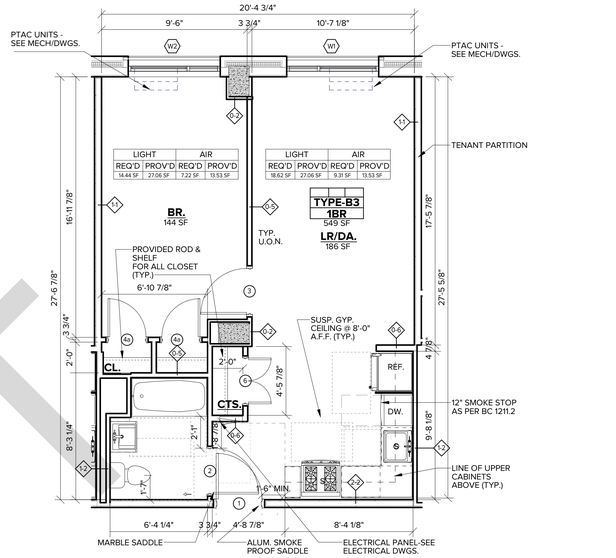



1 A-502 APT TYPE B1
1/4" = 1'-0"




2 A-502 APT TYPE B2
1/4" = 1'-0"




3 A-502 APT TYPE B3
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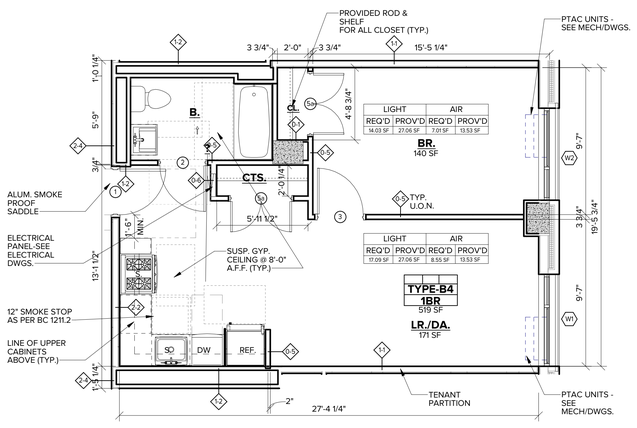


4 A-502 APT TYPE B4
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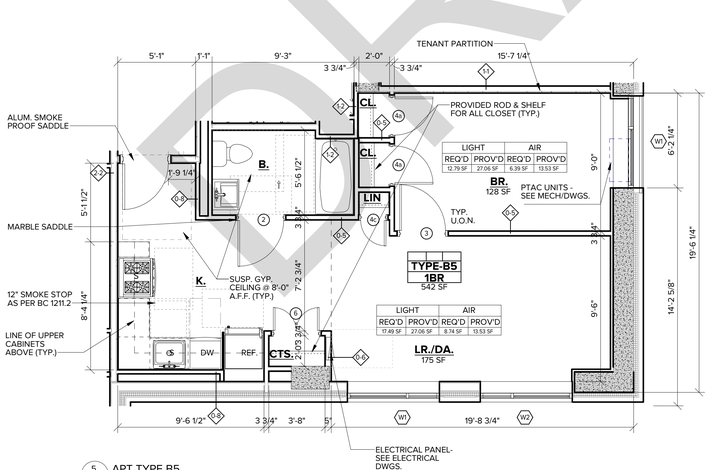
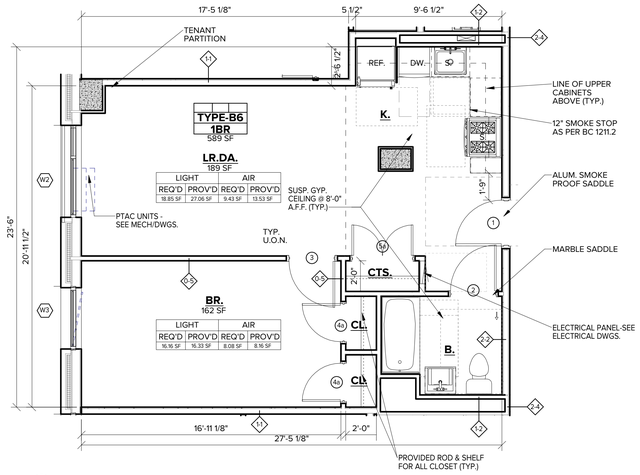



5 A-502 APT TYPE B5
1/4" = 1'-0"




6 A-502 APT TYPE B6
1/4" = 1'-0"

DRAFT

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DRAWING NO: A-502.00

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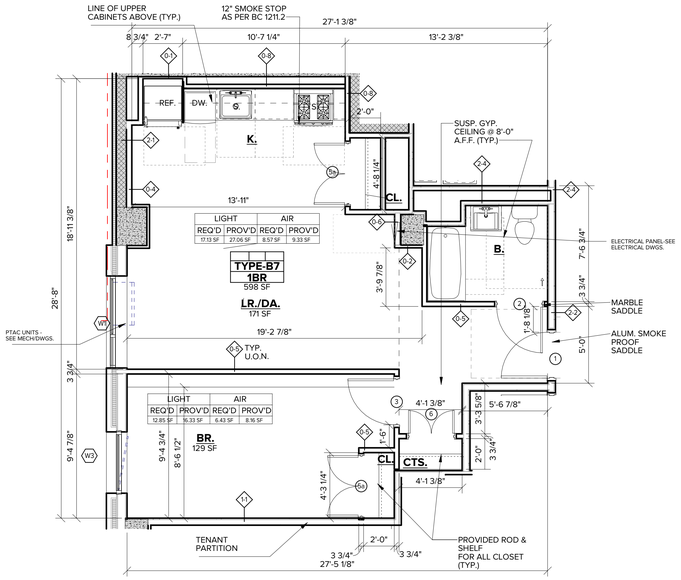


1 A-503 APT TYPE B7
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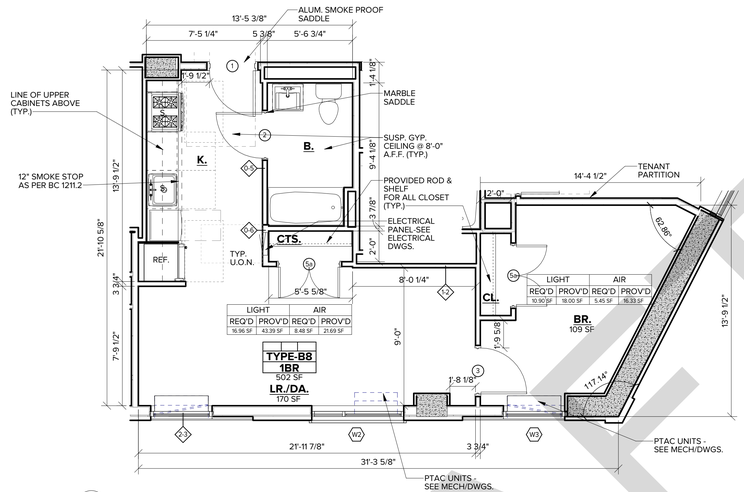
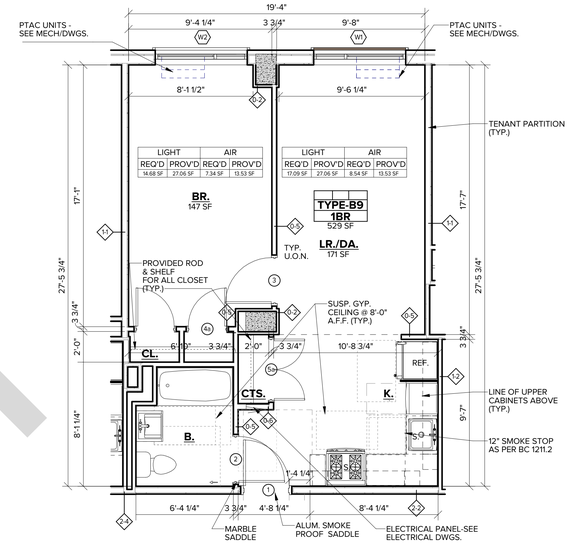
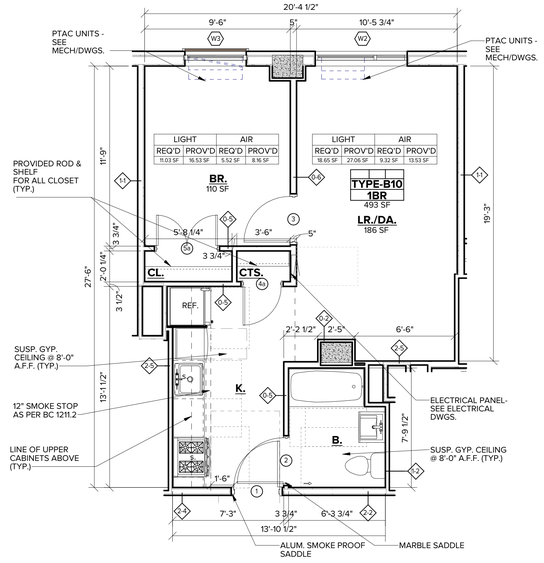


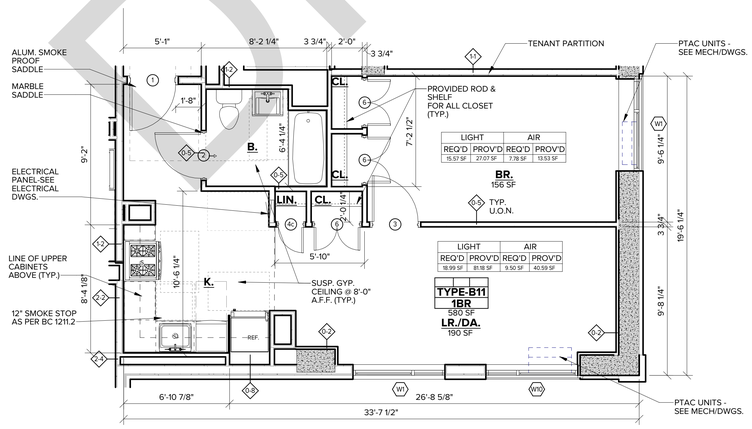

2 A-503 APT TYPE B8
1/4" = 1'-0"




3 A-503 APT TYPE B9
1/4" = 1'-0"




4 A-503 APT TYPE B10
1/4" = 1'-0"




5 A-503 APT TYPE B11
1/4" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

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**DESIMONE ENGINEERING:**
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212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
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New York, NY 10016
212.929.5656

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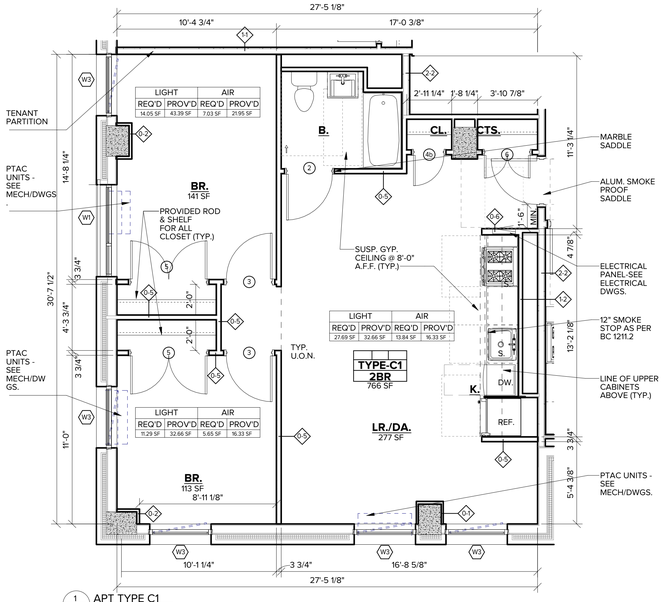
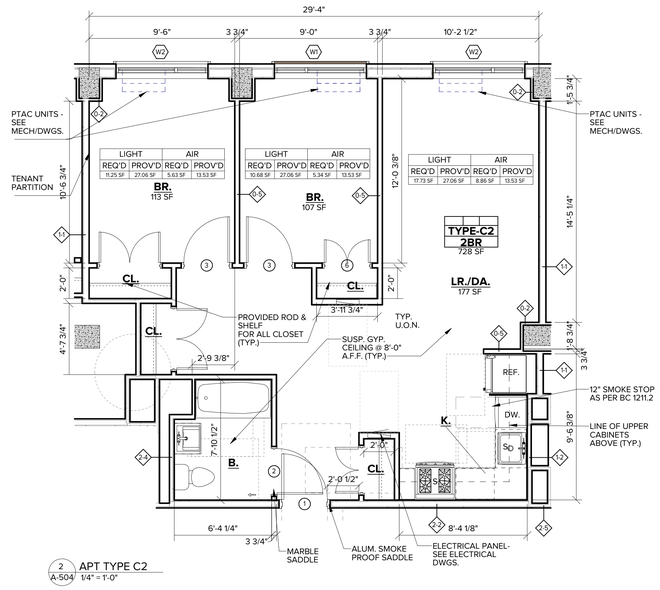
DRAWING NO: A-503.00

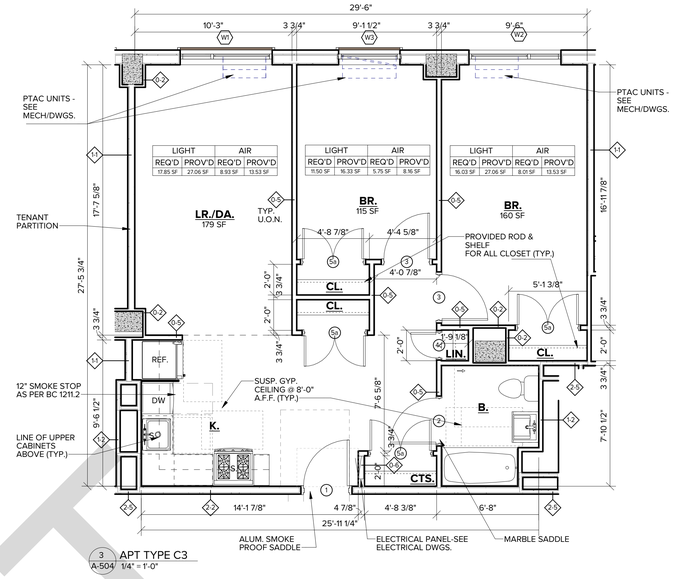
NYC DOB NUMBER: X00945951-I1



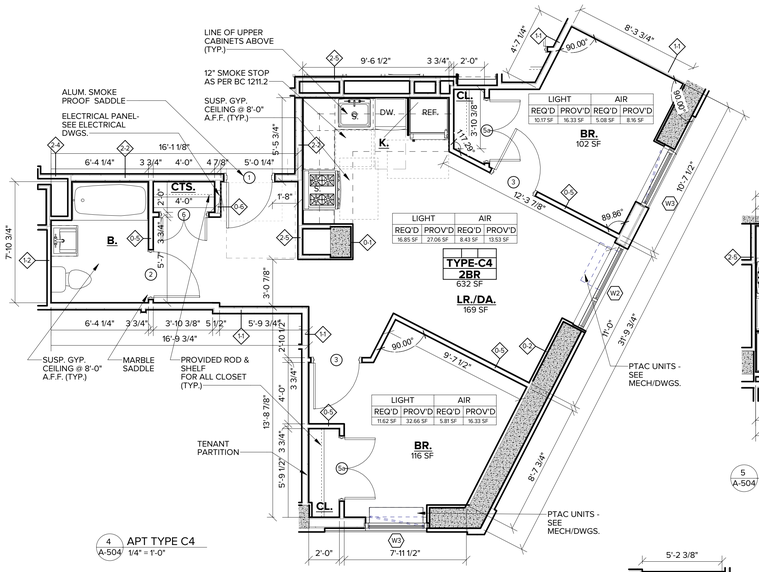

1 APT TYPE C1
A-504 1/4" = 1'-0"



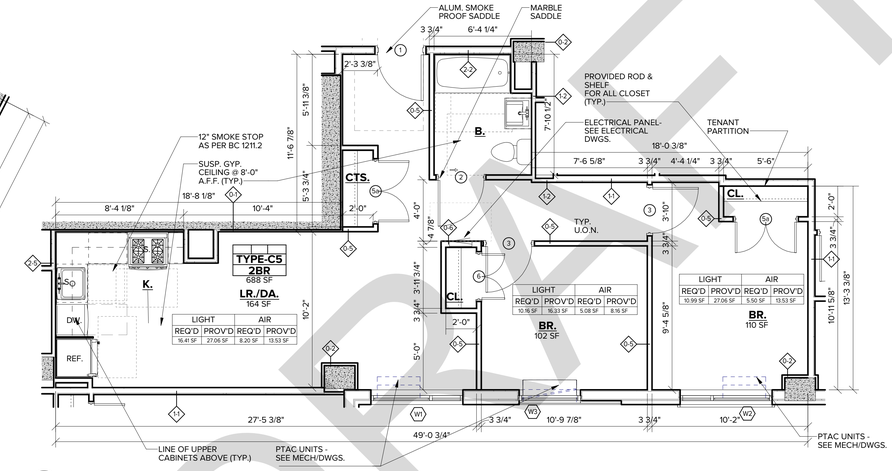

2 APT TYPE C2
A-504 1/4" = 1'-0"



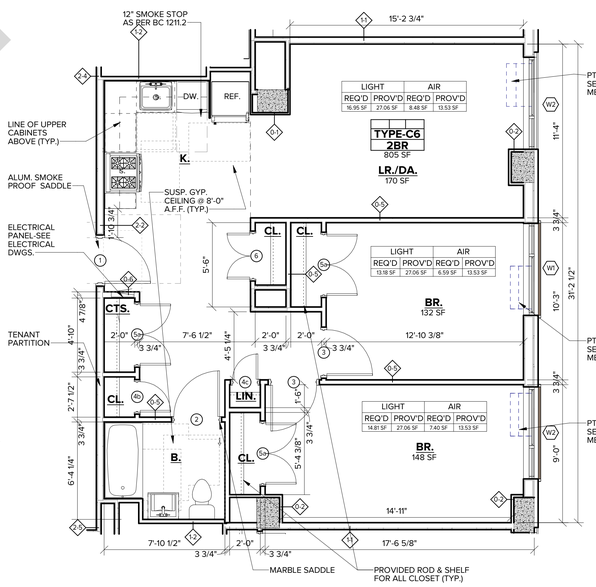

3 APT TYPE C3
A-504 1/4" = 1'-0"



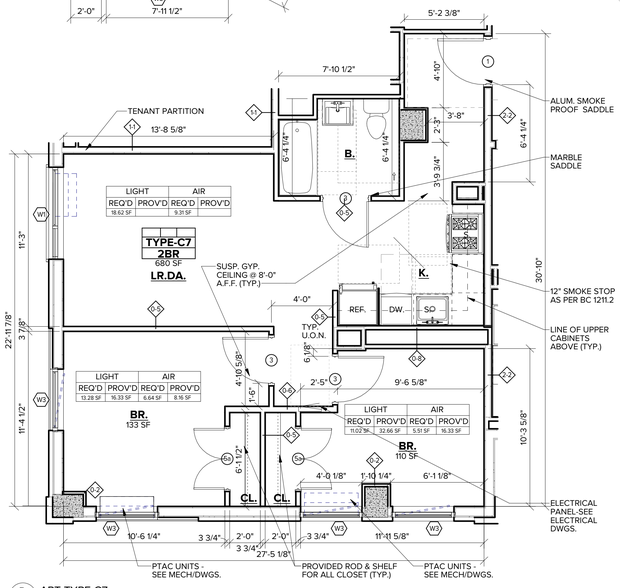

4 APT TYPE C4
A-504 1/4" = 1'-0"



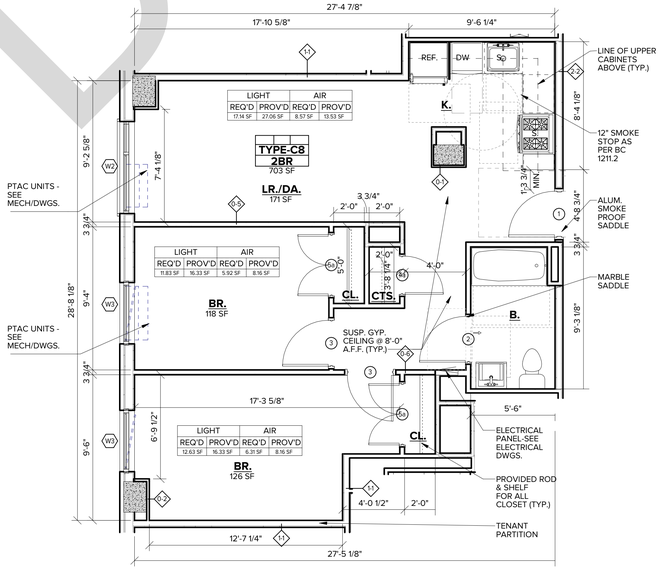

5 APT TYPE C5
A-504 1/4" = 1'-0"




6 APT TYPE C6
A-504 1/4" = 1'-0"




7 APT TYPE C7
A-504 1/4" = 1'-0"




8 APT TYPE C8
A-504 1/4" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
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Owner/Developer
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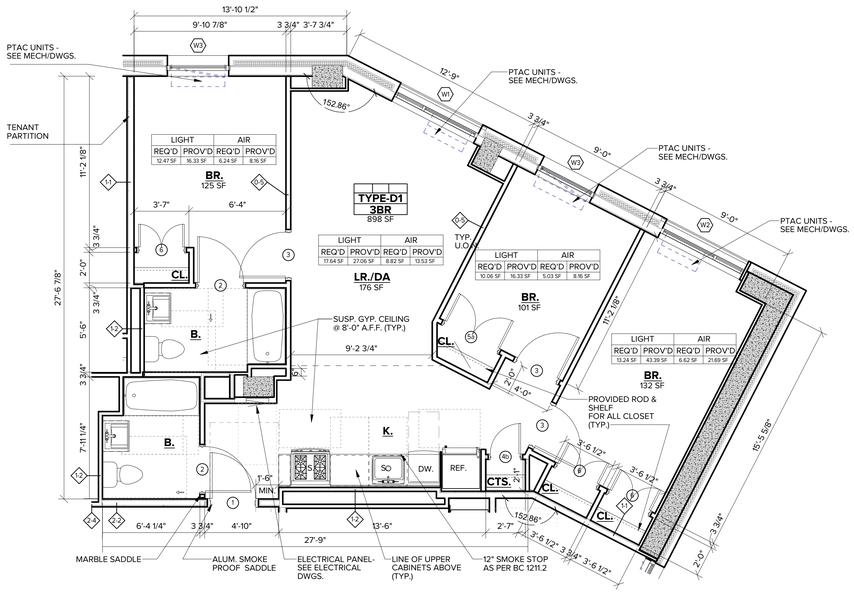
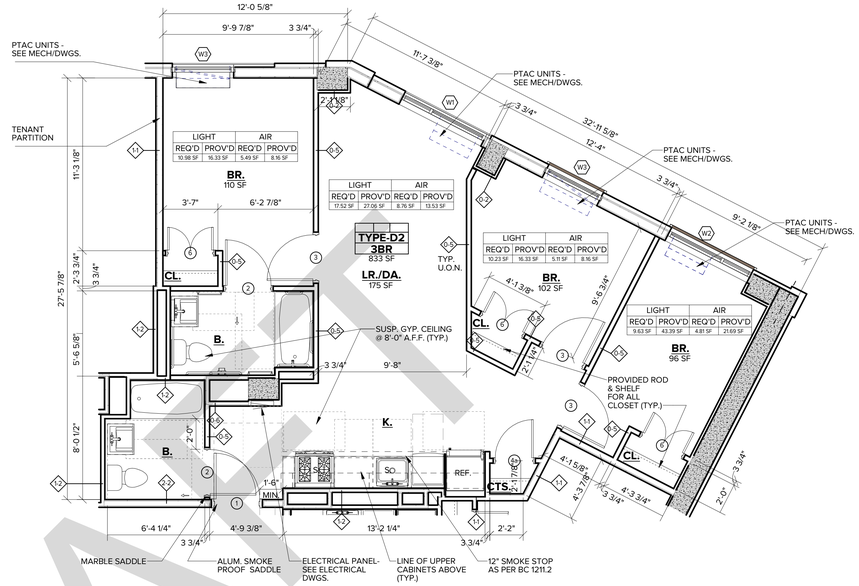
NYC DOB NUMBER: X00945951-I1




1 APT TYPE D1
A-505 1/4" = 1'-0"




2 APT TYPE D2
A-505 1/4" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
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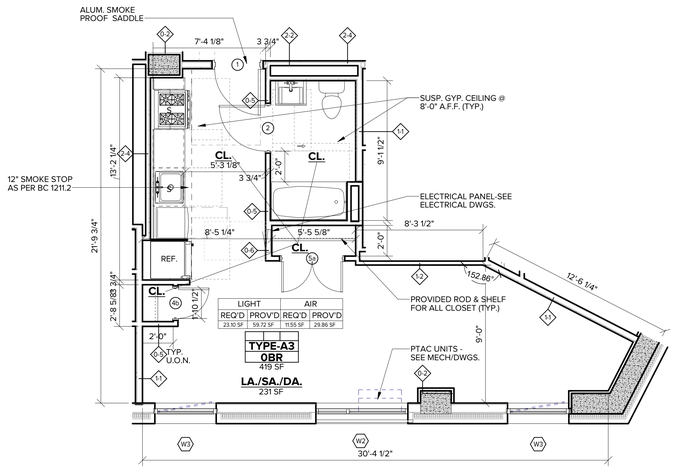
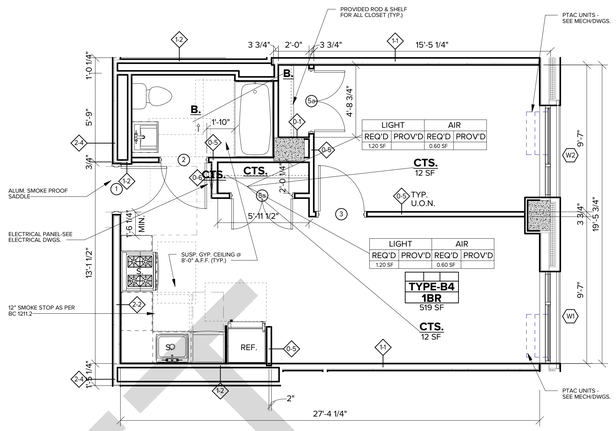
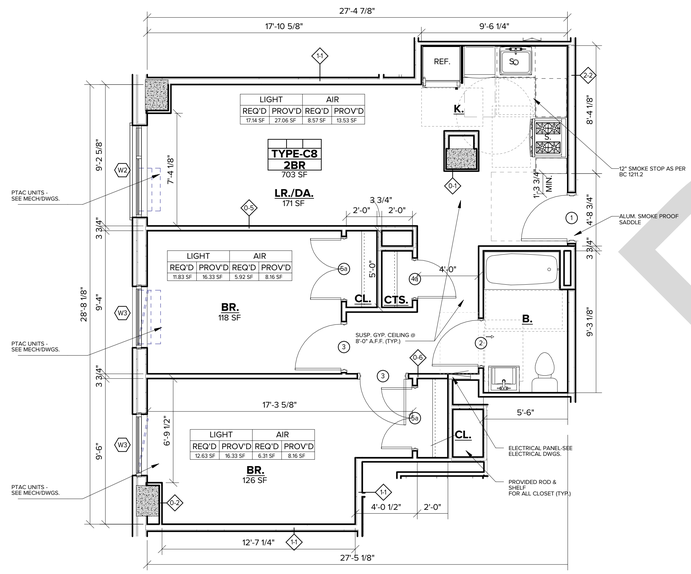
NYC DOB NUMBER: X00945951-I1



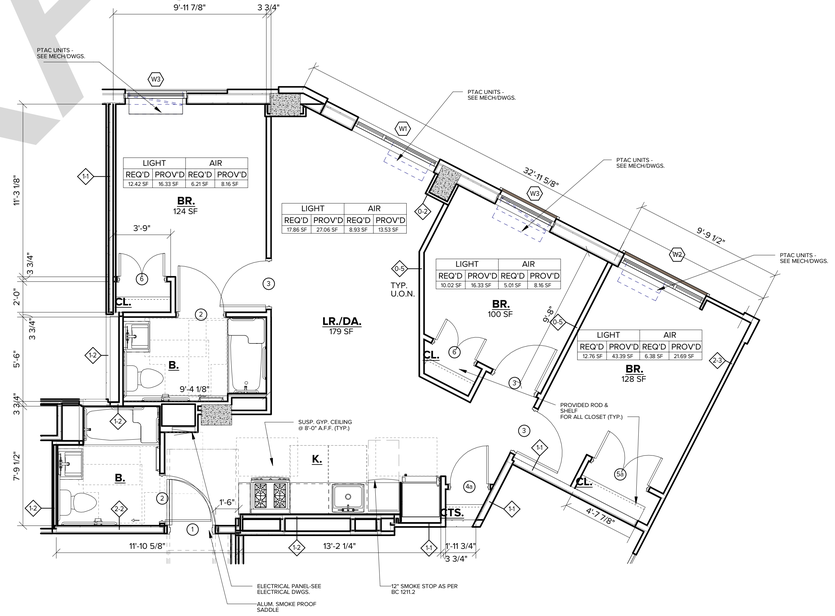

1 A-506 UFAS UNIT TYPE A3 # 207, 307, 407, 507
1/4" = 1'-0"




2 A-506 UFAS UNIT TYPE B4 # 210, 310, 410, 510, 610, 710, 810, 910
1/4" = 1'-0"




3 A-506 UFAS UNIT TYPE C8 # 1612
1/4" = 1'-0"




4 A-506 UFAS UNIT TYPE D2 # 1705
1/4" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
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845.368.0004
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Owner/Developer
**BRONX PARK GTAH II LLC:**
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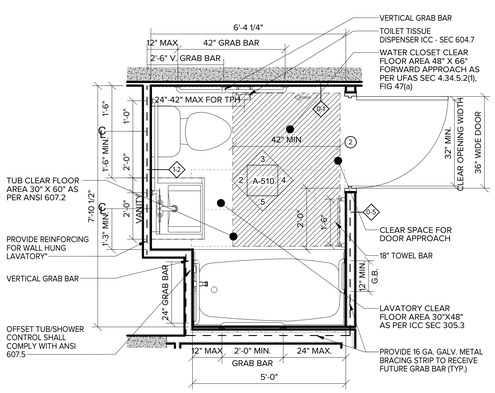
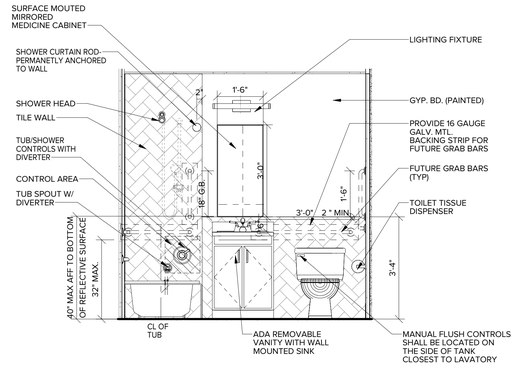
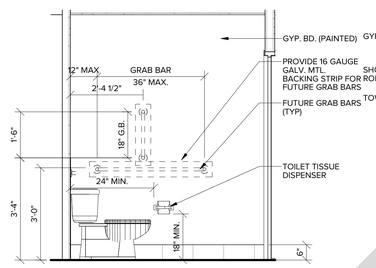


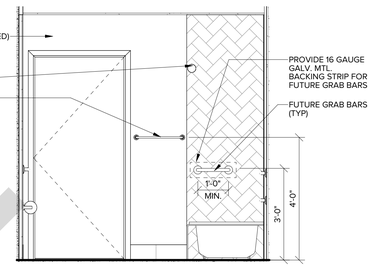

1 A-510 ENLARGED BATHROOM TYPE 1
1/2" = 1'-0"



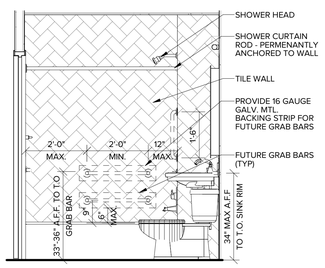

2 A-510 ELEVATION 2
1/2" = 1'-0"



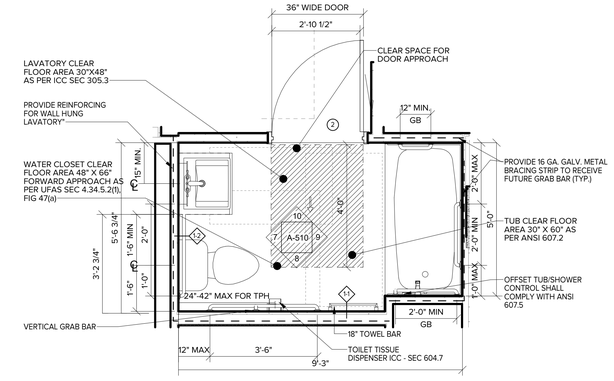

3 A-510 ELEVATION 3
1/2" = 1'-0"



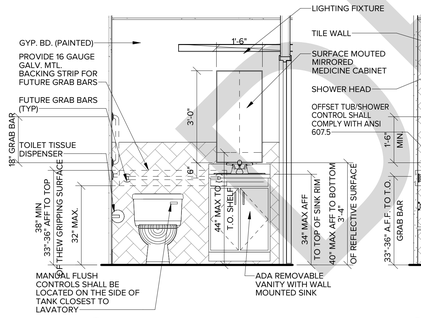

4 A-510 ELEVATION 4
1/2" = 1'-0"



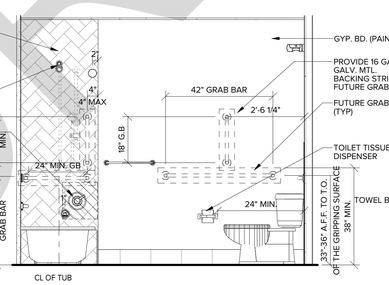

5 A-510 ELEVATION 5
1/2" = 1'-0"



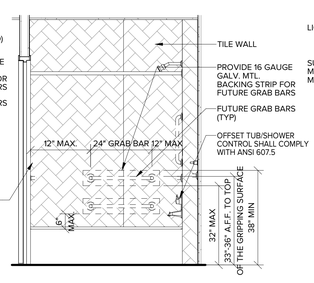

6 A-510 ENLARGED BATHROOM TYPE 2
1/2" = 1'-0"



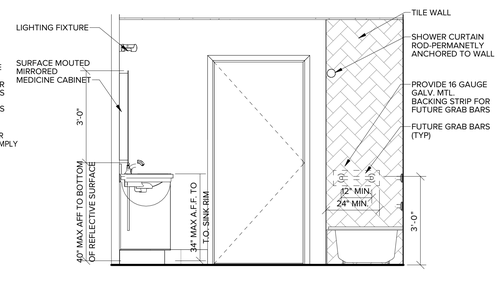

7 A-510 ELEVATION 7
1/2" = 1'-0"




8 A-510 ELEVATION 8
1/2" = 1'-0"




9 A-510 ELEVATION 9
1/2" = 1'-0"




10 A-510 ELEVATION 10
1/2" = 1'-0"

HEIGHT MEASURED FROM FIN. FL
Shower Head Height (Standard): 80"
Shower Head Height (Minimum): 72"
Hand Held Shower Head (MAX.): 48"
Shower Head Control Height: 40"-50"
Curtain Rod Height (Standard): 75"-77"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

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BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

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# TYPICAL BATHROOM PLANS & ELEVATIONS

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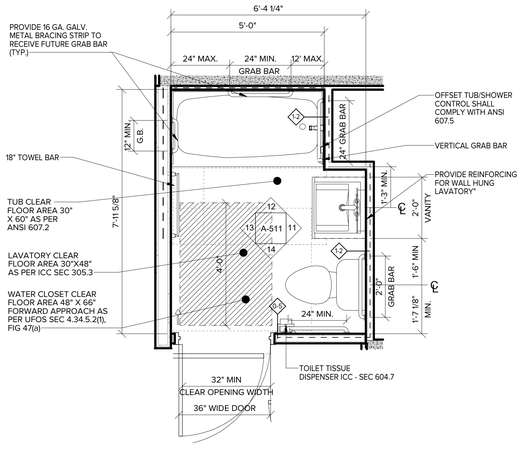
SHEET NO: OF
DRAWING NO: A-510.00

NYC DOB NUMBER: X00945951-I1




1 A-511 ENLARGED BATHROOM TYPE 3
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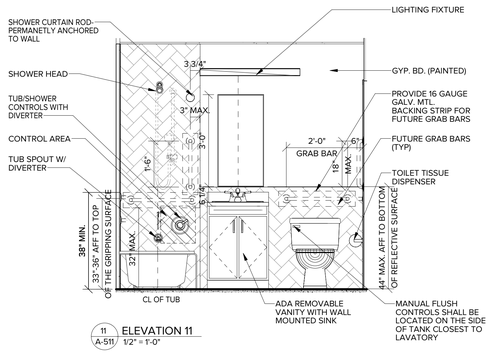


11 A-511 ELEVATION 11
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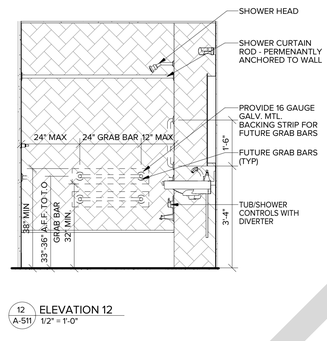


12 A-511 ELEVATION 12
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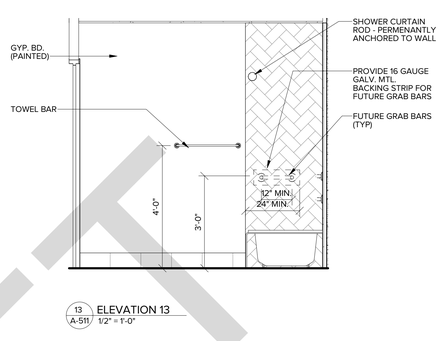
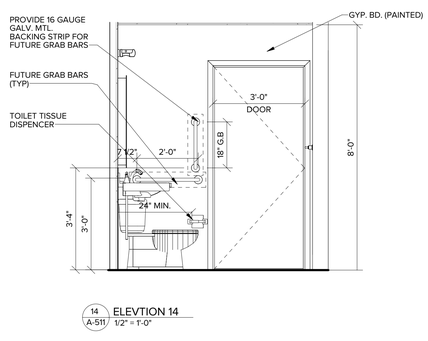



13 A-511 ELEVATION 13
1/2" = 1'-0"




14 A-511 ELEVTION 14
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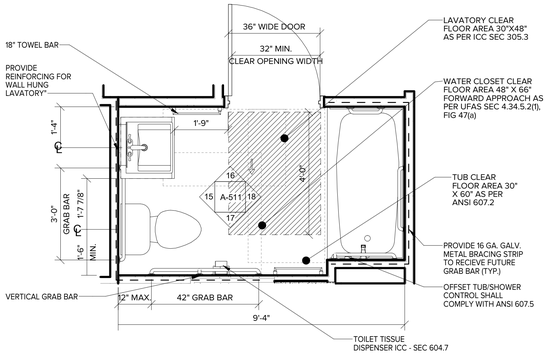
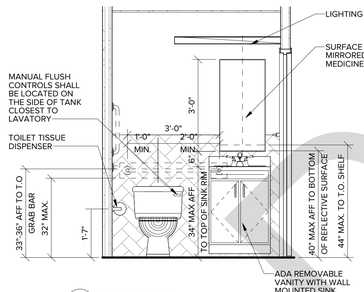
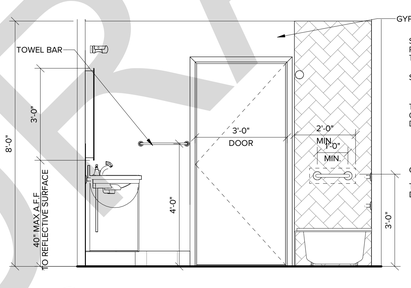



2 A-511 ENLARGED BATHROOM TYPE 4
1/2" = 1'-0"




15 A-511 ELEVATION 15
1/2" = 1'-0"




16 A-511 ELEVATION 16
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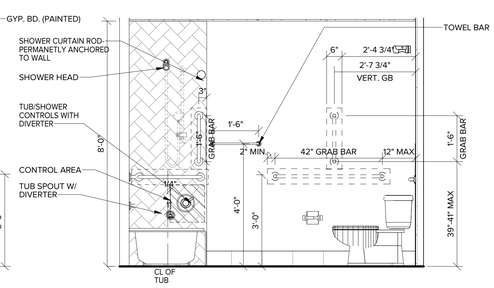
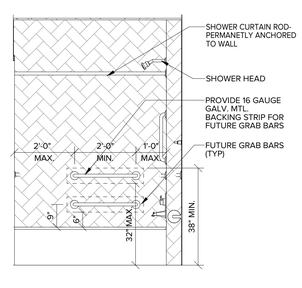



17 A-511 ELEVATION 17
1/2" = 1'-0"




18 A-511 ELEVATION 18
1/2" = 1'-0"

HEIGHT MEASURED FROM FIN. FL
Shower Head Height (Standard): 80"
Shower Head Height (Minimum): 72"
Hand Held Shower Head (MAX.): 48"
Shower Head Control Height: 40"-50"
Curtain Rod Height (Standard): 75"-77"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
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New York, NY 10016
212.929.5656

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## TYPICAL BATHROOM PLANS & ELEVATIONS

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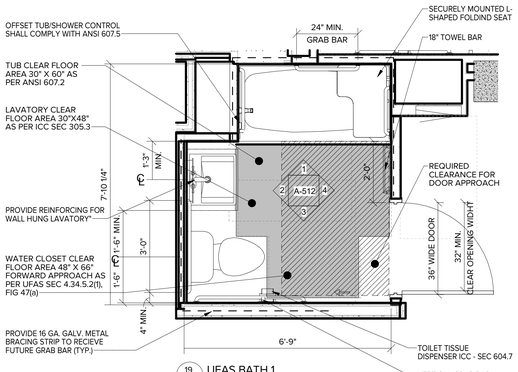
ISSUE DATE: 05/10/23
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/2" = 1'-0"
SHEET NO: OF
DRAWING NO: A-511.00

NYC DOB NUMBER: X00945951-I1




19 A-512 UFAS BATH 1
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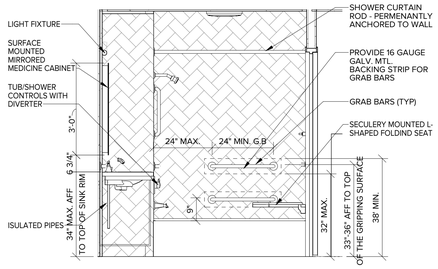
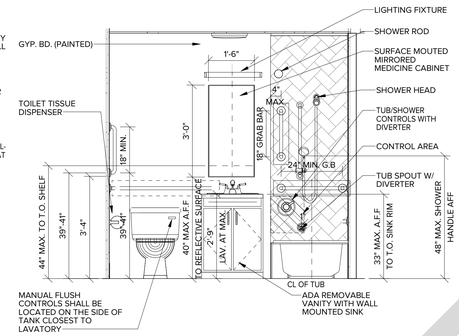
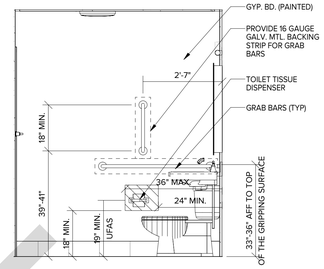


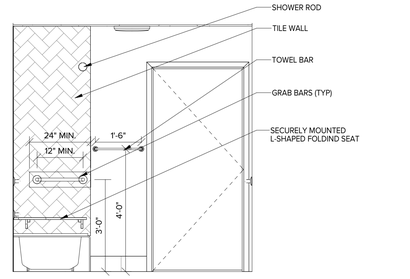

1 A-512 ELEVATION 19
1/2" = 1'-0"



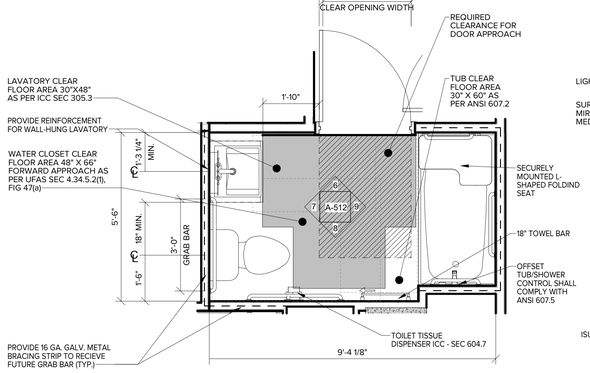

2 A-512 ELEVATION 20
1/2" = 1'-0"



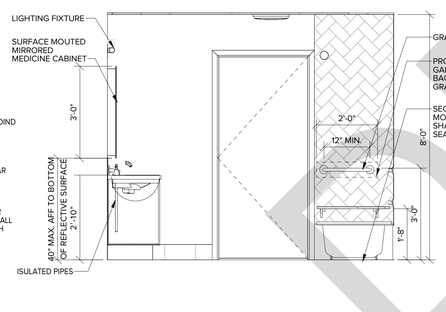

3 A-512 ELEVATION 21
1/2" = 1'-0"



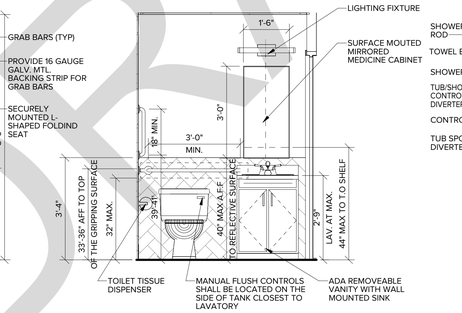

4 A-512 ELEVATION 22
1/2" = 1'-0"



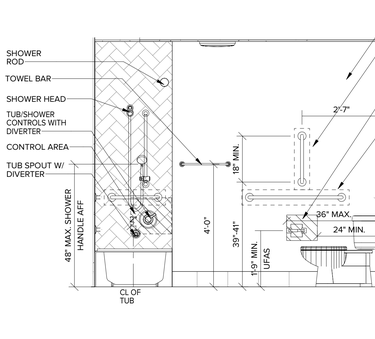

5 A-512 UFAS BATH TYPE 2
1/2" = 1'-0"




6 A-512 ELEVATION 23
1/2" = 1'-0"




7 A-512 ELEVATION 24
1/2" = 1'-0"




8 A-512 ELEVATION 25
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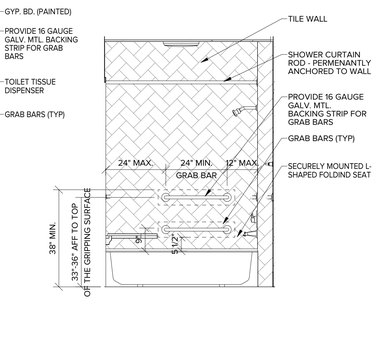


9 A-512 ELEVATION 26
1/2" = 1'-0"

HEIGHT MEASURED FROM FIN. FL
Shower Head Height (Standard): 80"
Shower Head Height (Minimum): 72"
Hand Held Shower Head (MAX.): 48"
Shower Head Control Height: 40"-50"
Curtain Rod Height (Standard): 75"-77"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
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25th Floor
New York, NY 10005
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MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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32nd Floor
New York, NY 10038
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**PHILIP HABIB & ASSOCIATES:**
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## UFAS BATHROOM PLANS & ELEVATIONS

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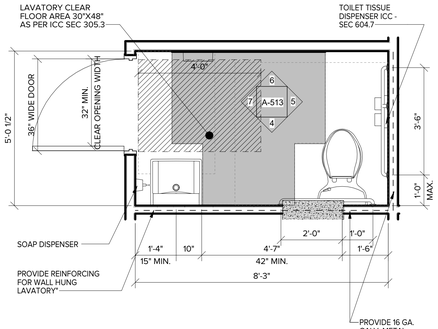
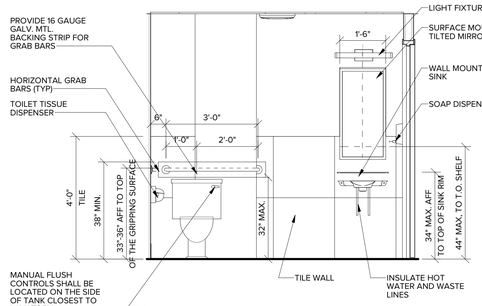
SCALE: 1/2" = 1'-0"
SHEET NO: OF
DRAWING NO: A-512.00

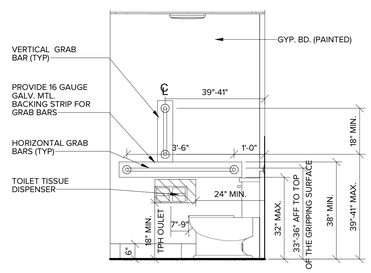
NYC DOB NUMBER: X00945951-I1



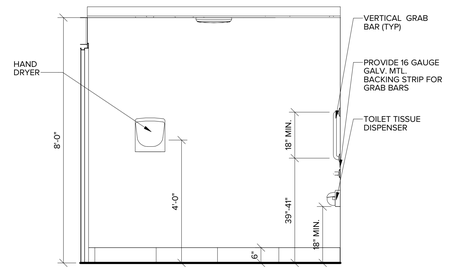

1 A-513 STAFF BATHROOM @ CELLAR FLOOR
1/2" = 1'-0"



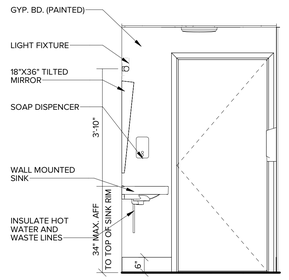

4 A-513 ELEVATION 27
1/2" = 1'-0"



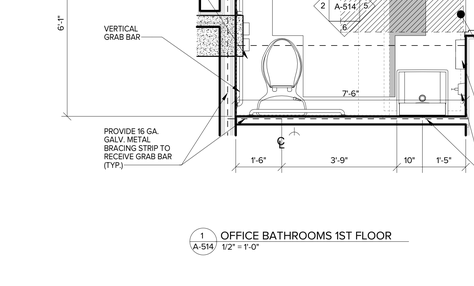

5 A-513 ELEVATION 28
1/2" = 1'-0"



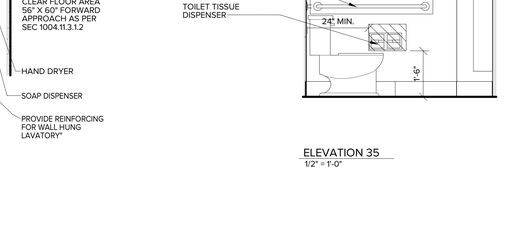

6 A-513 ELEVATION 29
1/2" = 1'-0"




7 A-513 ELEVATION 30
1/2" = 1'-0"

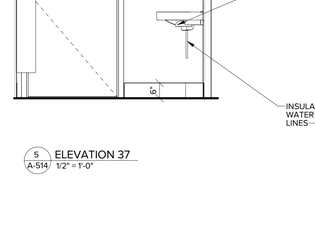



2 A-513 STAFF BATHROOM WITH SHOWER
1/2" = 1'-0"

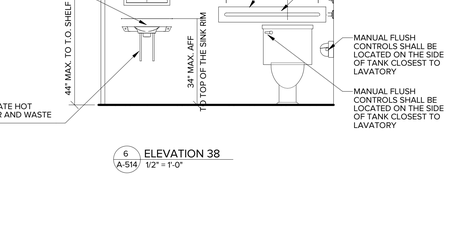



8 A-513 ELEVATION 31
1/2" = 1'-0"

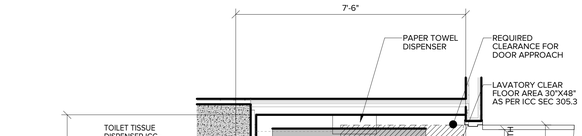
9 A-513 ELEVATION 32
1/2" = 1'-0"



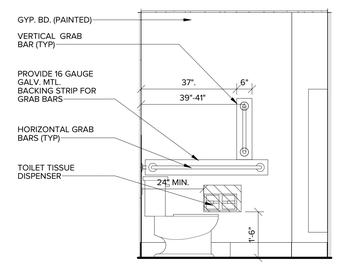

10 A-513 ELEVATION 33
1/2" = 1'-0"



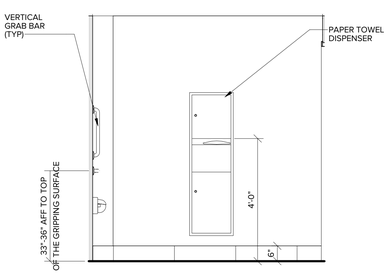

11 A-513 ELEVATION 34
1/2" = 1'-0"



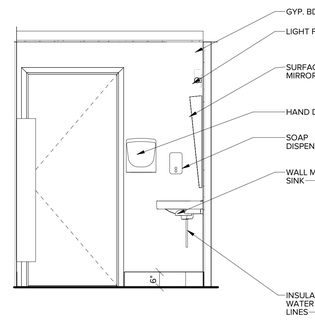

1 A-514 OFFICE BATHROOMS 1ST FLOOR
1/2" = 1'-0"



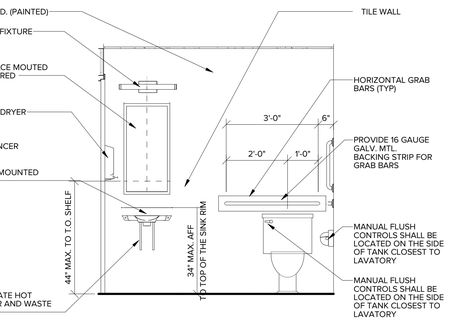

ELEVATION 35
1/2" = 1'-0"




4 A-514 ELEVATION 36
1/2" = 1'-0"




5 A-514 ELEVATION 37
1/2" = 1'-0"




6 A-514 ELEVATION 38
1/2" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
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## PUBLIC BATHROOM PLANS & ELEVATIONS

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SCALE: 1/2" = 1'-0"
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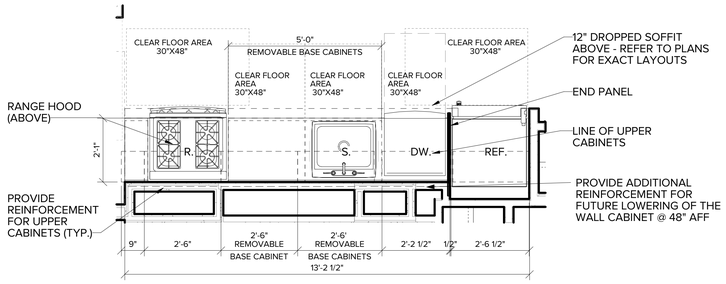
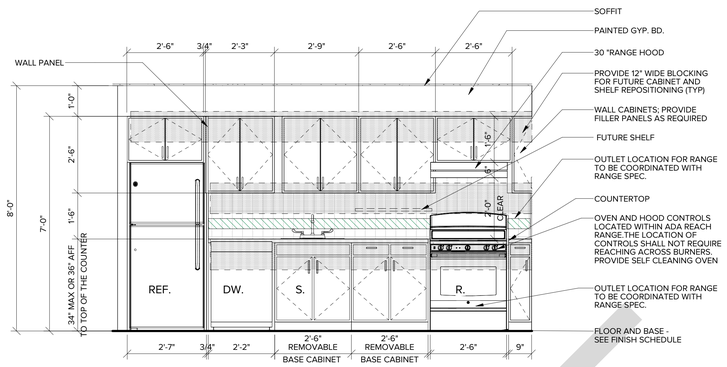
DRAWING NO: A-513.00

NYC DOB NUMBER: X00945951-I1




1 ENLARGED KITCHEN PLAN-STRIPE SHAPE
A-515.00 1/2" = 1'-0"



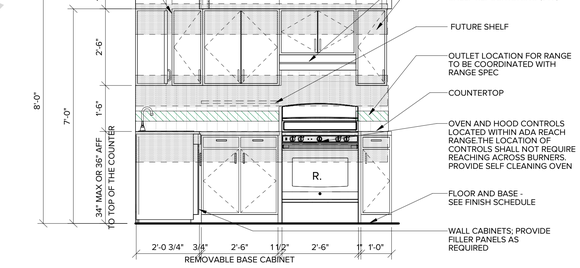

1A ELEVATION 1A
A-515.00 1/2" = 1'-0"




2 ENLARGED KITCHEN PLAN-L SHAPE
A-515.00 1/2" = 1'-0"




2B ELEVATION 2B
A-515.00 1/2" = 1'-0"

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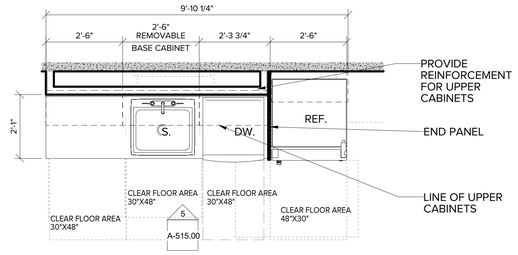


3 ENLARGED KTCHEN STAFF & LOUNGE
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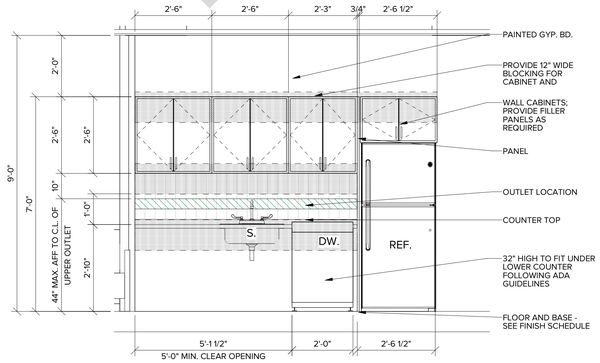


5 ELEVATION 4D
A-515.00 1/2" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

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## TYPICAL KITCHEN PLANS & ELEVATIONS

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ISSUE DATE: 07/27/22

PROJECT NO: Project Number

DRAWN BY: Author

CHECKED BY: Checker

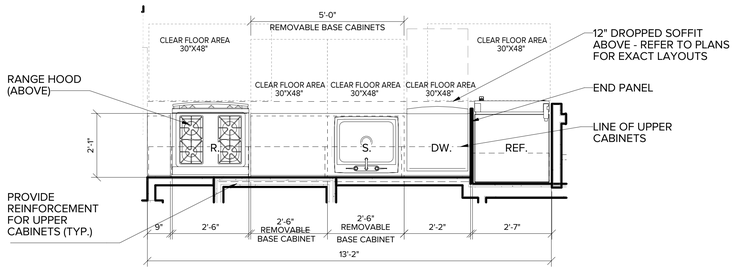
SCALE: 1/2" = 1'-0"

SHEET NO: OF

DRAWING NO:

# A-515.00

NYC DOB NUMBER: X00945951-I1




1 UFAS KITCHEN
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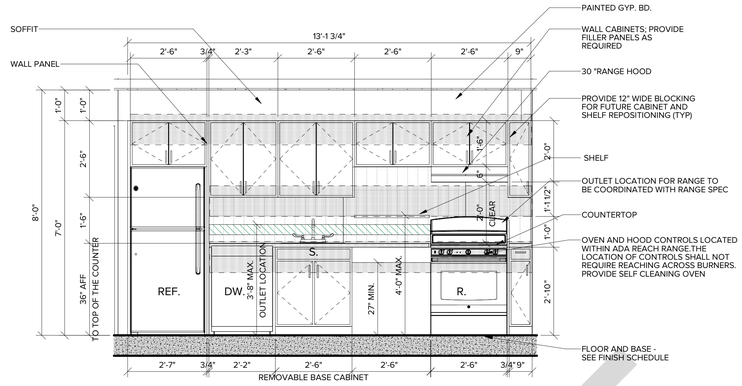


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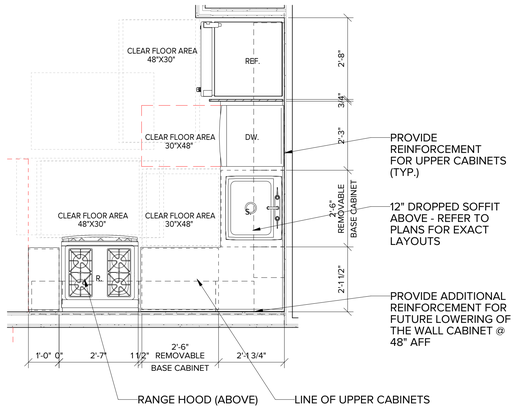
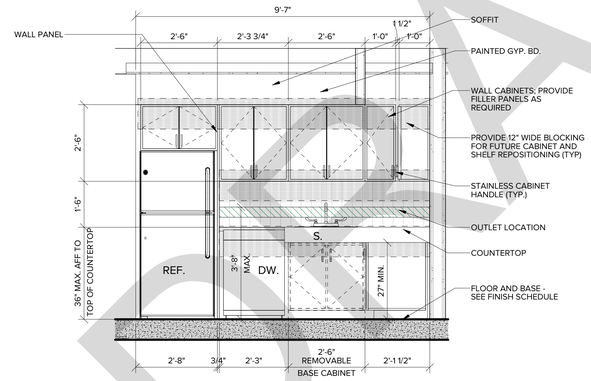
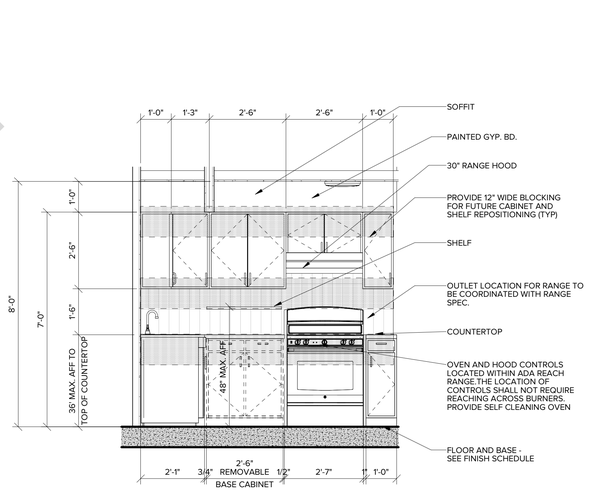



3 ENLARGED UFAS KITCHEN - L SHAPE
A-516.00 1/2" = 1'-0"




4 ELEVATION 3B
A-516.00 1/2" = 1'-0"




5 ELEVATION 4B
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DRAFT

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## UFAS KITCHEN PLANS & ELEVATIONS

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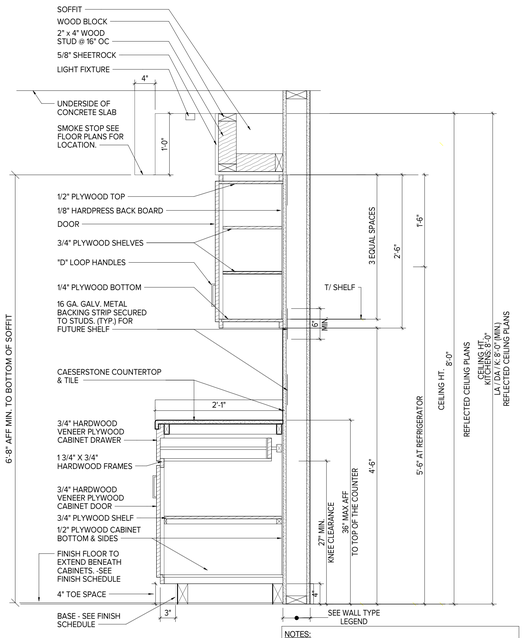
CHECKED BY: Checker
SCALE: 1/2" = 1'-0"
SHEET NO: OF
DRAWING NO: A-516.00

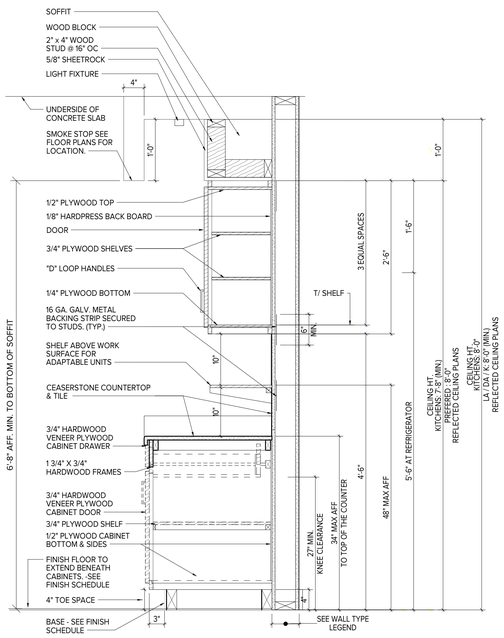
NYC DOB NUMBER: X00945951-I1

## TYPICAL KITCHEN CABINET DIAGRAM




NOTES:
1. CONTRACTOR SHALL PROVIDE ALL REQUIRED FILLER STRIPS.
2. IN THE EVENT A PHYSICALLY HANDICAPPED PERSON MOVES INTO AN APARTMENT AT A LATER DATE, THE OWNER, AT HIS OWN EXPENSE WILL TAKE DOWN THE EXISTING CABINETS AND RE-INSTALL KITCHEN CABINETRY @ STANDARD A.D.A. MOUNTING HEIGHTS AS INDICATED ON THIS DRAWING.

TYP. KITCHEN CABINET DETAIL
1" = 1'-0"

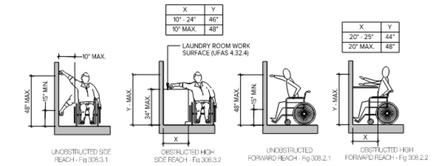


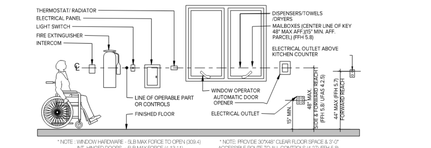

TYP. KITCHEN CABINET DETAIL UFAS
1" = 1'-0"

NOTES:
1. CONTRACTOR SHALL PROVIDE ALL REQUIRED FILLER STRIPS. USE PARTICLE BOARD & MEDIUM DENSITY FIBER BOARD (MDF) THAT IS CERTIFIED COMPLIANT W/ THE ANSI 208.1 & 208.2.
2. IN THE EVENT A PHYSICALLY HANDICAPPED PERSON MOVES INTO AN APARTMENT AT A LATER DATE, THE OWNER, AT HIS OWN EXPENSE WILL TAKE DOWN THE EXISTING CABINETS AND RE-INSTALL KITCHEN CABINETRY AT STANDARD A.D.A. MOUNTING HEIGHTS AS INDICATED ON THIS DRAWING.
3. COUNTER-TOP SUPPORTS MUST BE PROVIDED WHERE BASE CABINETS ARE BEING REMOVED TO WITHSTAND THE APPLICATION OF A MAX. BENDING MOMENT OF 250 LBS (UFAS 4.26.3)
4. AT ALL ADAPTABLE & ACCESSIBLE APARTMENTS, THE FOLLOWING NOTICE MUST BE POSTED INSIDE THE COAT CLOSET:

PER UFAS SEC. 4.34.4. THIS UNIT MAY BE PROVIDED WITH THE FOLLOWING:

1. ALTERNATE HEIGHT FOR COUNTER TOPS IS 34" AT SINKS AND WORK AREAS. (INCLUDING UNDER-CABINET CLEARANCES [29"] AND TOP CABINET MAX. REACH HEIGHTS [48"].)
2. GRAB BARS AT TOILETS AND BATHTUBS.
3. VISUAL/AUDIBLE EMERGENCY ALARMS MAY BE INSTALLED IN SELECTED UNITS.
4. ITEMS 1.) THRU 3.) ABOVE ARE READILY AVAILABLE UPON TENANT'S REQUEST TO MANAGEMENT FOR INSTALLATION.
5. THIS UNIT HAS BEEN DESIGNED IN ACCORDANCE WITH "UNIFORM FEDERAL ACCESSIBILITY STANDARDS" (UFAS) GUIDELINES.




TYPICAL HANDICAP INSTALLATION HEIGHTS

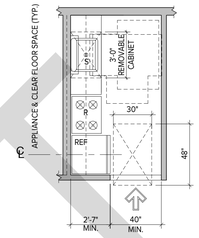
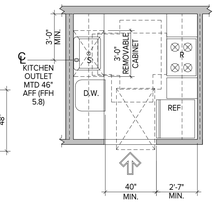



Fig 1013.12.1.1/ 804.21



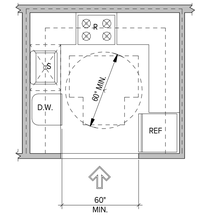
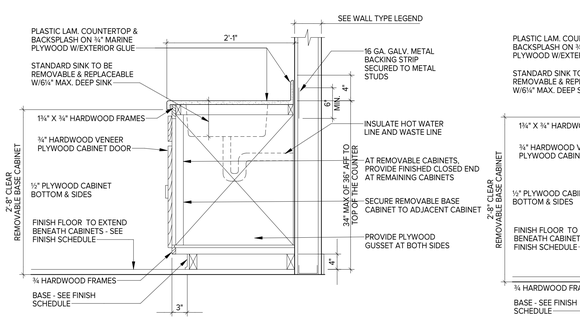



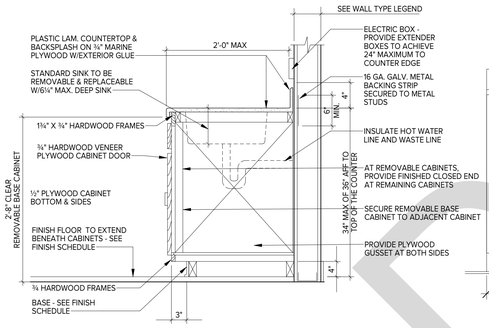

Fig 1013.12.1.2/ 804.22

NOTE:
1. PROVIDE EITHER PARALLEL OR PERPENDICULAR APPROACH TO EACH FIXTURE/ APPLIANCE FFH 7.3
2. PARALLEL APPROACH IS REQUIRED A REFRIGERATOR (2014 NYC BC)
3. PROVIDE (2) 30" WIDE REMOVABLE CABINETS

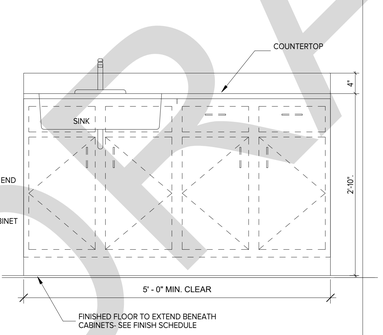
KITCHEN HEIGHT REQUIREMENTS & MINIMUM KITCHEN CLEARANCE




SECTION THRU REMOVABLE KITCHEN CABINET DETAIL
1 A-517.00 1" = 1'-0"




SECTION THRU REMOVABLE KITCHEN CABINET DETAIL - UFAS
3 A-517.00 1" = 1'-0"

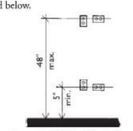



TYPICAL KITCHEN REMOVABLE BASE CABINET
2 A-517.00 1" = 1'-0"

## FAIR HOUSING ACT DESIGN MANUAL

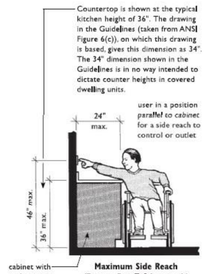
### Mounting Locations for Outlets

For accessible controls and outlets, all operable parts must be within the ranges specified above. When electrical outlets are installed horizontally or vertically, duplex outlets must have both receptacles within the reach range. Measurements are made as illustrated below.

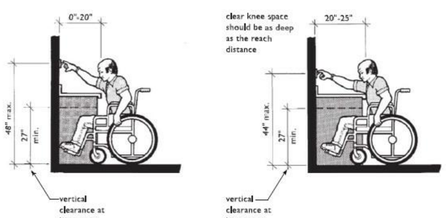


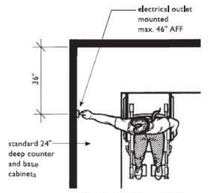

Mounting Height for Outlets

FHA DESIGN MANUAL (WHERE APPLICABLE)

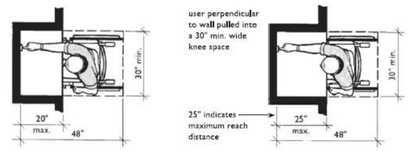



Maximum Side Reach (From a Parallel Approach) Over an Obstruction

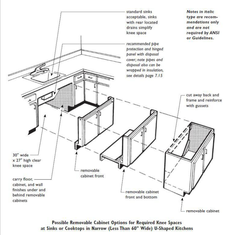


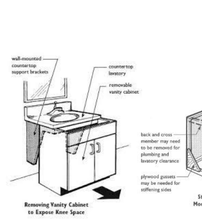

Electrical Outlets on Walls Over Cabinets Must Be a Minimum of 36" from a Corner

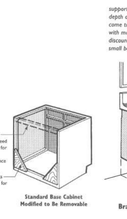



Maximum Forward Reach (From a Perpendicular Approach) over an Obstruction

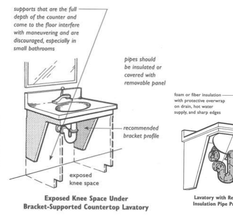



Possible Removable Cabinet Options for Required Knee Spaces at Sinks or Cooktops in Narrow (Less Than 60" Wide) U-Shaped Kitchens



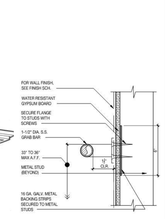




Standard Base Cabinet Modified to Be Removable

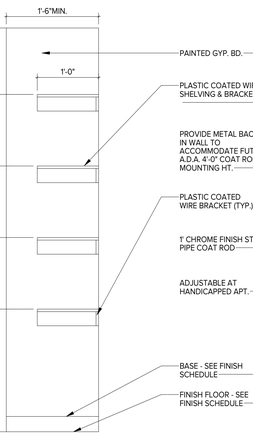



Exposed Knee Space Under Bracket-Supported Countertop Lavatory

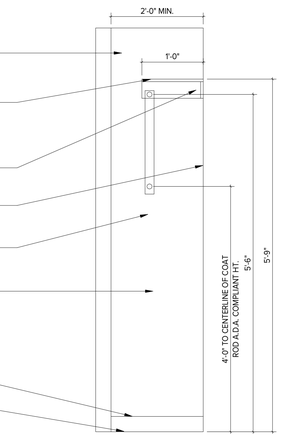
Lavatory with Removable Insulation Pipe Protection



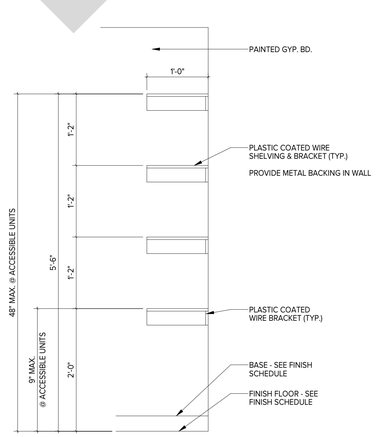

GRAB BAR DETAIL




LINEN CLOSET SHELVING
1" = 1'-0"




CLOSET / COAT CLOSET HANGING ROD & SHELF
1" = 1'-0"




STORAGE CLOSET SHELVING
1" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

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BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

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| 01/31/2024 | ISSUED FOR 100% SD |

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# KITCHEN AND MISCELLANEOUS INTERIOR MILLWORK DETAILS

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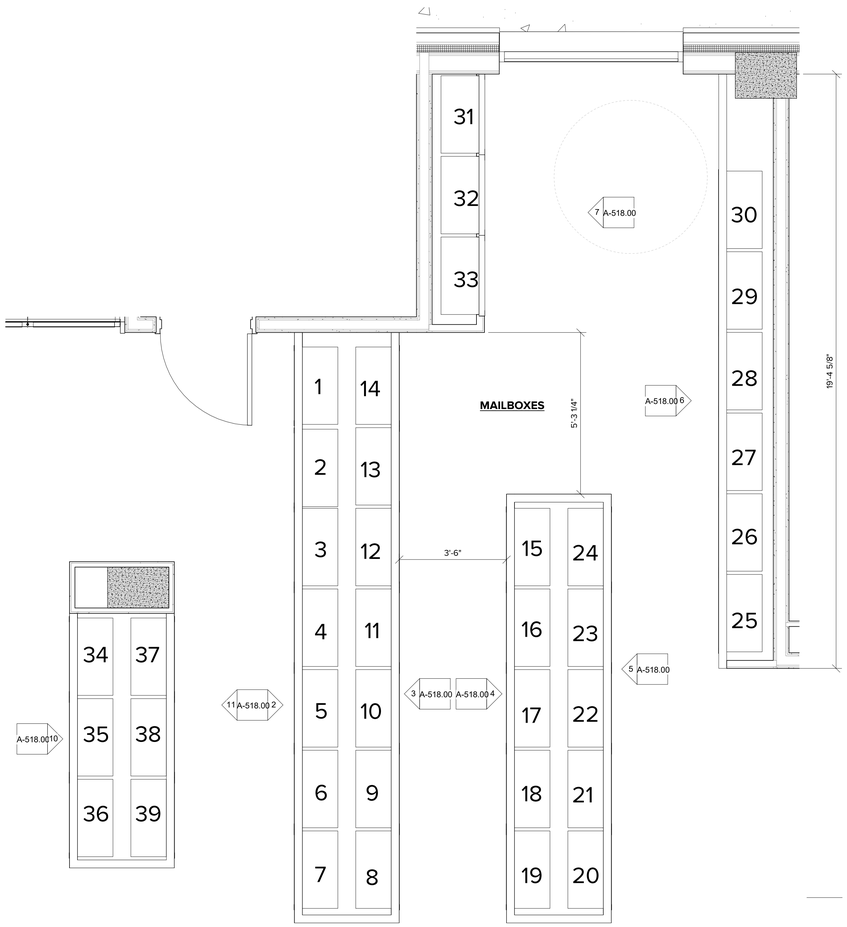
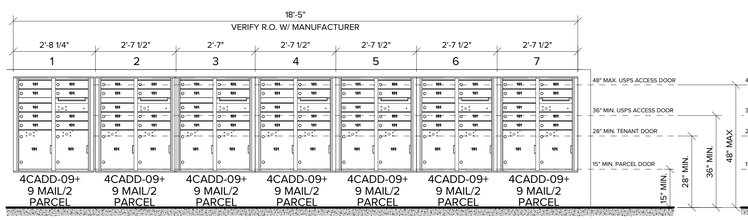
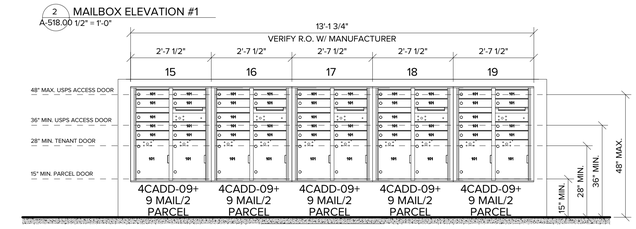
NYC DOB NUMBER: X00945951-I1



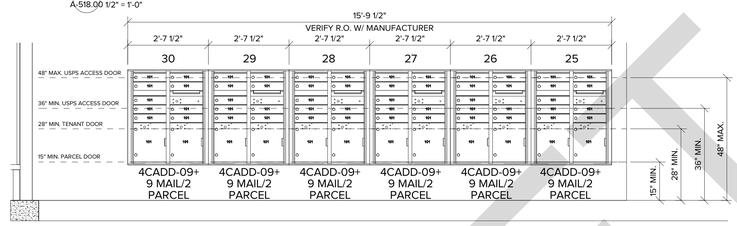

1 MAILBOX ROOM PLAN
A-518.00 1/2" = 1'-0"



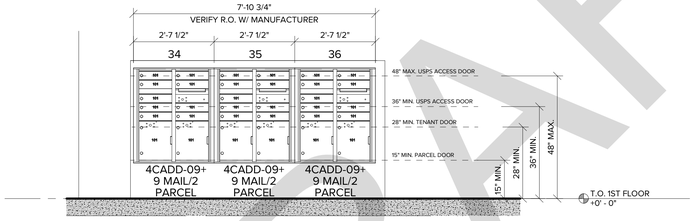

2 MAILBOX ELEVATION #1
A-518.00 1/2" = 1'-0"



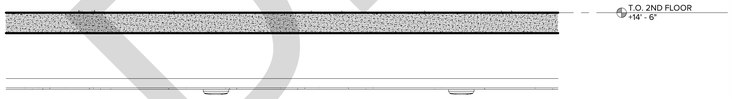

4 MAILBOX ELEVATION #3
A-518.00 1/2" = 1'-0"




6 MAILBOX ELEVATION #5
A-518.00 1/2" = 1'-0"



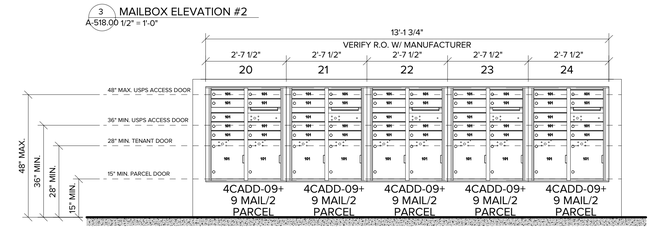

10 MAILBOX ELEVATION #7
A-518.00 1/2" = 1'-0"



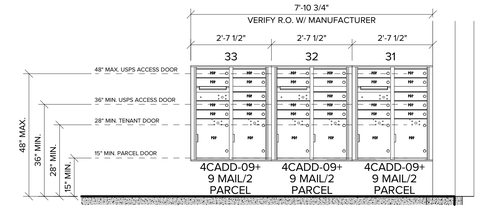




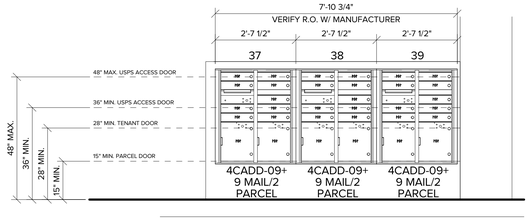
3 MAILBOX ELEVATION #2
A-518.00 1/2" = 1'-0"



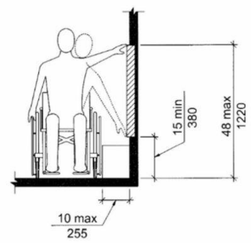

5 MAILBOX ELEVATION #4
A-518.00 1/2" = 1'-0"




7 MAILBOX ELEVATION #6
A-518.00 1/2" = 1'-0"



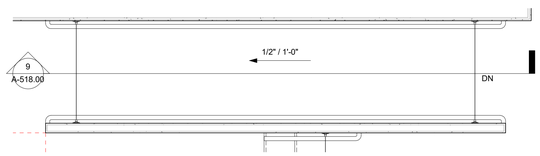

11 MAILBOX ELEVATION #8
A-518.00 1/2" = 1'-0"



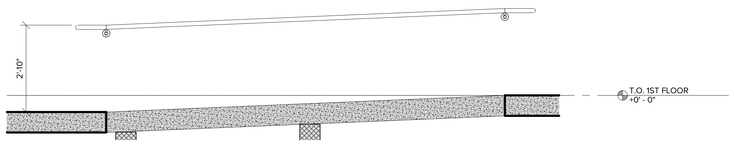

(a)
Elevation




FIG. 308.3.1
UNOBSTRUCTED SIDE REACH




8 RAMP PLAN @ 1ST FLOOR
A-518.00 1/2" = 1'-0"




9 RAMP PLAN SECTION
A-518.00 1/2" = 1'-0"

| BUILDING MAILBOX CALCULATION | | |
|---|---|---|
| TOTAL RESIDENTIAL DW = 347 APARTMANTS = 351 MAIL BOXES/66 PARCEL BOXES | | |
| BUILDING MAILBOX CONFIGURATION | | |
| MAILBOX MODEL | TENANT UNITS | REMARKS |
| (9) 4CADD-09 | 351 MAIL | 78ARCEL |
| | | |
| TOTAL: | 351 MAIL | 78 PARCEL |

GENERAL NOTES:

1. FURNISH AND INSTALL (1) PARCEL LOCKER PER (5) APARTMENT MAILBOXES.

2. ALL MAILBOXES SHALL BE "VERSATILE" STD-40 SUITE "A" (ALUMINUM), FRONT LOADING HORIZONTAL MAILBOX AS MANUFACTURED BY AUTH-FLORENCE.

3. CONTRACTOR SHALL VERIFY ALL ROUGH OPENINGS WITH MANUFACTURER.

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

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## MAILBOX ROOM, RAMP AND ELEVATIONS

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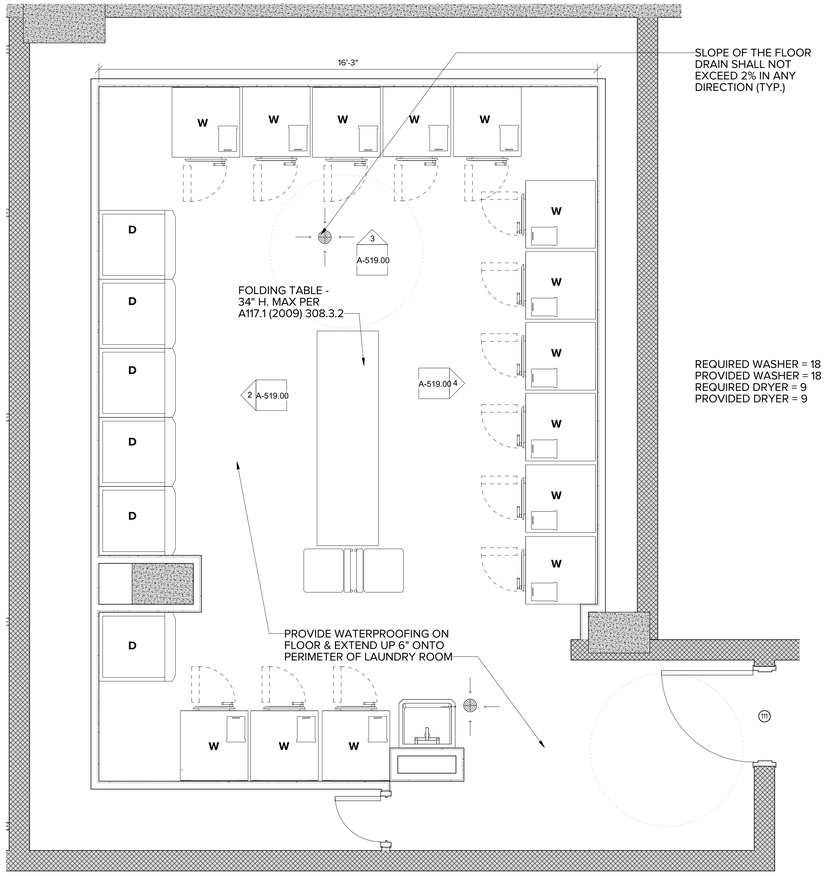
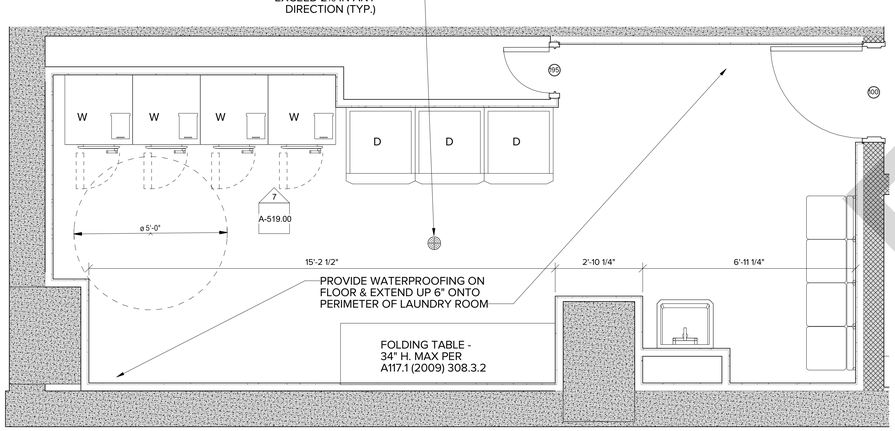
SHEET NO: OF

DRAWING NO:
# A-518.00

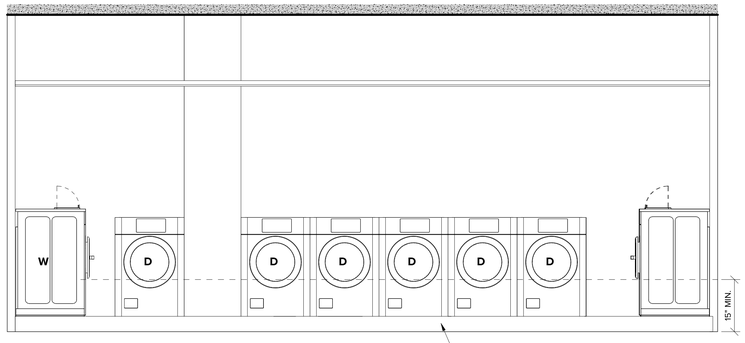
NYC DOB NUMBER: X00945951-I1



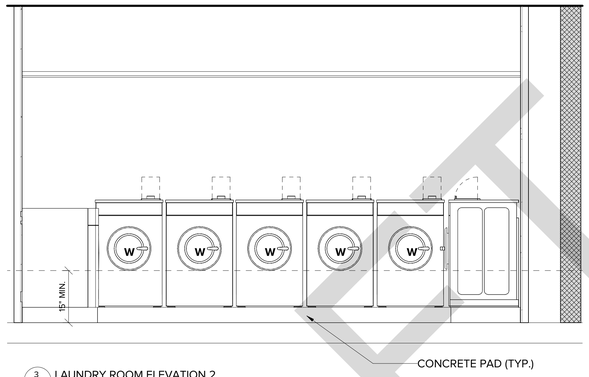

1 LAUNDRY ROOM
A-519.00 1/2" = 1'-0"



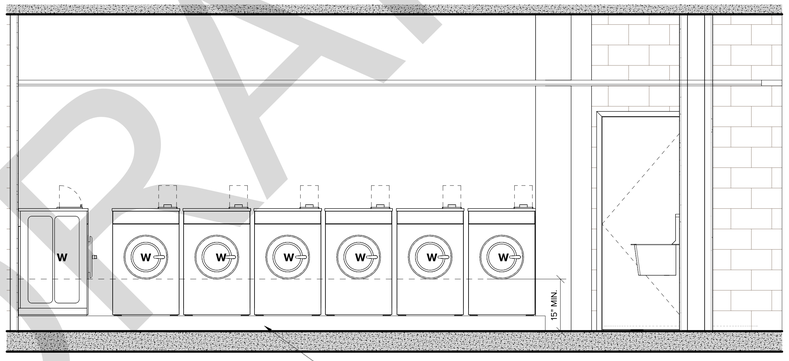

6 LAUNDRY ROOM 2
A-519.00 1/2" = 1'-0"



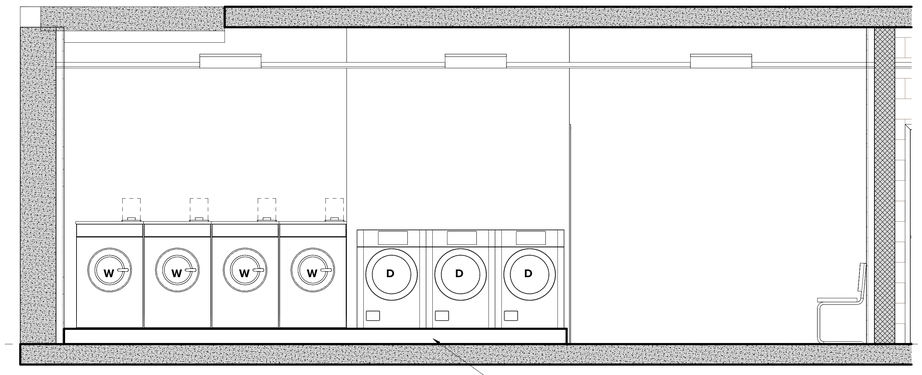

2 LAUNDRY ROOM ELEVATION 1
A-519.00 1/2" = 1'-0"




3 LAUNDRY ROOM ELEVATION 2
A-519.00 1/2" = 1'-0"




4 LAUNDRY ROOM ELEVATION 3
A-519.00 1/2" = 1'-0"




7 LAUNDRY ROOM 2 ELEVATION
A-519.00 1/2" = 1'-0"

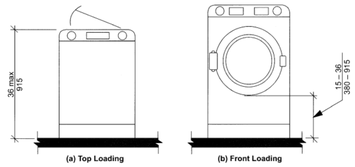
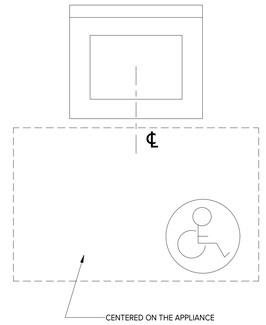
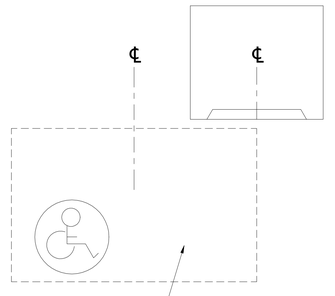



FIG. 611.4
HEIGHT OF LAUNDRY EQUIPMENT




(a) TOP LOADING




(b) FRONT LOADING

FIG. 611.2
CLEAR FLOOR SPACE

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
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25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
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New York, NY 10016
212.929.5656

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## LAUNDRY ROOM PLAN, AND ELEVATIONS

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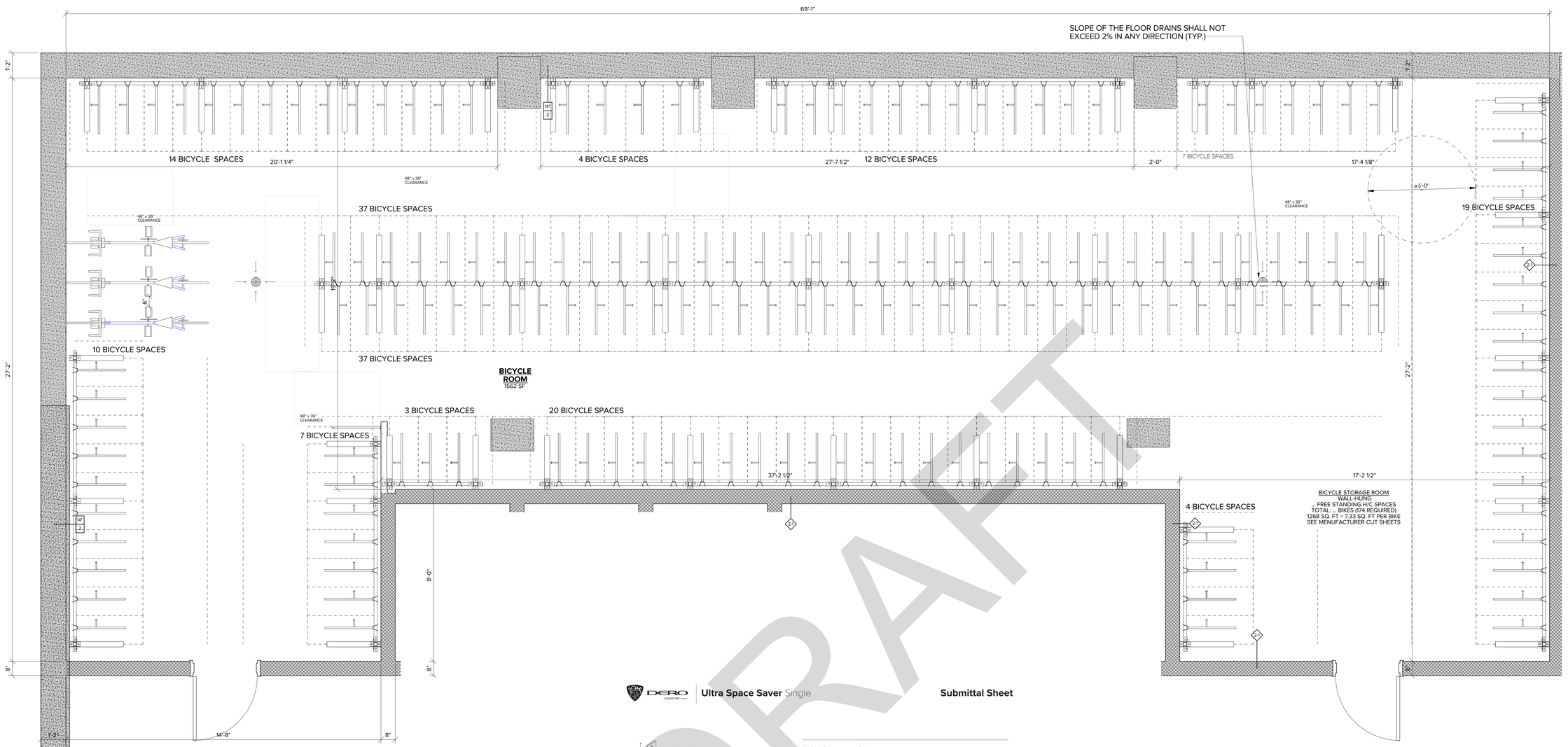
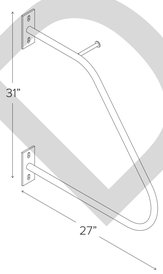


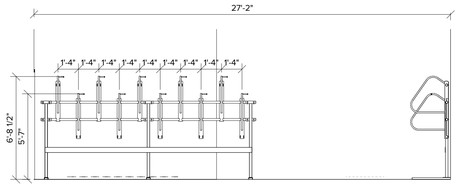

1 BICYCLE ROOM PLAN
A-520.00 1/2" = 1'-0"

DERO + FLEXCORE | **Ultra Space Saver** Single — **Submittal Sheet**




| | | |
|---|---|---|
| **CAPACITY** | 1 Bike | |
| **MATERIALS** | **Body:** 1" OD 11 gauge tube with ½" steel round bar hanger<br>**Mounting flanges:** ¼" plate | |
| **FINISHES** | ☐ | **Powder Coat (Interior Use)**<br>Our interior powder coat finish assures a high level of adhesion and durability for indoor use by following these steps:<br>1. Sandblast<br>2. Final thick TGIC polyester powder coat |
| | ☐ | **Powder Coat (Exterior Use)** Additional Cost<br>Our exterior powder coat finish assures a high level of adhesion and durability for outdoor or exposed air use by following these steps:<br>1. Sandblast<br>2. Epoxy primer electrostatically applied<br>3. Final thick TGIC polyester powder coat |
| **MOUNT OPTIONS** | **Wall only**<br>Wall mount has two 2.5" x 6" foot plates set 25" apart (centerline to centerline) with 4 fasteners. Can be set into concrete block, solid concrete, bricks, wood studs and other base materials. Tamper-resistant fasteners available upon request. | |
| **TUBE OPTIONS** | ☐ | **Round** |
| | ☐ | **Square** |

2 BICYCLE CUT SHEET
A-520.00 1/2" = 1'-0"




3 BICYCLE ROOM TYPICAL ELEVATION
A-520.00 1/4" = 1'-0"

**BICYCLE PARKING**

| | | | | |
|---|---|---|---|---|
| 25-811 | RESIDENTIAL | 50% | 347 * 50% = 174 | 174 |
| 25-811 | RESIDENTIAL | 1 PER 10,000 | 131,858.50 / 10,000 = 14 | 0 |
| 36-711 | COMMERCIAL | 1 PER 10,000 | | 0 |
| 36-711 | COMM. FACILITY | 1 PER 10,000 | 124,914.23 / 10,000 = 13 | 13 |
| 36-711 | COMM. FACILITY | 1 PER 10,000 | 5,960 / 10,000 = 1 | 1 |
| PARKING CALCULATION ... | SPACES PROVIDED | | 1,268.00 | |

DRAFT

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PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
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## BICYCLE ROOM PLAN

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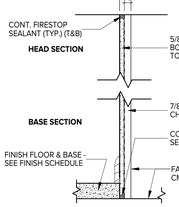
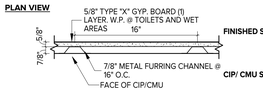



PLAN VIEW

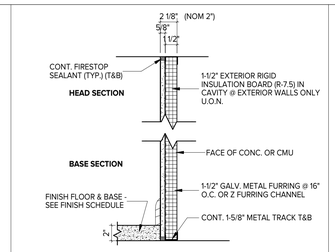



INTERIOR FURRING

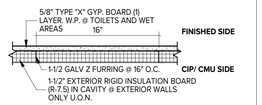
(1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)

## 0-1 NON RATED FURRING @ INTERIOR CIP/CMU (CORRIDOR SIDE)

1 1/2" = 1'-0"




PLAN VIEW

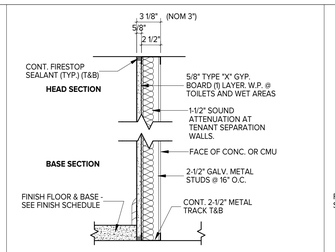



INTERIOR FURRING

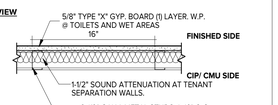
(1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL, 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS.

## 0-2 NON RATED FURRING @ INTERIOR CIP/CMU

1 1/2" = 1'-0"




PLAN VIEW

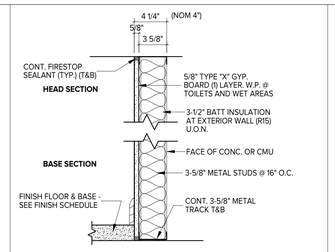



INTERIOR FURRING

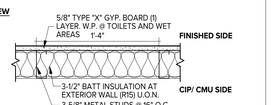
(1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)

## 0-3 NON RATED FURRING @INTERIOR CIP/CMU

1 1/2" = 1'-0"




PLAN VIEW

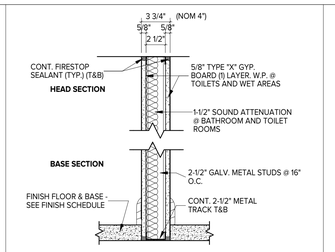



EXTERIOR CONC./CMU WALL FURRING

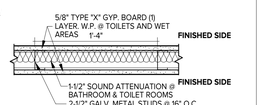
(1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15)

## 0-4 NON RATED FURRING @ EXTERIOR CIP/CMU

1 1/2" = 1'-0"




PLAN VIEW

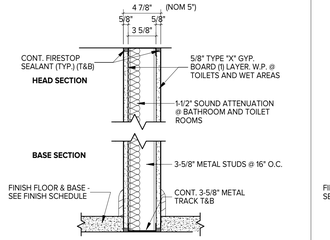



TYPICAL PARTITION

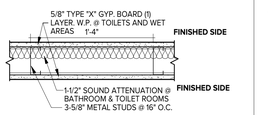
(1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS.

## 0-5 NON RATED PARTITION INTERIOR (TYPICAL PARTITION)

1 1/2" = 1'-0"




PLAN VIEW

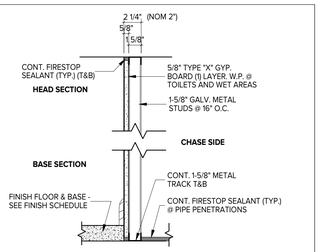



PARTITION @ PANEL

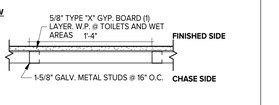
(1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS.

## 0-6 NON RATED PARTITION @ INTERIOR

1 1/2" = 1'-0"




PLAN VIEW

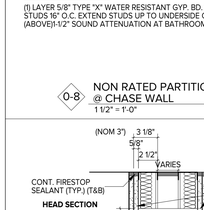



VERTICAL PIPE CHASE WALL

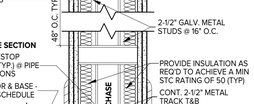
(1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)1-1/2" INSULATION AT COLD/HOT PIPES.

## 0-7 NON RATED PARTITION @PIPE CHASE WALL

1 1/2" = 1'-0"




PLAN VIEW

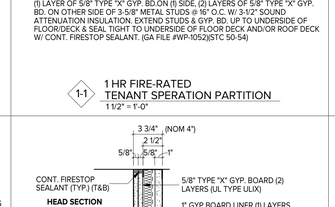



CHASE WALL PARTITION

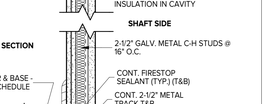
(1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS

## 0-8 NON RATED PARTITION @ CHASE WALL

1 1/2" = 1'-0"




PLAN VIEW

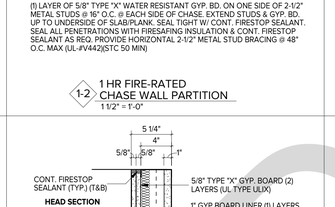



1 HR RATED TENANT PARTITION

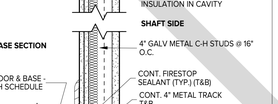
(1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54)

## 1-1 1 HR FIRE-RATED TENANT SEPARATION PARTITION

1 1/2" = 1'-0"




PLAN VIEW

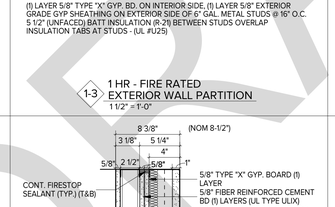



1 HR RATED TENANT SEPARATION CHASE WALL PARTITION

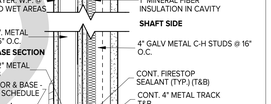
(1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT, SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN)

## 1-2 1 HR FIRE-RATED CHASE WALL PARTITION

1 1/2" = 1'-0"




PLAN VIEW

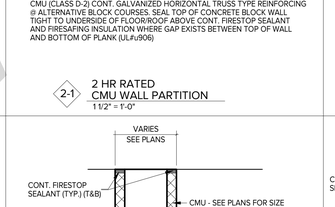



2 HR RATED SHAFT WALL - MASONRY EQUIVALENT

(1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" FINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C., SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY

## 1-3 1 HR - FIRE RATED EXTERIOR WALL PARTITION

1 1/2" = 1'-0"




PLAN VIEW

1 HR RATED EXTERIOR WALL PARTITION

(1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL. METAL STUDS @ 16" O.C. 5 1/2" (UNFACED) BATT INSULATION @ 24 BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25)

## 2-1 2 HR RATED CMU WALL PARTITION

1 1/2" = 1'-0"




PLAN VIEW

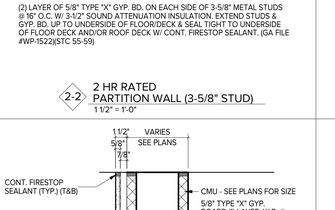



2 HR RATED CMU WALL

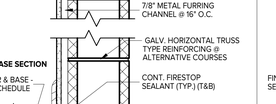
CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#u906)

## 2-2 2 HR RATED PARTITION WALL (3-5/8" STUD)

1 1/2" = 1'-0"




PLAN VIEW

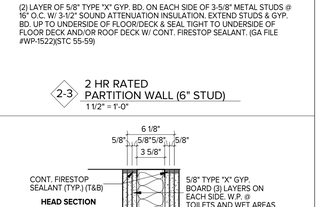



2 HR RATED PARTITION (3-5/8" STUD)

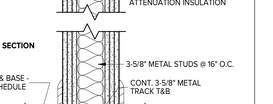
(2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59)

## 2-2 2 HR RATED PARTITION WALL (3-5/8" STUD)

1 1/2" = 1'-0"




PLAN VIEW




2 HR RATED PARTITION (6" STUD)

(2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59)

## 2-3 2 HR RATED PARTITION WALL (6" STUD)

1 1/2" = 1'-0"




PLAN VIEW




2 HR RATED CHASE WALL PARTITION

(2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN)

## 2-4 2 HR RATED CHASE WALL PARTITION

1 1/2" = 1'-0"




PLAN VIEW




2 HR RATED SHAFT WALL

(2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49)

## 2-5 2 HR RATED SHAFT WALL (4")

1 1/2" = 1'-0"




PLAN VIEW




2 HR RATED SHAFT WALL

(2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP BOARD LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49)

## 2-6 2 HR RATED SHAFT WALL (5")

1 1/2" = 1'-0"




PLAN VIEW




2 HR RATED SHAFT WALL - MASONRY EQUIVALENT

(1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" FINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C., SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY

## 2-7 2 HR RATED SHAFT WALL - MASONRY EQ.

1 1/2" = 1'-0"




PLAN VIEW




3 HR RATED CMU WALL

CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (UL#u907)

## 3-1 3 HR RATED CMU WALL PARTITION

1 1/2" = 1'-0"




PLAN VIEW




3 HR RATED CMU WALL

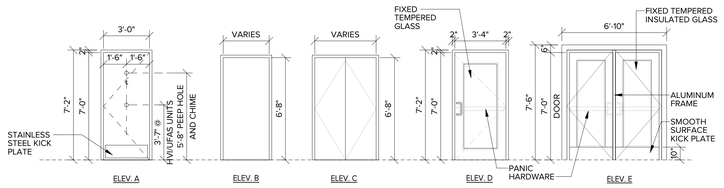
(1) LAYER OF 5/8" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CL

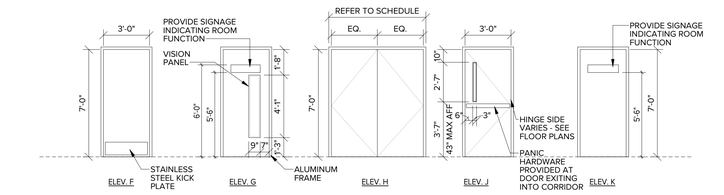
**LIST OF ABBREVIATIONS:**

**DOOR SCHEDULE**

| Program | ROOM DESIGNATION | DOOR DESIGNATION | DOOR ELEVATION | DOOR WIDTH | DOOR HEIGHT | DOOR THICKNESS | DOOR TYPE | DOOR MATERIAL | DOOR FINISH | FRAME FIRE RATING | FRAME STC RATING | FRAME MATERIAL | FRAME FINISH | FRAME FIRE RATING | FRAME SADDLE MATERIAL | HARDWARE SET | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 135 | | 2' - 10" | 6' - 11" | | | | | | | | | | | | |
| APARTMENT | | | | | | | | | | | | | | | | | |
| APARTMENT | APARTMENT ENTRY | 1 | A | 3' - 0" | 7' - 0" | 1 3/4" | FL | H.M. | PTD. | 3/4 HR | 35 | STL | PTD. | 1 1/2 HR | ALUM. | | |
| APARTMENT | BATHROOM | 2 | B | 3' - 0" | 6' - 8" | 1 3/8" | FL/HC | H.M. | PTD. | 3/4 HR | - | H.M. | PTD. | - | MAR | | |
| APARTMENT | BEDROOM | 3 | B | 3' - 0" | 6' - 8" | 1 3/8" | FL/HC | H.M. | PTD. | 3/4 HR | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - SWINGING DOOR | 4 | B | 3' - 0" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - SWINGING DOOR | 4a | B | 2' - 6" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - SWINGING DOOR | 4b | B | 2' - 0" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - SWINGING DOOR | 4c | B | 1' - 8" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - DOUBLE DOOR | 5 | C | 5' - 0" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - DOUBLE DOOR | 5a | C | 4' - 0" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - DOUBLE DOOR | 6 | C | 3' - 0" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - DOUBLE DOOR | 98 | C | 3' - 0" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| APARTMENT | CLOSET - DOUBLE DOOR | 99 | C | 3' - 0" | 6' - 8" | 1 3/8" | FL/HC | WD | PTD. | - | - | H.M. | PTD. | - | - | | |
| CELLAR | | | | | | | | | | | | | | | | | |
| CELLAR | PUBLIC BATHROOM @ CELLAR | 41 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| CELLAR | PUBLIC BATHROOM @ CELLAR | 42 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| CELLAR | ELECTRICAL ROOM @ CELLAR | 95 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | WORKSHOP ROOM @ CELLAR | 100 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | STAFF ROOM @ CELLAR | 101 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | SUPER OFFICE ROOM @ CELLAR | 102 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | SUPPLY ROOM @ CELLAR | 103 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | FIRE PUMP ROOM @ CELLAR | 104 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | MECHANICAL ROOM @ CELLAR | 105 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | ELECTRICAL ROOM @ CELLAR | 107 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | TELECOM ROOM @ CELLAR | 110 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | LAUNDRY ROOM @ CELLAR | 111 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | BICYCLE ROOM @ CELLAR | 112 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | WD | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | BICYCLE ROOM @ CELLAR | 113 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | WD | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 18 | |
| CELLAR | ELECTRICAL ROOM @ CELLAR | 114 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | ELECTRICAL ROOM @ CELLAR | 115 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| CELLAR | ATS ROOM @ CELLAR | 116 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| 1ST FLOOR | | | | | | | | | | | | | | | | | |
| 1ST FLOOR | BUILDING ENTRY @ 1ST FLOOR | 10 | | 5' - 10 5/32" | 9' - 11 3/4" | | | | | | | | | | | | |
| 1ST FLOOR | BUILDING ENTRY VESTIBULE @ 1ST FLOOR | 11 | D | 3' - 0" | 7' - 0" | 1 3/4" | GLASS | ALUM./GL. | GLASS | 1 1/2 HR | 35 | ALUM. | PTD. | 1 1/2 HR | ALUM. | | |
| 1ST FLOOR | SECURITY ROOM @ 1ST FLOOR | 12 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| 1ST FLOOR | RECREATION ROOM @ 1ST FLOOR | 14 | C | 5' - 0" | 7' - 0" | 1 3/4" | FL/HC | STL | PTD. | - | - | H.M. | PTD. | - | - | | |
| 1ST FLOOR | RECREATION ROOM @ 1ST FLOOR | 15 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| 1ST FLOOR | COMPACTOR ROOM @ 1ST FLOOR | 17 | F | 3' - 1" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 15 | |
| 1ST FLOOR | COMPACTOR ROOM @ 1ST FLOOR | 18 | F | 3' - 1" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| 1ST FLOOR | PACKAGE ROOM @ 1ST FLOOR | 19 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 20 | |
| 1ST FLOOR | LOUNGE ROOM @ 1ST FLOOR | 20 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | WD | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 18 | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 43 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 44 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 96 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 97 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 117 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 118 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 119 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 128 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 129 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 131 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 1ST FLOOR | PUBLIC BATHROOM @ 1ST FLOOR | 132 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL/HC | WD | PTD. | - | - | STL | PTD. | - | ALUM. | | |
| 2ND FLOOR | | | | | | | | | | | | | | | | | |
| 2ND FLOOR | REFUSE ROOM @ 2ND FLOOR | 80 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | | - | STL | PTD. | 1 1/2 HR | ALUM. | 21 | |
| 2ND FLOOR | JANITOR ROOM @ 2ND FLOOR | 90 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | | - | STL | PTD. | 1 1/2 HR | ALUM. | 14 | |
| 2ND FLOOR | ELEC. CL ROOM @ 2ND FLOOR | 120 | H | 4' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 13 | |
| 2ND FLOOR | ELEC. CL ROOM @ 2ND FLOOR | 121 | H | 4' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 13 | |
| 2ND FLOOR | LAUNDRY SERVICE ROOM | 133 | F | 1' - 6" | 7' - 0" | 1 3/4" | FL | H.M. | PTD. | - | | H.M. | PTD. | | | | |
| 2ND FLOOR | LAUNDRY SERVICE ROOM | 195 | F | 1' - 6" | 7' - 0" | 1 3/4" | FL | H.M. | PTD. | - | | H.M. | PTD. | | | #7 | |
| 3RD-9TH FLOOR | | | | | | | | | | | | | | | | | |
| 3RD-9TH FLOOR | ELEC. CL ROOM @ 3RD-9TH FLOOR | 122 | H | 4' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 13 | |
| 3RD-9TH FLOOR | ELEC. CL ROOM @ 3RD-9TH FLOOR | 123 | H | 4' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 13 | |
| 16TH-26TH FLOOR | | | | | | | | | | | | | | | | | |
| 16TH-26TH FLOOR | REFUSE ROOM @ 16TH-26TH FLOOR | 83 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | | - | STL | PTD. | 1 1/2 HR | ALUM. | 21 | |
| 16TH-26TH FLOOR | JANITOR ROOM @ 16TH-26TH FLOOR | 93 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | | - | STL | PTD. | 1 1/2 HR | ALUM. | 14 | |
| 16TH-26TH FLOOR | ELEC. CL ROOM @ 16TH-26TH FLOOR | 126 | H | 4' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 13 | |
| 16TH-26TH FLOOR | ELEC. CL ROOM @ 16TH-26TH FLOOR | 127 | H | 4' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | 13 | |
| PUBLIC SPACE | | | | | | | | | | | | | | | | | |
| PUBLIC SPACE | FIRE STAIR @ CELLAR | 49 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ CELLAR | 50 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | EXIT FIRE STAIR @ 1ST FLOOR | 54 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ 2ND FLOOR | 55 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ 2ND FLOOR | 56 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ 3RD-9TH FLOOR | 57 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | EXIT FIRE STAIR @ 1ST FLOOR | 58 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ 10TH-15TH FLOOR | 59 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ 10TH-15TH FLOOR | 60 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ 16TH-26 TH FLOOR | 61 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | | | |
| PUBLIC SPACE | FIRE STAIR @ 16TH-26 TH FLOOR | 62 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | | | |
| PUBLIC SPACE | FIRE STAIR @ ROOF FLOOR | 63 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | | | |
| PUBLIC SPACE | FIRE STAIR @ ROOF FLOOR | 64 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | | | |
| PUBLIC SPACE | FIRE STAIR @ TYPICAL FLOOR | 70 | J | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| PUBLIC SPACE | FIRE STAIR @ 1ST FLOOR | 94 | J | 3' - 0" | 6' - 8" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |
| SERVICE SPACES | | | | | | | | | | | | | | | | | |
| SERVICE SPACES | SUPER SHOP | 199 | F | 3' - 0" | 7' - 0" | 1 3/4" | FL | STL | PTD. | 1 1/2 HR | - | STL | PTD. | 1 1/2 HR | ALUM. | | |

**DOOR NOTES**

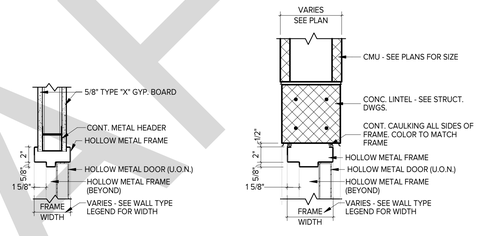



DOOR ELEVATIONS
1/4" = 1'-0"

DOOR NOTES:

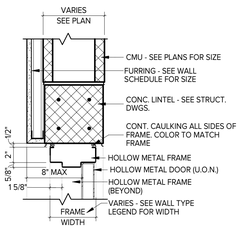
1. FOR DOOR HARDWARE SCHEDULE SEE SPECIFICATIONS
2. ALL HARDWARE SHALL BE LEVER HANDLE AS PER A.D.A. REQUIREMENTS (U.O.N.)
3. PROVIDE ADA MARBLE SADDLES AT ALL FLOOR TO TILE TRANSITIONS (U.O.N.)
4. ALL EXTERIOR DOORS SHALL BE INSULATED AND PROVIDED WITH WEATHER STRIPPING AT ALL SIDES. WEATHER STRIPPING MUST HAVE MECHANICALLY ATTACHED SWEEPS THAT ARE MADE OF SOLID MATERIAL (I.E. NOT A BRUSH)
5. ALL EXIT ACCESS DOORS SHALL BE PROVIDED WITH SELF CLOSER AND SMOKE PROOF ADA SADDLE
6. ALL ENTRY AND EXIT DISCHARGE DOORS SHALL BE PROVIDE WITH PANIC HARDWARE, SELF CLOSER, AND SMOKE PROOF ADA SADDLE
7. ALL EXTERIOR DOORS SHALL INCLUDE DOOR SWITCHES TO DISABLE MECHANICAL COOLING/HEATING WHEN OPEN
8. PROVIDE WEATHER STRIPPING @ ALL APT'S ENTRY & STAIR DOORS OFF OF CORRIDOR
9. ANODIZED ALUMINUM FINISH COLOR WILL BE APPROVED BY THE ARCHITECT TOGETHER WITH FINISHES MOCK UP.
10. ALL GLASS DOORS SHALL HAVE A U-FACTOR OF .40 AND SHGC RATING OF .30 AND ALL INSULATED DOORS SHALL HAVE A U-FACTOR OF .40 U.O.N ON COMCHECK CALCULATIONS
11. MAXIMUM FORCE TO OPEN DOORS IS 5 LBS (INTERIOR DOOR) AND 8.5 LBS (EXTERIOR DOOR)
12. AIR LEAKAGE, U-FACTOR, SHGC, & R-VALUE FOR FENESTRATION DOORS SHALL BE LABELED AND CERTIFIED BY THE MANUFACTURER
13. ALL FIRE RESISTANT RATED DOORS SHALL BE SELF CLOSING
14. ALL EXTERIOR DOORS, MECHANICAL DOORS, AND DOORS SEPERATING UNCONDITIONED FROM CONDITIONED SPACE SHALL BE WEATHER-STRIPPED. WEATHER STRIPPING SHALL BE OF THE RIGID TYPE AND HARD FASTENED TO THE DOOR FRAME
15. ALL EXTERIOR DOOR THRESHOLDS TO BE SET IN A CONTINUOUS BED OF SEALANT
16. DOOR SWEEPS SHALL BE PROVIDED @ ALL APT'S ENTRY TO PREVENT AIR LEAKAGE AND MINIMIZE PESTS MOVEMENT
17. ALL SIGNAGE SHALL INCLUDED LETTERS AND BRAILLE THAT COMPLIES WITH A117.1 SECTION 703.3.11



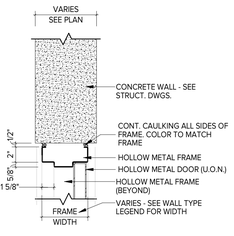

DOOR HEADER
@ GYP. WALL
1 1/2" = 1'-0"



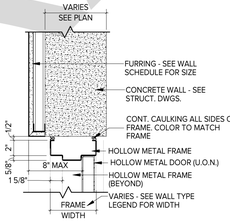

DOOR HEADER
@ CMU WALL
1 1/2" = 1'-0"



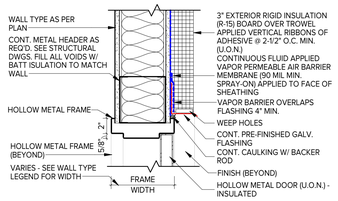

DOOR HEADER
@ CMU WALL W/FURRING
1 1/2" = 1'-0"



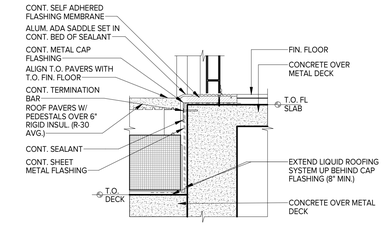

DOOR HEADER
@ CIP WALL
1 1/2" = 1'-0"



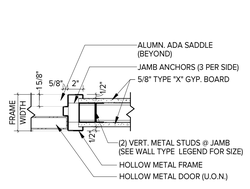

DOOR HEADER
@ CIP WALL W/FURRING
1 1/2" = 1'-0"



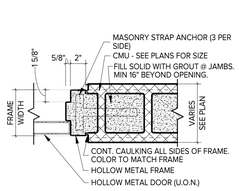

TYPICAL ROOF BULKHEAD DOOR
HEAD DETAIL @ STUD WALL
1 1/2" = 1'-0"



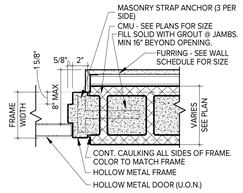

TYP. DOOR SILL DETAIL
@ DROPPED SLAB W/PAVERS
1 1/2" = 1'-0"



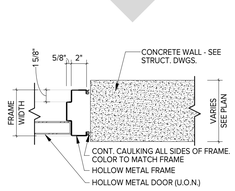

DOOR JAMB
@ GYP. WALL
1 1/2" = 1'-0"



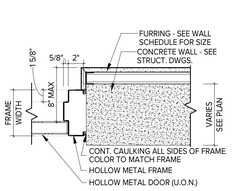

DOOR JAMB
@ CMU WALL
1 1/2" = 1'-0"



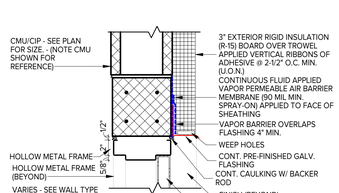

DOOR JAMB
@ CMU WALL W/FURRING
1 1/2" = 1'-0"



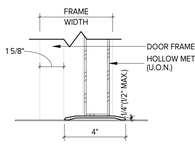

DOOR JAMB
@ CIP WALL
1 1/2" = 1'-0"



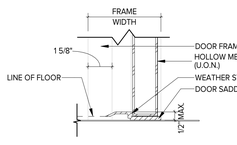

DOOR JAMB
@ CIP WALL W/FURRING
1 1/2" = 1'-0"



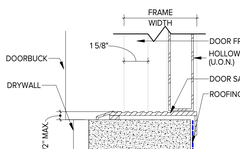

TYPICAL ROOF BULKHEAD DOOR
HEAD DETAIL @ CMU/CIP WALL
1 1/2" = 1'-0"



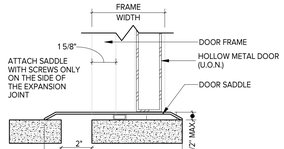

ALUMINUM SADDLE #1
3" = 1'-0"



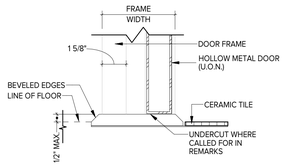

ALUMINUM SADDLE #2
3" = 1'-0"



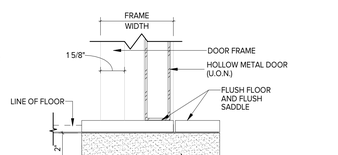

ALUMINUM SADDLE
@ ROOF AND BULKHEADS
3" = 1'-0"



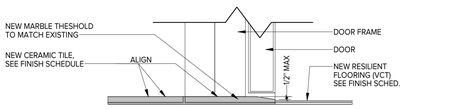

ALUMINUM SADDLE
@ EXPANSION POINT
3" = 1'-0"




MARBLE SADDLE
3" = 1'-0"




MARBLE SADDLE (FLUSH)
3" = 1'-0"


NEW MARBLE THESHOLD TO MATCH EXISTING
NEW CERAMIC TILE, SEE FINISH SCHEDUL

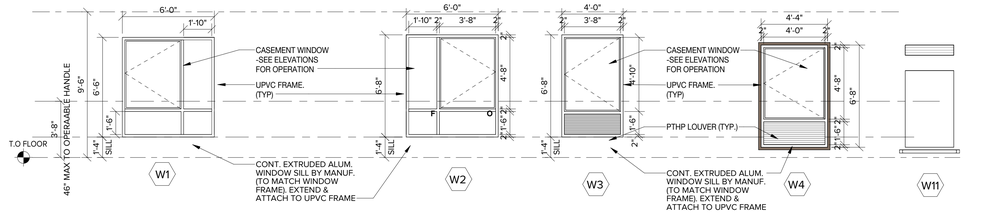
## WINDOW SCHEDULE

| WINDOW TYPE | WINDOW DESIGNATION | UNIT WIDTH | UNIT HEIGHT | FRAME MATERIAL | FINISH | FIRE RATING (HOUR) | R.O. WIDTH | R.O. HEIGHT | U-VALUE | OITC | SHGC | VT | INSECT SCREEN | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WINDOW/ FRAME | | | | R.O. | | | | | | | | |
| CASEMENT WINDOW | W1 | 6'-0" | <varies> | UPVC | PTD. | - | 6'-2" | <varies> | | | | | YES | SEE WINDOW NOTES |
| CASEMENT WINDOW | W2 | 6'-0" | <varies> | UPVC | PTD. | - | 6'-2" | <varies> | | | | | YES | SEE WINDOW NOTES |
| CASEMENT WINDOW | W3 | 4'-0" | 6'-8" | UPVC | PTD. | - | 4'-2" | 6'-10" | | | | | YES | SEE WINDOW NOTES |
| CASEMENT WINDOW | W10 | 6'-0" | 6'-8" | UPVC | PTD. | - | 6'-2" | 6'-10" | | | | | YES | SEE WINDOW NOTES |
| FIXED WINDOW | W11 | 3'-6" | 5'-4" | UPVC | PTD. | - | 3'-8" | 5'-6" | | | | | NO | SEE WINDOW NOTES |
| CASEMENT WINDOW | W14 | 4'-0" | 6'-8" | UPVC | PTD. | - | | | | | | | YES | SEE WINDOW NOTES |

NOTE:

ALL WINDOW U-VALUES AND GLAZING EDGE VALUES MUST BE CALCULATED ACCORDING TO EN ISO 10077

**O**- OPERABLE
**F**- FIXED




LIGHT PROVIDED = 27.06 SF
AIR PROVIDED = 13.53 SF

LIGHT PROVIDED = 27.06 SF
AIR PROVIDED = 13.53 SF

LIGHT PROVIDED = 16.33 SF
AIR PROVIDED = 8.16 SF

LIGHT PROVIDED = 18.67 SF
AIR PROVIDED = 9.33 SF

LIGHT PROVIDED = 15.83 SF

## LOUVER SCHEDULE

| LOUVER LOCATION | LOUVER DESIGNATION | DEPTH | HEIGHT | WIDTH | REMARKS |
|---|---|---|---|---|---|

GENERAL LOUVER NOTE:

ALL LOUVERS REQUIRED TO BE AMCA 550 RATED OR CONFIGURED TO DRAIN TO STORE OR SANITARY SYSTEM. AMCA 550 RECOMMENDED

GENERAL NOTES:

1. 0.08CFM/SF ENCLOSURE LEAKAGE FOR WHOLE BUILDING PER THE BLOWER DOOR TEST

2. COMPARTMENTALIZATION TESTING SHALL BE PERFORMED TO TEST AIR TIGHTNESS OF INDIVIDUAL DWELLING UNITS. THE TEST THRESHOLD SHALL BE 0.3 CFM50 / SQ. FT. UNIT SHELL AREA, OTHERWISE KNOWN AS ENVELOPE LEAKAGE RATIO (ELR).

3. EACH UNIT DOOR TO HAVE EXTERIOR GRADE WEATHERSTRIPPING / MECHANICALLY FASTENED BOTTOM DOOR SWEEPS.

4. INTERIOR PARTITIONS BETWEEN THE UNITS TO BE SEALED:
A. SEAL THE BOTTOM AND TOP PLATE TO THE PLANK/SLAB AND SEAL STUD TO SHEATHING
B. SEAL ALL HOLES, GAPS, AND PENETRATIONS
C. SEAL STUD TO DRYWALL

## FINISH SCHEDULE

| FLOOR | ROOM NAMES & LOCATION | | FLOOR: CERAMIC TILE | LUXARY VINYL TILE | PORCELAIN TILE | CONCRETE FINISH (POLISHED) | RUBBER FLOORING | WOOD FLOORING | CARPET | BASE: VINYL BASE | CERAMIC TILE (4" HIGH) | PORCELAIN TILE (4" HIGH) | WOOD (6" HIGH) | WALL: GYPSUM BOARD (PAINTED) | WALLPAPER | MASONRY (PAINTED) | CERAMIC TILE | PORCELAIN TILE | CEILING: GYPSUM BOARD (PAINTED) | PLANK (PAINTED) | CONCRETE FINISH (PAINTED) | ACOUSTICAL CEILING TILES (2'X2') | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CELLAR | PUBLIC SPACES | STAIR A & B | | | | ● | | | | | ● | | | | | ● | | | | | ● | | POLISHED CONCRETE FLOORING FOR EXPOSED BOH AREAS - INDUSTRIAL GRADE POLYASPARIC CONCRETE COATING OVER THE SLAB |
| | | MECH. - BOH/CORRIDOR | | | | ● | | | | | ● | | | | | ● | | | | | ● | | |
| | | BUILDING STORAGE | | | | ● | | | | | ● | | | | | ● | | | | | ● | | |
| | | SUPER SHOP, SUPPLY, WORKSHOP | | | | ● | | | | | ● | | | | | ● | | | | | ● | | |
| | | STAFF ROOM | | ● | | | | | | | | | ● | ● | | | | | | | ● | | |
| | | COMPACTOR ROOM | ● | | | | | | | | ● | | | | | ● | | | | | ● | | 3HR RATED CLG. & WALLS - 4'-0" 12X12 CERAMIC TILE WAINSCOTT ALL WALLS |
| | | FITNESS ROOM | | | | | ● | | | | ● | | | | ● | | | | | | | ● | |
| | | LAUNDRY ROOM | ● | | | | | | | | ● | | | | ● | | | | | | | ● | |
| | | PUBLIC CORRIDOR | | | ● | | | | | | | ● | | | ● | | ● | ● | ● | | | | |
| FIRST FLOOR | PUBLIC SPACES | STAIR A & B | | | | ● | | | | | ● | | | | | ● | | | | | ● | | |
| | | MAIL / PACKAGE ROOM | | | ● | | | | | | | ● | | | ● | | | | ● | | | | |
| | | LOBBY / CORRIDOR | | | ● | | | | | | | ● | | | ● | | ● | ● | ● | | | | |
| | | COMMUNITY ROOM | | ● | | | | | | | | | ● | ● | ● | | | | | | | ● | |
| | | LOUNGE | | ● | | | | | | | | | ● | ● | ● | | | | | | | ● | |
| | | SOCIAL SERVICE SUITE | | ● | | | | | | | | | ● | ● | ● | | | | | | | ● | |
| | | COMM. FACILITY SUITE | | ● | | | | | | | | | ● | ● | ● | | | | | | | ● | |
| | | PUBLIC BATHROOMS | | | ● | | | | | | | ● | | | ● | | ● | ● | | | | | |
| | ACCESSORY SPACES | PROP. MANAGER'S OFFICE | | ● | | | | | | | | | ● | ● | | | | | | | | ● | |
| | | SECURITY | | | ● | | | | | | | ● | | | ● | | | | | | | ● | |
| 2ND - 15 TH FLOORS | PUBLIC SPACES | STAIR A & B | | | | ● | | | | | ● | | | | | ● | | | | | ● | | |
| | | REFUSE & JANITOR ROOM | ● | | | | | | | | ● | | | | ● | | | | | ● | | | 4'-0" 12X12 CT WAINSCOT ALL WALLS |
| | | COMM. FACILITY SUITE | | ● | | | | | | | | | ● | | ● | | | | | | | ● | |
| | | CORRIDOR | | ● | | | | | | ● | | | | | ● | | | | | ● | | | |
| 2ND - 15 TH FLOORS | PRIVATE SPACES | APARTMENTS | | ● | | | | | | | | | ● | | ● | | | | | ● | | | |
| | | KITCHEN | | | ● | | | | | | | ● | | | | | ● | | | ● | | | |
| | | BATHROOM | | | ● | | | | | | | ● | | | ● | | | ● | ● | ● | | | |
| 16TH - 26TH FLOOR | PUBLIC SPACES | STAIR A & B | | | | ● | | | | | ● | | | | | ● | | | | | ● | | |
| | | REFUSE & JANITOR ROOM | ● | | | | | | | | ● | | | | ● | | | | | ● | | | 4'-0" 12X12 CT WAINSCOT ALL WALLS |
| | | CORRIDOR | | ● | | | | | | ● | | | | | ● | | | | | ● | | | |
| 16TH - 26TH FLOOR | PRIVATE SPACES | APARTMENTS | | ● | | | | | | | | | ● | | ● | | | | | ● | | | |
| | | KITCHEN | | | ● | | | | | | | ● | | | | | ● | | | ● | | | |
| | | BATHROOM | | | ● | | | | | | | ● | | | ● | | | ● | ● | ● | | | |
| ROOF | ACCESSORY SPACES | STAIR A & B | | | | ● | | | | | ● | | | | | ● | | | | | ● | | |
| | | BOILER ROOM | | | | ● | | | | | | | | | | ● | | | | | ● | | |
| | | ELEVATOR MACH. RM. | | | | ● | | | | | | | | | | ● | | | | | ● | | |
| | | ELEVATOR VEST. | ● | | | | | | | | ● | | | | | | | | | ● | | | |
| | | ATS ROOM | | | | ● | | | | | | | | | | ● | | | | | ● | | |

DRAFT

FINISH SCHEDULE NOTES

1. "PROVIDE AS REQUIRED GYPCRETE CONCRETE SELF-LEVELING TOPPING OVER ALL CONCRETE FLOOR (AND SLABS) SURFACES THAT ARE SCHEDULED TO RECEIVE A FINISH FLOOR
2. LEVEL THE ENTIRE FLOOR BEFORE APPLY FINAL FLOOR FINISH. MAXIMUM CHANGE IN ELEVATION FROM ADJACENT AREAS 1/4". GC TO ADVISE ARCHITECT IF FINISH FLOOR DOES NOT TOLERATES 1/2" ON THE STAIRS
3. PROVIDE WATERPROOF MEMBRANE UNDERLAYMENT TO EXTEND 6" UP IN LAUNDRY ROOM
4. FLOORING PRODUCTS TO BE FLOORSCORE CERTIFIED
5. PROVIDE STC 50 (OR GREATER) FOR WALLS, PARTITIONS AND FLOOR/CEILING ASSEMBLIES SEPARATING DWELLING UNITS FROM EACH OTHER, FROM ADJACENT OCCUPANCIES, FROM PUBLIC OR SERVICE AREAS, FROM STAIRS OR FROM MECHANICAL EQUIPMENT SPACES, INCLUDING BOILER ROOMS, OR ELEVATOR OR OTHER SHAFTS PER NYC BUILDING CODE SECTION 1207.2
6. PROVIDE IIC 50 (OR GREATER) FOR FLOOR/CEILING ASSEMBLIES BETWEEN DWELLING UNITS OR BETWEEN A DWELLING UNIT AND A PUBLIC OR SERVICE AREA STAIR, EXTERIOR MECHANICAL EQUIPMENT, OR OTHER MECHANICAL EQUIPMENT SPACE, INCLUDING BOILER ROOMS, SHALL BE CONSTRUCTED OF ASSEMBLED HAVING AN IMPACT INSULATION CLASS (IIC) RATING OF NOT LESS THAN 50 PER NYC BUILDING CODE SECTION 1207.3
7. BUILDING MATERIALS THAT HAVE THE POTENTIAL TO NEGATIVELY AFFECT INDOOR AIR QUALITY SUCH AS: PAINTS, APPLIED FINISHES, ADHESIVE, AND SEALANTS SHALL, AT MINIMUM, MEET GREEN SEAL, OR AN EQUIVALENT, LOW- VOC STANDARD
8. PROVIDE VIBRATION AND SOUND ABSORBING BASES OR SUPPORT FOR EQUIPMENT SUBJECT TO MOTION WHICH COULD TRANSMIT VIBRATION OR NOISE TO THE STRUCTURE
9. PROVIDE GYPCRETE CONCRETE TOPPING IN BICYCLE ROOM IF THERE IS A FINISH FLOOR ON THE PUBLIC CORRIDOR SIDE
10. APPLY INDUSTRIAL GRADE POLYASPARIC CONCRETE COATING SYSTEM OVER CONCRETE SLAB ON MECHANICAL ROOMS AND BICYCLE STORAGE
11. PROVIDE ANTI-SLIP TRAFFIC PAINT ON GARAGE RAMP
12. PROVIDE A SLIP-RESISTANT TILE IN BATHROOMS CONFORMING WITH ADA REGULATIONS

FINISH NOTES

1. PROVIDE WATERPROOFING INSULATION MEMBRANE IN ALL BATHROOMS
2. PROVIDE A FIREPROOFING INTUMESCENT COATING OVER THE SPRAY-ON THERMAL INSULATION
3. LEVEL THE ENTIRE FLOOR BEFORE APPLYING FINAL FLOOR FINISH. MAXIMUM CHANGE IN ELEVATION FROM ADJACENT AREAS 1/4". GC TO ADVISE ARCHITECT IF FINISH FLOOR DOES NOT TOLERATE 1/4" ON STAIRS
4. PROVIDE STC 50 (OR GREATER) FOR WALLS, PARTITIONS, AND FLOOR/CEILING ASSEMBLIES SEPARATING DWELLING UNITS FROM EACH OTHER,M FROM ADJACENT OCCUPANCIES, FROM PUBLIC OR SERVICE AREAS, FROM STAIRS OR FROM MECHANICAL EQUIPMENT SPACES, INCLUDED BOILER ROOMS, OR ELEVATOR OR OTHER SHAFTS PER NYC BUILDING CODE SECTION 1207.2
5. BUILDING MATERIALS THAT HAVE THE POTENTIAL TO NEGATIVELY AFFECT INDOOR AIR QUALITY SUCH AS: PAINTS, APPLIED FINISHES, ADHESIVE, AND SEALANTS SHALL, AT A MINIMUM, MEET GREEN SEAL, OR AN EQUIVALENT, LOW-VOC STANDARD
6. PROVIDE GYPCRETE IN BICYCLE ROOM IF THERE IS A FINISH FLOOR ON THE PUBLIC CORRIDOR SIDE
7. PROVIDE MOISTURE RESISTANCE BACKING MATERIAL (FIBER CEMENT BOARD OR CEMENT BOARD) @ WALLS & CEILINGS OF ALL BATHROOMS (ASTM # D3273)
8. ALL STAIS AND PLATFORMS TO RECEIVE A NON-SKID EPOXY PAINT FINISH (U.O.N.)
9. PROVIDE ACCESS DOORS AT CEILINGS AS REQUIRED BY MECHANICAL @ PUBLIC CORRIDORS (COLOR OF DOORS TO MATCH COLOR OF CEILING)
10. PROVIDE 8'-0" MIN. AFF. AND OR GYP. BD. CEILINGS AS REQUIRED TO CONCEAL ALL MECHANICAL, ELECTRICAL, & PLUMBING LINES, ETC. TO EXTEND FROM WALL TO WALL IN ORDER TO CREATE A 'BEAM' EFFECT
11. CERAMIC TILE/ LVT TO EXTEND BENEATH CABINETS AND APPLIANCES.
12. PROVIDE THIN-SET AT FLOOR TILE INSTALLATIONS. ENSURE THIN-SET IS COMPATIBLE BEFORE SPREADING OVER FLOORING TO AVOID CRACKS AND BUMP FORMATIONS ON THE TILE FLOOR. PROPER INSTALLATION OF THE FRAMING AND SUBSTRATE ARE CRITICAL TO A QUALITY TILE INSTALLATION.
13. CERAMIC WALL TILE SET ON THIN SET CEMENTATIOUS ADHESIVE
14. ALL INTERIOR PAINTS, PRIMERS, ADHESIVES AND SEALANT MUST CONTAIN LOW VOC
15. PROVIDE WATER RESISTANT GYPSUM BOARD AT WALLS & CEILING OF ALL BATHROOMS & TOILETS (EXCEPT SHOWER AREAS)
16. PROVIDE CEMENTITIOUS BACKER BOARD AS SUBSTRATE FOR SURFACES TO RECEIVE TILE FINISH @ SHOWER AREAS ONLY. THIS IS IN ADDITION TO THE NUMBER OF GYP. BD. LAYERS INDICATED ON THE WALL TYPE LEGEND.
17. PROVIDE 4'-0" HIGH CERAMIC TILE WAINSCOT AT ALL PUBLIC BATHROOM WALLS
18. CERAMIC WALL TILE SET ON THIN SET CEMENTITIOUS ADHESIVE
19. BATHROOM VANITY TO BE FULL PLYWOOD BOX MATCHING THE KITCHEN CABINETS (ADA REMOVABLE CABINET) - SERENITY KITCHEN CABINETS (COLOR - GREEN)
20. GREEN LEVEL CERTIFIED FLOOR COVERING: DO NOT INSTALL CARPETS IN BELOW GRADE LIVING SPACES, ENTRYWAYS, LAUNDRY ROOMS, BATHROOMS, KITCHENS, OR UTILITY ROOMS. IF USING CARPETS, USE PRODUCTS THAT MEET THE CARPET & RUG INSTITUTES GREEN LABEL CERTIFIED CARPET, PAD, & CARPET ADHESIVES.
21. MATERIALS IN WET AREAS: USE MATERIALS WITH SMOOTH, DURABLE, CLEANABLE SURFACES. DO NOT USE MOLD-PROPOGATING MATERIAL SUCH AS VINYL WALLPAPER AND UNSEALED GROUT.
22. INTEGRATED PEST MANAGEMENT: SEAL ALL WALL, FLOOR, CEILING, AND JOINT PENETRATION TO PREVENT PEST ENTRY. PROVIDE RODENT AND CORROSION PROOF SCREENS (EG COPPER OR STAINLESS STEEL MESH) FOR LARGE OPENINGS.
23. USE PARTICLE BOARD & MEDIUM DENSITY FIBER BOARD (MDF) THAT IS CERTIFIED COMPLIANT W/ THE ANSI 208.1 & 208.2

WINDOW NOTES

1. ALL WINDOW UNITS SHALL HAVE INSULATED GLASS (U.O.N.).
2. CONTRACTOR SHALL PROVIDE 1" ALUMINUM MINI BLINDS AT ALL RESIDENTIAL WINDOW UNITS.
3. CONTRACTOR SHALL PROVIDE SUPPORT MULLION TRIM BETWEEN WINDOW UNITS AS PER MANUFACTURER SPECIFICATION.
4. WINDOWS REQUIRING PUSHING, PULLING, OR LIFTING TO OPEN (FOR EXAMPLE, DOUBLE HUNG, SLIDING, OR CASEMENT AND AWNING UNITS WITHOUT CRANKS) SHOULD REQUIRE NO MORE THAN 5 lbf (22.2N) MAX. TO OPEN OR CLOSE.
5. ALL WINDOW UNITS SHALL HAVE A U-FACTOR OF .38 OR BETTER AND SHGC RATING OF .38 OR BETTER.
6. ALL WINDOW UNITS SHALL HAVE A MINIMUM OITC 30 RATING (U.O.N.).
7. PROVIDE WINDOW STOPS @ ALL OPERABLE WINDOWS (4" MAX. OPENING).
8. ALL OPERABLE WINDOWS USED TO MEET NYC VENTILATION REQUIREMENTS SHALL HAVE CONTROL @ A.D.A. REACH HEIGHT (3'-8" MAX. A.F.F.) OR USE ADAPTIVE DEVICES IN ACCESSIBLE AREAS.
9. AIR LEAKAGE, U-FACTOR, SHGC & R-VALUE FOR FENESTRATION WINDOWS SHALL BE LABELED AND CERTIFIED BY THE MANUFACTURER.
10. IF WINDOWS EXCEED 6'-0" WIDE PROVIDE WINDOW RECEPTOR @ HEAD AND SILL OF WINDOW
11. WHERE WINDOWS THAT ARE REQUIRED TO PROVIDE NATURAL VENTILATION ARE NOT IN COMPLIANCE WITH REACH RANGES SPECIFIED IN SECTION309.3(HEIGHT) FOR OPERABLE PARTS AS REQUIRED BY SECTION 1003.13.1 OF ICC A117.1, THE OPERABLE PARTS OF SUCH WINDOWS SHALL BE DESIGNED TO BE OPERABLE BY THE USE OF ADAPTIVE DEVICES. THE OWNER SHALL PROVIDE SUCH ADAPTIVE DEVICES AT THE TIME A PERSON WITH PHYSICAL DISABILITIES TAKES OCCUPANCY OF THE UNIT, OR WITHIN 10 DAYS OF THE DATE THE REQUEST IS MADE BY A PERSON WITH PHYSICAL DISABILITIES, WHICHEVER IS LATER, AT THE OWNER'S EXPENSE.
12. ALL GLASS TO BE BIRD FRIENDLY
13. PROVIDE LOW E DOUBLE PANE INSULATED GLASS IN ALL EXTERIOR WINDOWS
14. THE GLASS OF ANY STOREFRONT, ANY WINDOW LOCATED UP TO 75'-0" IN HEIGHT ABOVE THE GROUND LEVEL AND ON THE CANOPY SHALL BE CONSTRUCTED WITH A BIRD FRIENDLY MATERIAL
15. PROVIDE MINI BLINDS AT ALL DWELLING UNIT WINDOWS
16. PROVIDE AN ALUMINUM INSULATED PANEL ON LOUVER WHERE A PTAC OR AN AC UNIT IS NOT PROVIDED. COLOR OF PANEL TO MATCH COLOR OF WINDOW FRAME
17. REMOVABLE INSECT SCREENS TO BE PROVIDED AT ALL OPERABLE WINDOWS

LOUVER NOTES

1. ALL LOUVERS SHALL BE PROVIDED WITH INSECT SCREEN U.O.N.
2. PROVIDE AN ALUMINUM INSULATED PANEL ON LOUVER WHERE A PTAC IS NOT PROVIDED. COLOR OF PANEL TO MATCH COLOR OF WINDOW FRAME
3. MECHANICAL LOUVERS COLOR SHALL MATCH COLOR OF SURROUNDING MATERIAL

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 10/17/2025 | ISSUED FOR 100% DD |
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |

SHEET TITLE:

# WINDOW & LOUVER, FINISH SCHEDULE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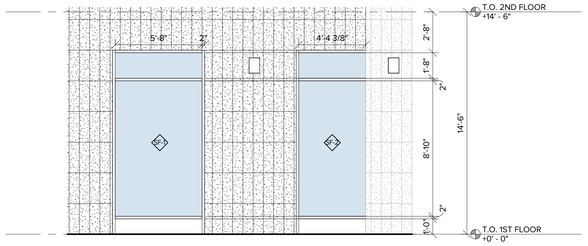
SEAL & SIGNATURE

ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: As indicated
SHEET NO: OF
DRAWING NO: A-601.00

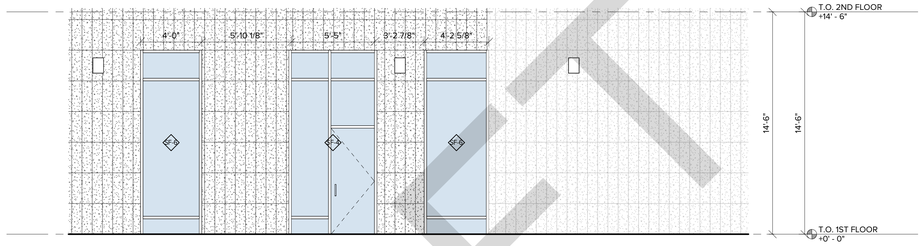
NYC DOB NUMBER: X009459511-I1

STOREFRONT SCHEDULE

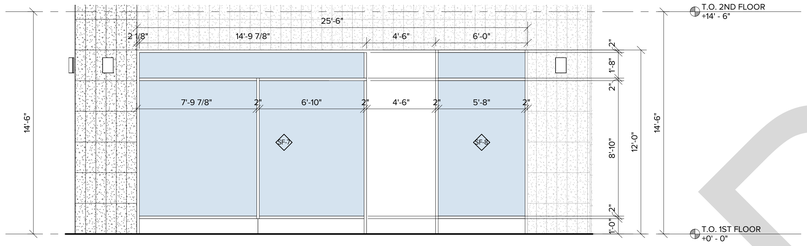
| | | | WINDOW / FRAME | | | | | ROUGH OPENING | | | ENERGY REQ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WINDOW TYPE | DESIGNATION | ELEVATION | WIDTH | HEIGHT | FRAME MATERIAL | FINISH | FIRE RATING (HOUR) | STC RATING | WIDTH | HEIGHT | INSECT SCREEN | U FACTOR | S.H.G.C. | REMARKS |
| STOREFRONT - FIXED PANE | SF-1 | 1 | 6' - 1 3/4" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 6' - 3 11/32" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-2 | 1 | 4' - 0" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 4' - 2" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-4 | 2 | 3' - 10" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 4' - 0" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-6 | 2 | 11' - 11" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 12' - 1" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-7 | 3 | 15' - 0" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 15' - 2" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-8 | 3 | 6' - 0" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 6' - 2" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-11 | 4 | 6' - 0" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 6' - 2" | 12' - 2" | | 0.22 | | |
| STOREFRONT - DOOR + FIXED PANE | SF-12 | 4 | 8' - 9 1/2" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 8' - 11 1/2" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-14 | 4 | 6' - 0" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 6' - 2" | 12' - 2" | | 0.22 | | |
| STOREFRONT - FIXED PANE | SF-15 | 4 | 15' - 0" | 12' - 0" | UPVC | AN. | (1) 1 HR RATED | | 15' - 2" | 12' - 2" | | 0.22 | | |



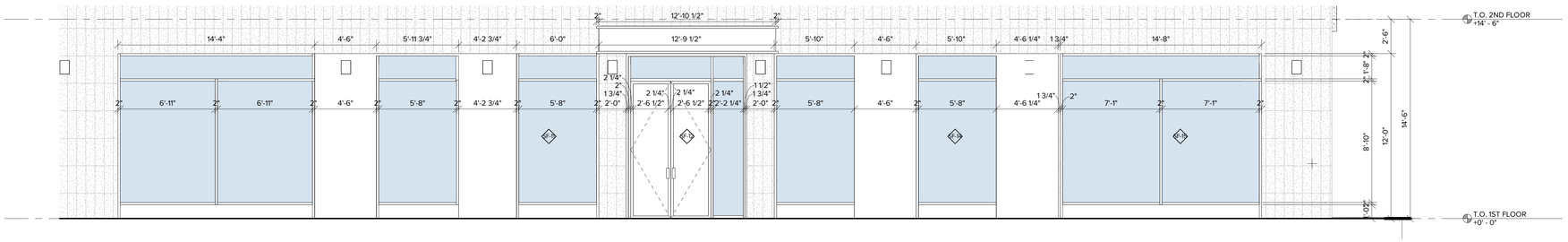

1 A-602 STOREFRONT ELEVATION #1
1/4" = 1'-0"




2 A-602 STOREFRONT ELEVATION #2
1/4" = 1'-0"




3 A-602 STOREFRONT ELEVATION #3
1/4" = 1'-0"




4 A-602 STOREFRONT ELEVATION #4
1/4" = 1'-0"

DRAFT

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150

Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
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32nd Floor
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646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
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212.929.5656

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| 09/15/2025 | ISSUED TO DOB |
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## STOREFRONT SCHEDULE

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SEAL & SIGNATURE

ISSUE DATE: 07/27/22
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/4" = 1'-0"
SHEET NO: OF
DRAWING NO: A-602.00

NYC DOB NUMBER: X00945951-I1

## LEGEND

### CEILING SYMBOL

- 2' X 2' ACCESS HATCH
- CEILING MOUNTED SPRINKLER
- WALL MOUNTED SPRINKLER
- CEILING GRILLE
- OCCUPANCY SENSOR
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- EXIT LIGHT AND SIGN - WALL MOUNTED
- SCM — SMOKE & CARBON MONOXIDE DETECTOR
- IC — INTERCOM
- 0 0'-0" — CEILING HEIGHT
- CEILING TYPE
- DIF — 24" x 24" HVAC DIFFUSER - SEE MECHANICAL DWGS.
- 24" x 24" FLAT PANEL LED LIGHT FIXTURE
- 24" x 24" FLAT PANEL LED LIGHT FIXTURE - EMERGENCY BACK -UP
- 48" LED STRIP LIGHT
- 48" LED STRIP LIGHT - EMERGENCY BACK -UP
- 6" LED DOWN LIGHT
- 6" LED DOWN LIGHT - EMERGENCY BACK -UP
- HORN
- CAMERA

### CEILING TYPES

1. BOTTOM OF CEILING - KADEX PAINTED FINISH
2. GYP. BD. SUSPENDED CEILING
3. 2' X 2' ACOUSTIC TILE CEILING
4. CHARCOAL MONOGLASS SPRAY ON THERMAL INSULATION R-30
5. 3HR SPRAY ON FIREPROOFING INSULATION
6. EXPOSED CEILING

### NOTES:

1. REFER TO ELECTRICAL DRAWINGS FOR LIGHT TYPES.
2. REFER TO SPRINKLER DRAWINGS FOR SPRINKLER HEAD TYPES.
3. REFER TO MECHANICAL DRAWINGS FOR CEILING ACCESS LOCATIONS.
4. ALL DIMENSIONS ARE A.F.F.
5. ALL SOFFITS IN LIVABLE AREAS TO BE 8'-0" MIN. AFF.
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NOTES:

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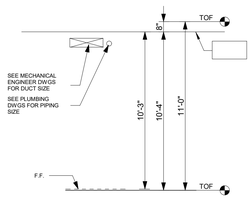
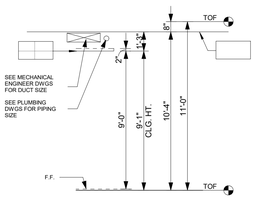
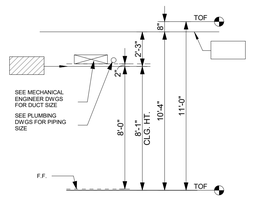


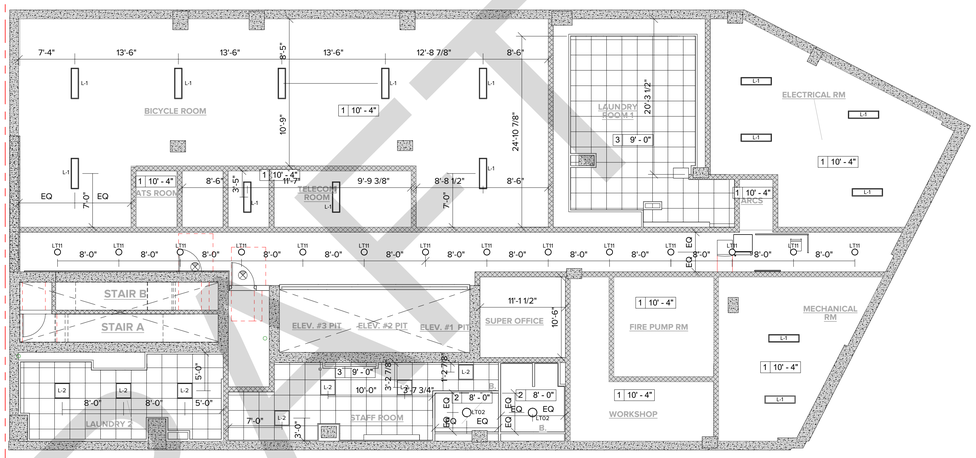

PUBLIC CORRIDOR




LAUNDRY




BATHROOM(S)




1 A-700 CELLAR REFLECTED CEILING PLAN
1/8" = 1'-0"

DRAFT

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## CELLAR REFLECTED CEILING PLAN

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SCALE: As indicated
SHEET NO: OF
DRAWING NO: A-700.00

NYC DOB NUMBER: X00945951-I1

## LEGEND

### CEILING SYMBOL

- 2' X 2' ACCESS HATCH
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- WALL MOUNTED SPRINKLER
- CEILING GRILLE
- OCCUPANCY SENSOR
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- EXIT LIGHT AND SIGN - WALL MOUNTED
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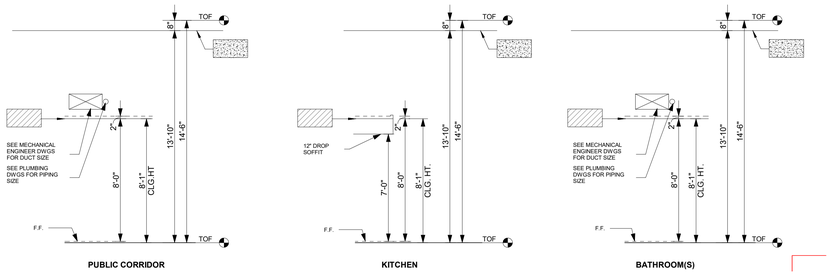
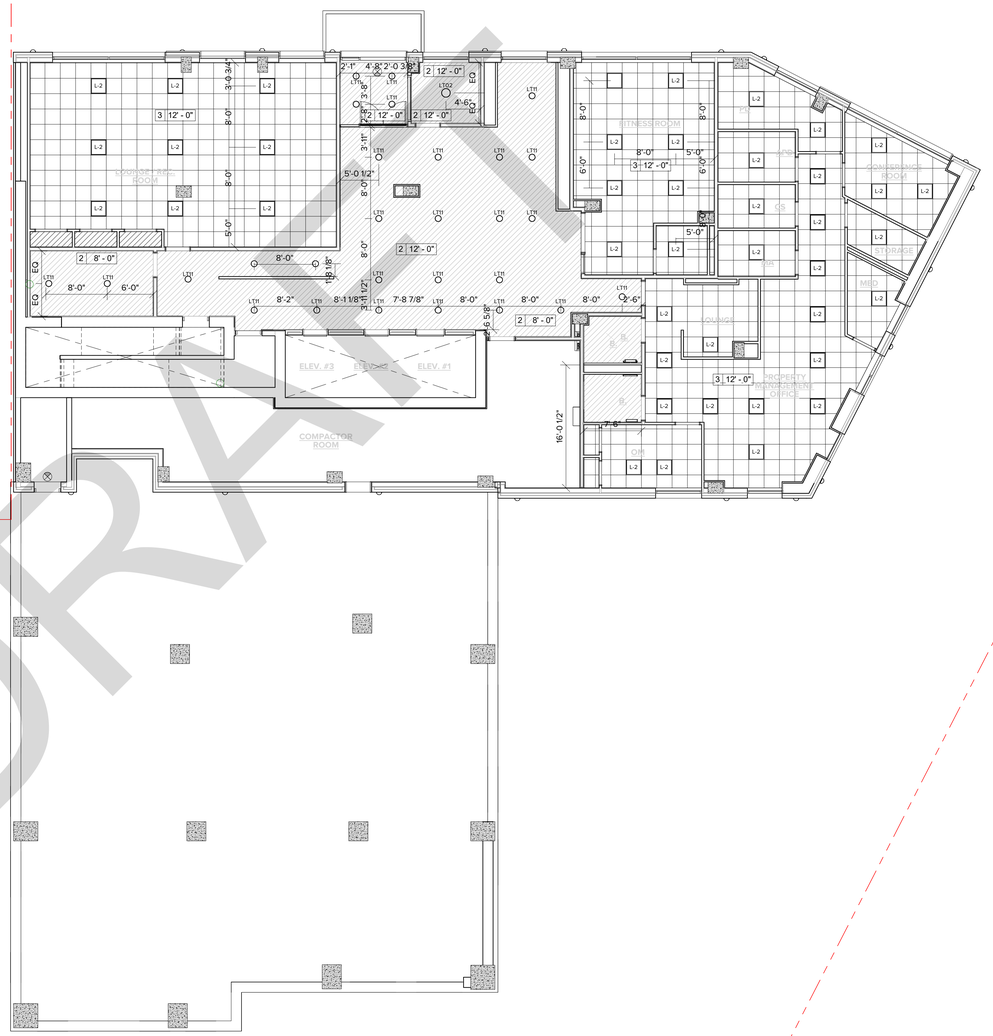



**PUBLIC CORRIDOR** | **KITCHEN** | **BATHROOM(S)**




1 A-701 1ST FLOOR REFLECTED CEILING PLAN
1/8" = 1'-0"

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
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Owner/Developer
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SHEET TITLE:

# 1ST FLOOR REFLECTED CEILING PLAN


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ISSUE DATE: 07/27/22
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CHECKED BY: Checker
SCALE: As indicated
SHEET NO: OF
DRAWING NO: A-701.00

NYC DOB NUMBER: X00945951-I1

DRAFT

## LEGEND

### CEILING SYMBOL

- 2' X 2' ACCESS HATCH
- CEILING MOUNTED SPRINKLER
- WALL MOUNTED SPRINKLER
- CEILING GRILLE
- OCCUPANCY SENSOR
- EXIT LIGHT AND SIGN - CEILING MOUNTED
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### CEILING TYPES

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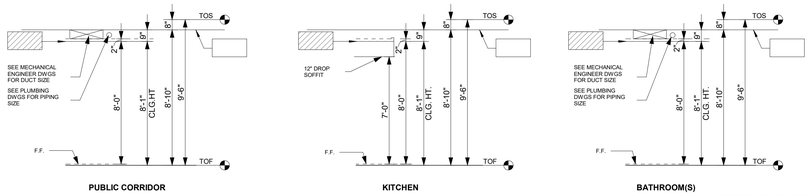
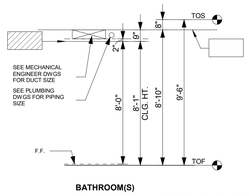


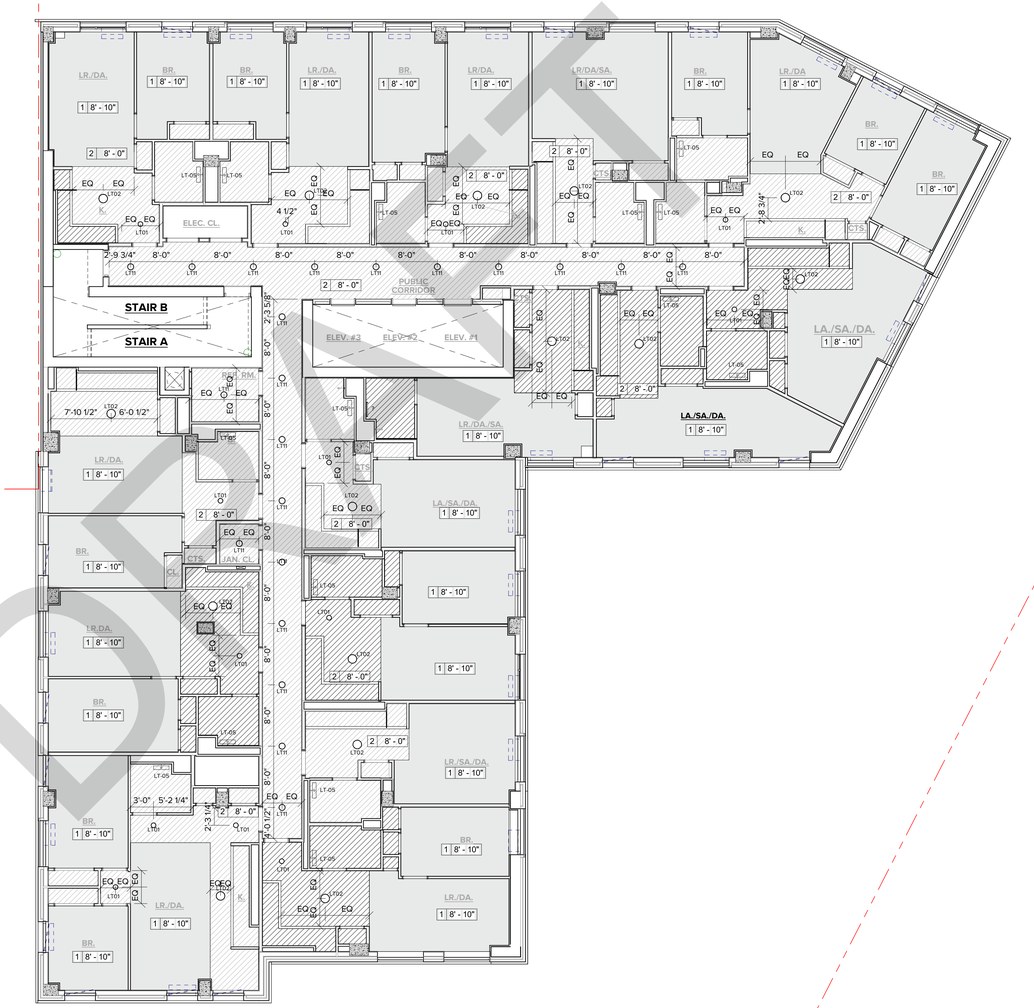

PUBLIC CORRIDOR




KITCHEN




BATHROOM(S)




1 A-702 2ND FLOOR REFLECTED CEILING PLAN
1/8" = 1'-0"

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

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BLOCK: 2420 LOT: 120 & 150


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SHEET TITLE:

## 2ND FLOOR REFLECTED CEILING PLAN


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DRAWING NO: A-702.00

NYC DOB NUMBER: X00945951-I1

## LEGEND

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- WALL MOUNTED SPRINKLER
- CEILING GRILLE
- OCCUPANCY SENSOR
- EXIT LIGHT AND SIGN - CEILING MOUNTED
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- SCM — SMOKE & CARBON MONOXIDE DETECTOR
- IC — INTERCOM
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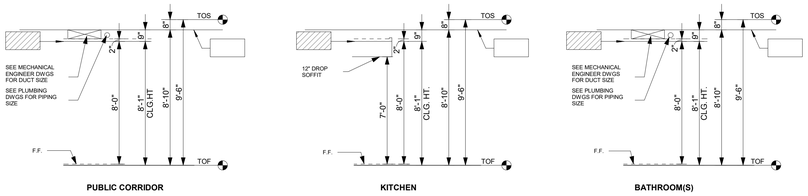


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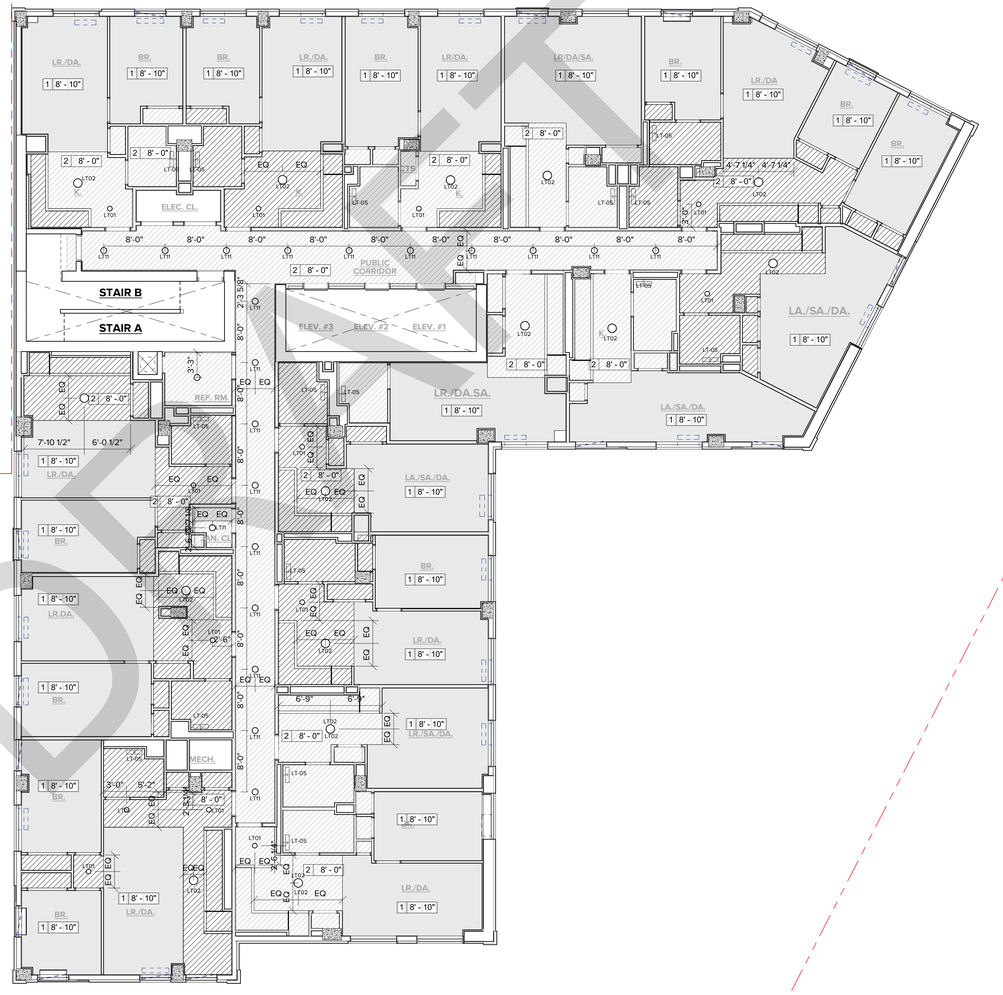


1 A-703 3RD-9TH FLOOR REFLECTED CEILING PLAN
1/8" = 1'-0"

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
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Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
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25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


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## 3RD-9TH FLOOR REFLECTED CEILING PLAN


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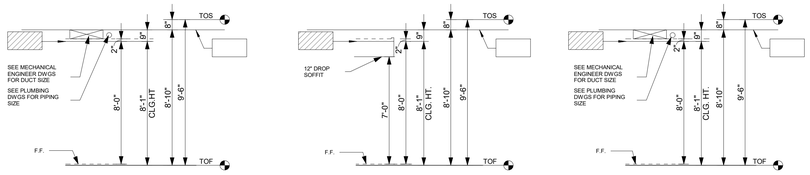


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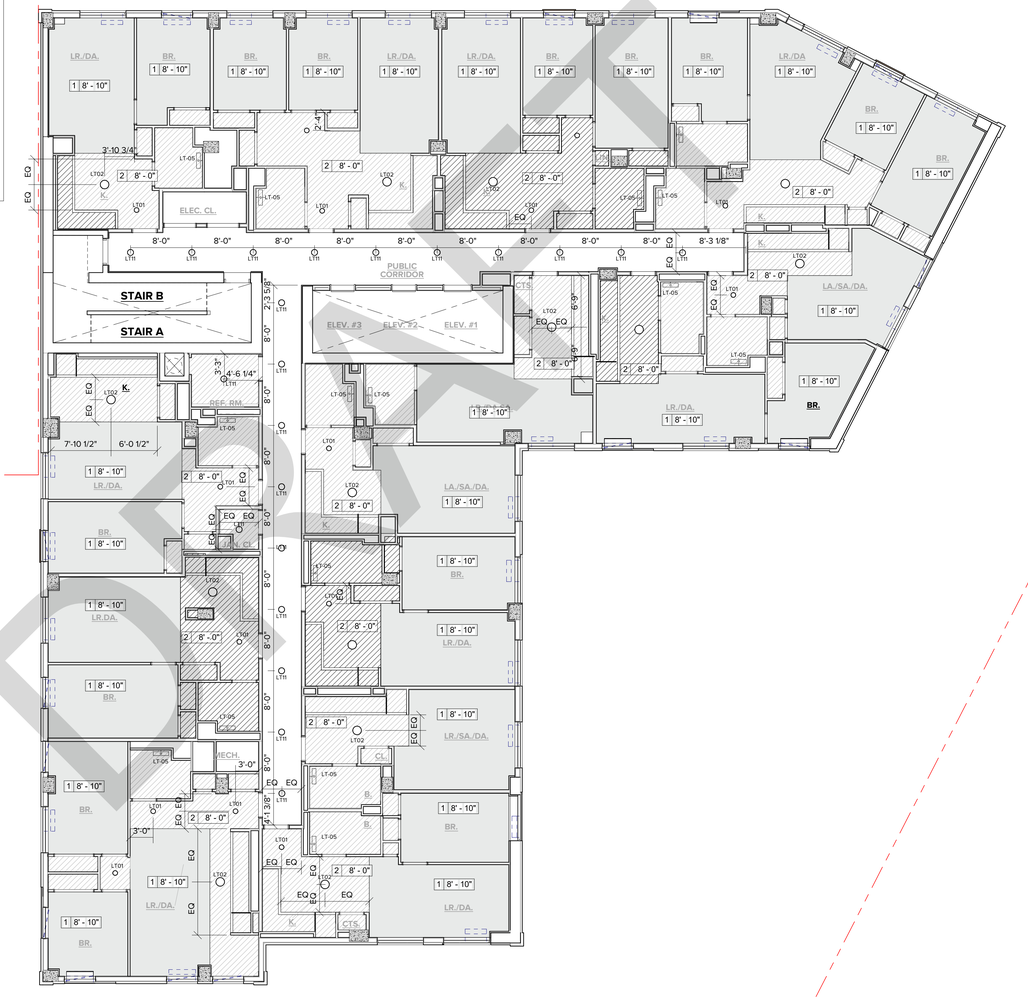


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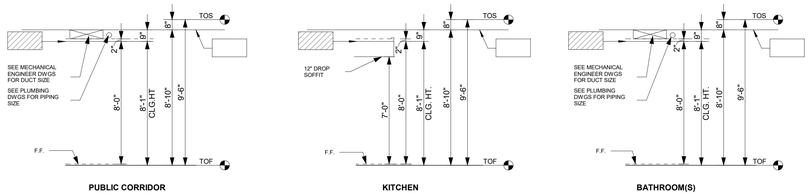


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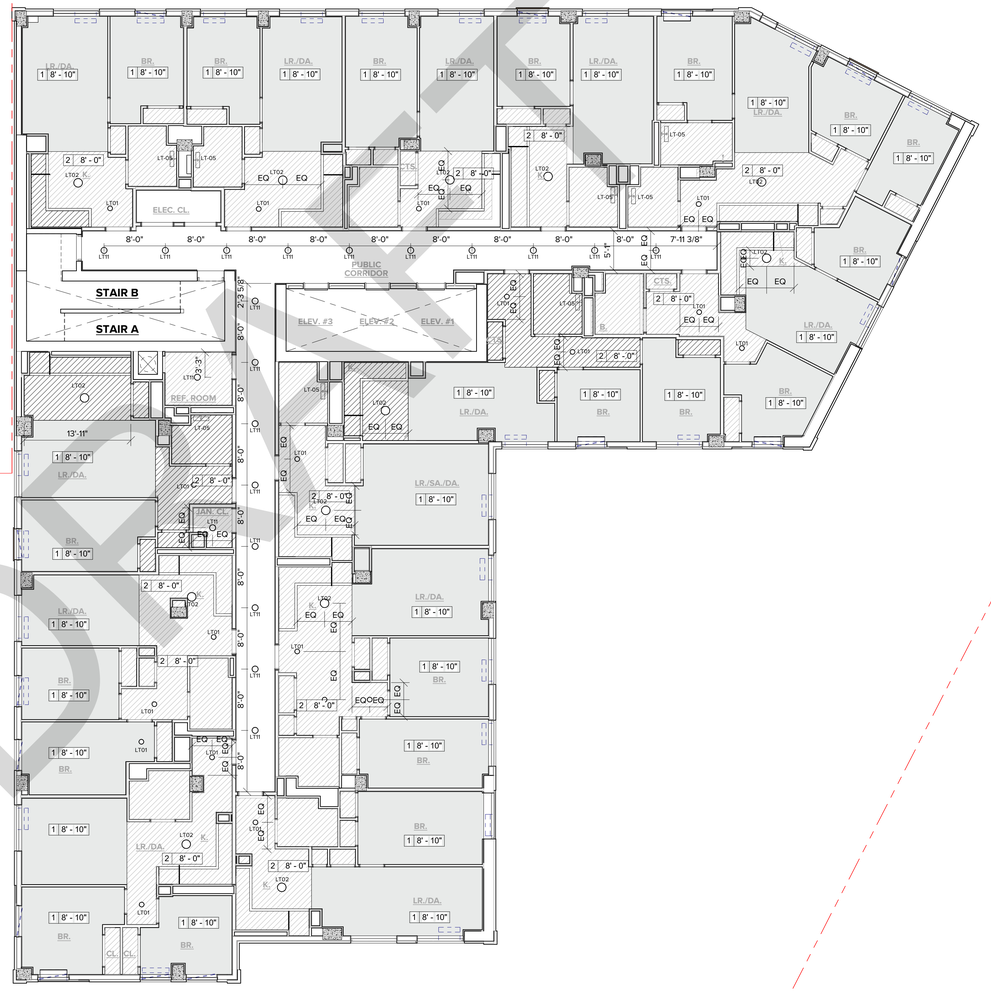


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# APPENDIX B

Historical Environmental Reports

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# APPENDIX C

Citizen Participation Plan

DRAFT

NEW YORK STATE | Department of Environmental Conservation

# Brownfield Cleanup Program

## Citizen Participation Plan
for
## Morrisania East

May 2025

DRAFT

C203183
310 East 161st Street
Bronx, NY 10451

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**3. Major Issues of Public Concern..... 8**

**4. Site Information..... 8**

**5. Investigation and Cleanup Process ..... 9**

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* * * * *

**Note:** The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

DRAFT

Applicant: **TEG Morrisania Development LLC ("Applicant")**
Site Name: **Morrisania East ("Site")**
Site Address: **310 East 161st Street**
Site County: **Bronx**
Site Number: **C203183**

## 1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html .

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## 2. Citizen Participation Activities

*Why NYSDEC Involves the Public and Why It Is Important*

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision-makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process
- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community
- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision-making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

*Project Contacts*

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

*Locations of Reports and Information*

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web-site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

*Site Contact List*

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;

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- Residents, owners, and occupants of the site and properties adjacent to the site;
- The public water supplier which services the area in which the site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- Location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

**Note:** The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

*CP Activities*

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.
- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

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This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

*Technical Assistance Grant*

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, **the significant threat determination for the site had not yet been made.**

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
https://dec.ny.gov/search?text=technical+assistance+grants

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

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| Citizen Participation Activities | Timing of CP Activity(ies) |
|---|---|
| **Application Process:** | |
| • Prepare site contact list<br>• Establish document repository(ies) | At time of preparation of application to participate in the BCP. |
| • Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period<br>• Publish above ENB content in local newspaper<br>• Mail above ENB content to site contact list<br>• Conduct 30-day public comment period | When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time. |
| **After Execution of Brownfield Site Cleanup Agreement (BCA):** | |
| • Prepare Citizen Participation (CP) Plan | Before start of Remedial Investigation<br>**Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA. |
| **Before NYSDEC Approves Remedial Investigation (RI) Work Plan:** | |
| • Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan<br>• Conduct 30-day public comment period | Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet. |
| **After Applicant Completes Remedial Investigation:** | |
| • Distribute fact sheet to site contact list that describes RI results | Before NYSDEC approves RI Report |
| **Before NYSDEC Approves Remedial Work Plan (RWP):** | |
| • Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period<br>• Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager)<br>• Conduct 45-day public comment period | Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period. |
| **Before Applicant Starts Cleanup Action:** | |
| • Distribute fact sheet to site contact list that describes upcoming cleanup action | Before the start of cleanup action. |
| **After Applicant Completes Cleanup Action:** | |
| • Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report<br>• Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC) | At the time, the cleanup action has been completed.<br>**Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC. |

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## 3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

There may be areas on the Site where soil excavation is necessary. Therefore, once the remediation commences, there may be concerns regarding odors, noise or truck traffic coming from the Site. However, these impacts will be mitigated through implementation of a Health and Safety Plan (HASP) and Soil Management Plan (SMP) approved by the Department, which will be designed to minimize these impacts. A Community Air Monitoring Plan (CAMP) will also be implemented to monitor dust and vapors to ensure the community is not impacted.

The Site has been identified as a Disadvantaged Community, an Environmental Justice Area, and an Environmental Zone (En-Zones) by the State of New York (NYS).

NYS has identified Disadvantaged Communities in order to ensure that frontline and otherwise underserved communities benefit from NYS' historic transition to cleaner, greener sources of energy, reduction pollution and cleaner air, and economic opportunities. En-Zone are determined by either census tracts with a poverty rate of at least 20 percent and an unemployment rate of at least 125 percent of the NYS unemployment rate, or a poverty rate of at least double the rate for the county in which the tract is located.

Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

The Site is located in an area with sizeable Hispanic-American population. Therefore, all future fact sheets will be translated into Spanish. For additional information, visit:

https://statisticalatlas.com/block-group/New-York/Bronx-County/017300-4/Race-and-Ethnicity

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## 4. Site Information

Appendix C contains a map identifying the location of the site.

*Site Description*

- **Location – 310 East 161st Street, Bronx, New York**
- **Setting - urban**
- **Site size – 0.8747 acres**
- **Adjacent properties – the surrounding land use includes multi-family residential buildings, mixed use commercial and residential buildings, office buildings, religious institutions, and the overbuilt of the Long Island Railroad (LIRR) Tracks.**

*History of Site Use, Investigation, and Cleanup*

The Morrisania East Site is located in an urban area and is located at 310 East 161st Street, Bronx, NY. The Site is identified on the New York City Tax Map as Block 2420, Lot 150 in the Bronx County of New York City. Currently, the Site consists of a parking area associated with an adjacent existing eight story multifamily building.

Historical use at the Site included residential as well as commercial and industrial use. The Site was initially developed for residential use by 1891 with East 160th Street (now demapped) bisecting the Site. By 1951, several buildings appear to have been demolished and new buildings were constructed. In the 1951 Sanborn Map included, the Site was shown to contain an automobile repair facility with a 550-gallon gasoline underground storage tank (UST), an automobile brake service shop with a 550-gallon gasoline UST, multiple 1- and 2-story residential dwellings, and a 2-story Baptist Church. In 1969, a portion of the Site was used as a welding and boiler repair facility with a gasoline UST of unknown size (i.e., the former automobile repair facility identified in 1951), and the automobile brake service shop (also identified in 1951) and a gasoline filling station. By 1970, the buildings at the Site were demolished, East 160th Street was demapped, and the current parking area was constructed at the Site. A Phase II Environmental Site Assessment (ESA) and BCP eligibility investigations were completed at the Site. Based upon previous investigations conducted to date, the primary contaminants of concern for the Site include select polycyclic aromatic hydrocarbons (PAHs) and metals in soil, metals in groundwater, and volatile organic compounds (VOCs), and chlorinated VOCs (CVOCs) in soil vapor.

## 5. Investigation and Cleanup Process

*Application*

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a **Volunteer**. This means **that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must**

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**fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.**

The Applicant in its Application proposes that the site will be used for **restricted residential** purposes.

To achieve this goal, the Applicant will conduct **investigation** activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

*Investigation*

The Applicant has completed a **partial** site investigation before it entered into the BCP. **For the partial investigation, NYSDEC will determine if the data are useable.**

The Applicant will conduct an investigation of the site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation workplan, which is subject to public comment.

The site investigation has several goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; and
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a "significant threat," it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved

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analysis of alternatives.

*Interim Remedial Measures*

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

*Remedy Selection*

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a "Certificate of Completion" (described below) to the Applicant.

**or**

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a "Remedial Work Plan." The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

*Cleanup Action*

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time

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frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

*Certificate of Completion*

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the Final Engineering Report (FER). NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

*Site Management*

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

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## Appendix A -
## Project Contacts and Locations of Reports and Information

### Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

**New York State Department of Environmental Conservation (NYSDEC):**

Yildiz Palumbo
Project Manager
NYSDEC Region 2
Division of Environmental Remediation
47- 40 21st Street,
Long Island City, NY 11101
(718) 485-4891
Yildiz.palumbo@dec.ny.gov

Thomas V. Panzone
Public Participation Specialist
Division of Communication, Education and Engagement
NYSDEC – Region 2
47-40 21st Street
Long Island City, NY 11101
Thomas.panzone@dec.ny.gov
718-482-4953

New York State Department of Health (NYSDOH):
Christine Vooris
Project Manager
NYSDOH
Bureau of Environmental Exposure Investigation
Empire State Plaza
Corning Tower Room 1787
Albany, New York 12237
(518) 402-0445
beei@health.ny.gov

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### Locations of Reports and Information:

The facilities identified below are being used to provide the public with convenient access to important project documents:
**https://extapps.dec.ny.gov/data/DecDocs/C203183/**

Melrose Branch
New York Public Library
910 Morris Avenue
Bronx, NY 10451
718-588-0110
melrose@nypl.org

Hours:

| | |
|---|---|
| Monday | 10 AM–7 PM |
| Tuesday | 10 AM–7 PM |
| Wednesday | 10 AM–7 PM |
| Thursday | 10 AM–7 PM |
| Friday | 10 AM–5 PM |
| Saturday | 10 AM–5 PM |
| Sunday | Closed |

Bronx Community Board 4
1650 Selwyn Avenue, Suite 11A
Bronx, NY 10457
Phone: (718) 299-0800
Leonardo J. Coello - District Manager
Housing & Land Use – Chairperson - Ms. Lilliam Rosa
Chairperson: Beverly Bond
Hours:

| | |
|---|---|
| Monday | 9 AM–5 PM |
| Tuesday | 9 AM–5 PM |
| Wednesday | 9 AM–5 PM |
| Thursday | 9 AM–5 PM |
| Friday | 9 AM–5 PM |
| Saturday | Closed |
| Sunday | Closed |

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## Appendix B - Site Contact List

### i. Local and State Officials

Hon. Charles Schumer
United States Senate
780 Third Avenue, Suite 2301
New York, NY 10017

Hon. Kirsten E. Gillibrand
United States Senate
780 Third Avenue, Suite 2601
New York, NY 10017

Hon. Rep. Ritchie Torres (CD-15)
U.S. House of Representatives
540 E Fordham Rd, Unit 2A
Bronx, NY 10458

Hon. Eric Adams
New York City Mayor
City Hall
New York, NY 10007

Hon. Althea Stevens
NYC Councilmember – District 16
1377 Jerome Avenue
Bronx, NY 10452

Hon. José M. Serrano
NYS Senator – District 29
335 E 100th Street
New York, NY 10029

Hon. Chantel Jackson
NYS Assemblymember – District 79
780 Concourse Village West, Ground Fl
Professional
Bronx, NY 10451

New York City Municipal Water Finance Authority
Philip Wasserman - Executive Director
255 Greenwich Street, 6th Floor
New York, NY 10007

New York City Water Board
NYC Department of Environmental Protection
Alfonso L. Carney, Jr., Chairperson
59-17 Junction Boulevard, 8th Floor
Flushing, NY 11373

Hon. Brad Lander
New York City Comptroller
1 Centre Street Room 517
New York, NY 10007

Hon. Jumaane D Williams
Public Advocate
1 Centre Street #15N
New York, NY 10007

David Gold, Esq.
Commissioner, NYC Dept. of City Planning
120 Broadway, 31st Floor
New York, NY 10271

Hon. Vanessa L. Gibson
Bronx Borough President
851 Grand Concourse, 3rd Floor
Bronx, NY 10451

Hon. Ischia Bravo
Bronx County Clerk
851 Grand Concourse
Bronx, NY 10451

Public Water Supplier - Rohit Aggarwala
Commissioner, NYCDEP
59-17 Junction Boulevard
Flushing, NY 11373

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## ii. Current Site Owner

TEG Morrisania Development LLC
7 Jackson Walkway
Providence, RI 02903

## iii. Current Site Operators

TEG Morrisania Development LLC
7 Jackson Walkway
Providence, RI 02903

## iv. Current Owners and Occupants of Adjacent Sites

**Block 2420 – Lot 40**
NYC Dept. of Education
65 Court Street, Suite 1
Brooklyn, NY 11201

**Block 2420 – Lot 49**
**Epworth United Methodist Church**
**834 Concourse Village East**
**Bronx, NY 10451**

**Block 2420 – Lot 49**
**Epworth United Methodist Church**
**834 Concourse Village East**
**Bronx, NY 10451**

**Block 2420 – Lot 120**
Morrisania Apartments LLC
199 Lee Avenue #309
Brooklyn, NY 11211

**Block 2420 – Lot 170**
NYC Housing Authority
478 East Fordham Road, 2nd Floor
Bronx, NY 10458

**Block 2420 – Lot 171**
NYC Housing Authority
478 East Fordham Road, 2nd Floor
Bronx, NY 10458

**Block 2420 – Lot 174**
NYC Housing Authority
478 East Fordham Road, 2nd Floor
Bronx, NY 10458

**Block 2421 – Lot 49**
Bronx 161 LLC
295 E 161st Street
Bronx NY 10451

**Block 2421 – Lot 45**
Montefiore Medical Center
305 E 161st Street
Bronx NY 10451

**Block 2421 – Lot 36**
Park Realty
313 E 161st Street
Bronx NY 10451

**Block 2421 – Lot 36**
Park Realty
315 E 161st Street
Bronx NY 10451

## v. Parks and Recreation

NYC Dept. of Parks & Recreation
Attn: Sue Donoghue - Commissioner
The Arsenal,
Central Park,
830 Fifth Avenue
New York, NY 10065

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## vi. Day Cares and Schools within Quarter Mile Radius

Bronx Early College Academy
President/Executive Director/Principal
https://www.beca324.org/
250 East 164th Street
Bronx, NY 10456
(718) 681-8287

Marshall England Early Learning Center - Highbridge Advisory Council Family Services Inc.
President/Executive Director/Principal
800 Concourse Village East
Bronx, NY 10451
(718) 742-2370

Kipp Academy Charter School
President/Executive Director/Principal
https://kippnyc.org/schools/250 East 156th Street
4th Fl
Bronx, NY 10451
(718) 655-3555

PS 35 Franz Siegel
President/Executive Director/Principal
https://www.ps35x.org/
261 East 163rd Street
Bronx, NY 10451
(718) 681-7214

P.S./M.S. 029 Melrose School
President/Executive Director/Principal
https://www.psms29.net
758 Courtlandt Avenue
Bronx, NY 10451
(718) 292-3785

PS/MS 31 William Lloyd Garrison
President/Executive Director/Principal
https://www.psms31.org/
250 E 156th Street
Bronx, NY 10451

KIPP Academy Elementary
President/Executive Director/Principal
https://kippnyc.org/schools/
718-943-3737
730 Concourse Village West, Tower D
Bronx, NY, 10451

PS/MS 29 Melrose School
Fabiana Day Care Academy Inc
President/Executive Director/Principal
http://www.fabianaacademy.org/
937 Teller Avenue
Bronx, NY 10451
(718) 588-4545

Tender Tots Child Care and Learning Center at Teller Avenue
President/Executive Director/Principal
924 Teller Avenue
Bronx, NY 10451
(718) 298-3930

Children's Castle Group Family Daycare
President/Executive Director/Principal
910 Sheridan Avenue Apt. 4K
Bronx, NY 10451
(347) 879-1008

Starlight Sunshine Preschool
President/Executive Director/Principal
3204 Park Avenue
Bronx, NY 10451
(201) 878-1036

All Seasons ABC Daycare
President/Executive Director/Principal
190 East 162nd Street
Brown, NY 10451
(718) 410-9200

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KIPP Academy Middle School
President/Executive Director/Principal
https://kippnyc.org/schools/
718-665-3555
250 E. 156th Street
New York, NY, 10451

Bronx Sky Child Care Center Inc
President/Executive Director/Principal
495 E 158th St,
Bronx, NY 10451
(718) 401-0100

Happy Kiddos II Group Family Daycare,
215 E 164th St,
Bronx, NY 10456

Little Precious Angels LLC {Family Home Daycare}
President/Executive Director/Principal
387 E 158th St,
Bronx, NY 10451
(347) 271-4914

Everyone's Daycare
President/Executive Director/Principal
https://www.everyonesdaycare.com/contact-us
(347) 282-0438
812 Melrose Ave,
Bronx, NY 10451

Blake's Playroom Daycare Inc.
President/Executive Director/Principal
https://blakesplayroomdaycare.org/contact-us/
2950 Park Ave,
Bronx, NY 10451
(929) 465-1560

Wee Care Group Family Day Care
President/Executive Director/Principal
837 Washington Ave,
Bronx, NY 10451
(917) 847-4642

Amayda Martinez Daycare
President/Executive Director/Principal
406 E 161st St #2g,
Bronx, NY 10451

M&M Academy Daycare
President/Executive Director/Principal
294 E 162nd St
Apt. 11-A,
Bronx, NY 10451

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Alba's Group Family Daycare
President/Executive Director/Principal
940 Grand Concourse,
Bronx, NY 10451
(917) 310-8024

My LiL Treasures Nursery
President/Executive Director/Principal
302 E 165th St,
Bronx, NY 10456
(917) 513-1517

Glorious Group Day Care LLC Daycare
President/Executive Director/Principal
1011 Washington Ave #414,
Bronx, NY 10456
(646) 209-2591

Paola's Family Child Care
President/Executive Director/Principal
320 E 156th St Apt. 5h,
Bronx, NY 10451
(347) 876-1080

Rosas Y Angeles Day Care
President/Executive Director/Principal
361e E 163rd St,
Bronx, NY 10451
(917) 736-7644

Happy Kiddos Group Family Daycare
President/Executive Director/Principal
930 Sheridan Ave,
Bronx, NY 10451

Science and Technology Academy: A Mott Hall School
President/Executive Director/Principal
https://motthallsta.org/
250 E 164th St, #3
Bronx, NY 10456
(718) 293-4017

New Millennium Bronx Academy of the Arts
President/Executive Director/Principal
https://www.bronxacademyofthearts.com/
(718) 588-8308
1000 Teller Ave,
Bronx, NY 10456

Family Life Academy Middle School
President/Executive Director/Principal
https://www.flacsnyc.com/
(718) 588-2320
316 E 165th St,
Bronx, NY 10456

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Grant Avenue Elementary School
President/Executive Director/Principal
https://insideschools.org/school/09X449
718-681-6288
250 E 164th St,
Bronx, NY 10456

Bronx Leadership Academy II High School
President/Executive Director/Principal
https://www.bla2hs.org/apps/contact/
(718) 292-7171
730 Concourse Village West
Bronx, NY 10451

Mott Haven Educational Campus
President/Executive Director/Principal
730 Concourse Village W,
Bronx, NY 10451
(718) 292-7441

PS1X The Courtlandt School
President/Executive Director/Principal
https://insideschools.org/school/07X001
718-299-3700
335 East 152 Street
Bronx NY 10451

Bronx School for Law, Government and Justice
President/Executive Director/Principal
https://www.bronxlgj.org/
(718) 410-3430
244 E 163rd St,
Bronx, NY 10451

P.S. X140 The Eagle School
President/Executive Director/Principal
https://www.ps140.org/
(718) 585-1205
916 Eagle Ave,
Bronx, NY 10456

AECI 1 Charter School
President/Executive Director/Principal
https://aecischools.org/aeci1/
(646) 400-5566
838 Brook Ave,
Bronx, NY 10451

Success Academy Charter School - Bronx 3 Elementary
President/Executive Director/Principal
https://www.successacademies.org/school/bronx-3/
646-558-0086
1000 Teller Ave 4th Floor,
Bronx, NY 10456

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### vii. Local News and Media

Bronx Times
3602 East Tremont Avenue, Suite 205
Bronx, NY 10465

Spectrum NY1 News
75 Ninth Ave
New York, NY 10011

New York Daily News
PO Box 7180
New York, NY 10008

New York Post
1211 Avenue of the Americas
New York, NY 10036

Hoy Nueva York
Impremedia,
41 Flatbush Avenue 1st Floor
Brooklyn, NY 11217

El Diario NY
Impremedia,
41 Flatbush Avenue 1st Floor
Brooklyn, NY 11217

Schneps Media
3602 East Tremont Avenue
Bronx, NY 10465

Noticia NYC
3602 East Tremont Avenue
Bronx, NY 10465

### viii. Community, Civic, Religious and Other Environmental Conservation

Consolidated Edison Corporate Affairs
Franchesca Diaz - Director Regional and Community Affairs Bronx.
511 Theodore Fremd Avenue
Rye, NY 10580

44th Police Precinct Council
President Mildred James
2 East 169 Street
Bronx, NY, 10452

FDNY
DIVISION 6/ENGINE 71/LADDER 55
720 MELROSE AVENUE
Bronx, NY 10455

Epworth United Methodist Church
834 Concourse Village East
Bronx, NY 10451

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Kingdom Hall of Jehovah's Witnesses – Courtlandt
886 Morris Avenue
Bronx, NY 10451

Unity Baptist Church
839 Cortlandt Avenue
Bronx, NY 10451

All Saints Church
750 Concourse Village W,
Bronx, NY 10451

New Season Christian Center
937 Teller Ave,
Bronx, NY 10451

St. David's Episcopal Church
384 E 160th St,
Bronx, NY 10451

La Primitiva Pentecostal Church
277 E 162nd St,
Bronx, NY 10451

St Angela Merici Church
917 Morris Ave,
Bronx, NY 10451

Rivers James
401 E 161st St,
Bronx, NY 10451

Sts. Peter & Paul Church
824 Brook Ave,
Bronx, NY 10451

Missionary Church of Christ
937 Teller Ave,
Bronx, NY 10451

Mt. Bethel Baptist Church
698 Courtlandt Avenue between 154th &, E 155th St,
Bronx, NY 10451

Greater Universal Baptist Church
253 E 153rd St,
Bronx, NY 10451

St. Adalbert's Church
422 E 156th St,
Bronx, NY 10451

Calvary Deliverance Christian
737 Concourse Village W #739,
Bronx, NY 10451

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The Redeemed Christian Church of God, Chapel of Restoration
1005 Morris Ave,
Bronx, NY 10456

Solid Rock Church
3373 Third Ave,
Bronx, NY 10456

INT Apostolic Church
1000 Morris Ave # 165,
Bronx, NY 10456

Greater Eternal Baptist Church
746 Elton Ave,
Bronx, NY 10451

Iglesia Pentecostal Unida Latinoamericana Inc
384 E 160th St,
Bronx, NY 10451

Islamic Cultural Center of the Bronx
371 E 166th St,
Bronx, NY 10456

Masjid Al-Ridwan Islamic Center
435 E 166th St,
Bronx, NY 10456

Darou Salam Islamic Community, Inc.
677 Elton Ave #2a,
Bronx, NY 10455

Al-Ridwane Muslim Center
279 E 165th St,
Bronx, NY 10456

Chabad of South Bronx
177 E 161st St,
Bronx, NY 10451

Mid-Bronx Senior Citizens Council Inc.
918 Morris Ave,
Bronx, NY 10451

PSS Andrew Jackson Senior Center
325 E 156th St,
Bronx, NY 10451

PSS Morrisania Air Rights Senior Center
3135 Park Ave 20th Floor,
Bronx, NY 10451

Melrose Mott Haven Senior Citizen
372 E 152nd St,
Bronx, NY 10455

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Concourse Village Special Adlt
773 Concourse Village E Ld,
Bronx, NY 10451

Rain College Avenue Senior Center
1020 College Ave,
Bronx, NY 10456

La Familia Adult Day Center Inc.
653 Morris Ave,
Bronx, NY 10451

Alianza Civica Bayamonesa Inc
696 Courtlandt Ave,
Bronx, NY 10451

We stay/Nos Quedamos
https://www.nosquedamos.org/
754 Melrose Avenue
Bronx, NY 10451
Jessica Clemente – CEO
clemente@nosquedamos.org

South Bronx Unite
Arif Ullah – Executive Director
https://www.southbronxunite.org/
info@southbronxunite.org

Melrose Houses NYCHA
DEVELOPMENT MANAGEMENT OFFICE
chrome-
345 EAST 153RD STREET
Bronx, NY 10451

Melrose Houses NYCHA
COMMUNITY CENTER/
286 EAST 156TH STREET
Bronx, NY 10451

Melrose Houses NYCHA
President – Residents Association
345 EAST 153RD STREET
Bronx, NY 10451

161st Street BID
https://www.161bid.org/contact
Trey Jenkins – Executive Director
900 Grand Concourse
Bronx, NY 10451
161StreetBIDinfo@gmail.com

**ix. Any Person, Community Based Organization, or Local Media Who Has Requested to be placed on the contact list**

No persons have requested to be on the Site Contact List.

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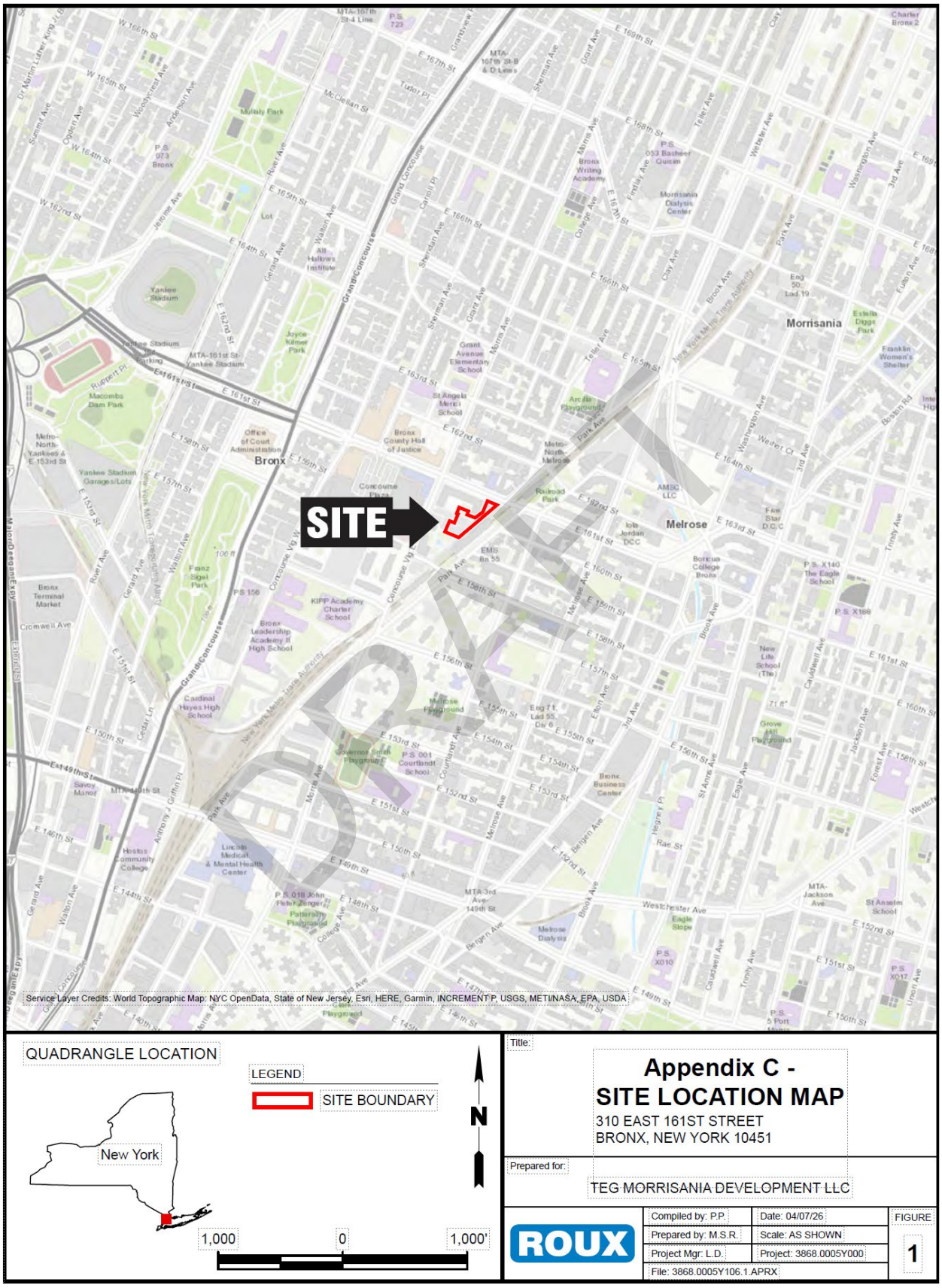
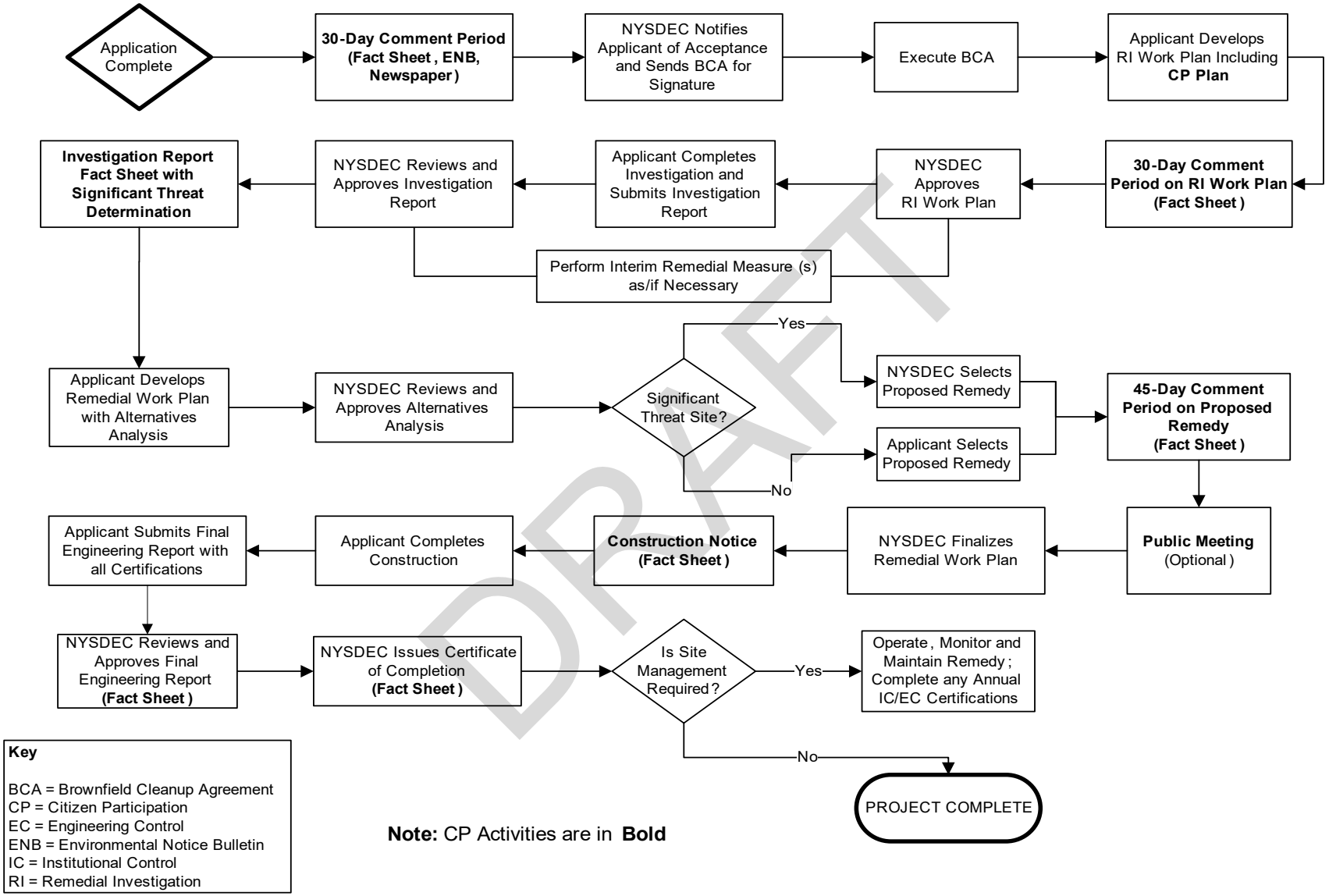
# Appendix C - Site Location Map



# Appendix D– Brownfield Cleanup Program Process




**Key**

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

**Note:** CP Activities are in **Bold**

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NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

**Division of Environmental Remediation**

# Remedial Programs

## Scoping Sheet for Major Issues of Public Concern (see instructions)

**Site Name:** Morrisania East

**Site Number:** C203183

**Site Address and County:** 310 East 161st Street Bronx, New York 10451

**Remedial Party(ies):** TEG Morrisania Development LLC

**Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.**

**Part 1.** List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**
No known issues to date.

How were these issues and/or information needs identified?
Not applicable.

**Part 2.** List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
Nothing is needed from the community at this time.

How were these information needs identified?
Not applicable.

**Part 3.** List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.
Communication of each step in the BCP process must be communicated in Fact Sheets and public hearings if required.

How were these issues and/or information needs identified?
Standard impacts will have to be addressed via the Remedial Action Work Plan (RAWP), Community Air Monitoring Plan (CAMP), Site Specific Health and Safety Plan (HASP) and Soil Management Plan (SMP).

**Part 4.** Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

**a.** Land use/zoning at and around site:
☒ **Residential** ☐ **Agricultural** ☒ **Recreational** ☒ **Commercial** ☐ **Industrial**

**b.** Residential type around site:
☒ **Urban** ☐ **Suburban** ☐ **Rural**

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**c.** Population density around site:
☒ **High** ☐ **Medium** ☐ **Low**

**d.** Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

**e.** Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:

**f.** Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:

**g.** Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☒ **Yes** ☐ **No**

**h.** Special considerations:
☒ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
All future fact sheets will be translated into Spanish.

**Part 5.** The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List.' Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☐ **Non-Adjacent Residents/Property Owners:** Click here to enter text.

☒ **Local Officials:** Click here to enter text.

☒ **Media:** Click here to enter text.

☐ **Business/Commercial Interests:** Click here to enter text.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☒ **Citizens/Community Group(s):** Click here to enter text.

☐ **Environmental Justice Group(s):** Click here to enter text.

☐ **Environmental Group(s):** Click here to enter text.

☒ **Civic Group(s):** Click here to enter text.

☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

**Prepared/Updated By:** Lauren Dolginko **Date:** 4/23/25

**Reviewed Approved By:** Thomas V. Panzone **Date:** 5-13-25



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# APPENDIX D

Health and Safety Plan (and Community Air Monitoring Plan)

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# Site-Specific Health and Safety Plan (HASP)

310 East 161st Street
Bronx, New York 10451

June 17, 2026

DRAFT

Prepared for:

**TEG Morrisania Development LLC**

Prepared by:

**Roux Environmental Engineering and Geology, D.P.C.**
209 Shafter Street
Islandia, New York 11749

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Environmental Consulting
& Management
+1.800.322.ROUX
rouxinc.com

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G. New York State Department of Health (NYSDOH) Community Air Monitoring Plan (CAMP)
H. Special Requirements CAMP


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# Site-Specific Emergency Information

## Emergency Phone Numbers

Most emergency services can be obtained by calling 911. Where 911 service is not available, use the telephone numbers provided in the below table. The following is a master emergency phone list for use by the project management personnel. A more condensed version of the emergency numbers listed below will be posted throughout project work areas. Emergencies encountered on the site will be responded to by a combination of off-site emergency services and on-site personnel.

| **Emergency Contact Information** | | | |
|---|---|---|---|
| **Site Personnel** | | | |
| **Title** | **Contact** | | **Telephone** |
| Operations Manager (OM) | Jeff Wills | | 516-637-0213 |
| Project Principal (PP) | Frank Cherena | | 631-445-0357 |
| Project Manager (PM) | Lauren Dolginko | | 631-697-2773 |
| Site Supervisor (SS) | TBD | | |
| Site Health and Site Safety Officer (SHSO) | TBD | | |
| Office Health and Safety Manager (OHSM) | Nevin Pahlad | | 347-885-6930 |
| Corporate Health and Safety Director (CHSD) | Brian Hobbs, CIH, CSP | | 631-807-0193 |
| WorkCare, Inc. | Occupational Health Care Management Provider | | 888-449-7787 |
| Client Emergency Contact | Serin Leung | | 347-205-3927 |
| **Outside Assistance** | | | |
| **Agency** | **Contact** | **Telephone** | **Address/Location** |
| Police | Bronx Police Department | 718-279-5200 | 215 E 161st St, Bronx, NY 10451 |
| Fire | FDNY Engine 71, Ladder 55 | 718-999-2000 | 720 Melrose Ave, Bronx, NY 10455 |
| Site Address | 860 Concourse Village East, Bronx, NY 10451 | | |

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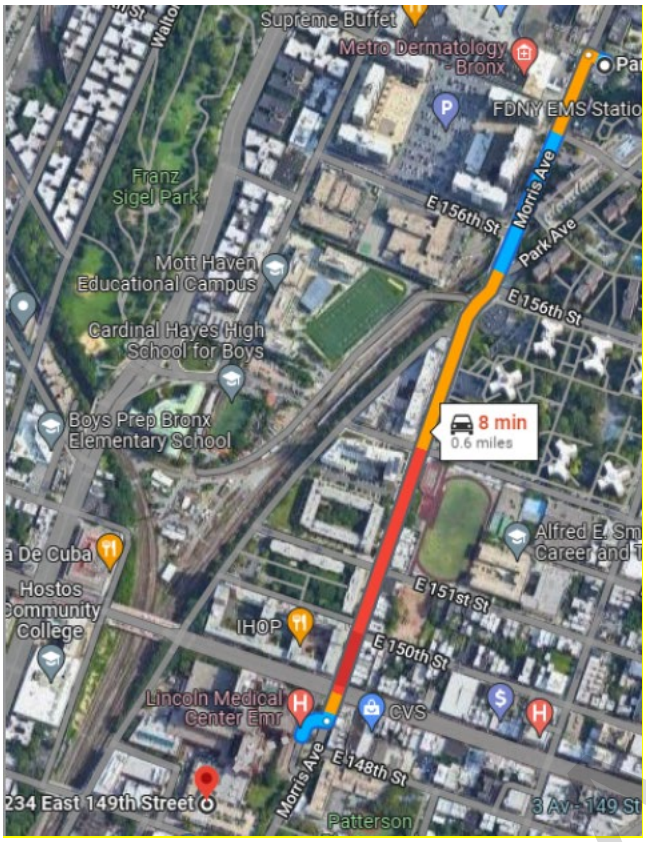


Route to Lincoln Medical Center

1. From parking lot turn left onto Morris Avenue.
2. Lincoln Medical Center entrance is on the right, just past East 149th Street

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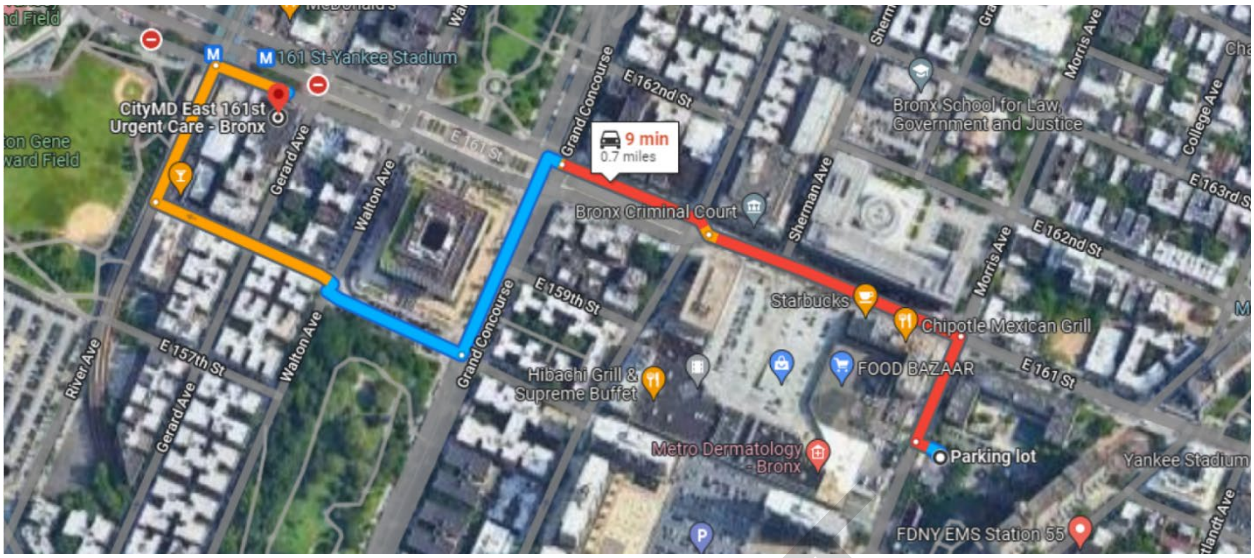


Route to CityMD, 161 EAST 161st STREET

1. From parking lot turn right onto Morris Avenue.
2. Turn left onto East 161st Street.
3. Turn left onto Grand Concourse.
4. Turn right onto East 158th Street.
5. Turn right onto River Avenue.
6. Turn right onto East 161st Street.
7. CityMD is on the right.

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# 1. Introduction

This Site-specific Health and Safety Plan (HASP) has been prepared by Roux Environmental Engineering and Geology, D.P.C. (Roux) on behalf of TEG Morrisania Development LLC (Volunteer) for use during the Remedial Action implementation at the property located at 310 East 161st Street, Bronx, New York (Site). The Site will be properly investigated and remediated under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) site #C203183. This HASP was prepared in general accordance with the requirements of the Occupational Safety and Health Administration (OSHA) standards promulgated at 29 CFR 1910.120 and 29 CFR 1926.65, both commonly referred to as the Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard. In accordance with the HAZWOPER Standard, this Site-specific HASP was prepared to address the safety and health hazards associated with the Remedial Action activities being performed at the Site by Roux and to provide requirements and procedures for the protection of Roux employees, subcontractor personnel, government oversight personnel, Site personnel, and the general public. It also addresses client- and Site-specific requirements for health and safety. Additionally, subcontractors may be required to submit their own HASP as it relates to their specific work activities and will be kept onsite during such work.

Implementation of this HASP is the joint responsibility of the Project Manager (PM), the Site Health and Safety Officer (SHSO), and all field staff, with assistance from the Project Principal (PP), Office Health and Safety Manager (OHSM), and Corporate Health and Safety Director (CHSD). The PM for this project is Lauren Dolginko. The Site Supervisor (SS) and Site Health and Safety Officer (SHSO) are TBD.

This HASP will be introduced to, reviewed, and signed off by all Roux personnel through a formal training session prior to commencing work. A copy of the HASP will be kept at the Site at all times. The Roux SHSO or PM will be responsible for posting any changes, amendments, memos, etc. to the HASP. Any revisions to this HASP will be signed by appropriate personnel, which can include Roux's PP, CHSD, and SS. Any changes will be announced to all workers at the next safety meeting.

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## 1.1 Roles and Responsibilities

Overall Roles and Responsibilities (R&Rs) of Roux personnel are provided in Roux's Policies and Procedures Manual. Only those R&Rs specific to HASP requirements are listed below.

**Project Manager (PM)**

The PM has responsibility and authority to direct all work operations. The PM coordinates safety and health functions with the Site Health and Safety Officer (SHSO), has the authority to oversee and monitor the performance of the SHSO, and bears ultimate responsibility for the proper implementation of this HASP. The specific duties of the PM are:

- Preparing and coordinating the Site work plan;
- Providing Site supervisor(s) with work assignments and overseeing their performance; Coordinating safety and health efforts with the SSHO;
- Ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC); and
- Serving as primary Site liaison with public agencies and officials and Site contractors.

**Site Health and Safety Officer (SHSO)**

The SHSO has the full responsibility and authority to develop and implement this HASP and to verify compliance. The SHSO reports to the Project Manager. The SHSO is on Site or readily accessible to the Site during all work operations and has the authority to halt Site work if unsafe conditions are detected. The specific responsibilities of the SHSO include:

- Managing the safety and health functions on this Site;
- Serving as the Site's point of contact for safety and health matters;
- Ensuring Site monitoring, worker training, and effective selection and use of PPE;
- Assessing Site conditions for unsafe acts and conditions and providing corrective action;
- Assisting the preparation and review of this HASP;
- Maintaining effective safety and health records as described in this HASP; and
- Coordinating with the SS and others as necessary for safety and health efforts.

**Site Supervisor (SS)**

The Site Supervisor (SS) is responsible for field operations and reports to the Project Manager (PM). The SS ensures the implementation of the HASP requirements and procedures in the field. The specific responsibilities of the Site Supervisor include:

- Executing the work plan and schedule as detailed by the PM;
- Coordination with the SHSO on safety and health; and
- Ensuring Site work compliance with the requirements of this HASP.

**Employees**

All Roux employees are responsible for reading and following all provisions of the Corporate Health and Safety Manual, including this HASP. Employees report to the SS at the project Site. Each employee is also responsible for the following:

- Wearing all appropriate PPE as outlined within this HASP;
- Attending all safety meetings;
- Inspecting tools and equipment prior to use, and taking any defective tools or equipment out of service;
- Appropriately documenting field events as they occur within a logbook or equivalent;
- Properly operating machinery and/or equipment only if trained to do so;
- Stopping work operations if unsafe conditions exist;
- Identifying and mitigating hazards when observed;
- Reporting all incidents and near misses to the Roux SHSO and SS immediately; and
- Knowing where emergency equipment is located (e.g., first aid kit, fire extinguisher).

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**Subcontractors and Visitors**

Subcontractors and visitors are responsible for complying with the same health and safety requirements. It is the responsibility of all to make sure subcontractors and visitors comply and uphold the HASP. Subcontractors and visitors have the following additional responsibilities:

- Designating a qualified safety representative for the project that can make the necessary changes in work practices, as necessary;
- Attending all safety meetings while participating in Roux Site work activities;
- Reporting all incidents and near misses to Roux SHSO and SS immediately;
- Conducting initial and periodic equipment inspections in accordance with manufacturer and regulatory guidelines; and
- Providing copies of all Safety Data Sheets (SDS) to Roux SHSO for materials brought to the Site.

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# 2. Background

## 2.1 Site Description and Setting

The Site address is 310 East 161st Street, Bronx, New York, and consists of Tax Block 2420, p/o Lot 150 and encompasses approximately 0.8747 acres. A BCA amendment executed on February 27, 2026, was accepted by the NYSDEC to reduce the property by 0.0243 acres on the western portion of Site. The Site was most recently utilized as a parking lot for the adjacent offsite eight-story multifamily residential building. As detailed in the NYSDEC-approved Change of Use (COU) dated February 11, 2026, the Site has been utilized as a truck route and equipment staging area for redevelopment activities for the adjacent Tax Block 2420, Lot 130. Redevelopment for the adjacent Tax Block 2420, Lot 130 is being completed in accordance with the New York City Department of Environmental Protection (NYCDEP)-approved Remedial Action Plan (RAP).

A summary of the acreage and the property information is provided below.

| Property Location | |
|---|---|
| Property Name: | Morrisania East |
| Property Address: | 310 East 161st Street |
| Property Town, County, State: | Bronx, New York |
| Property Tax Identification: | Block 2420 and Lot 150 |
| Property Topographic Quadrangle: | USGS-Bronx, New York |
| Nearest Intersection: | Morris Avenue and East 161st Street. |
| Area Description: | The Site is in a mixed-use densely populated area in the Morrisania neighborhood of The Bronx, New York. The surrounding area consists of commercial and residential uses. |

A map showing an aerial view of the existing conditions is provided as **Figure 3**.

| Property Information | |
|---|---|
| Property Size: | 0.8747-acres |
| Property Use: | The Site was most recently utilized as a parking lot for the adjacent offsite eight-story multifamily residential building. As of the NYSDEC-approved COU dated February 11, 2026, the Site has been utilized as a truck route and equipment staging area for redevelopment activities for the adjacent Tax Block 2420, Lot 130. Redevelopment for the adjacent Tax Block 2420, Lot 130 is being completed in accordance with the NYCDEP-approved RAP. |
| Improvements: | The majority of the Site is paved with asphalt and concrete, with limited areas of landscaping. |

### 2.1.1 Historical Site Operations

Based on the Roux Phase I Environmental Site Assessment, dated June 2022 (Roux 2022 Phase I ESA), historical use at the Site included mixed residential as well as commercial and industrial use. The Site was

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initially developed for residential use by 1891 with East 160th Street bisecting the Site. By 1951, several buildings appear to have been demolished and new buildings were constructed. The new construction observed in the 1951 Sanborn Map includes an automobile repair facility with a 550-gallon gasoline underground storage tank (UST), an automobile brake service shop with a 550-gallon gasoline UST, multiple 1- and 2-story residential dwellings, and a 2-story Baptist Church. In 1969, a portion of the Site was used as a welding and boiler repair facility with a gasoline UST of unknown size (i.e., the former garage identified in 1951), and the automobile brake service shop (also identified in 1951) and a gasoline filling station. There were no records found in regard to the documentation or closure of the USTs, so it is unknown if the USTs have undergone any testing since their installation or if the USTs had/have secondary containment. By 1970, the buildings at the Site were demolished, East 160th Street was demapped, and the current parking area was constructed at the Site. Fill material, such as brick and concrete, found at depth at the Site during previous investigations suggests the pre-1970 buildings were demolished and used as fill material to prepare the Site for the parking area.

## 2.3 Known and Potential Releases of Hazardous Substances at the Site

According to the 1951 Sanborn Map, the Site was developed with an automobile repair facility and garage with associated USTs containing gasoline. No violations or compliance monitoring programs are associated with the former automobile repair facility. No records were found regarding the two adjacent 550-gallon USTs buried onsite.

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# 3. Scope of Work

This Scope of work includes the following field activities:

- Soil excavation and removal of contaminated soil at the Site. Soil excavation will occur at various depths over the entire site footprint for the construction of the building cellar area, the slab on grade area, and to support the installation of exterior landscaping. During the proposed Site development, soil excavation will be completed to 2 feet below land surface (ft bls) for the Track 4 remediation area, 4 ft bls for the Track 2 remediation area, 5 ft bls for Hot Spot 1, 7 ft bls for Hot Spot 2, and 14 ft bls for Hot Spot 3.
- Post-excavation soil samples (61 total) will be collected from the base of the excavation to document remaining soil quality at the Site and analyzed by a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory.
- Removal of two 550-gallon UST and collection of endpoint samples in accordance with the procedures defined in DER-10.
- Exposure to soil with residual impacts at the Site will be prevented by the installation of a cover system.
- Implementation of a sub-slab soil vapor barrier made of polyolefin and barrier resins that is American Society for Testing and Materials (ASTM) E 1745 Class A, B, and C compliant, resistant to puncturing and has high tensile strength.
- An active Sub-slab Depressurization System (SSDS) will be installed under the building slab to prevent the potential migration of vapors into the building.
- A New York State Department of Health (NYSDOH) real-time Community Air Monitoring Plan (CAMP) will be implemented if contaminated or potentially contaminated media is handled during any ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching. CAMP details can be found in **Appendices G** and **H.**
- Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone [EZ]) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions
- Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the EZ at particulate monitoring stations
- Routine dust suppression methods will be employed at the direction of the Site Superintendent throughout the construction project when ground intrusive activities are being performed.
- While significant odors are not anticipated based on investigation data, procedures for odor control will include limiting the area of open excavations, shrouding open excavations with tarps and other covers; and using foams to cover exposed odorous soils.
- Screening for “unexpected conditions” (including, but not limited to, buried drums, USTs, subsurface features such as tunnels and vaults, etc.) will be performed by the Construction Contractor during all excavation and other earth moving activities (not including the activities related to “clean” fill brought onsite).
- Any accumulated stormwater and/or groundwater encountered during the remediation will be managed and discharged under the appropriate New York City permit and will follow all local, state, and federal regulations. Dewatered fluids will not be recharged back to the land surface or subsurface of the Site.

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Non-routine activities that may be performed by Roux personnel include the following:

- None.

If there are any changes with the scope a revision of the HASP will be required to address any new hazards.

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# 4. Site Control

This Site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the Site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the Site, and to deter vandalism and theft.

## 4.1 Site Map

A map of this Site, showing Site boundaries, designated work zones, and points of entry and exit is provided in Figure 2.

## 4.2 Site Access

Access to the work areas at the Site is restricted to reduce the potential for exposure to its safety and health hazards. During hours of Site operation, Site entry and exit is authorized only through a locked gate.

## 4.3 Buddy System

While working in the EZ, Site workers use the buddy system. The buddy system means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of an emergency. The responsibilities of workers using the buddy system include:

- Remaining in close visual contact with partner;
- Providing partner with assistance as needed or requested;
- Observing partner for signs of heat stress, chemical overexposure or other difficulties;
- Periodically checking the integrity of partner's PPE; and
- Notifying the SS or other Site personnel if emergency assistance is needed.

## 4.4 Site Communications

The following communication equipment is used to support on-site communication: visual hand signals.

As applicable, hand signals will be used according to the following:

**Hand Signals**

| SIGNAL | MEANING |
|---|---|
| Hand gripping throat | Out of air; I cannot breathe |
| Grip partner's wrist | Leave area immediately |
| Hands on top of head | Need assistance |
| Thumbs up | I am all right; okay |
| Thumbs down | No; negative |

A current list of emergency contact numbers is included in the Site-Specific Emergency Information at the beginning of this HASP

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## 4.5 Site Work Zones

This Site is divided into three major zones, described below. These zones are characterized by the likely presence or absence of biological, chemical, or physical hazards and the activities performed within them. Zone boundaries are clearly marked at all times and the flow of personnel among the zones is controlled. The Site is monitored for changing conditions that may warrant adjustment of zone boundaries. Zone boundaries are adjusted as necessary to protect personnel and clean areas. Whenever boundaries are adjusted, zone markings are also changed and workers are immediately notified of the change.

**Exclusion Zone**

The area where contamination exists is the EZ. All areas where excavation and handling of contaminated materials take place are considered part of the EZ. This zone will be clearly delineated by chain link fencing, caution tape, cones or other effective barriers, as necessary. Safety tape may be used as a secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The SHSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- A buddy (co-worker);
- Required minimum level PPE;
- Medical authorization;
- Training certification; and
- Requirement to be in the zone.

**Contamination Reduction Zone**

A Contamination Reduction Zone (CRZ) is established between the exclusion zone and the support zone. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for decontamination of personnel and equipment. The CRZ will be used for general Site entry and egress in addition to access for heavy equipment and emergency support services. Personnel are not allowed in the CRZ without:

- A buddy (co-worker);
- Appropriate PPE;
- Medical authorization;
- Training certification; and
- Requirement to be in the zone.

**Support Zone**

The Support Zone (SZ) is an uncontaminated area that will be the field support area for the Site operations. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

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# 5. Job Hazard Evaluation

Roux's work at the Site is expected to entail a variety of physical, chemical, and biological hazards, all of which must be sufficiently managed to allow the work to be performed safely. Some of the hazards are Site-specific (i.e., they are associated with the nature, physical characteristics, and/or routine operation of the Site itself), while others are activity-specific (i.e., they are associated with [or arise from] the particular activity being performed). The various hazards can be grouped into the following categories:

- **Caught/Crushed** – the potential to become caught in, under, between, or by an object or parts of an object, such as equipment with parts that open and close or move up and down ("pinch points") or equipment that rotates, and the accompanying potential to have body parts cut, mangled, or crushed thereby.
- **Contact** – the potential to be struck by or against moving or stationary objects that can cause physical injury, such as heavy machinery, overhead piping, moving vehicles, falling objects, and equipment (including tools and hand-held equipment) or infrastructure with the ability to cut or impale.
- **Energy Sources** – the potential for bodily harm associated with energy sources, most notably electricity, but also including latent energy sources such as compressed air and equipment under tension (which when released could cause injurious contact or a fall).
- **Ergonomics** – the potential for musculoskeletal injury associated with lifting/carrying, pushing/pulling, bending, reaching, and other physical activity attributable to poor body position/mechanics, repetitive motion, and/or vibration.
- **Exposure** – the potential for injury/illness due to physical, chemical, or biological exposures in the work environment, including, but not limited to, temperature extremes, solar radiation, and noise (physical), chemical splashes and hazardous atmospheres (chemical), and animal/insect bites and poisonous plants (biological).
- **Falls** – the potential to slip or trip and thus fall or drop a load, resulting in bodily injury to oneself or others.

The foregoing is intended to provide Roux employees with a general awareness of the hazards involved with Site work. A more detailed review of the potential hazards associated with each specific activity planned for the Site (or on-going activity, as the case may be) is provided in the activity-specific Job Safety Analysis (JSA) forms in **Appendix A**. As can be seen in the JSA forms, the hazards are identified by category per the above, and specific measures designed to mitigate/manage those hazards are also identified. In preparing the JSA forms, all categories of hazards were considered, and all anticipated potential hazards were identified to the extent possible based on the experience of the personnel preparing and reviewing the JSA forms. However, there is always the possibility for an unanticipated hazard to arise, potentially as condition change over the course of the workday. Roux personnel must maintain a continual awareness of potential hazards in the work zone, regardless of whether the hazard is identified in the JSA form. Particular attention should be paid to hazards associated with exposure to hazardous substances (see **Table 1** for a listing of the hazardous substances most likely to be encountered in environmental media at the Site) and to Site personnel being located "in the line of fire" with respect to moving equipment, pinch points, and latent energy (e.g., being located or having body parts located within the swing radius of an excavator, between two sections of pipe being connected, below a piece of suspended equipment, or adjacent to a compressed air line).

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## 5.1 Hazard Communication and Overall Site Information Program

The information in the JSAs and SDSs is made available to all employees and subcontractors who could be affected by it prior to the time they begin their work activities.

Modifications to JSAs are communicated during routine pre-work briefings, and periodically updated as needed in the HASP. SDSs will be maintained by the SHSO/SS for new chemicals brought on-site as needed. Copies of SDSs can be found in **Appendix B**.

## 5.2 Noise

Noise is associated with the operation of heavy equipment, power tools, pumps, and generators. Noise is also a potential hazard when working near operating equipment such as excavators, drill rigs or pole drivers. High noise (i.e., < 85 dBA) operations may be evaluated by the SHSO utilizing a type 2 handheld sound level meter (SLM) operating on the "A"-weighted scale with slow response because this scale most closely resembles human response to noise and complies with OSHA 29 CFR 1910.95. Hearing protection is required in areas with noise exposure greater than 85 dBA. Double hearing protection (ear plugs and earmuffs) should be donned in areas where the noise exposure is more than 95 dBA. Noise exposure will be controlled by hearing protection as described above or by maintaining set-backs from high-noise equipment, as warranted. Personnel handling heavy equipment and using power tools that produce noise levels exceeding those described levels above are required by OSHA 29 CFR 1910.95 to wear the appropriate Noise Reduction Rating (NRR) level of hearing protection. Appropriate hearing protection will be evaluated by the SHSO as necessary in consultation with the OHSM and CHSD.

## 5.3 Slip, Trip, and Fall Hazards

Slip, trip, and fall hazards may include, but are not limited to, general slip and trip hazards associated with uneven ground, possible debris, wet grass, and equipment. Prior to work, walking paths will be assessed for solid footings, any ground penetrations that may cause a tripping hazard will be appropriately marked, and other areas will be noted and discussed with the field team.

Personnel shall be aware of their surroundings and footings at all time, and all accommodations should be made for proper housekeeping and organized equipment placement at the Site, where possible, to help prevent any slip, trip, and fall-related incidents. All tools and materials should be appropriately stored when not in use and placed in appropriate storage containers.

## 5.4 Biological Hazards

Biological hazards that may potentially be present at a Site, include poisonous plants, insects (ticks, spiders, bees), animals (snakes, dogs), etc. Information on biological hazards can be found within Roux's Biological Hazard Awareness Management Program located within Roux's Corporate Health and Safety Manual. There is also potential for transmission and/or exposure to SARS-CoV-2, the virus that causes COVID-19. Prior to beginning work, on-Site protocols shall be established by the project team, including subcontractors, in accordance with federal, state, county, city, and/or other guidance, as applicable.

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# 6. Emergency Response Plan

This emergency response plan details actions to be taken in the event of Site emergencies. The PM and SHSO is responsible for the implementation of emergency response procedures onsite. The SHSO/PM provides specific direction for emergency action based upon information available regarding the incident and response capabilities and initiates emergency procedures and notification of appropriate authorities. In the event of an emergency, Site personnel are evacuated and do not participate in emergency response activities, response is facilitated through external emergency services.

## 6.1 Emergency Response

The SHSO, after investigating the incident and relevant information, shall determine the level of response required for containment, rescue and medical care. Limited on-site emergency response activities could occur therefore the SHSO is responsible for notifying external emergency response agencies. The SHSO provides relevant information to the responding organizations, including, but not limited to, the hazards associated with the emergency incident, potential containment problems, and missing Site personnel.

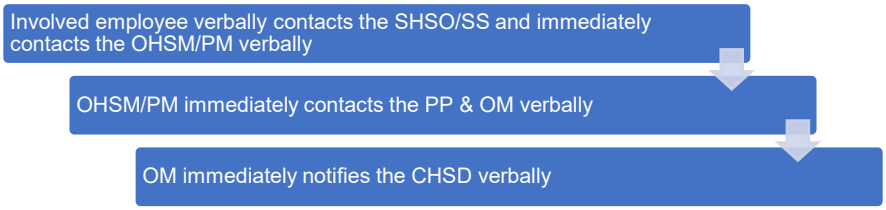
## 6.2 Emergency Alerting and Evacuation

If evacuation notice is given, Site workers leave the worksite, if possible, by way of the nearest exit. Appropriate primary and alternate evacuation routes and assembly areas have been identified and are shown on the Site Plan with Emergency Muster Area (**Figure 2**). The routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by SHSO/PM.

Personnel exiting the Site gather at a designated assembly point. To determine that everyone has successfully exited the Site, personnel will be accounted for at the assembly point. If any worker cannot be accounted for, notification is given to the SHSO, PM, and any arriving response authorities so that appropriate action can be initiated. Subcontractors on this Site have coordinated their emergency response plans to ensure that these plans are compatible and potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

## 6.3 Emergency Medical Treatment and First Aid

In the event of a work-related injury or illness, employees are required to follow the procedures outlined below. All work-place injury and illness situations require Roux's Project and Corporate Management Team to be notified when an injury/illness incident occurs, and communication with the contracted Occupational Health Care Management Provider, WorkCare, Inc., is initiated, as necessary. The Injury/Illness Notification Flowchart is provided below and within Roux's Incident Investigation and Reporting program included within Roux's Corporate Health and Safety Manual.

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If on-Site personnel require any medical treatment, the following steps will be taken:

a. Notify Roux's Project and Corporate Management Team for any work-related injury and/or illness occurrence, and communicate with the contracted Occupational Health Care Management Provider, WorkCare, immediately following the notifications provided above.

b. Based on discussions with the Project Team, Corporate Management and the WorkCare evaluation, if medical attention beyond onsite first aid is warranted, transport the injured / ill person (IP) to the Urgent Care Center, or notify the Fire Department or Ambulance Emergency service and request an ambulance or transport the victim to the hospital, and continue communications with Corporate Management Team. An Urgent Care/Hospital Route map with location to Lincoln Medical Center and CityMD is included as **Figure 3**.

c. Decontaminate to the extent possible prior to administration of first aid or movement to medical or emergency facilities.

d. First aid medical support will be provided by onsite personnel trained and certified in First Aid, Cardio Pulmonary Resuscitation (CPR), Automatic External Defibrillation (AED), and Blood-Borne Pathogens (BBP) Awareness, until relieved by emergency medical services (EMS).

e. The SHSO and PM will perform a Loss Investigation (LI) and the Project Team will complete the final Loss Report. If a Roux employee is involved in a vehicular incident, the employee must also complete the Acord Automobile Loss Notice.

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# 7. Environmental Conditions and Response

## 7.1 Adverse Weather Conditions

In the event of adverse weather conditions, the SHSO or project principal will determine if work can continue without jeopardizing the health and safety of field workers. Some of the items related to adverse weather conditions to be considered prior to determining if work should continue include:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related conditions. If wind speed is greater than 15 mph averaged over a 15-minute period or wind gusts over 25 mph, earthmoving operations will be ceased
- Limited visibility; and
- Electrical storm potential.

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions may include heavy rain, fog, high winds, and lightning. The SHSO and/or PM shall observe daily weather reports and evacuate, if necessary, in case of inclement weather conditions.

## 7.2 Electrical Storm Guidelines

In the event that lightning and/or thunder are observed while working onsite, all onsite activities shall stop and personnel shall seek proper shelter (e.g., substantial building, enclosed vehicle, etc.). Work shall not resume until the threat of lighting has subsided and no lightning or thunder has been observed for 30 minutes. If the possibility of lightning is forecast for the day, advise the onsite personnel on the risks and proper procedure at the pre-work safety briefing. Continuously monitor for changing weather conditions and allow enough time to properly stop work if lightning is forecast.

## 7.3 Environmental Stressors, Heat Stress, Heat Exhaustion, and Heat Stroke

It is the employer's responsibility to monitor weather forecasts and ambient air temperatures, both prior to the work shift and during the shift. The National Oceanic and Atmospheric Administration records average minimum/maximum temperatures of 31 to 85 degrees Fahrenheit during the year in Bronx, NY.

To prevent potential heat illness, the following strategies will be implemented:

- Adjusting personnel work/rest intervals;
- Monitoring for symptoms of heat illness;
- Providing shaded rest areas;
- Providing cool potable water so that each employee has access to at least one quart per hour for the entire shift, free of charge;
- Allowing for employees to acclimatize to the weather conditions and work demands;
- Observe workers during a heat wave (i.e., when the temperature is at least 80oF, and 10 degrees hotter than the average temperature of the five preceding days); and
- Implementing high heat procedures when the temperature reaches 95oF.

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Roux's Heat Illness Prevention Plan is implemented when the when ambient temperatures exceed 80oF. Roux's Heat Illness Prevention Program can be found within **Appendix C**. Additional information regarding heat illnesses is provided below. This can include, but is not limited to, access to shade that is sufficient in size to fit all workers who are on break; a car with air conditioning is acceptable, too. Preventative cool-down breaks shall be allowed at any time, and anyone taking such a break will be monitored for heat illness symptoms and not required to return to work until all symptoms (if present) of heat illness have disappeared. If necessary, first aid will be offered, but if symptoms are severe, emergency response procedures will be implemented per Section 6.3. Anyone who has shown symptoms of severe heat illness will not be sent home without being offered first aid or medical treatment.

High heat procedures must be implemented when temperatures reach 95oF. These procedures include:

- Ensuring that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if the reception in the area is reliable.
- Observing employees for alertness and signs or symptoms of heat illness. The employer shall ensure effective employee observation/monitoring by implementing one or more of the following:
    - Supervisor or designee observation of 20 or fewer employees;
    - Mandatory buddy system; and
    - Regular communication with sole employee such as by radio or cellular phone, or other effective means of observation.
- Designating one or more employees on each worksite as authorized to call for emergency medical services and allowing other employees to call for emergency services when no designated employee is available.
- Encouraging employees throughout the work shift to drink plenty of water.
- A review of the high heat procedures during the daily tailgate meeting and remind employees of their right to take a cool-down rest when necessary.

### 7.3.1 Heat Stress

Heat stress is the body's response to excessive heat and can be a significant potential hazard. The risk of heat stress can be increased with heavy physical activity and/or the use of personal protective equipment in hot, humid weather environments. There are also personal risk factors that can contribute to the risk of suffering from heat stress, such as obesity, water intake, alcohol and caffeine consumption, pregnancy, age, medication, etc. Heat illness includes heat cramps, heat exhaustion, heat syncope, and heat stroke.

### 7.3.2 Heat Cramps

Heat cramps may be brought on by prolonged exposure to heat. As an individual sweats, water and salts are lost by the body resulting in painful muscle cramps, typically in the legs.

First aid treatment includes, but is not limited to, shade, rest, and fluid replacement. Typically, the individual should recover within one-half hour while being monitored constantly. If the individual has not improved substantially within 30 minutes and the body temperature has not decreased, the individual should be transported to a hospital for medical attention.

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Per Roux's Heat Illness Prevention Plan, employees shall have access to potable drinking water that is fresh, pure, suitably cool, free of charge and in sufficient quantities. Access to shade shall be present when temperatures exceed 80 degrees Fahrenheit and shall be available when temperatures do not exceed 80 degrees Fahrenheit.

### 7.3.3 Heat Exhaustion

Heat exhaustion may occur in an individual who has been exposed to excessive heat while working or exercising. The circulatory system of the individual fails as blood collects near the skin to rid the body of excess heat through transference. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing;
- Weak pulse;
- Cold and clammy skin with heavy perspiration;
- Skin appears pale;
- Fatigue and weakness;
- Dizziness; and
- Elevated body temperature.

First aid treatment includes, but is not limited to, cooling the victim, elevating the feet, and replacing fluids.

If the individual is not substantially improved within 30 minutes and the body temperature has not decreased, the individual should be transported to the hospital for medical attention.

### 7.3.4 Heat Stroke

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a MEDICAL EMERGENCY requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot, red skin;
- Body temperature approaching or above 105oF;
- Confusion, altered mental state, slurred speech;
- Seizures;
- Large (dilated) pupils; and
- Loss of consciousness – the individual may go into a coma.

First aid treatment requires immediate cooling and transportation to a medical facility. Heat stress is a significant hazard if any type of protective equipment (semi-permeable or impermeable) that prevents evaporative cooling when worn in hot weather environments.

## 7.4 Cold Stress

Cold stress is a danger at low temperatures and when the wind-chill factor is low. Prevention of cold-related illnesses is a function of whole-body protection. Adequate insulating clothing must be used when the air temperature is below 60°F. A work/rest regimen will be initiated when ambient temperatures and protective

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clothing cause a stressful situation. In addition, reduced work periods followed by rest in a warm area may be necessary in extreme conditions. The signs and symptoms of cold stress include the following:

- Severe shivering;
- Abnormal behavior;
- Slowing;
- Weakness;
- Stumbling or repeated falling;
- Inability to walk;
- Collapse; and/or
- Unconsciousness.

First aid requires removing the victim from the cold environment and seeking medical attention immediately. Also, prevent further body heat loss by covering the victim lightly with blankets. Do not cover the victim's face. If the victim is still conscious, administer hot drinks and encourage activity such as walking, wrapped in a blanket.

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# 8. Safety Procedures

This section of the HASP presents the specific safety procedures to be implemented during Roux's activities at the Site in order to protect the health and safety of various on-site personnel. Minimum OSHA-mandated procedures are presented first, followed by client- and Site-specific procedures. Lastly, activity-specific procedures are discussed. These Site and activity-specific procedures supplement the general safety procedures included in Roux's Corporate Health and Safety Manual, which also must be followed in their entirely.

## 8.1 Training

At a minimum, Site personnel who will perform work in areas where there exists the potential for toxic exposure will be health and safety-trained prior to performing work onsite per OSHA 29 CFR 1910.120(e) and 29 CFR 1926.65(e). More specifically, all Roux, subcontractor, and other personnel engaged in sampling and remedial activities at the Site and who are exposed or potentially exposed to hazardous substances, health hazards, or safety hazards must have received at a minimum the 40 hour initial HAZWOPER training consistent with the requirements of 29CFR 1910.120(e)(3)(i) training and a minimum of 3 days' actual field experience under the direct supervision of a trained experienced supervisor, plus 8 hours of refresher training on an annual basis. Depending on tasks performed, less training may be permitted. Evidence of such training must be maintained at the Site at all times. Furthermore, all on-Site management and supervisory personnel directly responsible for or who supervise the employees engaged in Site remedial operations, must have received an additional 8 hours of specialized training at the time of job assignment on topics including, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques, plus 8 hours of refresher training on an annual basis. Additionally, all workers who will be required to don a respirator will be properly trained on their employer's Respiratory Protection Program, which also includes being medically cleared to wear a respirator and passed a fit test, at least initially prior to use, and then annually thereafter in accordance with 29 CFR 1910.134, Respiratory Protection.

Roux personnel training records are maintained in a corporate database with records available upon request from either the OHSM/SHSO/CHSD or Human Resources Department.

## 8.2 Site-Specific Safety Briefings for Visitors

A site-specific briefing is provided to all site visitors who enter this site beyond the site entry point. For visitors, the site-specific briefing provides information about site hazards, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

## 8.3 HASP Information and Site-Specific Briefings for Workers

Site personnel review this HASP and are provided a Site-specific tailgate briefing prior to the commencement of work to ensure employees are familiar with this HASP and the information and requirements it contains, as well as the relevant JSAs included in **Appendix A**. Additional briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during on-going Site characterization and analysis of changing conditions. Conditions for which we

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schedule additional briefings include, but are not limited to: changes in site conditions, changes in the work schedule/plan, newly discovered hazards, and incidents occurring during Site work.

## 8.4 Medical Surveillance

The medical surveillance section of the Health and Safety Plan describes how worker health status is monitored at this site. Medical surveillance is used when there is the potential for worker exposure to hazardous substance at levels above OSHA Permissible Exposure Limits (PEL) or other published limits. The purpose of a medical surveillance program is to medically monitor worker health to ensure that personnel are not adversely affected by site hazards. The provisions for medical surveillance at this site are based on the site characterization and job hazard analysis found in Section 4 of this HASP and are consistent with OSHA requirements in 29 CFR 1910.120(f) as applicable.

### 8.4.1 Site Medical Surveillance Program

Medical surveillance requirements are based on a worker's potential for exposure as determined by the site characterization and job hazard analysis documented in Section 4 and JSAs within **Appendix A** of this HASP and in compliance with the requirements of 29 CFR 1910.120(f)(2). Based on site information and use of direct reading instruments, limited use of respirators (less than 30 days per year), and the absence of an employee-staffed HAZMAT team, a limited medical surveillance program is required and implemented at this site. The medical surveillance program provides that:

1. Workers assigned to tasks requiring the use of respirators receive medical examinations in accordance with 29 CFR 1910.134(e) to ensure they are physically capable to perform the work and use the equipment, and
2. If a worker is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substance or health hazards, medical examinations are provided to that worker as soon as possible after the occurrence and as required by the attending physician.
3. These medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to workers free of cost, without loss of pay, and at a reasonable time and place. In addition, the need to implement a more comprehensive medical surveillance program will be re-evaluated after any apparent over-exposure.

### 8.4.2 Medical Recordkeeping Procedures

Medical recordkeeping procedures are consistent with the requirements of 29 CFR 1910.1020 and are described in the company's overall safety and health program. A copy of that program is available at our Islandia, New York office.

The following items are maintained in worker medical records:

- Respirator fit test and selection;
- Physician's medical opinion of fitness for duty (pre-placement, periodic, termination);
- Physician's medical opinion of fitness for respirator protection (pre-placement, periodic); and
- Exposure monitoring results.

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### 8.4.3 Program Review

The medical program is reviewed to ensure its effectiveness. The Corporate Health and Safety Manager, in coordination with the Human Resources Director, is responsible for this review. At minimum, this review consists of:

- Review of accident and injury records and medical records to determine whether the causes of accidents and illness were promptly investigated and whether corrective measures were taken wherever possible;
- Evaluation of the appropriateness of required medical tests based on site exposures; and
- Review of emergency treatment procedures and emergency contacts list to ensure they were site specific, effective, and current.

## 8.5 Personnel Protection

Site safety and health hazards are eliminated or reduced to the greatest extent possible through engineering controls and work practices. Where hazards are still present, a combination of engineering controls, work practices and PPE are used to protect employees. Appropriate personal protective equipment (PPE) shall be worn by Site personnel when there is a potential exposure to chemical, biological or physical hazards (e.g., falling objects, flying particles, sharp edges, electricity, and noise), as determined by the SHSO. The level of personal protection, type and kind of equipment selected will depend on the hazardous conditions and in some cases cost, availability, compatibility with other equipment, and performance. An accurate assessment of all these factors will be made before work can be safely executed.

Roux maintains a comprehensive written PPE program that addresses proper PPE selection, use, maintenance, storage, fit and inspection. Roux's PPE program can be found within **Appendix D**. PPE to be used at the Site will meet the appropriate American National Standards Institute (ANSI) standards and the following OSHA (General/Construction Industry) standards for minimum PPE requirements.

The minimum level of PPE for entry onto the Site is Level D. The following equipment shall be worn:

- Work uniform (long pants, sleeved shirt);
- Hard hat;
- Steel or composite toe work boots (must comply with American Society for Testing and Materials [ASTM]) F 2412-05, Standard Test Methods for Foot Protection and ASTM F 2413-05, Standard Specification for Performance Requirements for Foot Protection);
- Safety Glasses (must comply with one of the following ANSI/ISEA Z87.1-2010, ANSI Z87.1-2003, ANSI Z87.1-2003);
- Boot Covers (as needed);
- Hearing protection (as needed);
- High visibility clothing (shirt/vest); and
- Hand protection (e.g., minimum cut resistance meeting ANSI 105-2000 Level 2).

Note that jewelry shall be removed or appropriately secured to prevent it from becoming caught in rotating equipment or unexpectedly snagged on a fixed object (e.g., wrist watches, bracelets, rings, chains and necklaces, open earrings). Do not wear loose clothing and all shoulder-length hair should be tied back.

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Site specific PPE ensembles and materials are identified within task specific JSAs located within **Appendix A**, and any upgrades or downgrades of the level of protection (i.e., not specified in the JSA) must be approved by the PP and immediately communicated to all Roux personnel and subcontractors as applicable. PPE is used in accordance with manufacturer's recommendations.

### 8.5.1 Hearing Conservation

Hearing protection is made available when noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA. Hearing protection is required when the 8-hour time weighted average sound level > 85 dBA, or when noise levels exceed 140 dBA at any point or exceeds 115 dBA for at least 15 minutes. Where noise exposure meets or exceeds this level, noise is listed as a physical hazard in the JSA for the tasks/operation, and hearing protection is included as one of the control measures (PPE).

## 8.6 Monitoring

An air monitoring program is important to the safety of on- and off-Site personnel, and the surrounding area. A preliminary survey, to establish background conditions in the immediate sampling area, may be made prior to the initiation of Site work including, but not limited to, monitoring wind direction (e.g., wind socks) and approximate temperature during all invasive Site activities. This survey will be conducted with the appropriate pre-calibrated air monitoring instrument(s), as warranted by the field activity. Once this survey has been complete, any changes in the type of PPE will be determined and relayed to those working on Site.

Work zone air monitoring will be performed to verify that the proper level of PPE is used, and to determine if increased protection or work stoppage is required. The following equipment shall be used to monitor conditions:

- A Photoionization Detector (PID) with a lamp energy of 10.6 eV will be used to provide direct readings of organic vapor concentrations during intrusive activities to determine that personnel protection is adequate. Concentrations shall be recorded during intrusive activities with the potential to encounter contaminant vapors.

Personal exposure monitoring utilizing activated charcoal tubes may be considered based on whether or not the area sample results are at or above half of the PEL. The decision to perform the monitoring will be made by, and under the control of, the CHSD.

Below are monitoring action levels for Site-specific chemicals of concern. In the event PID readings above the thresholds identified below are sustained for 5 minutes in the breathing zone, worker protection will require upgrading following notification to the OHSM and applicable parties.

### 8.6.1 Action Levels for Air Monitoring

PPE can remain at Level D if breathing zone VOC concentrations are less than 5 ppm. Personnel are required to evacuate the Site when breathing zone VOC readings exceed 25 ppm.

The following tables include summaries of the air monitoring, work practices, and action levels for the expected contaminants. The action levels to initiate testing with colorimetric tubes for airborne volatiles is 1 ppm (PID reading) and is based on the Permissible Exposure Limit (PEL) for benzene (1 ppm). The colorimetric tubes are used to confirm the presence or absence of specific constituents, and they do not provide a measured concentration.

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PPE can remain at Level D if breathing zone VOC concentrations are less than 5 ppm. Personnel are required to evacuate the Site when breathing zone VOC readings exceed 25 ppm.

The following tables include summaries of the air monitoring, work practices, and action levels for the expected contaminants.

PPE can remain at Level D if breathing zone VOC concentrations are less than 5 ppm and specific compounds, such as benzene, vinyl chloride, or formaldehyde, is non-detect. Personnel are required to evacuate the Site when breathing zone VOC readings exceed 25 ppm.

The following tables include summaries of the air monitoring, work practices, and action levels for the expected contaminants.

| Air Monitoring Summary and Action Levels<br>Organic Vapors | |
|---|---|
| **PID Reading in Breathing Zone (ppm)** | **Action** |
| 0-1 ppm above background | Continue monitoring |
| >1-5 ppm sustained 60 seconds | Continue monitoring; if applicable initiate additional collection of benzene/vinyl chloride/formaldehyde using colorimetric tubes. |
| <5 ppm and no presence of benzene/vinyl chloride/formaldehyde | Continue Monitoring, ventilate space |
| ≥ 5 ppm - ≤ 25 ppm and no presence of benzene/vinyl chloride/formaldehyde | Ventilate space until PID reads < 5 ppm. If < 5 ppm cannot be achieved, upgrade to Level C[1]. |
| ≥ 25 ppm | Ventilate space and evacuate area.<br>Consult with CHSD. |

Background concentrations should be established at the beginning of each work day. It may be necessary to re-establish background concentrations and ambient conditions vary through the day.

1 Measured air concentrations of known organic vapors will be reduced by the respirator to one half of the PEL or lower, and the individual and combined compound concentrations shall be within the service limit of the respirator cartridge.

### 8.6.2 Air Monitoring Equipment and Calibration

A PID calibrated to an appropriate calibration mixture will be used to detect organic vapors in and around the work areas. Monitoring will be conducted in and around all work areas and at the workers breathing zone before activities commence to establish a background level, then at 15-minute intervals throughout the day. All equipment will be calibrated according to the manufacturer's recommendation. A calibration log will be maintained and will include the name of the person who performed the calibration, the date and time calibrated, and the instrument reading at the time of calibration. A manual bellows pump or equivalent with colorimetric tubes for specific compounds will be utilized to determine the course of action related to upgrading or downgrading the level of respiratory protection, as applicable.

If air monitoring data indicate safe levels of potentially harmful constituents at consistent intervals (5-minute intervals), then monitoring can be conducted less frequently (every 30 minutes). This determination will be made by the onsite SHSO. Monitoring data, including background readings and calibration records, will be documented. Work to be performed on-Site will conform to Roux's Standard Operating Procedures (SOPs). Conformance with these guidelines as well as the guidelines described in this HASP will aid in mitigating the physical and chemical hazards mentioned throughout this HASP.

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## 8.7 Tailgate Safety Meetings

A designated Site worker will provide daily safety briefings (e.g., tailgate meetings) including, but not limited to, the following scenarios:

- When new operations are to be conducted;
- Whenever changes in work practices must be implemented; and
- When new conditions are identified and/or information becomes available.

Daily safety briefings shall be recorded on the Roux Daily Tailgate Health and Safety Meeting Log/Daily Site Safety Checklist, and all completed forms will become a part of the project file.

## 8.8 Spill Containment

Spill containment equipment and procedures should, at a minimum, meet the requirements of the facility's Spill Prevention, Control and Countermeasure Plan, if applicable. Otherwise, spill containment equipment and procedures must be considered depending on the task, including, but not limited to, chemical/product transfer points and handling.

### 8.8.1 Initial Spill Notification and Response

Any worker who discovers a hazardous substance spill will immediately notify the SHSO. The worker will, to his/her best ability, report the hazardous substance involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, and any associated injuries without compromising their own safety.

### 8.8.2 Spill Evaluation and Response

The SHSO is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area will be isolated and demarcated to the extent possible. If necessary to protect nearby community members, notification of the appropriate authorities is made by the PM as appropriate. On-Site response is limited to small spills (e.g., <10 gallons); large spills require external emergency responders who will be contacted by the SHSO.

## 8.9 Decontamination

The decontamination section of the HASP describes how personnel and equipment are decontaminated when they leave the Exclusion Zone. This section also describes how residual waste from decontamination processes is disposed. The site decontamination procedures are designed to achieve an orderly, controlled removal or neutralization of contaminants that may accumulate on personnel or equipment. These procedures minimize worker contact with contaminants and protect against the transfer of contaminants to clean areas of the site and off-site. They also extend the useful life of PPE by reducing the amount of time that contaminants contact and can permeate PPE surfaces. Decontamination is facilitated within the CRZ at this site, if applicable.

### 8.9.1 Decontamination Procedures for Personnel and PPE

The following are general decontamination procedures established and implemented at this site.

1. Decontamination is required for all workers exiting a contaminated area. Personnel may re-enter the SZ only after undergoing the decontamination procedures described below in the next section.

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2. Protective clothing is decontaminated, cleaned, laundered, maintained and/or replaced as needed to ensure its effectiveness.
3. PPE used at this site that requires maintenance or parts replacement is decontaminated prior to repairs, or
4. PPE used at this site is decontaminated or prepared for disposal on the premises. Personnel who handle contaminated equipment have been trained in the proper means to do so to avoid hazardous exposure.
5. This site uses an off-site laundry for decontamination of PPE. The site has informed that facility of the hazards associated with contaminated PPE from this site.
6. The site requires and trains workers that if their permeable clothing is splashed or becomes wetted with a hazardous substance, they will immediately exit the work zone, perform applicable decontamination procedures, shower, and change into uncontaminated clothing.
7. Procedures for disposal of decontamination waste meet applicable local, State, and Federal regulations.

### 8.9.2 Decontamination Procedures for Equipment

All tools, equipment, and machinery from the EZ or CRZ are decontaminated in the CRZ prior to removal to the SZ. Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure and to avoid cross-contamination and chemical incompatibilities.

General Equipment Decontamination Procedures:

1. Decontamination is required for all equipment exiting a contaminated area. Equipment may re-enter the SZ only after undergoing the equipment decontamination procedures.
2. Vehicles that travel regularly between the contaminated and clean areas of the site are carefully decontaminated each time they exit the EZ and the effectiveness of that decontamination is monitored to reduce the likelihood that contamination will be spread to other parts of the site.
3. Particular attention is given to decontaminating tires, scoops, and other parts of heavy equipment that are directly exposed to contaminants and contaminated soil.
4. Procedures for disposal of decontamination waste shall meet applicable local, State, and Federal regulations.

The following items may be used to decontaminate equipment:

- Fresh water rinse;
- Non-phosphorus detergent wash;
- Acetone rinse;
- Distilled water rinse; and
- A steam cleaner or pressure washer (heavy equipment only).

### 8.9.3 Monitoring the Effectiveness of Decontamination Procedures

Visual examination and sampling are used to evaluate the effectiveness of decontamination procedures. Visual examination is used to ensure that procedures are implemented as described and that they appear to control the spread of contaminants under changing site conditions. Visual examination is also used to inspect for signs of residual contamination or for contaminant permeation of PPE.

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Personnel who work in contaminated areas of the site, either the CRZ or the Exclusion Zone, are trained in the principles and practices of decontamination described in this section of the HASP and in related SOPs. If site procedures are changed as a result of inspection and monitoring, all affected employees are notified of these changes.

## 8.10 Confined Space Entry

Confined Space Entry will not be performed.

The following is a list of the safety requirements for confined space entry at the Site:

- **ROUX PERSONNEL ARE NOT AUTHORIZED TO ENTER AN OSHA PERMIT REQUIRED CONFINED SPACE;**
- Currently the scope of work **DOES NOT** require personnel to enter permitted confined space for this project; and
- Any changes to the field activities that may necessitate confined space entry will be reported to the Project Principal and OHSM.

Confined space is defined as any space, depression, or enclosure that:

- Has limited opening for entry and egress;
- Is large enough for and employee to enter and perform assigned work; and
- Is not intended for continuous occupancy.

A permit required confined space is one that meets the definition of a confined space and has one or more of the following characteristics:

- May contain or produce life-threatening atmospheres due to oxygen deficiency the presence of toxic, flammable, or corrosive contaminants;
- Contains a material that has the potential for engulfment;
- Has an internal configuration that may cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section; and
- Contains any other serious safety or health hazards.

Although Roux personnel will not perform confined space entry, it is expected that subcontractors performing cleaning and mitigation and/or remedial measures activities may be required to enter structures that are considered to be a permit required confined space. Permitting of the confined space as well as hazard mitigation for entry will be completed by the subcontractor in accordance with 29 CFR 1910.146 or 1926.1201-1213 and/or applicable local/client requirements.

## 8.11 Client and Site-Specific

In addition to the OSHA-specific procedures discussed above, there may be client and site-specific safety procedures that must be adhered to during the performance of remedial activities at the Site.

## 8.12 Unusual or Significant Risks

Field activities that appear to have unusual or significant risks that cannot be adequately managed with existing risk tools such as LPS, HASPs, traffic safety plans, work permits, design and O&M practices,

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equipment HAZOPS or other safety tools must be referred to the CHSD to help with the assessment and management of the associated potential safety risks. Examples include the use of explosives for demolition, use of firearms to control wildlife, rappelling, demolition over water, diving, etc.

## 8.13 Activity-Specific Hazards

In addition to the general hazards discussed above, there are activity-specific hazards associated with each work activity planned for the Site. An activity-specific JSA has been completed for each of the activities planned for the Site. JSAs are provided in **Appendix A**. In the event that new work activities or tasks are planned, JSAs will be developed and implemented prior to performing the new activities. In the absence of a JSA, the personnel performing work must prepare a field JSA and receive clearance from a designated competent safety official prior to performing any task with significant risk. In emergency situations where time is critical, Last Minute Risk Assessments (LMRAs) will be utilized to identify the task, associated hazards and mitigative actions to take. For lower risk activities (as deemed by the discretion of a Competent Person) where a JSA is determined to not be needed, the individual(s) conducting the activities must perform LMRAs prior to and during the work.

### 8.13.1 Electrical and Other Utility Assessment and Accommodations

Roux shall perform a site walk to identify any potential overhead electrical or utility lines. All applicable guidelines will be followed in the vicinity of overhead power and utility lines (see Section 8.13.3 below).

Roux has also reviewed all available Site maps showing buried utility lines to identify potential hazards; the review revealed no underground hazards are known to exist in the vicinity of the areas of the Site pertinent to this HASP.

### 8.13.2 Subsurface Work

Subsurface work activities will require adherence to Roux's Corporate Subsurface Utility Clearance Management program found within **Appendix E.**

### 8.13.3 Heavy Equipment

Use of heavy equipment at the Site will require adherence to Roux's Corporate Heavy Equipment Exclusion Zone Management Program found within **Appendix F**. Additionally, operation of the drill rig/other heavy equipment will maintain clearances from overhead power lines in accordance with 29 CFR 1926.1408 Table A Minimum Clearance Distances provided below.

**Minimum Required Clearances for Energized Overhead Power Lines**

| Nominal System Voltage of Power Line (K V) | Minimum Required Clearance (feet) |
|---|---|
| 0-50 | 10 |
| 51-100 | 12 |
| 101-200 | 15 |
| 201-300 | 20 |
| 301-500 | 25 |
| 501-750 | 35 |
| 751-1000 | 45 |

1 kilovolt (KV) = 1,000 volts

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## 8.14 Traffic Control

If Site operations encroach upon public streets or highways and a hazard exists to Site personnel because of traffic conditions, a traffic control plan will be implemented in accordance with the United States Department of Transportation's (DOT's) "Manual on Uniform Traffic Control Devices."

## 8.15 Sanitation

Sanitation facilities will be provided in accordance with the sanitation standards (29 CFR 1910.141, 29 CFR 1926.51 and 29 CFR 1928.110). Sanitation facilities will be maintained and kept in good conditions at all times.

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# 9. Field Team Review

Each person performing work at or visiting this site shall sign this section after site-specific training is completed and before being permitted to access the CRZ or Exclusion Zone.

I have read and understand this Site-Specific Health and Safety Plan. I will comply with the provision contained therein.

**Site/Project: Morrisania East**

| Name & Company | Signature | Date |
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# 10. Approvals

By their signature, the undersigned certify that this HASP is approved and will be utilized at the Morrisania East Site.

| | |
|---|---|
| TBD – Site Health and Safety Officer | Date |
| Nevin Pahlad – Office Health and Safety Manager | Date |
| Lauren Dolginko – Project Manager | Date |
| Frank Cherena – Project Principal | Date |

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# TABLES

1. Toxicological Properties of Hazardous Substances Present at the Site

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| **ORGANOCHLORINE PESTICIDES (OCP)** | | | | | | | | | |
| DDT | 50-29-3 | TWA 1 mg/m3 | TWA 0.5 mg/m3 | TWA 1 mg/m3 | 500 mg/m3 | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen] | Eyes, skin, central nervous system, kidneys, liver, peripheral nervous system | White, odorless and tasteless, very stable, water-insoluble, synthetic<br><br>BP: 260°F<br>Fl.Pt. = 162-171°F<br>LEL: NA<br>UEL: NA |
| Aldrin | 309-00-2 | TWA 0.1 mg/m3 | TWA 0.25 mg/m3 | TWA 0.25 mg/m3 | 25 mg/m3 | Inhalation, ingestion, skin and/or eye contact | headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort); myoclonic jerks of limbs; clonic, tonic convulsions; coma; hematuria (blood in the urine), azotemia; [potential occupational carcinogen] | Developmemntal, Endocrine, Liver, Immune System, Nervous System, | Colorless to dark-brown crystalline solid with a mild chemical odor.<br><br>BP: 293°F<br>Fl.Pt. = 150°F<br>LEL: NA<br>UEL: NA |
| Lindane (gamma-BHC) | 58-89-9 | TWA 0.5 mg/m3 | TWA 0.5 mg/m3 | TWA 0.5 mg/m3 | 50 mg/m3 | Inhalation, ingestion, skin and/or eye contact | irritation eyes, skin, nose, throat; headache; nausea; clonic convulsions; resp difficulty; cyanosis; aplastic anemia; muscle spasm; In Animals: liver, kidney damage | Eyes, skin, respiratory system, central nervous system, blood, liver, kidneys | White to yellow, crystalline powder with a slight, musty odor.<br><br>BP: 614°F<br>Fl.Pt. = 150°F<br>LEL: NA<br>UEL: NA |
| Dieldrin | 860-57-1□ | TWA 0.1 mg/m3 | TWA 0.25 mg/m3 | TWA 0.25 mg/m3 | 25 mg/m3 | Inhalation, ingestion, skin and/or eye contact | headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; ; In Animals: liver, kidney damage [potential occupational carcinogen] | Developmemntal, Endocrine, Liver, Immune System, Nervous System, | Colorless to light-tan crystals with a mild, chemical odor.<br><br>BP: NA (Decomposes)<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| **VOLATILE ORGANIC COMPOUNDS (VOCs)** | | | | | | | | | |
| 1,1,1-Trichloroethane | 71-55-6 | TWA 350 ppm<br>STEL 450 ppm | C 350 ppm (1900 mg/m$^3$) [15-minute] | TWA 350 ppm (1900 mg/m$^3$) | 700 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage | Eyes, skin, central nervous system, cardiovascular system, liver | Colorless liquid with a mild, chloroform-like odor.<br>BP: 165°F<br>Fl.Pt. = NA<br>LEL: 7.5%<br>UEL: 12.5%<br>Combustible Liquid, but burns with difficulty |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | TWA 1 ppm [skin] | Ca TWA 1 ppm (7 mg/m^3) [skin] | TWA 5 ppm (35 mg/m^3) [skin] | Ca [100 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Nausea, vomiting, abdominal pain; tremor fingers; jaundice, hepatitis, liver tenderness; dermatitis; leukocytosis (increased blood leukocytes); kidney damage; [potential occupational carcinogen] | Skin, liver, kidneys, central nervous system, gastrointestinal tract | Colorless to pale-yellow liquid with a pungent, chloroform-like odor<br>BP: 296°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 76-13-1 | TWA 1000 ppm<br>STEL 1250 ppm | TWA 1000 ppm (7600 mg/m3)<br>ST 1250 ppm (9500 mg/m3) | TWA 1000 ppm (7600 mg/m3) | 2000 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation skin, throat, drowsiness, dermatitis; central nervous system depression; In Animals: cardiac arrhythmias, narcosis | Skin, heart, central nervous system, cardiovascular system | Colorless to water-white liquid with an odor like carbon tetrachloride at high concentrations. [Note: A gas above 118°F.]<br>BP: 118°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| 1,1,2-Trichloroethane | 79-00-5 | TWA 10 ppm [skin] | Ca TWA 10 ppm (45 mg/m3) [skin] | TWA 10 ppm (45 mg/m3) [skin] | Ca [100 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis; [potential occupational carcinogen] | Eyes, respiratory system, central nervous system, liver, kidneys | Colorless liquid with a sweet, chloroform-like odor<br>BP: 237°F<br>Fl.Pt. = NA<br>LEL: 6%<br>UEL: 15.5%<br>Combustible Liquid, forms dense soot |
| 1,1-Dichloroethane | 75-34-3 | TWA 100 ppm | TWA 100 ppm (400 mg/m^3) | TWA 100 ppm (400 mg/m^3) | 3,000 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation skin; central nervous system depression; liver, kidney, lung damage | Skin, liver, kidneys, lungs, central nervous system | Colorless, oily liquid with a chloroform-like odor.<br>BP: 135°F<br>Fl.Pt. = 2°F<br>LEL: 5.4%<br>UEL: 11.4%<br>Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F. |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| 1,1-Dichloroethene | 75-35-4 | TWA 5 ppm | Ca | None | Ca | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen] | Eyes, skin, respiratory system, central nervous system, liver, kidneys | Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor<br>BP: 89°F<br>Fl.Pt. = -2°F<br>LEL: 6.5%<br>UEL: 15.5%<br>Class IA Flammable Liquid: Fl.P. below 73°F and BP below 100°F |
| 1,2,3-Trichlorobenzene | 87-61-6 | Cameo Chemicals Source https://cameochemicals.noaa.gov/chemical/10051 | NA | NA | NA | Inhalation, skin absorption, ingestion, skin and/or eye contact | Inhalation may cause irritation of respiratory tract. Irritating to the eyes. May redden skin on contact. Ingestion may cause liver damage. | Skin, eyes, respiratory tract, liver | A white solid with a sharp chlorobenzene odor. Insoluble in water and denser than water. Hence sinks in water<br>Fl.Pt. = 234.9°F |
| 1,2,4-Trichlorobenzene | 120-82-1 | C 5 ppm | C 5 ppm (40 mg/m3) | None | N.D. | inhalation, skin absorption, ingestion, skin and/or eye contact | irritation eyes, skin, mucous membrane; In Animals: liver, kidney damage; possible teratogenic effects | Eyes, skin, respiratory system, liver, reproductive system | Colorless liquid or crystalline solid (below 63°F) with an aromatic odor<br>BP: 416°F<br>Fl.Pt. = 222°F<br>LEL (302°F): 2.5%<br>UEL (302°F): 6.6%<br>Class IIIB Combustible Liquid: Fl.P. at or above 200°F.<br>Combustible Solid |
| 1,2-Dibromo-3-chloropropane | 96-12-8 | NA | Ca | TWA 0.001 ppm | Ca | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; drowsiness; nausea, vomiting; pulmonary edema; liver, kidney injury; sterility; [potential occupational carcinogen] | Eyes, skin, respiratory system, central nervous system, liver, kidneys, spleen, reproductive system, digestive system | Dense yellow or amber liquid with a pungent odor at high concentrations. [pesticide] [Note: A solid below 43°F.]<br>BP: 384°F<br>Fl.Pt. = (oc) 170°F<br>LEL: NA<br>UEL: NA<br>Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. |
| 1,2-Dibromoethane | 106-93-4 | None listed<br>Skin | Ca TWA 0.045 ppm<br>C 0.13 ppm<br>[15-minute] | TWA 20 ppm<br>C 30 ppm<br>50 ppm<br>[5-minute maximum peak] | Ca [100 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, respiratory system; dermatitis with vesiculation; liver, heart, spleen, kidney damage; reproductive effects; [potential occupational carcinogen] | Eyes, skin, respiratory system, liver, kidneys, reproductive system | Colorless liquid or solid (below 50°F) with a sweet odor. [fumigant]<br>BP: 268°F<br>Fl.Pt. = 50°F<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid |
| 1,2-Dichlorobenzene | 95-50-1 | TWA 25 ppm<br>STEL 50 ppm | C 50 ppm (300 mg/m3) | C 50 ppm (300 mg/m3) | 200 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, nose; liver, kidney damage; skin blisters | Eyes, skin, respiratory system, liver, kidneys | Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide]<br>BP: 357°F<br>Fl.Pt. = 1°F<br>LEL: 2.2%<br>UEL: 9.2%<br>Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. |
| 1,2-Dichloroethane | 107-06-2 | TWA 10 ppm | Ca TWA 1 ppm (4 mg/m3)<br>ST 2 ppm (8 mg/m3) | TWA 50 ppm<br>C 100 ppm<br>200 ppm [5-minute maximum peak in any 3 hours] | Ca [50 ppm] | Inhalation, ingestion, skin absorption, skin and/or eye contact | Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen] | Eyes, skin, kidneys, liver, central nervous system, cardiovascular system | Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.]<br>BP: 182°F<br>Fl.Pt. = 56°F<br>LEL: 6.2%<br>UEL: 16%<br>Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F. |
| 1,2-Dichloropropane | 78-87-5 | TWA 10 ppm<br>Dermal Sensitizer (DSEN) | Ca | TWA 75 ppm (350 mg/m3) | Ca [400 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, respiratory system; drowsiness, dizziness; liver, kidney damage; In Animals: central nervous system depression; [potential occupational carcinogen] | Eyes, skin, respiratory system, liver, kidneys, central nervous system | Colorless liquid with a chloroform-like odor. [pesticide]<br>BP: 206°F<br>Fl.Pt. = 60°F<br>LEL: 3.4%<br>UEL: 14.5%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F. |
| 1,3-Dichlorobenzene | 541-73-1 | https://cameochemicals.noaa.gov/chemical/8514 | | | | Inhalation, skin absorption, ingestion, skin and/or eye contact | INHALATION: Causes headache, drousiness, unsteadiness. Irritating to mucous membranes. EYES: Severe irritation. SKIN: Severe irritation. INGESTION: Irritation of gastric mucosa, nausea, vomiting, diarrhea, abdominal cramps and cyanosis. | | Colorless liquid. Sinks in water.<br>BP: 343°F<br>Fl.Pt. = 146°F<br>LEL: 2.02%<br>UEL: 9.2% |
| 1,4-Dichlorobenzene | 106-46-7 | TWA 10 ppm | Ca | TWA 75 ppm (450 mg/m3) | Ca [150 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; In Animals: liver, kidney injury; [potential occupational carcinogen] | Liver, respiratory system, eyes, kidneys, skin | Colorless or white crystalline solid with a mothball-like odor. [insecticide]<br>BP: 345°F<br>Fl.Pt. = 150°F<br>LEL: 2.5%<br>UEL: NA<br>Combustible Solid, but may take some effort to ignite. |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| 1,4-Dioxane | 123-91-1 | TWA 20 ppm [skin] | Ca C 1 ppm (3.6 mg/m3) [30-minute] | TWA 100 ppm (360 mg/m3) [skin] | Ca [500 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | irritation eyes, skin, nose, throat; drowsiness, headache; nausea, vomiting; liver damage; kidney failure; [potential occupational carcinogen] | Eyes, skin, respiratory system, liver, kidneys | Colorless liquid or solid (below 53°F) with a mild, ether-like odor.<br>BP: 214°F<br>Fl.Pt. = 55°F<br>LEL: 2.0%<br>UEL: 22%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F |
| 2-Butanone | 78-93-3 | TWA 200 ppm<br>STEL 300 ppm | TWA 200 ppm (590 mg/m3)<br>ST 300 ppm (885 mg/m3) | TWA 200 ppm (590 mg/m3) | 3000 ppm | inhalation, ingestion, skin and/or eye contact | irritation eyes, skin, nose; headache; dizziness; vomiting; dermatitis | Eyes, skin, respiratory system, central nervous system | Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor<br>BP: 175°F<br>Fl.Pt. = 16°F<br>LEL (200°F): 1.4%<br>UEL (200°F): 11.4%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F |
| 2-Hexanone | 591-78-6 | TWA 5 ppm<br>STEL 10 ppm<br>[skin] | TWA 1 ppm (4 mg/m3) | TWA 100 ppm (410 mg/m3) | 1600 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness | Eyes, skin, respiratory system, central nervous system, peripheral nervous system | Colorless liquid with an acetone-like odor<br>BP: 262°F<br>Fl.Pt. = 77°F<br>LEL: NA<br>UEL: 8.0%<br>Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F |
| 4-Methyl-2-pentanone | 108-10-1 | TWA 20 ppm<br>STEL 75 ppm | TWA 50 ppm (205 mg/m3)<br>ST 75 ppm (300 mg/m3) | TWA 100 ppm (410 mg/m3) | 500 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; In Animals: liver, kidney damage | Eyes, skin, respiratory system, central nervous system, liver, kidneys | Colorless liquid with a pleasant odor<br>BP: 242°F<br>Fl.Pt. = 64°F<br>LEL (200°F): 1.2%<br>UEL (200°F): 8.0%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F |
| Acetone | 67-64-1 | TWA 250 ppm<br>STEL 500 ppm | TWA 250 ppm (590 mg/m^3) | TWA 1000 ppm (2400 mg/m^3) | 2500 ppm [10% LEL] | Inhalation, ingestion, skin and/or eye contact | irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis | Eyes, skin, respiratory system, central nervous system | Colorless liquid with a fragrant, mint-like odor BP: 133°F<br>Fl.Pt. = 0°F<br>LEL: 12.8%<br>UEL: 2.5%<br>Class IB Flammable liquid: Fl.P. below 73°F and BP at or above 100°F. |
| Benzene | 71-43-2 | TWA 0.5 ppm<br>STEL 2.5 ppm | Ca TWA 0.1 ppm<br>ST 1 ppm | TWA 1 ppm<br>ST 5 ppm | Ca [500 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen] | Eyes, skin, respiratory system, blood, central nervous system, bone marrow | Colorless to light yellow liquid with an aromatic odor [Note: Solid below 42 °F]<br>BP: 176°F<br>Fl.Pt. = 12°F<br>LEL: 1.2%<br>UEL: 7.8%<br>Class IB Flammable liquid. Fl.P. below 73°F and BP at or above 100°F |
| Bromochloromethane | 74-97-5 | TWA 200 ppm | TWA 200 ppm (1050 mg/m3) | TWA 200 ppm (1050 mg/m3) | 2000 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, throat; confusion, dizziness, central nervous system depression; pulmonary edema | Eyes, skin, respiratory system, liver, kidneys, central nervous system | Colorless to pale-yellow liquid with a chloroform-like odor. [Note: May be used as a fire extinguishing agent.]<br>BP: 155°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid |
| Bromodichloromethane | 75-27-4 | https://cameochemicals.noaa.gov/chemical/16064 | | | | Inhalation, ingestion, skin and/or eye contact | Symptoms of exposure to this compound may include irritation of the skin, eyes, mucous membranes and respiratory tract. It may also cause narcosis. Other symptoms may include nausea, dizziness and headache. | Liver and kidney damage. Central nervous system effects may also occur. | Clear colorless liquid<br>BP: 189°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Bromoform | 75-25-2 | TWA 0.5 ppm | TWA 0.5 ppm (5 mg/m3) [skin] | TWA 0.5 ppm (5 mg/m3) [skin] | 850 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, respiratory system; central nervous system depression; liver, kidney damage | Eyes, skin, respiratory system, central nervous system, liver, kidneys | Colorless to yellow liquid with a chloroform-like odor. [Note: A solid below 47°F.]<br>BP: 301°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid |
| Bromomethane | 74-83-9 | TWA 1 ppm [skin] | Ca | C 20 ppm (80 mg/m3) [skin] | Ca [250 ppm] | Inhalation, skin absorption (liquid), skin and/or eye contact (liquid) | Irritation eyes, skin, respiratory system; muscle weak, incoordination, visual disturbance, dizziness; nausea, vomiting, headache; malaise (vague feeling of discomfort); hand tremor; convulsions; dyspnea (breathing difficulty); skin vesiculation; liquid: frostbite; [potential occupational carcinogen] | Eyes, skin, respiratory system, central nervous system | Colorless gas with a chloroform-like odor at high concentrations. [Note: A liquid below 38°F. Shipped as a liquefied compressed gas.]<br>BP: 38°F<br>Fl.Pt. = NA (Gas)<br>LEL: 10%<br>UEL: 16.0%<br>Flammable Gas, but only in presence of a high energy ignition source. |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| Carbon disulfide | 75-15-0 | TWA 1 ppm [skin] | TWA 1 ppm (3 mg/m3)<br>ST 10 ppm (30 mg/m3) [skin] | TWA 20 ppm<br>C 30 ppm<br>100 ppm<br>(30-minute maximum peak) | 500 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | Dizziness, headache, poor sleep, lassitude (weakness, exhaustion), anxiety, anorexia, weight loss; psychosis; polyneuropathy; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects | Central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system | Colorless to faint-yellow liquid with a sweet ether-like odor. [Note: Reagent grades are foul smelling.]<br>BP: 116°F<br>Fl.Pt. = -22°F<br>LEL: 1.3%<br>UEL: 50.0%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F. |
| Carbon tetrachloride | 56-23-5 | TWA 5 ppm<br>STEL 10 ppm<br>[skin] | Ca ST 2 ppm (12.6 mg/m3)<br>[60-minute] | TWA 10 ppm<br>C 25 ppm<br>200 ppm (5-minute maximum peak in any 4 hours) | Ca [200 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen] | Central nervous system, eyes, lungs, liver, kidneys, skin | Colorless liquid with a characteristic ether-like odor<br>BP: 170°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid |
| Chlorobenzene | 108-90-7 | TWA 10 ppm | NA | TWA 75 ppm (350 mg/m3) | 1000 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; In Animals: liver, lung, kidney injury | Eyes, skin, respiratory system, central nervous system, liver | Colorless liquid with an almond-like odor<br>BP: 270°F<br>Fl.Pt. = 82°F<br>LEL: 1.3%<br>UEL: 9.6%<br>Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F. |
| Chloroethane | 75-00-3 | TWA 100 ppm [skin] | Handle with caution in the workplace | TWA 1000 ppm (2600 mg/m3) | 3800 ppm [10%LEL] | Inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact | Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage | Liver, kidneys, respiratory system, cardiovascular system, central nervous system | Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. [Note: Shipped as a liquefied compressed gas.]<br>BP: 54°F<br>Fl.Pt. = NA (gas), -58°F (liquid)<br>LEL: 3.8%<br>UEL: 15.4%<br>Flammable Gas |
| Chloroform | 67-66-3 | TWA 10 ppm | Ca ST 2 ppm (9.78 mg/m3)<br>[60-minute] | C 50 ppm (240 mg/m3) | Ca [500 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen] | Liver, kidneys, heart, eyes, skin, central nervous system | Colorless liquid with a pleasant odor<br>BP: 143°F<br>Fl.Pt. = -82°F<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid |
| Chloromethane | 74-87-3 | TWA 50 ppm<br>STEL 100 ppm | Ca | TWA 100 ppm<br>C 200 ppm<br>300 ppm (5-minute maximum peak in any 3 hours) | Ca [2000 ppm] | Inhalation, skin and/or eye contact (liquid) | Dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; liquid: frostbite; reproductive, teratogenic effects; [potential occupational carcinogen] | Central nervous system, liver, kidneys, reproductive system | Colorless gas with a faint, sweet odor which is not noticeable at dangerous concentrations. [Note: Shipped as a liquefied compressed gas.]<br>BP: -12°F<br>Fl.Pt. = NA (Gas)<br>LEL: 8.1%<br>UEL: 17.4%<br>Flammable Gas |
| cis-1,2-Dichloroethene | 156-59-2 | TWA 200 ppm (All isomers) | TWA 200 ppm (790 mg/m3) | TWA 200 ppm (790 mg/m3) | 1000 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, respiratory system; central nervous system depression | Eyes, respiratory system, central nervous system | Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.<br>BP: 118-140°F<br>Fl.Pt. = 36-39°F<br>LEL: 5.6%<br>UEL: 12.8%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F |
| cis-1,3-Dichloropropene | 10061-01-5 | https://cameochemicals.noaa.gov/chemical/20168 | | | | Inhalation, ingestion, skin and/or eye contact | Symptoms of exposure to this compound may include local irritation of the eyes skin and respiratory tract; dermatitis, gasping, coughing, substernal pain, extreme respiratory distress, lacrimation, central nervous system depression, skin irritation, acute gastrointestinal distress with pulmonary congestion and edema. It also may cause injury to the liver, kidneys and heart. | Skin, eyes, mucous membranes, liver, kidney, heart | Colorless to amber liquid with a sweetish odor.<br>BP: 219.7°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Cyclohexane | 110-82-7 | TWA 100 ppm | TWA 300 ppm (1050 mg/m3) | TWA 300 ppm (1050 mg/m3) | 1300 ppm [10%LEL] | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma | Eyes, skin, respiratory system, central nervous system | Colorless liquid with a sweet, chloroform-like odor. [Note: A solid below 44°F.]<br>BP: 177°F<br>Fl.Pt. = 0°F<br>LEL: 1.3%<br>UEL: 8.0%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F. |
| Dibromochloromethane | 124-48-1 | https://cameochemicals.noaa.gov/chemical/16183 | | | | Inhalation, ingestion, skin and/or eye contact | Symptoms of exposure to this compound may include irritation of the skin, eyes, mucous membranes and upper respiratory tract. It may also cause fatigue. Other symptoms may include central nervous system effects, lung and cornea irritation and liver and kidney damage. Prolonged exposure can cause nausea, dizziness, headache and narcosis. | Skin, eyes, mucous membranes, upper respiratory tract | Clear colorless to yellow-orange liquid<br>BP: 246-248°F<br>Fl.Pt. = Greater than 200°F<br>LEL: NA<br>UEL: NA |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| Dichlorodifluoromethane | 75-71-8 | TWA 1000 ppm | TWA 1000 ppm (4950 mg/m3) | TWA 1000 ppm (4950 mg/m3) | 15,000 ppm | Inhalation, skin and/or eye contact (liquid) | Dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite | Cardiovascular system, peripheral nervous system | Colorless gas with an ether-like odor at extremely high concentrations. [Note: Shipped as a liquefied compressed gas.]<br>BP: -22°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Nonflammable Gas |
| Ethyl benzene | 100-41-4 | TWA 20 ppm | TWA 100 ppm (435 mg/m$^3$)<br>ST 125 ppm (545 mg/m^3) | TWA 100 ppm (435 mg/m$^3$) | 800 ppm [10%LEL] | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma | Eyes, skin, respiratory system, central nervous system | Colorless liquid with an aromatic odor.<br>BP: 277°F<br>Fl.Pt. = 55°F<br>LEL: 0.8%<br>UEL: 6.7%<br>Class IB Flammable Liquid below 73°F and BP at or above 100°F. |
| Isopropyl benzene | 98-82-8 | TWA 5 ppm | TWA 50 ppm (245 mg/m3) [skin] | TWA 50 ppm (245 mg/m3) [skin] | 900 ppm [10%LEL] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma | Eyes, skin, respiratory system, central nervous system | Colorless liquid with a sharp, penetrating, aromatic odor<br>BP: 306°F<br>Fl.Pt. = 96°F<br>LEL: 0.9%<br>UEL: 6.5%<br>Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F |
| Methyl Acetate | 79-20-9 | TWA 200 ppm<br>STEL 250 ppm | TWA 200 ppm (610 mg/m3)<br>ST 250 ppm (760 mg/m3) | TWA 200 ppm (610 mg/m3) | 3100 ppm [10%LEL] | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; headache, drowsiness; optic nerve atrophy; chest tightness; In Animals: narcosis | Eyes, skin, respiratory system, central nervous system | Colorless liquid with a fragrant, fruity odor<br>BP: 135°F<br>Fl.Pt. = 14°F<br>LEL: 3.1%<br>UEL: 16%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F. |
| Methylcyclohexane | 108-87-2 | TWA 400 ppm | TWA 400 ppm (1600 mg/m3) | TWA 500 ppm (2000 mg/m3) | 1200 ppm [LEL] | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; dizziness, drowsiness; In Animals: narcosis | Eyes, skin, respiratory system, central nervous system | Colorless liquid with a faint, benzene-like odor<br>BP: 214°F<br>Fl.Pt. = 25°F<br>LEL: 1.2%<br>UEL: 6.7%<br>Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F. |
| Methylene chloride | 75-09-2 | TWA 50 ppm [skin]<br>STEL 100 ppm | Ca | [1910.1052] TWA 25 ppm<br>ST 125 ppm | Ca [2300 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen] | Eyes, skin, cardiovascular system, central nervous system | Colorless liquid with a chloroform-like odor. [Note: A gas above 104°F.]<br>BP: 104°F<br>Fl.Pt. = NA<br>LEL: 13%<br>UEL: 23%<br>Combustible Liquid |
| Methyl-t-butyl ether | 1634-04-4 | TWA 50 ppm | NA | NA | NA | Inhalation, skin absorption, ingestion, skin and/or eye contact | May cause dizziness or suffocation. Contact may irritate or burn eyes or skin. May be harmful if swallowed. | Eyes, skin | A colorless liquid with a distinctive anesthetic-like odor.<br>BP: 131°F<br>Fl.Pt. = -14°F<br>LEL: NA<br>UEL: NA |
| o-Xylene | 95-47-6 | TWA 20 ppm<br><br>(All isomers) | TWA 100 ppm (435 mg/m3)<br>ST 150 ppm (655 mg/m3) | TWA 100 ppm (435 mg/m3) | 900 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis | Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys | Colorless liquid with an aromatic odor<br>BP: 292°F<br>Fl.Pt. = 90°F<br>LEL: 0.9%<br>UEL: 6.7%<br>Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F |
| Styrene | 100-42-5 | TWA 10 ppm<br>STEL 20 ppm<br>OTO (ototoxicant) | TWA 50 ppm (215 mg/m3)<br>ST 100 ppm (425 mg/m3) | TWA 100 ppm<br>C 200 ppm<br>600 ppm (5-minute maximum peak in any 3 hours) | 700 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; possible liver injury; reproductive effects | Eyes, skin, respiratory system, central nervous system, liver, reproductive system | Colorless to yellow, oily liquid with a sweet, floral odor<br>BP: 293°F<br>Fl.Pt. = 88°F<br>LEL: 0.9%<br>UEL: 6.8%<br>Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F |
| Tetrachloroethene | 127-18-4 | TWA 25 ppm<br>STEL 100 ppm | Ca<br>Minimize workplace exposure concentrations | TWA 100 ppm<br>C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm | Ca [150 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen] | Eyes, skin, respiratory system, liver, kidneys, central nervous system | Colorless liquid with a mild, chloroform-like odor<br>BP: 250°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| Sodium Hydroxide | 1310-73-2 | Ceiling 2 mg/m$^3$ | C 2 mg/m$^3$ | TWA 2 mg/m$^3$ | 10 mg/m$^3$ | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, mucous membrane; pneumonitis; eye, skin burns; temporary loss of hair | Eyes, skin, respiratory system | Colorless to white, odorless solid (flakes, beads, granular form).<br>BP: 2534°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Solid, but when in contact with water may generate sufficient heat to ignite combustible materials. |
| Sulfuric Acid | 7664-93-9 | TWA 0.2 mg/m$^3$ (as thoracic particulate mass) | TWA 1 mg/m$^3$ | TWA 1 mg/m$^3$ | 15 mg/m$^3$ | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis | Eyes, skin, respiratory system, teeth | Colorless to dark-brown, oily, odorless liquid.[Note: Pure compound is a solid below 51°F. Often used in an aqueous solution.]<br>BP = 554°F<br>Fl.Pt. = NA<br>LEL = NA<br>UEL = NA<br>Noncombustible Liquid, but capable of igniting finely divided combustible materials. |
| trans-1,2-Dichloroethene | 156-60-5 | 200 ppm (All isomers) | TWA 200 ppm (790 mg/m3) | TWA 200 ppm (790 mg/m3) | 1000 ppm | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, respiratory system; central nervous system depression | Eyes, respiratory system, central nervous system | Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.<br>BP: 118-140°F<br>Fl.P: 36-39°F<br>LEL: 5.6%<br>UEL: 12.8%<br>Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F. |
| trans-1,3-Dichloropropene | 10061-02-6 | https://cameochemicals.noaa.gov/chemical/18110 | | | | Inhalation, ingestion, skin and/or eye contact | Symptoms of exposure to this compound may include local irritation of the eyes skin and respiratory tract, dermatitis, gasping, coughing, substernal pain, extreme respiratory distress, lacrimation, central nervous system depression, acute gastrointestinal distress with pulmonary congestion and edema. It may also cause injury to the liver, kidneys and heart | Skin, eyes, mucous membranes, liver, kidney, heart | A clear colorless liquid with chloroform odor<br>BP: 234°F<br>Fl.P: NA<br>LEL: NA<br>UEL: NA |
| Toluene | 108-88-3 | TWA 20 ppm<br>(ototoxicant) | TWA 100 ppm (375 mg/m$^3$)<br>ST 150 ppm (560 mg/m$^3$) | TWA 200 ppm<br>C 300 ppm<br>500 ppm (10-minute maximum peak) | 500 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage | Eyes, skin, respiratory system, central nervous system, liver, kidneys | Colorless liquid with a sweet, pungent, benzene-like odor.<br>BP: 232°F<br>Fl.P: 40°F<br>LEL: 1.1%<br>UEL: 7.1%<br>Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F. |
| Trichloroethene (TCE) | 79-01-6 | TWA 10 ppm<br>STEL 25 ppm | Ca | TWA 100 ppm<br>C 200 ppm<br>300 ppm (5-minute maximum peak in any 2 hours) | Ca [1000 ppm] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen] | Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system | Colorless liquid (unless dyed blue) with a chloroform-like odor.<br>BP: 189°F<br>Fl.Pt. = NA<br>LEL(77°F): 8.0%<br>UEL(77°F): 10.5%<br>Combustible Liquid, but burns with difficulty |
| Trichlorofluoromethane | 75-69-4 | STEL C 1000 ppm | C 1000 ppm (5600 mg/m3) | TWA 1000 ppm (5600 mg/m3) | 2000 ppm | Inhalation, ingestion, skin and/or eye contact | Incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite | Skin, respiratory system, cardiovascular system | Colorless to water-white, nearly odorless liquid or gas (above 75°F)<br>BP: 75°F<br>Fl.P: NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Liquid Nonflammable Gas |
| Vinyl Chloride (chloroethylene) | 75-01-4 | TWA 1 ppm | Ca | TWA 1 ppm<br>C 5 ppm [15-minute] | Ca (ND) | Inhalation, skin and/or eye contact (liquid) | Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen] | Liver, central nervous system, blood, respiratory system, lymphatic system | Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations.[Note: Shipped as a liquefied compressed gas.]<br>BP: 7°F<br>Fl.Pt. = NA (Gas)<br>LEL: 3.6%<br>UEL: 33.0%<br>Flammable Gas |
| Xylene (m, o & p isomers) | 108-38-3,<br>95-47-6,<br>106-42-3 | TWA 20 ppm | NA | NA | NA | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis | Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys | Colorless liquid with an aromatic odor<br>BP: 282°F, 292°F, 281°F<br>Fl. Pt. 82°F, 90°F, 81°F<br>LEL: 1.1%, 0.9%, 1.1%<br>UEL: 7.0%, 6.7%, 7.0%<br>Class IC Flammable Liquid at or above 73°F and below 100°F. |
| Zinc Oxide (dust) | 7440-66-6 | TWA 2 mg/m3 (repsirable)<br>STEL 10 mg/m$^3$ (respirable) | TWA 5 mg/m^3<br>C 15 mg/m^3 | TWA 15 mg/m^3 (total dust)<br>TWA 5 mg/m^3 (resp dust)<br>TWA 5 mg/m^3 (fume) | 500 mg/m^3 | Inhalation | Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function | Respiratory system | White, odorless solid.<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Solid |
| **SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)** | | | | | | | | | |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| 2-Chloronaphthalene | 91-58-7 | https://cameochemicals.noaa.gov/chemical/16185 | | | | Inhalation, ingestion, skin and/or eye contact | Chloracne, cysts, headache, fatigue, vertigo, anorexia and jaundice | | Monoclinic plates or off-white crystalline powder<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| 2-Methylnaphthalene | 91-57-6 | TWA 0.5 ppm<br>TLV-SL 3 mg/100 cm2<br>[skin] | https://cameochemicals.noaa.gov/chemical/20668 | | | Inhalation, ingestion, skin and/or eye contact | Headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose | Skin, eyes, mucous membranes and upper respiratory tract | White crystalline solid<br>Combustible solid<br>BP: 466-468 ° F<br>Fl.Pt. = 208 ° F<br>LEL: NA<br>UEL: NA |
| Acenaphthene | 83-32-9 | https://cameochemicals.noaa.gov/chemical/10358 | | | | Inhalation, ingestion, skin and/or eye contact | Irritation of the skin, eyes, mucous membranes and upper respiratory tract, vomiting | Skin, eyes, mucous membranes and upper respiratory tract | White needles<br>BP: 534 ° F<br>Fl.Pt. = NA<br>LEL: 0.6%<br>UEL: NA |
| Acenaphthylene | 208-96-8 | https://cameochemicals.noaa.gov/chemical/16157 | | | | Inhalation, ingestion, skin and/or eye contact | | | Colorless crystalline solid<br>BP: 509 to 527 ° F at 760 mm Hg<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Anthracene (as coal tar pitch volatiles) | 120-12-7 | TWA 0.2 mg/m3 (as Benzene solubles) | Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction) | TWA 0.2 mg/m3 (benzene-soluble fraction)<br>[1910.1002] | Ca [80 mg/m3] | Inhalation, skin and/or eye contact | Dermatitis, bronchitis, [potential occupational carcinogen] | Respiratory system, skin, bladder, kidneys | Black or dark-brown amorphous residue<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Combustible Solids |
| Benzo[a]anthracene | 56-55-3 | https://cameochemicals.noaa.gov/chemical/16171 | | | | Inhalation, injestion, skin and/or eye contact | | | Colorless leaflets or plates or coarse gold powder with a greenish-yellow fluorescence. May reasonably be expected to be a carcinogen.<br>BP: 815° F at 760 mm Hg<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Benzo[a]pyrene (as coal tar pitch volatiles) | 50-32-8 | TWA 0.2 mg/m3 (as Benzene solubles) | Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction) | TWA 0.2 mg/m3 (benzene-soluble fraction)<br>[1910.1002] | Ca [80 mg/m3] | Inhalation, skin and/or eye contact | Dermatitis, bronchitis, [potential occupational carcinogen] | Respiratory system, skin, bladder, kidneys | Black or dark-brown amorphous residue<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Combustible Solids |
| Benzo[b]fluoranthene | 205-99-2 | None listed | https://cameochemicals.noaa.gov/chemical/16172 | | | Inhalation, injestion, skin and/or eye contact | | | Needles or yellow fluffy powder<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Benzo[g,h,i]perylene | 191-24-2 | https://cameochemicals.noaa.gov/chemical/16174 | | | | Inhalation, injestion, skin and/or eye contact | Inhalation of material may be harmful. Contact may cause burns to skin and eyes. Inhalation of Asbestos dust may have a damaging effect on the lungs. Fire may produce irritating, corrosive and/or toxic gases. Some liquids produce vapors that may cause dizziness or suffocation. Runoff from fire control may cause pollution. | Lungs, skin, eyes | Colorless to white crystalline solid. Water insoluble.<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Benzo[k]fluoranthene | 207-08-9 | https://cameochemicals.noaa.gov/chemical/16173 | | | | Inhalation, injestion, skin and/or eye contact | When heated to decomposition this compound emits acrid smoke and irritating fumes. | | Pale yellow needles or yellow crystalline solid<br>BP: 896° F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Chrysene (as coal tar pitch volatiles | 218-01-9 | TWA 0.2 mg/m3 (as Benzene solubles) | Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction) | TWA 0.2 mg/m3 (benzene-soluble fraction)<br>[1910.1002] | Ca [80 mg/m3] | Inhalation, skin and/or eye contact | Dermatitis, bronchitis, [potential occupational carcinogen] | Respiratory system, skin, bladder, kidneys | Black or dark-brown amorphous residue<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Combustible Solids |
| Dibenzo(a,h)anthracene | 53-70-3 | https://cameochemicals.noaa.gov/chemical/16192 | | | | Inhalation, injestion, skin and/or eye contact | Symptoms of exposure to this compound may include irritation. This compound is harmful if swallowed or inhaled. It may cause irritation. When heated to decomposition it emits acrid smoke, irritating fumes and toxic fumes of carbon monoxide and carbon dioxide. | Lungs | White crystals or pale yellow solid. Sublimes<br>BP: 975° F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Fluoranthene | 206-44-0 | https://cameochemicals.noaa.gov/chemical/16213 | | | | Inhalation, injestion, skin and/or eye contact | When heated to decomposition this compound emits acrid smoke and fumes. | | Light yellow fine crystals<br>BP: 482° F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| Fluorene | 86-73-7 | https://cameochemicals.noaa.gov/chemical/16214 | | | | Inhalation, injestion, skin and/or eye contact | | | White leaflets. Sublimes easily under a vacuum. Fluorescent when impure.<br>BP: 563° F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Indeno[1,2,3-cd]pyrene | 193-39-5 | https://cameochemicals.noaa.gov/chemical/16218 | | | | Inhalation, injestion, skin and/or eye contact | | | Yellow crystals<br>BP: 997° F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Naphthalene | 91-20-3 | TWA 10 ppm [skin] | TWA 10 ppm (50 mg/m3)<br>ST 15 ppm (75 mg/m3) | TWA 10 ppm (50 mg/m3) | 250 ppm | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage | Eyes, skin, blood, liver, kidneys, central nervous system | Colorless to brown solid with an odor of mothballs. [Note: Shipped as a molten solid.]<br>BP: 424°F<br>Fl.P: 174°F<br>LEL: 0.9%<br>UEL: 5.9%<br>Combustible Solid, but will take some effort to ignite |
| Phenanthrene | 85-01-8 | https://cameochemicals.noaa.gov/chemical/16236 | | | | Inhalation, injestion, skin and/or eye contact | Symptoms following exposure to this compound may include skin sensitization, dermatitis, bronchitis, cough, dyspnea, respiratory neoplasm, kidney neoplasm, skin irritation, and respiratory irritation. | Skin, respiratory tract | Colorless monoclinic crystals with a faint aromatic odor. Solutions exhibit a blue fluorescence.<br>BP: 642° F<br>Fl.Pt. = 340° F<br>LEL: NA<br>UEL: NA |
| Pyrene (see coal tar pitch volatiles) | 129-00-0 | TWA 0.2 mg/m3 (as Benzene solubles) | Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction) | TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002] | Ca [80 mg/m3] | Inhalation, skin and/or eye contact | Dermatitis, bronchitis, [potential occupational carcinogen] | Respiratory system, skin, bladder, kidneys | Black or dark-brown amorphous residue<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Combustible Solids |
| **METALS** | | | | | | | | | |
| Aluminum | 7429-90-5 | TWA 1 mg/m3 | TWA 10 mg/m^3 (total)<br>TWA 5 mg/m^3 (resp) | TWA 15 mg/m^3 (total)<br>TWA 5 mg/m^3 (resp) | N.D. | Inhalation, skin and/or eye contact | Irritation eyes, skin, respiratory system | Eyes, skin, respiratory system | Silvery-white, malleable, ductile, odorless metal<br>BP: 4221°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Combustible Solid, finely divided dust is easily ignited; may cause explosions |
| Antimony | 7440-36-0 | TWA 0.5 mg/m3 (as Sb) | TWA 0.5 mg/m3<br>[*Note: The REL also applies to other antimony compounds (as Sb).] | TWA 0.5 mg/m3<br>[*Note: The PEL also applies to other antimony compounds (as Sb).] | 50 mg/m3 (as Sb) | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly | Eyes, skin, respiratory system, cardiovascular system | Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder<br>BP: 2975°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame. |
| Arsenic | 7440-38-2 | TWA 0.01 mg/m3 | Ca C 0.002 mg/m3 [15-minute] | [1910.1018] TWA 0.010 mg/m3 | Ca [5 mg/m3 (as As)] | Inhalation, skin absorption, skin and/or eye contact, ingestion | Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen] | Liver, kidneys, skin, lungs, lymphatic system | Metal: Silver-gray or tin-white, brittle, odorless solid<br>BP: Sublimes<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame |
| Barium | 7440-39-3 | TWA 0.5 mg/m3 | 0.5 mg Ba/m3 TWA | 0.5 mg Ba/m3 TWA | 50 mg Ba/m3 | Inhalation, ingestion, skin and/or eye contact | Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death. Contact may cause burns to skin, eyes, and mucous membranes. May be toxic by ingestion, inhalation and skin absorption. Used to make other chemicals. | Lungs, skin, eyes, and mucous membrane | A silver to white metallic solid<br>BP: 1337°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Beryllium | 7440-41-7 | TWA 0.00005 mg/m$^3$ | Ca C 0.0005 mg/m^3 | TWA 0.002 mg/m^3<br>C 0.005 mg/m$^3$<br>0.025 mg/m3<br>[30-minute maximum peak] | Ca [4 mg/m^3 (as Be)] | Inhalation, skin and/or eye contact | Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen] | Eyes, skin, respiratory system | Hard, brittle, gray-white solid<br>BP: 4532°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Solid in bulk form, but a slight explosion hazard in the form of a powder or dust |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 7440-43-9 | TWA 0.01 mg/m$^3$ total dust<br>TWA 0.002 mg/m^3 (as Cd) respirable fraction | Ca | TWA 0.005 mg/m$^3$ | Ca [9 mg/m3 (as Cd)] | Inhalation, ingestion | Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen] | Respiratory system, kidneys, prostate, blood | Silver-white/blue tinged lustrous, odorless solid.<br>BP: 1409°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible - will burn in powder form |
| Calcium | 7440-70-2 | https://cameochemicals.noaa.gov/chemical/309 | | | | Inhalation, ingestion, skin and/or eye contact | Contact with eyes or skin produces caustic burns. | Eyes, skin | A silvery, soft metal that turns grayish white on exposure to air.<br>BP: 2714°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Chromium | 7440-47-3 | TWA 0.5 mg/m$^3$ (metal)<br>TWA 0.003 mg/m$^3$ (water-soluble Cr III compounds)<br>TWA 0.0002 mg/m$^3$ (water-soluble Cr VI compounds)<br>STEL 0.0005 mg/m3 (water-soluble Cr VI compounds) | TWA 0.5 mg/m$^3$ | TWA 1 mg/m$^3$ | 250 mg/m$^3$ (as Cr) | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin; lung fibrosis (histologic) | Eyes, skin, respiratory system | Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.<br>BP: 4788°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible - will burn in dust form if heated in a flame |
| Cobalt | 7440-48-4 | TWA 0.02 mg/m3 [DSEN] [RSEN] | TWA 0.05 mg/m3 | TWA 0.1 mg/m3 | 20 mg/m3 (as Co) | Inhalation, ingestion, skin and/or eye contact | Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma | Skin, respiratory system | Odorless, silver-gray to black solid<br>BP: 5612°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Solid in bulk form, but finely divided dust will burn at high temperatures. |
| Copper | 7440-50-8 | TWA 0.2 mg/m$^3$ (fume)<br>TWA 1 mg/m3 (dusts and mists) | TWA 1 mg/m^3 | TWA 1 mg/m$^3$ | 100 mg/m$^3$ (as Cu) | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia | Eyes, skin, respiratory system, liver, kidneys (increased risk with Wilson's disease) | Reddish, lustrous, malleable, odorless solid.<br>BP: 4703°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible - powdered form may ignite |
| Iron (as iron oxide) | 7439-89-6 | TWA 5 mg/m3 (respirable particulate mass) | TWA 1 mg/m^3 | NA | NA | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting; possible liver damage | Eyes, skin, respiratory system, liver, gastrointestinal tract | Appearance and odor vary depending upon the specific soluble iron salt.<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Solids |
| Lead | 7439-92-1 | TWA 0.05 mg/m3 | TWA (8-hour) 0.050 mg/m3 | [1910.1025] TWA 0.050 mg/m3 | 100 mg/m3 (as Pb) | Inhalation, ingestion, skin and/or eye contact | Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension | Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue | A heavy, ductile, soft, gray solid<br>BP: 3164°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Noncombustible Solid in bulk form |
| Magnesium | 7439-95-4 | https://cameochemicals.noaa.gov/chemical/6949 | | | | Eye and/or skin contact | Dust irritates eyes in same way as any foreign material. Penetration of skin by fragments of metal is likely to produce local irritation, blisters, and ulcers which may become infected. | Eyes | A light silvery metal<br>BP: 1202°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Manganese | 7439-96-5 | TWA 0.02 mg/m3 [R]<br>TWA 0.1 mg/m3 [I] | TWA 1 mg/m3<br>ST 3 mg/m3 | C 5 mg/m3 | 500 mg/m3 (as Mn) | inhalation, ingestion | Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage | respiratory system, central nervous system, blood, kidneys | A lustrous, brittle, silvery solid<br>BP: 3564°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Metal: Combustible Solid |
| Mercury | 7439-97-6 | TWA 0.1 mg/m3, as Hg Aryl compounds<br>TWA 0.025 mg/m3 as Hg, inorganic forms including metallic mercury | Hg Vapor: TWA 0.05 mg/m3 [skin]<br>Other: C 0.1 mg/m3 [skin] | TWA 0.1 mg/m3 | 10 mg/m3 (as Hg) | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria | Eyes, skin, respiratory system, central nervous system, kidneys | Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.]<br>BP: 674°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Metal: Noncombustible Liquid |
| Nickel | 7440-02-0 | TWA 1.5 mg/m^3 [elemental]<br>TWA 0.1 mg/m^3 [soluble inorganic compound]<br>TWA 0.2 mg/m^3 [insoluble inorganic compound]<br>TWA 0.1 mg/m^3 [Nickel subsulfide] | Ca TWA 0.015 mg/m^3 | TWA 1 mg/m^3 | Ca [10 mg/m3 (as Ni)] | Inhalation, ingestion, skin and/or eye contact | Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen] | Nasal cavities, lungs, skin | Lustrous, silvery, odorless solid.<br>BP: 5139°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Combustible Solid; nickel sponge catalyst may ignite spontaneously in air. |

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**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|
| Potassium | 9/7/7440 | https://cameochemicals.noaa.gov/chemical/4289 | | | | Eye and/or skin contact | Will burn skin and eyes | Skin, eyes | Potassium is a soft silvery metal though normally grayish white due to oxidation<br>BP: 1425°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Selenium | 7782-49-2 | TWA 0.2 mg/m3 | TWA 0.2 mg/m3 | TWA 0.2 mg/m3 | 1 mg/m3 (as Se) | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; In Animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage | Eyes, skin, respiratory system, liver, kidneys, blood, spleen | Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.]<br>BP: 1265°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Combustible Solid |
| Silver | 7440-22-4 | TWA 0.1 mg/m3 [Metal, dust, and fume]<br>TWA 0.01 mg/m3 [Soluble compounds, as Ag] | TWA 0.01 mg/m3 | TWA 0.01 mg/m3 | 10 mg/m3 (as Ag) | Inhalation, ingestion, skin and/or eye contact | Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance | Nasal septum, skin, eyes | Metal: White, lustrous solid<br>BP: 3632°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA<br>Metal: Noncombustible Solid, but flammable in form of dust or powder |
| Sodium | 7440-23-5 | https://cameochemicals.noaa.gov/chemical/7794 | | | | Skin contact | Severe burns caused by burning metal or by caustic soda formed by reaction with moisture on skin | Skin | A silvery soft metal that becomes grayish white upon exposure to air<br>BP: 1621°F<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Thallium | 7440-28-0 | 0.02 mg/m3 inhallable particulate matter | TWA 0.1 mg/m3 [skin] | TWA 0.1 mg/m3 [skin] | 15 mg/m3 (as Tl) | Inhalation, skin absorption, ingestion, skin and/or eye contact | Nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs | Eyes, respiratory system, central nervous system, liver, kidneys, gastrointestinal tract, body hair | Appearance and odor vary depending upon the specific soluble thallium compound<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Vanadium | 7440-62-2 | https://cameochemicals.noaa.gov/chemical/16147 | | | | Inhalation, skin absorption, ingestion, skin and/or eye contact | Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin. Avoid any skin contact. Effects of contact or inhalation may be delayed. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution | Skin | Silvery-whitish powder<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| Zinc | 7440-66-6 | https://cameochemicals.noaa.gov/chemical/4814 | | | | Inhalation, skin absorption, ingestion, skin and/or eye contact | Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death. May produce corrosive solutions on contact with water. Fire will produce irritating, corrosive and/or toxic gases. Runoff from fire control may cause pollution | Lungs | A grayish powder<br>BP: NA<br>Fl.Pt. = NA<br>LEL: NA<br>UEL: NA |
| **PCBs** | | | | | | | | | |
| PCBs (total) | 11097-69-1, 53469-21-9 | TWA 0.5 mg/m3 [skin]<br>TWA 1 mg/m3 [skin] | Ca TWA 0.001 mg/m3<br>Ca TWA 0.001 mg/m3 | TWA 0.5 mg/m3 [skin]<br>TWA 1 mg/m3 [skin] | Ca [5 mg/m3]<br>Ca [5 mg/m3] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen] | Skin, eyes, liver, reproductive system | Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor<br>BP: 689-734°F, 617-691°F<br>Fl.Pt. = NA, NA<br>LEL: NA<br>UEL: NA<br>Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins. |
| **Petroleum Hydrocarbons** | | | | | | | | | |
| Gasoline | 86290-81-5 | TWA 300 ppm<br>STEL 500 ppm | Ca | None | Ca [N.D.] | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen] | Eyes, skin, respiratory system, central nervous system, liver, kidneys | Clear liquid with a characteristic odor<br>BP: 102°F<br>Fl.Pt. = -45°F<br>LEL: 1.4%<br>UEL: 7.6% |

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**Abbreviations:**

ACGIH – American Conference of Governmental Industrial Hygienists.
BP – boiling point at 1 atmosphere, °F
C – Ceiling, is a concentration that should not be exceeded during and part of the working exposure.
Ca – Carcinogenic.
CAS# - Chemical Abstracts Service registry number which is unique for each chemical.

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.**

| Compound | CAS # | ACGIH TLV | NIOSH REL | OSHA PEL | IDLH | Routes of Exposure | Toxic Properties | Target Organs | Physical/Chemical Properties |
|---|---|---|---|---|---|---|---|---|---|

DSEN - Dermal Sensitization
Ft Pt. – Flash point
IDLH - Immediately Dangerous to Life and Health concentrations represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
LEL – Lower explosive (flammable) limit in air, % by volume (at room temperature)
$mg/m^3$ – Milligrams of substance per cubic meter of air
NIOSH - National Institute for Occupational Safety and Health.
OSHA – Occupational Safety and Health Administration
OTO - Ototoxicant
PEL - OSHA Permissible Exposure Limit (usually) a time weighted average concentration that must not be exceeded during any 8 hour work shift of a 40 hr work week.
ppm – parts per million
REL – NIOSH Recommended Limit indicated a time weighted average concentration that must not be exceeded during any 10 hour work shift of a 40 hr work week
RSEN - Respiratory Sensitization
SG - Specific Gravity
STEL – ACGIH Short-term exposure limit (ST)
TLV - ACGIH Threshold Limit Values (usually 8 hour time weighted average concentrations).
TWA – 8-hour, time-weighted average
UEL – Upper explosive (flammable) limit in air, % by volume (at room temperature)
VP - Vapor Pressure

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# FIGURES

1. Site Location Map
2. Site Plan with Emergency Muster Area
3. Routes to Urgent Care and Hospital

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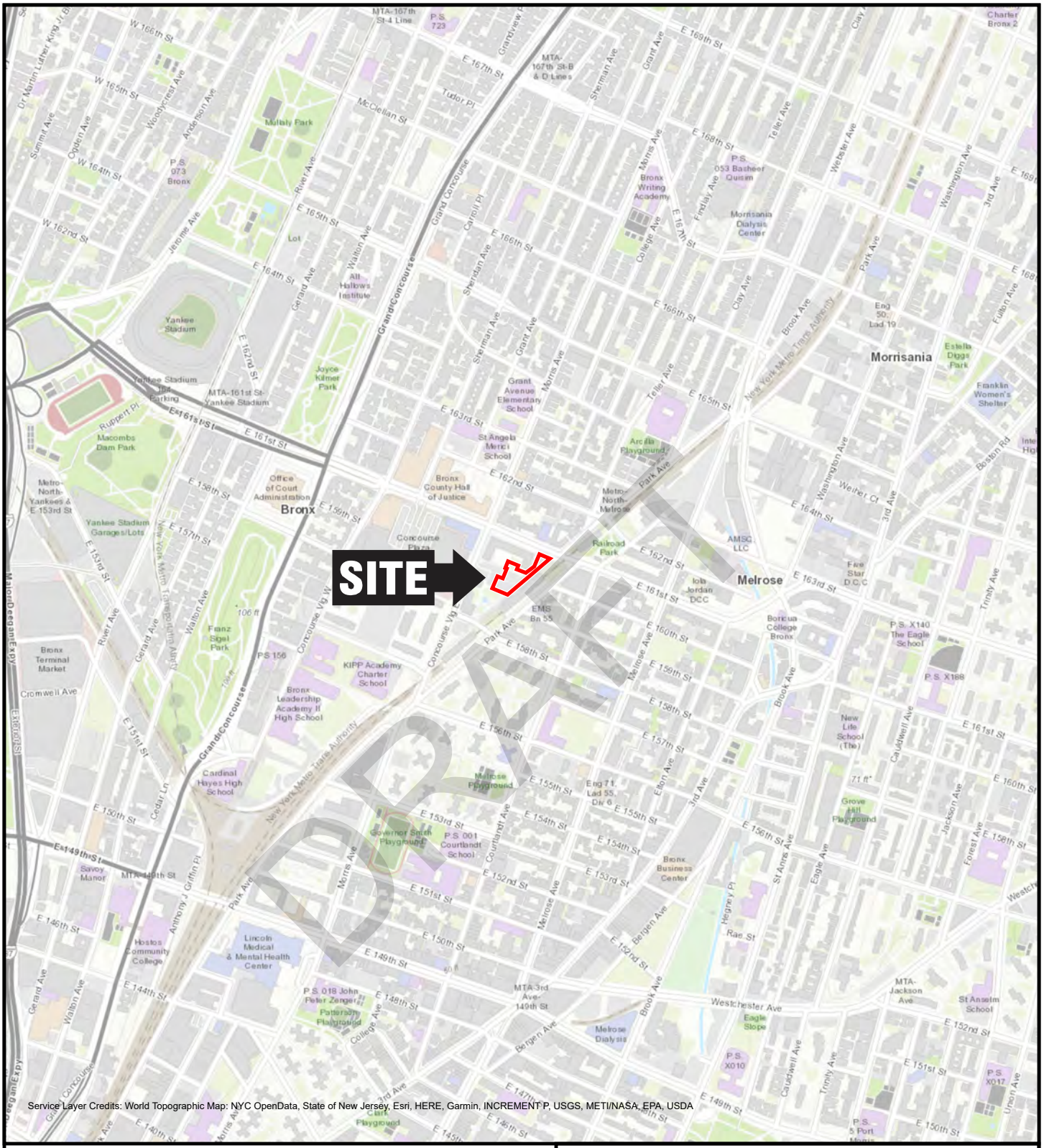


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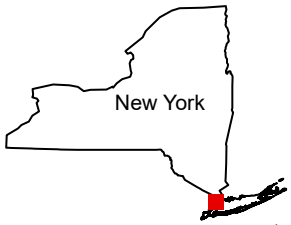
QUADRANGLE LOCATION




LEGEND

SITE BOUNDARY

N

1,000 0 1,000'

Title:

# SITE LOCATION MAP

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | |
|---|---|
| Compiled by: P.P. | Date: 04/07/26 |
| Prepared by: M.S.R. | Scale: AS SHOWN |
| Project Mgr: L.D. | Project: 3868.0005Y000 |
| File: 3868.0005Y106.1.APRX | |

FIGURE 1

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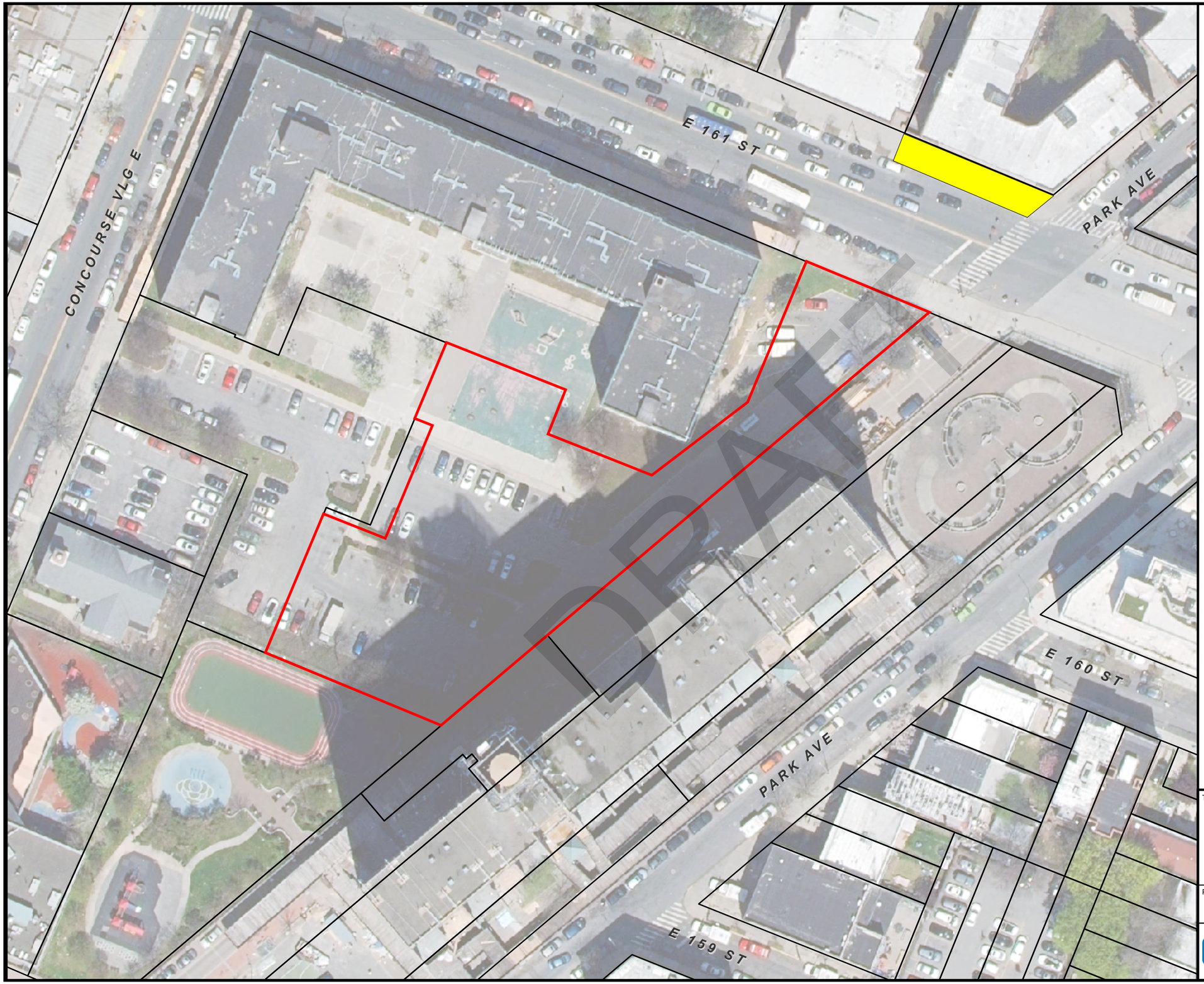


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LEGEND

- SITE BOUNDARY
- PARCEL BOUNDARY
- EMERGENCY MUSTER AREA

NOTES

1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)

60 0 60'

Title:

# SITE PLAN WITH EMERGENCY MUSTER AREA

MORRISANIA EAST
310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 05/12/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 2 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y106.02.APRX | | |

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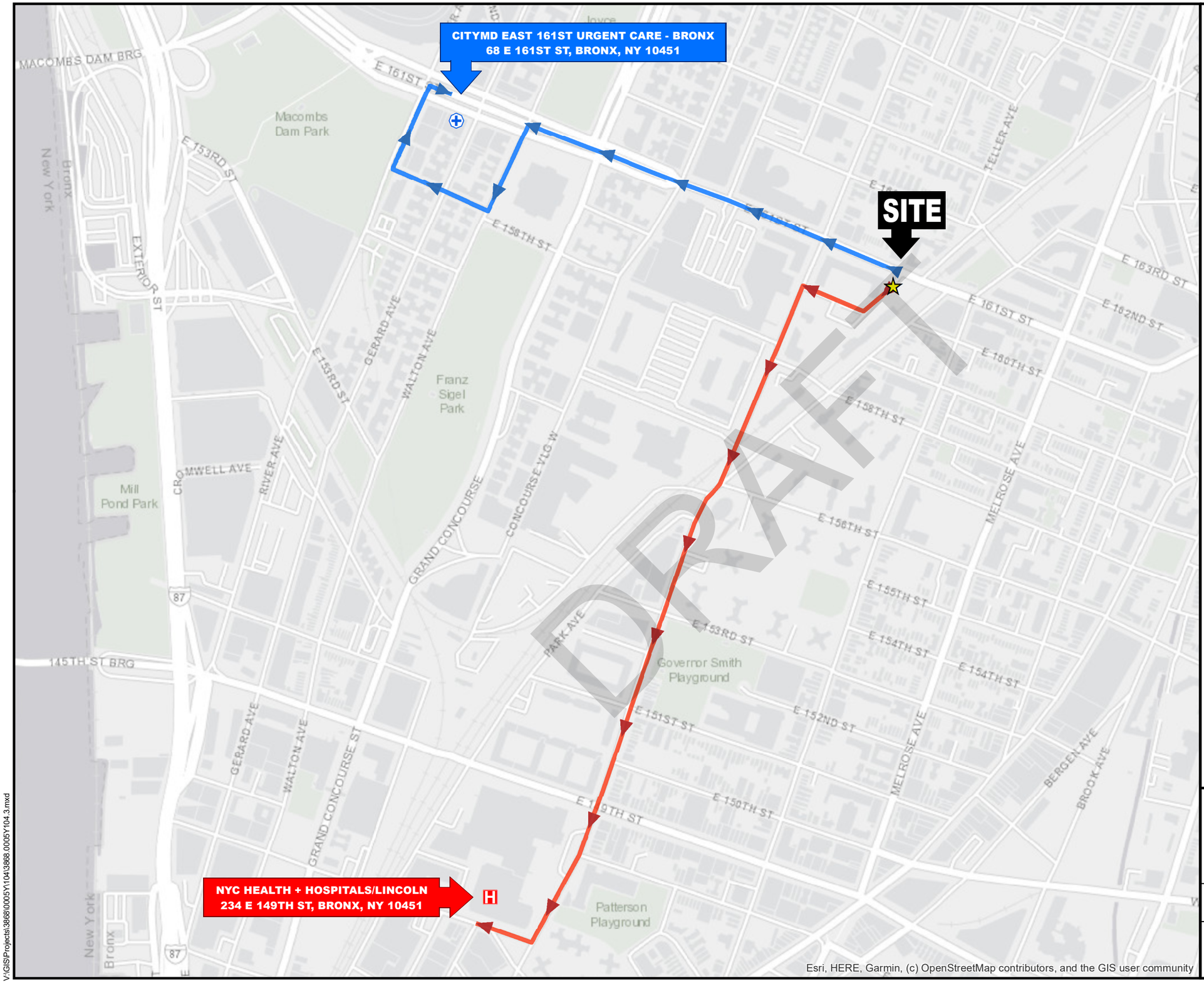


N

DIRECTIONS TO HOSPITAL

1. HEAD WEST THROUGH LOT TOWARD CONCOURSE VILLAGE E/MORRIS AVE
2. TURN LEFT ONTO CONCOURSE VILLAGE E/MORRIS AVE
3. TURN RIGHT ONTO E 144TH ST
4. GARAGE ENTRANCE WILL BE ON THE RIGHT

DIRECTIONS TO URGENT CARE

1. TURN LEFT ONTO E 161ST ST
2. TURN LEFT ONTO WALTON AVE
3. TURN RIGHT ONTO E 158TH ST
4. TURN RIGHT ONTO RIVER AVE
5. TURN RIGHT ONTO E 161ST ST
6. DESTINATION WILL BE ON THE RIGHT

500 0 500'

Title:

# ROUTES TO URGENT CARE AND HOSPITAL

MORRISANIA EAST
310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: L.D. | Date: 06/25/2025 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 3 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y104.3.mxd | | |

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# APPENDICES

A. Job Safety Analysis (JSA) Forms
B. SDSs for Chemicals Used
C. Heat Illness Prevention Program
D. Personal Protective Equipment (PPE) Management Program
E. Subsurface Utility Clearance Management Program
F. Heavy Equipment Exclusion Zone Management Program
G. New York State Department of Health (NYSDOH) Community Air Monitoring Plan (CAMP)
H. Special Requirements CAMP

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# APPENDIX A

Job Safety Analysis (JSA) Forms

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| JOB SAFETY ANALYSIS | Ctrl. No. GEN-006 | DATE 4/10/2023 | ☐ NEW ☒ REVISED | PAGE 1 of 2 |
|---|---|---|---|---|

| JSA TYPE CATEGORY: | WORK TYPE: | WORK ACTIVITY (Description): | |
|---|---|---|---|
| **Generic** | **Drilling** | **Direct Push Soil Borings / Well Installation** | |
| **DEVELOPMENT TEAM** | **POSITION / TITLE** | **REVIEWED BY:** | **POSITION / TITLE** |
| Timothy Zei | Project Hydrogeologist | Raymond Olson | OHSM |
| | | Brian Hobbs | CHSD |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST<br>☒ HARD HAT<br>☐ LIFELINE / BODY HARNESS<br>☒ SAFETY GLASSES | ☐ GOGGLES<br>☐ FACE SHIELD<br>☒ HEARING PROTECTION: (as needed)<br>☒ SAFETY SHOES: Composite-toe or steel toe boots | ☐ AIR PURIFYING RESPIRATOR<br>☐ SUPPLIED RESPIRATOR<br>☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing, Long Sleeve Shirt | ☒ GLOVES: Leather, Nitrile and cut resistant<br>☒ OTHER: Insect Repellant, sunscreen (as needed) |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Geoprobe or Truck-Mounted Direct Push Drill Rig, Hand Tools, Photoionization Detector, Multi-Gas Meter (or equivalent), Macrocore liners, Liner Opening Tool, 20 lb. Type ABC Fire Extinguisher, 42" Cones & Flags, "Work Area" Signs, Water

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

**EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.**

**"SHOW ME YOUR HANDS"**
**Driller and helper should show that hands are clear from controls and moving parts**

| Assess [1]JOB STEPS | Analyze [2]POTENTIAL HAZARDS | Act [3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Mobilization of drilling rig (ensure the Subsurface Clearance Protocol and Drill Rig Checklist are completed) | **1a. CONTACT:** Equipment/property damage. | 1a. The drill rig's tower/derrick will be lowered and secured prior to mobilization.<br>1a. A spotter should be utilized while moving the drill rig. If personnel move into the path of the drill rig, the drill rig will be stopped until the path is again clear. Use a spotter for all required backing operations.<br>1a. Set-up the work area and position equipment in a manner that eliminates or reduces the need for backing of support trucks and trailers.<br>1a. When backing up truck rig with an attached trailer use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver visibility.<br>1a. Inspect the driving path for uneven terrain. Level or avoid if needed.<br>1a. Drill rig should have a minimum **exclusion zone which encompasses its tip radius** for non-essential personnel (i.e., driller helper, geologist) when the rig is moving/ in operation. |
| | **1b. FALL:** Slip/trip/fall hazards. | 1b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment.<br>1b. Do not climb over stored materials/equipment; walk around. Practice good housekeeping.<br>1b. Use established pathways and walk on stable, secure ground. |
| | **1c. CONTACT:** Crushing from roll-over. | 1c Geoprobe should cross all hills/obstructions head on with the mast down to reduce risk of roll-over. |
| **2.** Raising tower/derrick of drill rig | **2a. CONTACT:** Overhead hazards. | 2a. Prior to raising the tower/derrick, the area above the drilling rig will be inspected for wires, tree limbs, piping, or other structures, that could come in contact with the rig's tower and/or drilling rods or tools.<br>2a. Maintain a safe distance of 10' from overhead structures. |
| | **2b. CONTACT:** Pinch Points/Amputation Points when raising the rig and instability of rig | 2b. Inspect the equipment prior to use and avoid pinch/amputation points.<br>2b. Lower outriggers to ensure stability prior to raising rig tower/derrick.<br>2b. If the rig needs to be mounted, be sure to use three points of contact. |
| **3.** Advancement of drilling equipment and well installation | **3a. CONTACT:** Flying debris | 3a. Be aware of and avoid potential line-of-fire hazards and wear required PPE such as eye, ear, and hand protection. |
| | **3b. EXPOSURE:** Noise and dust. | 3b. Wet borehole area with sprayer to minimize dust.<br>3b. Stand upwind and keep body away from rig.<br>3b. Dust mask should be worn if conditions warrant.<br>3b. Wear hearing protection when the drill rig is in operation. |
| **Assess [1]JOB STEPS** | **Analyze [2]POTENTIAL HAZARDS** | **Act [3]CRITICAL ACTIONS** |

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[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

| | | |
|---|---|---|
| **3.** Advancement of drilling equipment and well installation (Continued) | **3a. CONTACT:** Flying debris<br><br>**3b. EXPOSURE:** Noise and dust.<br><br>**3c. FALL:** Slip/trip/fall hazards.<br><br>**3d. CAUGHT:** Limb/extremity pinching; abrasion/crushing.<br><br>**3e. CONTACT:** Equipment imbalance during advancement of drill equipment.<br><br>**3f. EXPOSURE:** Inhalation of contamination/vapors.<br><br>**3g. EXERTION:** Potential for muscle strain/injury while lifting and installing well casings, lifting sand bags, and/or lifting rods. | 3c. Contain drill cuttings and drilling water to prevent fall hazards from developing in work area.<br>3c. See 1b.<br><br>3d. Ensure all Emergency Safety Stop buttons function properly.<br>3d. Always wear leather gloves when making connections and using hand tools; wear cut-resistant (i.e., Kevlar) gloves when handling cutting tools.<br>3d. Inspect the equipment prior to use for potential pinch/amputation points. Keep hands away from pinch/amputation points and use of tools is preferable compared to fingers and hands.<br>3d. Inspect drill head for worn surface or missing teeth; replace if damaged or blunt.<br>3d. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body.<br>3d. All non-essential personnel should stay away from the immediate work area; position body out of the line-of-fire of equipment.<br>3d. Drillers and helpers will understand and use the "Show Me Your Hands" Policy.<br>3d. Spinning rods/casing have an **exclusion zone of tip radius** while in operation.<br><br>3e. Drillers will advance the borehole with caution to avoid causing the rig to become imbalanced and/or tip.<br>3e. The blocking and leveling devices used to secure the rig will be inspected by drillers and Roux personnel regularly to see if shifting has occurred.<br>3e. In addition, personnel and equipment that are non-essential to the advancement of the borehole will be positioned away from the rig at a distance that is at least as far as the boom is high (**minimum exclusion zone**).<br><br>3f. Monitor ambient air for dangerous conditions using a calibrated photoionization detector (PID) to periodically monitor the breathing zone of the work area.<br>3f. If a reading of >5ppm is recorded, the Roux field personnel must temporarily cease work, instruct all Site personnel to step away from the area of elevated readings and inform the Roux PM of the condition. The Roux PM will then recommend additional precautions in accordance with the site specific health and safety plan.<br>3f. Use a multi-gas meter to monitor ambient air for dangerous conditions (i.e. unsafe levels of carbon monoxide when drilling indoors or the presence of explosive vapors).<br><br>3g. Keep back straight and bend at the knees.<br>3g. Utilize team lifting or mechanical means for objects over 50lbs.<br>3g. Use mechanical lifting device for odd shaped objects. |
| **4.** Remove sample liner. | **4a. EXERTION:** Potential for muscle strain/injury while removing liner from probe rod.<br><br>**4b. CONTACT:** Pinch points and cuts<br><br>**4c. EXPOSURE:** Inhalation and/or dermal contact with contaminants. | 4a Utilize team lifting or mechanical means for objects over 50lbs.<br>4a. Use hydraulic liner extruder if available.<br><br>4b. Place liner on sturdy surface when opening.<br>4b. Don cut-resistant gloves and use appropriate liner cutter when opening liners.<br>4b. Always cut away from the body.<br><br>4c. Wear chemical-resistant disposable gloves when handling liners.<br>4c. See 3f. |
| **5.** Decontaminate equipment. | **5a. EXPOSURE/CONTACT**: To contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors).<br><br>**5b. EXPOSURE:** To chemicals in cleaning solution including ammonia. | 5a. Wear chemical-resistant disposable gloves and safety glasses.<br>5a. Contain decontamination water so that it does not spill.<br>5a. Use an absorbent pad to clean spills, if necessary.<br>5a. Spray equipment from side angle, not straight on, to avoid backsplash.<br>5a. See 3b and 3f.<br><br>5b. See 4a. Review SDS to ensure appropriate precautions are taken and understood. |

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

| JOB SAFETY ANALYSIS | Ctrl. No. GEN-009 | DATE: 4/10/2023 | ☐ NEW ☒ REVISED | PAGE 1 of 1 |
|---|---|---|---|---|

| JSA TYPE CATEGORY | WORK TYPE | WORK ACTIVITY (Description) |
|---|---|---|
| **Generic** | **O&M** | **Movement of 55-Gallon Drums/Drum Handling with Mobile Carrier** |

| DEVELOPMENT TEAM | POSITION / TITLE | REVIEWED BY: | POSITION / TITLE |
|---|---|---|---|
| Michael Sarni | Technician | Brian Hobbs | CHSD |
| | | | |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST | ☐ GOGGLES | ☐ AIR PURIFYING RESPIRATOR | ☒ GLOVES: Cut-resistant gloves |
| ☒ HARD HAT | ☐ FACE SHIELD | ☐ SUPPLIED RESPIRATOR | ☐ OTHER: |
| ☐ LIFELINE / BODY HARNESS | ☐ HEARING PROTECTION | ☒ PPE CLOTHING: Fluorescent long sleeve shirt or long sleeve shirt and reflective safety vest. | |
| ☒ SAFETY GLASSES | ☒ SAFETY SHOES: Steel or composite toe | | |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Mobile Drum Carrier, over-pack drum container, safety cones, and caution tape

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

**EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment (i.e. forklift) and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.**

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Preparing for and Inspection of Drum | **1a. FALL:** Tripping/falling due to uneven surface. Loose debris/garbage in work area. | 1a. Clear area of loose garbage and debris. Inspect 55-gal drums for proper condition, labeling, check drum ring and bolts for tightness, inspect mobile drum carrier.<br>1a. Do a Test Lift to get a general sense of the weight of the drum.<br>1a. Inspect and use established pathways to avoid uneven terrain, weather-related hazards (i.e., debris, puddles, ice, etc.), and other obstructions.<br>1a. Secure work area and coordinate and communicate the planned work activities with other personnel working in the area.<br>1a. Delineate work area with 42" safety cones. |
| | **1b. CONTACT/EXPOSURE:** Drums could potentially be damaged or contain hazardous material. Mobile drum carrier could potentially be in poor working condition causing malfunctioning during operation. | 1b. Prior to inspecting drums don cut-resistant gloves. If drum is not properly labeled, do not open and cease all drum transport activities. Immediately contact project manager and inform him/her of drum situation.<br>1b. Do not continue drum transport activities until further actions are determined by the project manager.<br>1b. If the drum is properly labeled, but leaking, improperly sealed or in poor condition, place drum in an over-pack drum.<br>1b. Inspect mobile drum carrier to ensure its overall integrity. Look for rust marks or potential weak points where the drum carrier could malfunction. Inspect the wheels to ensure that they easily turn and nothing is impeding their movement. |
| | **1c. EXERTION/CAUGHT:** Potential pinching/exertion hazards while securing ring/ tightening bolts | 1c. Keep back straight and knees slightly bent while securing drum ring/tightening bolt. Wear cut-resistant gloves. |
| **2.** Position drum clamp tightly in between drum ribs, securing drum clamp to drum with chain | **2a. CAUGHT:** Pinching fingers between drum clamp and handle/chain. | 2a. Attach drum clamp with chain and tighten until snug. Do not place hands between drum clamp and drum as the chain is tightened; wear cut resistant gloves. Keep face away from drum when handling in case of escaping vapors. |

DRAFT

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **3.** Disengage safety latches on handle, pull handle down until drum is lifted off ground and safety latches are reengaged; slightly suspending drum off the ground | **3a. EXERTION/ CONTACT:** Potential muscle strain associated with lifting/engaging drum/handle. Drum could shift/slip downward and crush toes. | 3a. Ascertain whether the drum is overweight; if it is, then two people are needed to lower handle while drum is secured with clamp so that safety latches can be engaged. Keep body out of the lin-of-fire of the handle (do not position head above handle) as it is being pushed down. Do not allow feet/toes to be positioned under the drum as it is being lifted; wear steel/composite-toed boots. |
| | **3b. CAUGHT:** Fingers could be pinched while engaging/disengaging safety latches on handle | 3b. Wear cut-resistant gloves while disengaging/reengaging safety latches.<br>3b. Avoid placing hands in pinch points. |
| **4.** Transport drums to designated location and disengage drum clamp (repeat Step 3 in reverse order) | **4a. FALL:** Tripping/ falling due to obstructions and uneven terrain. Potential for drum to fall during transport. | 4a. Ensure transport path is free of potential obstructions that may cause the drum/carrier to become unstable. Position drum clamp between the ribs on the drum to prevent possible slipping. |

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[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

| JOB SAFETY ANALYSIS Ctrl. No. GEN-013 | DATE 4/10/2023 | ☐ NEW ☒ REVISED | PAGE 1 of 2 |
|---|---|---|---|

| JSA TYPE CATEGORY | WORK TYPE: | WORK ACTIVITY (Description): | |
|---|---|---|---|
| **Generic** | **Gauging and Sampling** | **Gauging and Sampling** | |
| **DEVELOPMENT TEAM** | **POSITION / TITLE** | **REVIEWED BY:** | **POSITION / TITLE** |
| Tim Unalp | SHSO | Brian Hobbs | CHSD |
| | | | |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☒ LIFE VEST<br>☒ HARD HAT<br>☐ LIFELINE / BODY HARNESS<br>☒ SAFETY GLASSES | ☐ GOGGLES<br>☐ FACE SHIELD<br>☐ HEARING PROTECTION<br>☒ SAFETY SHOES: Composite-toed or steel-toed boots | ☐ AIR PURIFYING RESPIRATOR<br>☐ SUPPLIED RESPIRATOR<br>☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing | ☒ GLOVES: Leather, Nitrile and cut resistant<br>☒ OTHER: Knee pads, Insect Repellant, sunscreen (as needed) |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

42-inch Safety Cones, Caution Tape, Interface Probe with Ground Clamp, and/or Water Level Meter, 20-lb., Type ABC Fire Extinguisher, Buckets. Tools as needed: Socket Wrench, Screw Driver, Crow Bar, Mallet, and Wire Brush.

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Mobilization to monitoring well(s). | **1a. FALL:** Personal injury from slip/trip/fall due to uneven terrain and/or obstructions. | 1a. Inspect pathway and plan for most suitable designated pathway prior to mobilization.<br>1a. Use established pathways, walk and/or drive on stable, secure ground and avoid steep hills or uneven terrain.<br>1a. If working near open water with an unguarded edge, wear life vest. |
| | **1b. CONTACT:** With traffic/third parties. | 1b. Identify potential traffic sources and delineate work area with 42-inch traffic safety cones. Position vehicle to protect against oncoming traffic. Use caution tape to provide a more visible delineation of the work area if necessary.<br>1b. Wear appropriate PPE including high visibility clothing or reflective vest.<br>1b. Face traffic, maintain eye contact with oncoming vehicles, and establish a safe exit route. |
| | **1c. EXERTION:** Muscle strain from lifting equipment | 1c. Use proper lifting techniques when handling/moving equipment; bend knees and keep back straight.<br>4c. Use mechanical assistance or team lifting techniques when equipment is 50 lbs. or heavier.<br>4c. Make multiple trips to carry equipment. |
| | **1d. EXPOSURE:** To biological hazards. | 1d. Inspect work area for bees and insects.<br>1d. Use insect/tick repellent as necessary. |
| **2.** Open/close well. | **2a. EXERTION:** Muscle strain. | 2a. Use proper lifting techniques; keep back straight, lift with legs and bend knees when reaching to open/close well. |
| | **2b. CAUGHT:** Pinch/crush points associated with removing/replacing manholes and working with hand tools. | 2b. Wear leather gloves or cut resistant gloves when working with well cover and hand tools.<br>2b. Use proper tools (ratchet and pry bar or magnet for well cover) and inspect before use.<br>2b. Do not put fingers under well cover. |
| | **2c. CAUGHT:** Pinch points associated with placing J-plug back onto PVC pipe. | 2c. See 2b.<br>2c. Keep fingers out of line-of-fire when securing cap. |
| | **2d. EXPOSURE:** To potential hazardous vapors. | 2d. No open flames/heat sources.<br>2d. To minimize exposure to vapors, allow well to vent after opening it and before sampling activities begin.<br>2d. Stand up-wind if possible, to avoid inhaling vapors. |
| **3.** Gauge well. | **3a. CONTACT:** With contamination (e.g. contaminated groundwater). | 3a. Wear chemical-resistant disposable gloves (over cut-resistant gloves) and safety glasses when gauging well.<br>3a. Insert and remove probe slowly to avoid splashing.<br>3a. Use an absorbent pad to clean probe. |
| | **3b. CONTACT:** With traffic. | 3b. See 1b. |
| | **3c. Exposure:** To static electricity, fire or explosion. | 3c. Ground interface probe to a designated grounding point/rod, well casing or suitably electrically conductive surface to dissipate static electricity. |

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[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **4.** Purge and sample well | **4a. EXPOSURE/CONTACT:** To contamination (e.g., SPH, contaminated groundwater, vapors) and/or sample preservatives. | 4a. Open and fill sample jars slowly to avoid splashing and contact with preservatives.<br>4a. Wear cut-resistant gloves and chemical-resistant disposable gloves when sampling.<br>4a. Fill sample containers over purge container to avoid spilling water onto the ground.<br>4a. Use an absorbent pad to clean spills.<br>4a. When using a bailer to purge a well, pull the bailer slowly from the well to avoid splash hazards.<br>4a. When sampling or purging the water using a bailer, pour out water slowly to reduce the potential for splash hazards with groundwater.<br>4a. When using a tubing valve always remove the valve slowly after sample collection to release any pressure and avoid pressurized splash hazards.<br>4a. When collecting a groundwater sample always point sampling apparatus (tubing, bailer, etc.) away from face and body. |
| | **4b. CONTACT:** Personal injury from cuts, abrasions, or punctures by glassware or sharp objects. | 4b. To avoid spills or breakage, place sample ware on even surface.<br>4b. Do not over tighten caps on glass sample ware.<br>4b. Wear chemical-resistant nitrile disposable gloves over cut-resistant (i.e., Kevlar) gloves when sampling and handling glassware (i.e., VOA vials) or when using cutting tools. |
| | **4c. EXERTION:** Muscle strain while carrying equipment. | 4c. Use proper lifting techniques when handling/moving equipment, bend knees and keep back straight.<br>4c. Use mechanical assistance or team lifting techniques when equipment is 50 lbs. or heavier.<br>4c. Make multiple trips to carry equipment. |
| | **4d. CONTACT:** With traffic. | 4d. See 1b. |
| | **4e. CONTACT:** Pinch points with groundwater pump components (i.e., wheel, line, clamps). | 4e. Wear leather/cut-resistant gloves when working with groundwater pumps.<br>4e. Never place hands on or near pinch points such as the wheel, clamps or other moving parts during pump operations.<br>4e. Use the correct mechanisms, such as a pump reel, to lower pump into well.<br>4e. Never attempt to manually stop any moving part of equipment including hose reels and/or tubing. |
| | **4f. EXERTION:** Muscle strain from repetitive motion of bailing and sampling a well. | 4f. See 4c.<br>4f. Include a stretch break when repetitive motions are part of the task. |
| **5.** Management of purge water. | **5a. EXPOSURE/CONTACT:** To contamination (e.g., SPH, contaminated groundwater, vapors). | 5a. Do not overfill container and pour liquids slowly so that they do not splash.<br>5a. Properly dispose of used materials/PPE in appropriate container in designated storage area. |
| | **5b. EXERTION:** Muscle strain from lifting/carrying and moving containers. | 5b. Use proper lifting techniques when lifting / carrying or moving container(s) (see 4c.).<br>5b. Do not overfill container(s). |
| **6.** Decontaminate equipment. | **6a. EXPOSURE/CONTACT:** To contamination (e.g., SPH, contaminated groundwater, vapors). | 6a. Work on the upwind side, where possible, of decon area.<br>6a. Wear chemical-resistant disposable gloves and safety glasses.<br>6a. Use an absorbent pad to clean spills. |
| | **6b. CAUGHT:** Pinch points associated with handling hand tools | 6b. See 2b.<br>6b. Inspect hand tools for sharp edges before decontaminating. |

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| JOB SAFETY ANALYSIS | Ctrl. No. GEN-015 | DATE: 4/10/2023 | ☐NEW ☒REVISED | PAGE 1 of 2 |
|---|---|---|---|---|

| JSA TYPE CATEGORY | WORK TYPE | WORK ACTIVITY (Description) |
|---|---|---|
| **GENERIC** | **Site Recon** | **Mobilization/Demobilization** |

| DEVELOPMENT TEAM | POSITION / TITLE | REVIEWED BY: | POSITION / TITLE |
|---|---|---|---|
| Tim Unalp | SHSO | Brian Hobbs | CHSD |
| | | | |
| | | | |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST<br>☒ HARD HAT<br>☐ LIFELINE / BODY HARNESS<br>☒ SAFETY GLASSES | ☐ GOGGLES<br>☐ FACE SHIELD<br>☒ HEARING PROTECTION (as needed)<br>☒ SAFETY SHOES: Steel Toe or composite toe | ☐ AIR PURIFYING RESPIRATOR<br>☐ SUPPLIED RESPIRATOR<br>☒ PPE CLOTHING: Fluorescent reflective vest of high-visibility clothing; long sleeve shirt; long pants | ☒ GLOVES: Leather, nitrile, and cut resistant (as needed)<br>☐ OTHER |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Required Equipment: Varies

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

**EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.**

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| 1. Mobilize/demobilize and establish work area | **1a. FALL:** Slip/trips/falls from obstructions, uneven terrain, weather conditions, heavy loads, and/or poor housekeeping. | 1a. Use 3 points-of-contact/ensure secure footing when entering and exiting vehicle.<br>1a. Inspect walking path for uneven terrain, steep hills, obstructions, and/or weather-related hazards (i.e., ice, snow, and puddles) prior to mobilizing equipment. Use established pathways. Walk on stable/secure ground.<br>1a. Do not climb over stored materials/equipment; walk around. Practice good housekeeping; organize and store equipment neatly in one area at its lowest potential energy.<br>1a. Wear boots with adequate treads.<br>1a. Delineate unsafe areas with 42” cones, caution tape and/or flagging. |
| | **1b. CONTACT:** Personal injury and/or property damage caused by being struck by Site traffic or equipment used in Site activities. | 1b. Observe and maintain the posted speed limits.<br>1b. When first arriving onsite, park vehicles in designated parking space and/or out of the way locations. Use parking brake on all vehicles and tire chocks on work trucks and trailers.<br>1b. Check in with Site Manager/Supervisor to ensure coordination with other Site activities and to discuss any special hazards. Ensure that short-service employees (SSE) are identified.<br>1b. Identify potential traffic sources.<br>1b. Wear PPE including high visibility clothing or reflective vest.<br>1b. Use a spotter while moving work vehicles; plan ahead to avoid backing whenever possible.<br>1b. Maintain a minimum exclusion zone when vehicles are in motion (i.e. greater than swing/tip radius of equipment). When backing up truck rig with an attached trailer use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver-to-spotter visibility.<br>1b. Delineate work area with 42” cones, flags, caution tape, and/or other barriers.<br>1b. Position “Work Area” signs at Site entrances, if possible, or at either side of work area. |

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| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| | | 1b. Position largest vehicle to protect against oncoming traffic.<br>1b. Face traffic, maintain eye contact with oncoming vehicles, use a spotter, and establish a safe exit route.<br>1b. Observe potential overhead and ground surface features that may interfere with moving equipment. Clear the path of physical hazards prior to initiating mobilization. |
| | **1c. CAUGHT:** Personal injury from pinch points and being in line-of-fire of vehicle and/or equipment. | 1c. Make sure driver has engaged parking brake and placed wheel chocks in a position to prevent movement. Be sure that vehicle is parked in front/down gradient (positioned to best block oncoming traffic) of work area.<br>1c. Wear leather gloves when handling any tools or equipment. Wear cut-resistant gloves (Kevlar or similar) when handling sharp objects/cutting tools/glass.<br>1c. Keep body parts away from line-of-fire of equipment.<br>1c. Always carry tools by the handles and/or designated carrier. Ensure sharp-edged tools are sheathed/secure.<br>1c. Remove any loose jewelry. Avoid wearing loose clothing and/or ensure loose clothing is secure.<br>1c. Secure all items on the equipment, tighten up any items or features that have potential to shift or break during mobilization. |
| | **1d. OVEREXERTION:** Muscle strains while lifting/carrying equipment. | 1d. Use body positioning and lifting techniques that avoid muscle strain; keep back straight, lift with legs, turn with whole body, keep load close to body, and never reach with a load.<br>1d. Ensure that loads are balanced. Use assistance (mechanical or additional person) to carry equipment that is either unwieldy or over 50 lbs. |
| | **1e. EXPOSURE:** Personal injury from exposure to biological and environmental hazards. | 1e. Inspect area to avoid contact with biological hazards (i.e. poisonous plants, stinging insects, ticks, etc.).<br>1e. Wear long sleeved clothes treated with Permethrin, apply insect repellant containing DEET to exposed skin, and inspect clothes and skin for ticks during and after work.<br>1e. Apply sunscreen (SPF 15+) if exposure to sun for 30 minutes or more is expected. |
| | **1f. EXPOSURE:** Weather related injuries. | 1f. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, nausea, rapid and shallow breathing). Take breaks in cool places and hydrate as needed.<br>1f. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks in warm areas as needed.<br>1f. Wear clothing appropriate for weather and temperature conditions (e.g., rain jackets, snow pants, multiple layers).<br>1f. If lightning is observed, wait 30 minutes in a sheltered location (car is acceptable) before resuming work. |
| | **1g. EXPOSURE:** Personal injury from noise hazards. | 1g. Wear hearing protection if sound levels exceed 85 dBA (if you must raise your voice for normal conversation). |

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| JOB SAFETY ANALYSIS | Ctrl. No. GEN-019 | DATE: 4/10/2023 | ☐NEW ☒REVISED | PAGE 1 of 2 |
|---|---|---|---|---|

| JSA TYPE CATEGORY | WORK TYPE | WORK ACTIVITY (Description) | |
|---|---|---|---|
| **GENERIC** | **Site Reconnaissance** | **Site Walk and Inspection** | |
| **DEVELOPMENT TEAM** | **POSITION / TITLE** | **REVIEWED BY:** | **POSITION / TITLE** |
| Sara Barrientos | Project Geologist | Brian Hobbs | Corporate Health and Safety Director |
| Tim Unalp | SHSO | Joe Duminuco | Executive Vice President |
| | | | |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST<br>☒ HARD HAT<br>☐ LIFELINE / BODY HARNESS<br>☒ SAFETY GLASSES | ☐ GOGGLES<br>☐ FACE SHIELD<br>☒ HEARING PROTECTION: ear plugs as necessary<br>☒ SAFETY SHOES: Steel or composite toed | ☐ AIR PURIFYING RESPIRATOR<br>☐ SUPPLIED RESPIRATOR<br>☒ PPE CLOTHING: High-visibility vest or high-vis outerwear | ☒ GLOVES: Leather/cut-resistant/chemical resistant<br>☒ OTHER: Tyvek and rubber boots as necessary, dust mask as necessary |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Required Equipment: Site map, emergency contact list, documentation of urgent care/hospital routes and / or guide familiar with Site, operating cell phone or walkie-talkie if Site allows, and bug spray.

**Commitment to Safety** – All personnel onsite will actively participate in SPSA performance by verbalizing SPSAs throughout the day.

**EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.**

**SITE SECURITY: Prior to site inspection verify appropriate method to address Site Security concerns as it relates to potential criminal activity, homeless population, and/or isolation concerns. Work with the Project Principal and/or Project Manager to address appropriately.**

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Check in with Site contact. | **1a. CONTACT/EXPOSURE/FALL:** Personal injury caused by lack of awareness of site-specific hazards. | 1a. Inquire about hazards and other activities taking place at the Site.<br>1a. Inform Site contact of work scope, timeline and location(s).<br>1a. Discuss emergency evacuation procedures and muster points with Site contact. |
| **2.** Traversing the Site | **2a. CONTACT:** Property damage and personal injury caused by obstructions/vehicles or unauthorized personnel at remote Sites.<br><br>**2b. FALL:** Uneven terrain and weather conditions. Overgrown shrubs and vines. Equipment in the work zone.<br><br>**2c. OVEREXERTION:** Muscle strain while carrying equipment.<br><br>**2d. EXPOSURE:** Biological hazards – ticks; bees/wasps; poison ivy; insects; (Ticks are most active any time the temperature is above freezing, typically from March to November.) | 2a. All equipment must be stowed and secured prior to moving.<br>2a. Maintain speed limit as posted on-site.<br>2a. When possible, drive on established roadways.<br>2a. Yield to all pedestrians.<br>2a. Use pull-through spots or back into parking spots.<br>2a. Don high visibility clothing/safety vest. If working at remote Site, add orange accessories during hunting season.<br><br>2b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment.<br>2b. When possible, use established pathways and walk on stable, secure ground.<br>2b. Communicate traversing hazards with others.<br><br>2c. When carrying equipment to/from work area, use proper lifting techniques; keep back straight, lift with legs, keep load close to body, never reach with a load. Ensure that loads are balanced to reduce the potential for muscle strain. Use the buddy system or mechanical means to maneuver items heavier than 50-lb. If necessary, make multiple trips to carry equipment.<br><br>2d. Inspect area to avoid contact with biological hazards.<br>2d. Ticks:<br>• Treat outer clothing including pants, shirts, socks, boots and hats the evening before with Permethrin (allowing at least two hours before use).<br>• Apply DEET to exposed skin before travelling to the Site and reapply after two hours.<br>• Check for ticks during and after work.<br>2d. Bees:<br>• Use bee spray as appropriate to deter/eliminate bees. |

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| | | |
|---|---|---|
| | **2e. EXPOSURE:**<br>Heat Stress & Cold Stress.<br>Personal injury from working in inclement weather conditions. | • Protect exposed skin with insect repellent.<br>2d. Poison Ivy:<br>• Identify areas of poison ivy and spray with weed killer. Don Tyvek and rubber boots while traversing poison ivy areas.<br>• If skin contacts poison ivy, wash skin thoroughly with soap and water.<br>2e. Wear sunscreen with SPF 15 or greater on exposed skin whenever 30 minutes or more of sun exposure is expected.<br>2e. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed.<br>2e. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed.<br>2e. Wear appropriate rain gear as needed.<br>2e. Take frequent breaks if tired, wet, or cold/hot. Drink water.<br>2e. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again. |
| **3.** Walking near heavy equipment and machinery. | **3a. CONTACT:**<br>Personal injury from Site and roadway traffic. Personal injury from flying debris<br><br>**3b. OVEREXERTION:**<br>Personal injury from lifting/moving/rotating equipment.<br><br>**3c. EXPOSURE:**<br>Hearing damage from noise generating equipment/processes.<br>Inhalation/exposure to hazardous vapors and or dust.<br><br>**3d. EXPOSURE:**<br>Working in a remote area. | 3a. See 2a.<br>3a. Maintain an exclusion zone of at least 10'-25' feet from all engaged equipment.<br>3a. Keep body parts out of the line-of-fire of pinch points.<br>3a. Wear appropriate PPE always.<br>3b. See 2c.<br>3c. Wear hearing protection if >85 dBA. (i.e. noise levels which require you to raise your voice to communicate)<br>3c. Always wear leather gloves when handling any tools or equipment.<br>3c. Always wear appropriate PPE based off chemicals present.<br>3d. Use the "buddy system" whenever possible. If working alone, contact PM upon arrival/departure, as well as during work activities prior to commencing work if applicable.<br>3d. Always carry a communication device (i.e., cell phone, walkie-talkie) or directional (i.e., map, compass, etc.) when traversing remote areas.<br>3d. If available, follow Lone Worker Protocol/Procedure. |
| **4.** Working in adverse weather conditions. | **4a. EXPOSURE:**<br>Heat Stress & Cold Stress. Personal injury from working in inclement weather conditions. | 4a. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed.<br>4a. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed.<br>4a. Wear appropriate rain gear as needed.<br>4a. Take frequent breaks if tired, wet, or cold/hot. Drink water.<br>4a. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again. |
| **5.** Departing Site. | **5a. EXPOSURE:**<br>Exposure to unnecessary hazards should personnel believe Roux is on-Site during an emergency and conduct a search. | 5a. Sign out or notify Site contact and Roux Project Manager of your departure. |

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| JOB SAFETYANALYSIS Ctrl. No. GEN-020 | DATE: 04/11/2023 | ☐NEW ☒REVISED | PAGE 1 of 2 |
|---|---|---|---|

| JSA TYPE CATEGORY: | WORK TYPE: | WORK ACTIVITY (Description): | |
|---|---|---|---|
| **GENERIC** | **Gauging & Sampling** | **Soil Sampling** | |
| **DEVELOPMENT TEAM** | **POSITION / TITLE** | **REVIEWED BY:** | **POSITION / TITLE** |
| MaryBeth Lyons | Project Scientist | Brian Hobbs | CHSD |
| Tim Unalp | SHSO | | |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST | ☐ GOGGLES | ☐ AIR PURIFYING RESPIRATOR | ☒ GLOVES: Leather, Nitrile and cut resistant |
| ☒ HARD HAT | ☐ FACE SHIELD: | ☐ SUPPLIED RESPIRATOR | |
| ☐ LIFELINE / BODY HARNESS | ☒ HEARING PROTECTION: (as needed) | ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing | ☒ OTHER: Insect repellant, sunscreen (as needed) |
| ☒ SAFETY GLASSES | | | |
| ☒ FLAME RESISTANT CLOTHING (as needed) | ☒ SAFETY SHOES: Composite-toe or steel toe boots | | |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Recommended Equipment: 42" traffic cones, caution tape, trowel

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

**EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.**

| Assess [1]JOB STEPS | Analyze [2]POTENTIAL HAZARDS | Act [3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Secure location | **1a. CONTACT:** Personnel and vehicular traffic may enter the work area. | 1a. If in an area with foot or vehicle traffic, delineate the work area with 42" traffic cones and/or caution tape to prevent exposure to traffic and inform others of work activity.<br>1a. Wear reflective vest and/or high visibility clothing.<br>1a. Face the direction of any vehicular traffic. Position vehicle to protect worker from traffic.<br>1a. Communicate work activity with adjacent work areas. |
| | **1b. FALL:** Tripping/falling due to uneven terrain or entry/exit from excavations. | 1b. Inspect pathways and work area for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions.<br>1b. Use established pathways and walk on stable, secure ground.<br>1b. Stage equipment and tools in a convenient, stable, and orderly manner. Store equipment at lowest potential energy.<br>1b. Roux employees should stay 5 feet from in-progress excavations and trenches. Should entry to an excavation be required (when stabilization is complete), ladders must be employed for steep embankments, excavations, pits, and trenches. |
| | **1c. EXPOSURE:** Exposure to sun and excessive heat, possibly causing sunburn, heat exhaustion or heat stroke.<br>Exposure to cold temperatures possibly causing cold stress.<br>Skin burn as a result of fire, if applicable.<br>Exposure to explosive vapors due to tank farm operations.<br>Exposure to airborne dust due to high wind speeds.<br>Biological hazards - ticks, bees/wasps, poison ivy, thorns, insects, etc. | 1c. Wear sunscreen with an SPF 15 or greater whenever 30 minutes or more of exposure is expected.<br>1c. Use a tent to shade the work area from direct sunlight particularly when warm temperatures are expected.<br>1c. Be aware of the location of all Site personnel.<br>1c. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing).<br>1c. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse).<br>1c. Take breaks for rest and water as necessary. Move to an area that is well shaded or a climate controlled area (i.e., car, site trailer, etc.).<br>1c. No open flames/heat sources.<br>1c. Conduct air monitoring and ensure that harmul vapor concentrations are within the levels detailed in the Site Specific HASP. Follow procedures detailed in HASP for exceedances.<br>1c. Flame retardant clothing must be worn when specified by Site policy.<br>1c. Cell phones should be disabled when specified by Site policy.<br>1c. Pre-treat field clothing with Permethrin prior to site visit to kill ticks and insects.<br>1c. Wear long sleeved shirts and tuck in (or tape) pant legs into socks or boots to prevent ticks from reaching skin.<br>1c. Spray insect repellant containing DEET on exposed skin when working in overgrown areas of the Site.<br>1c. Inspect area to avoid contact with biological hazards.<br>1c. Wear cut-resistant gloves when handling branches, shrubs, etc. that may lie within the walking path.<br>1c. Wear spoggles if the average wind speeds are above 15 mph.<br>1c. Personnel shall examine themselves and co-worker's outer clothing for ticks periodically when onsite.<br>1c. If skin comes in contact with poison ivy, wash skin thoroughly with soap and water. If rash persists after washing, immediately notify your supervisor, the OM and OHSM for possible consultation with a physician at an approved Occupational Health Clinic. |

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| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **2.** Collect Soil Sample | **2a. CONTACT:** Personal injury from pinch points, cuts, and abrasions from sampling equipment tools, and material within soil sample. Personal injury from contact with moving equipment while sampling. Personal injury from contact with glass sample jars. | 2a. Wear cut-resistant (i.e., Kevlar) gloves under chemical-resistant (nitrile) disposable gloves when handling soil samples and sampling jars.<br>2a. Where possible, use trowel or equivalent tool to avoid contact with soil.<br>2a. If sampling from bucket of heavy equipment, ensure all equipment is off and operator utilizes the "show me your hands" policy.<br>2a. See 1a. |
| | **2b. EXPOSURE:** Exposure to contamination (impacted soil) and/or lab preservatives. | 2b. Wear chemical-resistant (nitrile) disposable gloves over cut resistant gloves to protect hands when handling samples; use containment material or plastic sheeting to protect surrounding areas.<br>2b. Wear safety glasses to protect eyes from dust or air-borne contaminants that may results from disturbing the soil.<br>2b. Where possible, remain upgradient from sample location if collecting soil sample from stockpile, drill rig, etc. to avoid breathing contaminant vapors, if they are present.<br>2b. When collecting soil sample from hand auger, put large zip lock bag over entire auger to prevent spillage of soil on to the ground.<br>2b. Open sample jars slowly and fill carefully to avoid contact with preservatives. |
| | **2c. EXERTION:** Exertion due to repetitive motion and ergonomics. | 2c. Utilize a table or raised surface for soil sampling if multiple soil samples are going to be taken to minimize repetitive bending motion. |
| **3.** Decontaminate equipment | **3a. EXPOSURE/CONTACT:** Contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated vapors and/or soil).<br>**3b. EXPOSURE:** Chemicals in cleaning solution including ammonia. | 3a. Wear chemical-resistant (nitrile) disposable gloves and safety glasses.<br>3a. Use an absorbent pad to clean spills.<br>3a. Properly dispose of used materials/PPE in provided drums in designated drum storage area.<br>3a. Remain upwind of sample and avoid breathing contaminant vapors, if they are present.<br>3b. Wear chemical-resistant (nitrile) disposable gloves and safety glasses.<br>3b. Work on the upwind side of decontamination area.<br>3b. Use an absorbent pad to clean spills.<br>3b. Properly dispose of used materials/PPE in provided drums in designated drum storage area. Ensure that all drums are properly labeled and secured. |

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| JOB SAFETY ANALYSIS | Ctrl. No. GEN-021 | DATE: 05/29/2025 | ☐ NEW ☒ REVISED | PAGE 1 of 2 |
|---|---|---|---|---|

| JSA TYPE CATEGORY: | WORK TYPE | WORK ACTIVITY (Description) |
|---|---|---|
| **GENERIC** | **Gauging and Sampling** | **Soil Vapor Sampling (Permanent Monitoring Points)** |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST<br>☒ HARD HAT<br>☐ LIFELINE / BODY HARNESS<br>☒ SAFETY GLASSES | ☐ GOGGLES<br>☐ FACE SHIELD<br>☐ HEARING PROTECTION<br>☒ SAFETY SHOES: Steel-toe composite safety boots | ☐ AIR PURIFYING RESPIRATOR<br>☐ SUPPLIED RESPIRATOR<br>☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing | ☒ GLOVES: Cut-resistant level ii & Nitriles<br>☒ OTHER: Bug Spray, Sun Screen, Knee Pads, or kneeling pad |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

9/16" Socket and Wrench, Non-Toxic Clay, Teflon-Lined Tubing, Masterflex Tubing, Air Pump with Low Flow, Dry Cal, Enclosure (Bucket with 2 holes), Helium Gas Canister, Summa Canisters and Flow Controllers, MultiRAE Photo Ionization Detector (PID), Helium Detector, Tubing Cutter, Traffic/Safety Cones, Caution Tape or Retractable Cone Bars

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing LMRAs.

**Work Zone (WZ): A 5-foot exclusion zone will be maintained for non-essential personnel.**

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Define and secure a work area. | **1a. FALL:** Potential tripping hazards. | 1a. Ensure work area is secure and inform others (third party) of work activity.<br>1a. Remove tripping hazards and inspect the walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. |
| | **1b. CONTACT:** Potential contact with moving vehicles or pedestrians. | 1b. If working alongside roads, look both ways before entering roadways, face traffic, and utilize the work vehicle to protect employees.<br>1b. Delineate work area (including vehicles) with traffic safety cones and caution tape or retractable cone bars.<br>1b. Maintain a 5-foot exclusion zone.<br>1b. Wear high visibility clothing or a reflective safety vest. |
| | **1c. EXERTION:** Muscle strain while lifting and carrying equipment. | 1c. When carrying equipment to/from the work area, keep back straight, lift with legs, keep the load close to the body, never reach with a load. Ensure that loads are balanced. Use the buddy system or mechanical means to maneuver loads heavier than 40 lbs. If necessary, make multiple trips to carry equipment. |
| **2.** Remove well cover / close well cover. | **2a. CONTACT/CAUGHT:** Pinch points and scrapes associated with hand tools and well covers. | 2a. Keep hands away from pinch points.<br>2a. Use hand tools with extensions or a magnet to remove and replace well covers.<br>2a. Wear cut-resistant gloves.<br>2a. Use knee pads or a kneeling pad when repetitive kneeling on rough ground is anticipated. |
| | **2b. FALL:** Potential tripping hazards associated with installing bolts. | 2b. Place security bolts in a secure location so as not to create tripping hazards. Replace security bolts so that they fit flush with monitoring well covers. |
| | **2c. EXERTION:** Physical exertion is required to remove bolts that were over-torqued or stripped. | 2c. Replace any security bolts that show signs of stripping. Do not over-tighten.<br>2c. Use body positioning and bending techniques that minimize muscle strain; keep back straight, bend at the knees.<br>2c. See 2a. |

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **3.** Screen vapor point with PID. | **3a. FALL:**<br>Potential tripping hazards associated with equipment. | 3a. Place the equipment in one area close to the sampling location.<br>3a. Identify an area where the equipment is to be stored within the work area (away from the main walking path).<br>3a. Do not leave equipment on the ground. Return equipment to the storage area between uses. |
| | **3b. EXPOSURE:**<br>Inhalation of soil vapor | 3b. Replace brass caps immediately upon completion to avoid soil vapors migrating to the surface through sample tubing.<br>3b. Stand upwind of the sample point during screening activities. |
| **4.** Remove/replace brass caps at the end of the sample tubing. | **4a. CONTACT:**<br>Pinch points are associated with hand tools and brass caps. | 4a. Use a wrench to remove and replace brass caps.<br>4a. Wear cut-resistant gloves to protect against pinch points and scrapes. |
| | **4b. EXPOSURE:**<br>Potential pathway for vapors to migrate to the land surface. | 4b. See 3b.<br>4b. Stand upwind of the sample point location. |
| **5.** Set up soil vapor sampling equipment and calibration of meters. | **5a. FALL:**<br>Potential tripping hazards associated with equipment and tubing. | 5a. See 3a.<br>5a. Keep tubing slack to a minimum and locate the summa canister as close to the sampling location as possible.<br>5a. Avoid stepping over equipment and tubing. |
| | **5b. CONTACT:**<br>Pinch points associated with handling equipment. | 5b. Do not place fingers/hands under sampling equipment.<br>5b. Make multiple trips when unloading equipment in the work area.<br>5b. Wear cut-resistant gloves to protect against pinch points while handling sampling equipment. |
| | **5c. EXPOSURE:**<br>Inhalation of calibration gas and helium. | 5c. Review the SDS for each type of calibration gas used before calibrating.<br>5c. Calibrate meters in a well-ventilated area and keep the air flow regulator away from your face.<br>5c. Close valve on canisters after use to avoid inhalation of excess helium or calibration gas.<br>5c. Stand upwind of the bucket during the helium tracer gas test. |
| **6.** Cleaning Work Area. | **6a. FALL:**<br>Potential tripping hazards are associated with equipment and tubing. | 6a. See 3a.<br>6a. See 3b. |
| | **6b. CONTACT:**<br>Storing and transport of equipment in car. | 6b. Ensure that the equipment is placed securely in the vehicle. Do not stack equipment on top of each other. Secure the equipment so that it will not slide while being transported.<br>6b. Wear cut-resistant gloves while handling/loading equipment. |

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| JOB SAFETY ANALYSIS | Ctrl. No. GEN-022 | DATE 05/29/2025 | ☐ NEW ☒ REVISED | PAGE 1 of 2 |
|---|---|---|---|---|

| JSA TYPE CATEGORY: | WORK TYPE: | WORK ACTIVITY (Description): |
|---|---|---|
| **General** | **Drilling** | **Rotosonic Soil Borings / Well Installation** |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST<br>☒ HARD HAT<br>☐ LIFELINE / BODY HARNESS<br>☒ SAFETY GLASSES | ☐ GOGGLES<br>☐ FACE SHIELD<br>☒ HEARING PROTECTION: (as needed)<br>SAFETY SHOES steel or composite toe | ☐ AIR PURIFYING RESPIRATOR<br>☐ SUPPLIED RESPIRATOR<br>☒ PPE CLOTHING: fluorescent long-sleeve shirt and reflective safety vest. | ☒ GLOVES: Nitrile and cut resistant level II<br>☒ OTHER: Insect Repellant, sunscreen (as needed) |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Truck-Mounted Sonic Drilling Rig or Mini Sonic Rig, Hand Tools, Photoionization Detector, Multi-Gas Meter (or equivalent), Interface Probe, 20 lb. Type ABC Fire Extinguisher, Traffic/Safety Cones & Flags, "Work Area" Signs, Water

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing LMRAs

**EXCLUSION ZONE (EZ): Maintain a Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents.**

**"SHOW ME YOUR HANDS"**
**Driller and helper should show that their hands are clear from controls and moving parts**

| Assess [1]JOB STEPS | Analyze [2]POTENTIAL HAZARDS | Act [3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Mobilization of the drilling rig (ensure the Subsurface Clearance Protocol and Drill Rig Checklist are completed).<br><br>**See also Mobilization/Demobilization JSA.** | **1a. CONTACT/CRUSH:** Equipment/property damage during movement. Crush point between the moving rig and other objects. | 1a. The drill rig's tower/derrick will be lowered and secured prior to mobilization.<br><br>1a. A spotter should be utilized while moving the drill rig or backing operations. If personnel move into the path of the drill rig, the drill rig will be stopped until the path is again clear.<br><br>1a. Set up the work area and position equipment in a manner that eliminates or reduces the need for backing of support trucks and trailers.<br><br>1a. When backing up the truck rig with an attached trailer, use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver/spotter visibility.<br><br>1a. Inspect the driving path for uneven terrain. Level or avoid if needed.<br><br>1a. Drill rig should have a **minimum exclusion zone (i.e., greater than the swing/tip radius of the rig)** for non-essential personnel (i.e., geologist) when the rig is moving/in operation. |
| | **1b. FALL:** Slip/trip/fall hazards. | 1b Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment.<br><br>1b. Do not climb over stored materials/equipment; walk around. Practice good housekeeping.<br><br>1b. Use established pathways and walk on stable, secure ground. |
| **2.** Raising the tower/derrick of the drill rig. | **2a. CONTACT**: Overhead hazards. | 2a. Prior to raising the tower/derrick, the area above the drilling rig will be inspected for overhead utilities, tree limbs, piping, or other structures that could come in contact with the rig's tower and/or drilling rods or tools.<br><br>2a. Site requirements for raising a tower/derrick around overhead utilities must be reviewed prior to drilling. Maintain **a minimum distance of 10 feet** from overhead structures.<br><br>2a. The tower/derrick must not be raised beneath overhead power lines unless approved by both the Roux and Project PMs. |
| | **2b. CONTACT:** Amputation points occur when raising the rig and the instability of the rig. | 2b. Inspect the equipment prior to use and avoid amputation points when engaging the tower/derrick.<br><br>2b. Lower outriggers to ensure stability prior to raising the rig tower/derrick.<br><br>2b. If the rig needs to be mounted, be sure to use three points of contact. |

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| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **3.** Advancement of soil boring and well installation. | | **If possible, operate the drill rig using a remote control to avoid potential hazards.** |
| | **3a. CONTACT**: Flying debris. | 3a. Be aware of and avoid potential line-of-fire hazards and wear required PPE such as eye, ear, and hand protection. |
| **See also Soil Sampling JSA.** | **3b. EXPOSURE**: Noise and dust. | 3b. Wet borehole area with sprayer to minimize dust.<br>3b. Stand upwind and keep your body away from the rig.<br>3b. A disposable dust mask/respiratory protection (depending on site COCs) should be worn if there is visible dust in the breathing zone.<br>3b. Wear hearing protection when the drill rig is in operation. |
| | **3c. CAUGHT**: Limb/extremity amputation points; abrasion/crushing. | 3c. Always wear cut-resistant gloves (Level II) when making connections, using hand tools, or when handling cutting tools.<br>3c. Inspect the equipment prior to use for potential amputation points. Keep hands away from being between connections, and the use of tools is preferable compared to fingers and hands.<br>3c. Inspect the drill head for worn surface or missing teeth; replace it if damaged or blunt.<br>3c. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body.<br>3c. All non-essential personnel should remain outside the heavy equipment exclusion zone, which is at least as far as the boom is high (**minimum exclusion zone based on swing/tip radius**).<br>3c. Drillers and helpers will understand and use the “Show Me Your Hands” Policy. Operators and helpers will remain a **minimum of 3 feet** from augers/drill rods while in operation. |
| | **3d. CONTACT/CRUSH**: Crushed between equipment due to an imbalance during the advancement of the drill equipment. | 3d. Drillers will advance the borehole with caution to avoid causing the rig to become imbalanced and/or tip.<br>3d. The blocking and leveling devices used to secure the rig will be inspected by drillers and Roux personnel regularly to see if shifting has occurred.<br>3d. In addition, personnel and equipment that are non-essential to the advancement of the borehole will be positioned away from the rig at a distance that is at least as far as the boom is high (**minimum exclusion zone based on swing/tip radius**). |
| | **3e. EXPOSURE**: Inhalation of contamination/vapors. | 3e. Air monitoring using a calibrated photoionization detector (PID) will be used to monitor the breathing zone of the work area.<br>3e. If readings above the site-specific action levels, the Roux field personnel must temporarily cease work, instruct all Site personnel to step away from the area of elevated readings, and inform the Roux PM of the condition. The Roux PM will then recommend additional precautions in accordance with the site-specific health and safety plan. |
| | **3f. FALL**: Slip/trip/fall hazards. | 3f. Contain drill cuttings and drilling water to prevent slip/trip/fall hazards from developing in the work area.<br>3f. See 1b. |
| | **3g. EXERTION:** Potential for muscle strain/injury while installing well casings and/or lifting sonic rods/casings. | 3g. Keep back straight and bend at the knees.<br>3g. Utilize team lifting for objects over 40 lbs.<br>3g. Use a mechanical lifting device for odd-shaped objects. |

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| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **4.** Decontaminate equipment. | **4a. EXPOSURE:** Contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors, chemicals in cleaning supplies). | 4a. Wear chemical-resistant gloves and safety glasses.<br>4a. Contain decontamination water so that it does not spill.<br>4a. Use an absorbent pad to clean spills, if necessary.<br>4a. See 3b. |

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| JOB SAFETY ANALYSIS | Ctrl. No. GEN-023 | DATE: 04/11/2023 | ☐ NEW ☒ REVISED | PAGE 1 of 2 |
|---|---|---|---|---|

| JSA TYPE CATEGORY | WORK TYPE | WORK ACTIVITY (Description) | |
|---|---|---|---|
| **Generic** | **Construction** | **Spotting Heavy Machinery** | |
| **DEVELOPMENT TEAM** | **POSITION / TITLE** | **REVIEWED BY:** | **POSITION / TITLE** |
| Levi Curnutte | Senior Scientist | Brian Hobbs | CHSD |
| Tim Unalp | SHSO | | |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST | ☐ GOGGLES | ☐ Particulate Respirator | ☒ GLOVES: Cut resistant / leather |
| ☒ HARD HAT | ☐ FACE SHIELD | ☐ SUPPLIED RESPIRATOR | ☐ OTHER: |
| ☒ LONG SLEEVED SHIRT | ☐ HEARING PROTECTION | ☒ PPE CLOTHING: Fluorescent reflective clothing | |
| ☐ LIFELINE / BODY HARNESS | ☒ SAFETY SHOES: Steel-/Composite-toe boots/shoes | | |
| ☒ SAFETY GLASSES | | | |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Heavy Machinery (i.e. excavator, payloader, truck, forklift, etc.), two-way radios.

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

**EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.**

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Prepare for machine activity. | **1a. CONTACT:** Obstructions in the work area may create contact hazards from machinery.<br><br>**1b. Fall :** Slip/Trip/Fall | 1a. Cordon off the work area with safety barrels/cones and a rigid barrier (snow fence, traffic bar, etc.). Communicate that only necessary personnel should be in the work area. Spotter and equipment operator shall enforce the **EZ.** Operator will not operate but shall remain in the hands-off mode while personnel are within the exclusion zone.<br><br>1b. Ensure that work area is flat, level and clear of any obstructions or debris before setting up work zone. |
| **2.** Spotting. | **2a. CONTACT:** Machine or load contact with personnel, property, or machinery. | 2a. Discuss the specifics of the work with the operator and be clear about any hand signals that will be used. Clearly discuss the limits of the assigned work area and the machine's Exclusion Zone. Maintain Exclusion Zone. The Exclusion Zone shall be delineated by using 42-inch traffic cones/barrels and a fixed rigid barrier.<br>2a. The Minimum Heavy Equipment Exclusion zone is greater than the swing/tip radius of equipment.<br><br>2a. Both the spotter and equipment operators shall have 2-way radios/cellular devices on their persons to ensure audible communication in the event any changes or new hazards may arise.<br><br>2a. All workers should stay outside of the Exclusion Zone of all equipment unless operator is stopped and in "Hands Off" mode. **(This includes the spotter unless an exception has been established in the Site-specific JSA).** If the Exclusion Zone must be reduced due to work area restrictions, then the spotter and operator shall enforce the reduced Exclusion Zone.<br><br>2a. Spotters must make eye contact with the machine operator or all movement ceases until visual contact can be reestablished.<br><br>2a. Spotter shall keep an eye out for any issues with the machine the operator may not see and communicate with other work crews and spotters on behalf of the operator.<br><br>2a. If the spotter needs to take a break, he must find a replacement before leaving or have the machine stop operations. **No heavy equipment shall operate without a spotter under any circumstances.**<br><br>2a. Wear fluorescent clothing/safety vest.<br><br>2a. **Do not multitask. Only perform Spotting** |

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| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| | **2b. FALL:**<br>Slip/Trip/Fall | 2b. Look where walking to identify and avoid slip/trip/fall hazards. Avoid icy and/or wet surfaces. Remove obstacles if possible.<br>2b. Use designated walkways during spotting whenever possible.<br>2b. **Do not walk backwards. Always face the direction you are walking towards.** |
| | **2c. CAUGHT:**<br>Caught between machinery and nearby objects. | 2c. **Maintain Exclusion Zone.** Do not stand between large, loose or fixed objects or structures and the machinery while it is in motion. Keep in sight of operator at all times while being aware of surrounding structures. |
| | **2d. EXPOSURE:**<br>Inhalation of exhaust from machinery. | 2d. The spotter will position him/herself upwind of the working machinery, when possible. Spotter will also inform others working within the vicinity of the EZ of proper positioning, if applicable. |

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| JOB SAFETY ANALYSIS | Ctrl. No. GEN-029 | DATE: 4/11/2023 | ☐ NEW ☒ REVISED | PAGE 1 of 2 |
|---|---|---|---|---|

| JSA TYPE CATEGORY | WORK TYPE | WORK ACTIVITY (Description) | |
|---|---|---|---|
| **GENERIC** | **Preclearing/Sampling** | **Hand Augering** | |
| **DEVELOPMENT TEAM** | **POSITION / TITLE** | **REVIEWED BY:** | **POSITION / TITLE** |
| Sean Owens | Senior Health & Safety Specialist | Brian Hobbs | Corporate Health & Safety Director |

**REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT**

| | | | |
|---|---|---|---|
| ☐ LIFE VEST | ☐ GOGGLES | ☐ AIR PURIFYING RESPIRATOR | ☒ GLOVES: Cut Resistant / Leather / Nitrile / Chemical resistant |
| ☒ HARD HAT | ☐ FACE SHIELD | ☐ SUPPLIED RESPIRATOR | ☐ OTHER |
| ☐ LIFELINE / BODY HARNESS | ☐ HEARING PROTECTION | ☒ PPE CLOTHING: Long sleeve high visibility clothing | |
| ☒ SAFETY GLASSES | ☒ SAFETY SHOES: Steel or composite toed | | |

**REQUIRED AND / OR RECOMMENDED EQUIPMENT**

Hand Auger Tools (buckets, rods), 5-gallon buckets, hand tools (hammer, etc)

**COMMITMENT TO SAFETY-** All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

| Assess [1]JOB STEPS | Analyze [2]POTENTIAL HAZARDS | Act [3]CRITICAL ACTIONS |
|---|---|---|
| **1.** Drive/walk to hand clearing/hand augering location | **1a. CONTACT:** Property damage and personal injury caused by obstructions/vehicles | 1a. Maintain speed limit on-site.<br>1a. All equipment must be stowed and secured prior to moving.<br>1a. Drive on established roadways.<br>1a. Do not back up vehicle without spotter where visibility is limited; use pull-through spots or back into parking spots; use an audible signal (horn/back-up alarm) when backing up vehicles.1c. |
| | **1b. FALL:** Personal injury from tripping/falling due to uneven terrain, weather conditions, and materials/equipment stored at portions of the Site | 1b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment.<br>1b. Do not climb over stored materials/equipment; walk around. Use established pathways and walk on stable, secure ground.<br>1b. Use established ramp when descending into/ascending from impoundment areas.<br>1b. Keep tools and equipment in a designated area. When not in use, tools and equipment must be returned to their proper storage location. Keep work area clear of obstructions. |
| | **1c. EXERTION:** Muscle strain/exhaustion while carrying equipment (i.e., hand auger, post-hole digger, shovel, pry bar) | 1c. When carrying equipment to/from work area, use proper lifting techniques; keep back straight, lift with legs, keep load close to body, never reach with a load. Ensure that loads are balanced to reduce the potential for muscle strain. Use mechanical assistance or make multiple trips to carry equipment. |
| | **1d. EXPOSURE:** Exposure to sun, possibly causing sunburn Biological hazards - bees/wasps, poison oak, thorns, insects, etc. | 1d. Wear sunscreen with an SPF of at least 15 whenever 30 minutes or more of exposure is expected.<br>1d. Inspect area to avoid contact with biological hazards.<br>1d. Wear cut resistant gloves when handling branches, shrubs, etc. that may lie within the walking path.<br>1d. Avoid any areas onsite that have poison oak. |
| **2.** Secure location | **2a. CONTACT:** Personnel and vehicular traffic may enter the work area. | 2a. Delineate the work area with traffic cones and/or caution tape to prevent exposure to traffic and inform others of work activity.<br>2a. Wear reflective vest and/or fluorescent clothing.<br>2a. Face the direction of vehicular traffic. Position vehicle to protect worker from traffic.<br>2a. Communicate work activity with adjacent work areas. |
| | **2b. FALL:** Tripping/falling due to uneven terrain, and materials /equipment stored within the work area | 2b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment to the impoundments.<br>2b. Equipment and tools will be staged in a convenient, stable, and orderly manner.<br>2b. Equipment and tools will be stored at the lowest point of potential energy and out of the walkway and immediate work area (i.e. tools should not be propped against walls or nearby equipment or vehicles).<br>2b. Equipment and tools that are not anticipated to be used will be returned to an appropriate storage area that is out of the immediate work area. |

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[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

| Assess<br>[1]JOB STEPS | Analyze<br>[2]POTENTIAL HAZARDS | Act<br>[3]CRITICAL ACTIONS |
|---|---|---|
| **3.** Verify pre-clearance protocol; review completed Subsurface Utility Checklist and utility verification site walkthrough. | **3a. ENERGY SOURCE:** Underground utility damage; property damage; personal injury | 3a. Confirm that "Call Before You Dig" and local utility companies were contacted prior to hand augering.<br>3a. Walk the Site to evaluate utility markings and review maps. |
| **4.** Augering/advancing borehole | **4a. EXPOSURE:** Contaminated soil/water/vapor<br><br>**4b. EXERTION:** Muscle strain from lifting, bending, repetitive motion.<br><br>**4c. CAUGHT:** Personal injury as a result of jewelry/loose clothing caught on equipment, well covers, machinery, hand auger, pry bar etc..<br><br>**4d. CONTACT/CAUGHT:** Pinch points, abrasions | 4a. Monitor breathing zone with a PID when VOCs area concern. If vapors sustain > 5 ppm, upgrade PPE as per HASP.<br>4a. Wear chemical-resistant disposable gloves and safety glasses when handling impacted materials.<br>4a. Place excavated soil on plastic sheeting and store soil waste in designated area.<br>4a. Work on the upwind side of the boring.<br>4b. Body positioning and rotating with the auger to reduce strain. Don't twist back.<br><br>4c. No form of jewelry should be worn while on-site.<br>4c. Clothing must be appropriately sized so it is not loose fitting.<br><br>4d. Keep head and upper body clear when lifting hand auger, pry bar/post-hole digger. Ensure to not be overly aggressive when using pry bar.<br>4d. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body. |
| **5.** Lithologic observation and soil sampling | **5a. EXPOSURE:** Contact with contamination (impacted soil and/or lab preservatives) | 5a. Wear chemical-resistant disposable gloves to protect hands when handling samples; wear safety glasses when handling any preservatives; use containment material or plastic sheeting to protect surrounding areas.<br>5a. When collecting soil sample from hand auger, put large zip lock bag over entire auger to prevent spillage of soil on to the ground.<br>5a. Open sample jars slowly and fill carefully to avoid contact with preservatives. |
| **6.** Decontaminate equipment | **6a. EXPOSURE:** Contact with contamination (impacted soil and/or lab preservatives, decontamination solution)<br><br>**6b. CONTACT/CAUGHT:** pinch points and cuts/abrasions | 6a. Wear chemical-resistant disposable gloves and safety glasses.<br>6a. Use an absorbent pad to clean spills.<br>6a. Properly dispose of used materials/PPE trash bags.<br><br>6b. Keep fingers/hands out of pinch points when dis-assembling hand auger during decontamination. |

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[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

# APPENDIX B

Safety Data Sheets (SDSs) for Chemicals Used

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# Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

**Effective date**: 12.08.2015 **Revision** : 12.10.2015

**Trade Name**: Alconox

## 1 Identification of the substance/mixture and of the supplier

### 1.1 Product identifier

**Trade Name:** Alconox
**Synonyms:**
**Product number:** Alconox

### 1.2 Application of the substance / the mixture : Cleaning material/Detergent

### 1.3 Details of the supplier of the Safety Data Sheet

**Manufacturer**
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

**Supplier**
Not Applicable

**Emergency telephone number:**
**ChemTel Inc**
North America: 1-800-255-3924
International: 01-813-248-0585

## 2 Hazards identification

### 2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

**Hazard-determining components of labeling:**
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

### 2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

**Hazard pictograms:**

**Signal word**: Warning

**Hazard statements:**
H315 Causes skin irritation.
H319 Causes serious eye irritation.

**Precautionary statements:**
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

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**Safety Data Sheet**

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

**Effective date**: 12.08.2015 **Revision** : 12.10.2015

**Trade Name**: Alconox

**Additional information:** None.

**Hazard description**

**Hazards Not Otherwise Classified (HNOC):** None

**Information concerning particular hazards for humans and environment:**

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

**Classification system:**

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

## 3 Composition/information on ingredients

**3.1 Chemical characterization** : None

**3.2 Description** : None

**3.3 Hazardous components (percentages by weight)**

| Identification | Chemical Name | Classification | Wt. % |
|---|---|---|---|
| **CAS number:** 7758-29-4 | Sodium tripolyphosphate | Skin Irrit. 2 ; H315<br>Eye Irrit. 2; H319 | 12-28 |
| **CAS number:** 68081-81-2 | Sodium Alkylbenzene Sulfonate | Acute Tox. 4; H303<br>Skin Irrit. 2 ; H315<br>Eye Irrit. 2; H319 | 8-22 |
| **CAS number:** 7722-88-5 | Tetrasodium Pyrophosphate | Skin Irrit. 2 ; H315<br>Eye Irrit. 2; H319 | 2-16 |

**3.4 Additional Information** : None.

## 4 First aid measures

**4.1 Description of first aid measures**

**General information:** None.

**After inhalation:**

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

**After skin contact:**

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

**After eye contact:**

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

**After swallowing:**

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

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**Trade Name**: Alconox

**4.2 Most important symptoms and effects, both acute and delayed**

None

**4.3 Indication of any immediate medical attention and special treatment needed:**

No additional information.

## 5 Firefighting measures

**5.1 Extinguishing media**

**Suitable extinguishing agents:**

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

**For safety reasons unsuitable extinguishing agents** : None

**5.2 Special hazards arising from the substance or mixture** :

Thermal decomposition can lead to release of irritating gases and vapors.

**5.3 Advice for firefighters**

**Protective equipment:**

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

**5.4 Additional information** :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

## 6 Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures** :

Ensure adequate ventilation.
Ensure air handling systems are operational.

**6.2 Environmental precautions** :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

**6.3 Methods and material for containment and cleaning up** :

Wear protective eye wear, gloves and clothing.

**6.4 Reference to other sections** : None

## 7 Handling and storage

**7.1 Precautions for safe handling** :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

**7.2 Conditions for safe storage, including any incompatibilities** :

Store in a cool, well-ventilated area.

**7.3 Specific end use(s):**

No additional information.

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**Trade Name**: Alconox

## 8 Exposure controls/personal protection

**8.1 Control parameters** :

7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3.

**8.2 Exposure controls**

**Appropriate engineering controls:**

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

**Respiratory protection:**

Not needed under normal conditions.

**Protection of skin:**

Select glove material impermeable and resistant to the substance.

**Eye protection:**

Safety goggles or glasses, or appropriate eye protection.

**General hygienic measures:**

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

## 9 Physical and chemical properties

| | | | |
|---|---|---|---|
| **Appearance (physical state, color):** | White and cream colored flakes - powder | **Explosion limit lower**: **Explosion limit upper**: | Not determined or not available. Not determined or not available. |
| **Odor**: | Not determined or not available. | **Vapor pressure at 20°C**: | Not determined or not available. |
| **Odor threshold**: | Not determined or not available. | **Vapor density**: | Not determined or not available. |
| **pH-value**: | 9.5 (aqueous solution) | **Relative density**: | Not determined or not available. |
| **Melting/Freezing point**: | Not determined or not available. | **Solubilities**: | Not determined or not available. |
| **Boiling point/Boiling range**: | Not determined or not available. | **Partition coefficient (n-octanol/water)**: | Not determined or not available. |
| **Flash point (closed cup)**: | Not determined or not available. | **Auto/Self-ignition temperature**: | Not determined or not available. |
| **Evaporation rate**: | Not determined or not available. | **Decomposition temperature**: | Not determined or not available. |

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**Trade Name**: Alconox

| | | | |
|---|---|---|---|
| **Flammability (solid, gaseous)**: | Not determined or not available. | **Viscosity**: | a. Kinematic: Not determined or not available.<br>b. Dynamic: Not determined or not available. |
| **Density at 20°C**: | Not determined or not available. | | |

## 10 Stability and reactivity

**10.1 Reactivity** : None

**10.2 Chemical stability** : None

**10.3 Possibility hazardous reactions** : None

**10.4 Conditions to avoid** : None

**10.5 Incompatible materials** : None

**10.6 Hazardous decomposition products** : None

## 11 Toxicological information

**11.1 Information on toxicological effects** :

**Acute Toxicity:**

**Oral**:

: LD50 > 5000 mg/kg oral rat - Product .

**Chronic Toxicity:** No additional information.

**Skin corrosion/irritation:**

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

**Serious eye damage/irritation:**

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

**Respiratory or skin sensitization:** No additional information.

**Carcinogenicity:** No additional information.

**IARC (International Agency for Research on Cancer):** None of the ingredients are listed.

**NTP (National Toxicology Program):** None of the ingredients are listed.

**Germ cell mutagenicity:** No additional information.

**Reproductive toxicity:** No additional information.

**STOT-single and repeated exposure:** No additional information.

**Additional toxicological information:** No additional information.

## 12 Ecological information

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**Trade Name**: Alconox

**12.1 Toxicity:**

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

**12.2 Persistence and degradability:** No additional information.

**12.3 Bioaccumulative potential:** No additional information.

**12.4 Mobility in soil:** No additional information.

**General notes:** No additional information.

**12.5 Results of PBT and vPvB assessment:**

**PBT:** No additional information.

**vPvB:** No additional information.

**12.6 Other adverse effects:** No additional information.

## 13 Disposal considerations

**13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)**

**Relevant Information:**

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

## 14 Transport information

| | |
|---|---|
| **14.1 UN Number:**<br>ADR, ADN, DOT, IMDG, IATA | None |
| **14.2 UN Proper shipping name:**<br>ADR, ADN, DOT, IMDG, IATA | None |
| **14.3 Transport hazard classes:**<br>ADR, ADN, DOT, IMDG, IATA | **Class:** None<br>**Label:** None<br>**LTD. QTY:** None |

**US DOT**

**Limited Quantity Exception:** None

**Bulk:**
**RQ (if applicable):** None
**Proper shipping Name:** None
**Hazard Class:** None
**Packing Group:** None
**Marine Pollutant (if applicable):** No additional information.

**Non Bulk:**
**RQ (if applicable):** None
**Proper shipping Name:** None
**Hazard Class:** None
**Packing Group:** None
**Marine Pollutant (if applicable):** No additional information.

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| | |
|---|---|
| **Comments:** None | **Comments:** None |

| | |
|---|---|
| **14.4 Packing group:**<br>ADR, ADN, DOT, IMDG, IATA | None |
| **14.5 Environmental hazards** : | None |
| **14.6 Special precautions for user:** | None |
| **Danger code (Kemler):** | None |
| **EMS number:** | None |
| **Segregation groups:** | None |

**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.

**14.8 Transport/Additional information:**

| | |
|---|---|
| **Transport category:** | None |
| **Tunnel restriction code:** | None |
| **UN "Model Regulation":** | None |

## 15 Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.**

### North American

**SARA**

**Section 313 (specific toxic chemical listings)**: None of the ingredients are listed.
**Section 302 (extremely hazardous substances)**: None of the ingredients are listed.

**CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable**

**Spill Quantity**: None of the ingredients are listed.

**TSCA (Toxic Substances Control Act):**

**Inventory**: All ingredients are listed.
**Rules and Orders**: Not applicable.

**Proposition 65 (California):**

**Chemicals known to cause cancer**: None of the ingredients are listed.

**Chemicals known to cause reproductive toxicity for females**: None of the ingredients are listed.

**Chemicals known to cause reproductive toxicity for males**: None of the ingredients are listed.

**Chemicals known to cause developmental toxicity**: None of the ingredients are listed.

**Canadian**

**Canadian Domestic Substances List (DSL)**:
All ingredients are listed.

### EU

**REACH Article 57 (SVHC)**: None of the ingredients are listed.

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**Germany MAK**: Not classified.

### Asia Pacific

**Australia**

**Australian Inventory of Chemical Substances (AICS)**: All ingredients are listed.

**China**

**Inventory of Existing Chemical Substances in China (IECSC)**: All ingredients are listed.

**Japan**

**Inventory of Existing and New Chemical Substances (ENCS)**: All ingredients are listed.

**Korea**

**Existing Chemicals List (ECL)**: All ingredients are listed.

**New Zealand**

**New Zealand Inventory of Chemicals (NZOIC)**: All ingredients are listed.

**Philippines**

**Philippine Inventory of Chemicals and Chemical Substances (PICCS)**: All ingredients are listed.

**Taiwan**

**Taiwan Chemical Substance Inventory (TSCI)**: All ingredients are listed.

## 16 Other information

**Abbreviations and Acronyms:** None

**Summary of Phrases**

**Hazard statements:**

H315 Causes skin irritation.
H319 Causes serious eye irritation.

**Precautionary statements:**

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

**Manufacturer Statement:**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**NFPA:** 1-0-0

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**Trade Name**: Alconox

**HMIS:** 1-0-0

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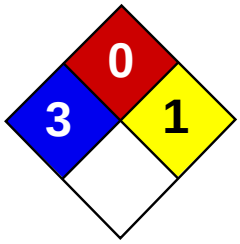

# Material Safety Data Sheet
## Hydrochloric acid MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Hydrochloric acid

**Catalog Codes:** SLH1462, SLH3154

**CAS#:** Mixture.

**RTECS:** MW4025000

**TSCA:** TSCA 8(b) inventory: Hydrochloric acid

**CI#:** Not applicable.

**Synonym:** Hydrochloric Acid; Muriatic Acid

**Chemical Name:** Not applicable.

**Chemical Formula:** Not applicable.

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:**
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Hydrogen chloride | 7647-01-0 | 20-38 |
| Water | 7732-18-5 | 62-80 |

**Toxicological Data on Ingredients:** Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

## Section 3: Hazards Identification

**Potential Acute Health Effects:**
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

**Potential Chronic Health Effects:**
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth. Repeated or prolonged exposure to the substance can produce target

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organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

## Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

**Ingestion:**
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

**Serious Ingestion:** Not available.

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## Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** of metals

**Explosion Hazards in Presence of Various Substances:** Non-explosive in presence of open flames and sparks, of shocks.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:**
Non combustible. Calcium carbide reacts with hydrogen chloride gas with incandescence. Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine. Rubidium acetylene carbides burns with slightly warm hydrochloric acid. Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved. Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammble gas. Cesium acetylene carbide burns hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. Reacts with most metals to produce flammable Hydrodgen gas.

**Special Remarks on Explosion Hazards:**

Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride AgClO + CCl4 Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca3P2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO4 Hexalithium disilicide H2SO4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U3P4 , Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

## Section 6: Accidental Release Measures

**Small Spill:**
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

**Large Spill:**
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
CEIL: 5 (ppm) from OSHA (PEL) [United States] CEIL: 7 (mg/m3) from OSHA (PEL) [United States] CEIL: 5 from NIOSH CEIL: 7 (mg/m3) from NIOSH TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)] TWA: 2 STEL: 8 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

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**Odor:** Pungent. Irritating (Strong.)

**Taste:** Not available.

**Molecular Weight:** Not applicable.

**Color:** Colorless to light yellow.

**pH (1% soln/water):** Acidic.

**Boiling Point:**
108.58 C @ 760 mm Hg (for 20.22% HCl in water) 83 C @ 760 mm Hg (for 31% HCl in water) 50.5 C (for 37% HCl in water)

**Melting Point:**
-62.25°C (-80°F) (20.69% HCl in water) -46.2 C (31.24% HCl in water) -25.4 C (39.17% HCl in water)

**Critical Temperature:** Not available.

**Specific Gravity:**
1.1- 1.19 (Water = 1) 1.10 (20%and 22% HCl solutions) 1.12 (24% HCl solution) 1.15 (29.57% HCl solution) 1.16 (32% HCl solution) 1.19 (37% and 38%HCl solutions)

**Vapor Pressure:** 16 kPa (@ 20°C) average

**Vapor Density:** 1.267 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 0.25 to 10 ppm

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, diethyl ether.

**Solubility:** Soluble in cold water, hot water, diethyl ether.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, water

**Incompatibility with various substances:**
Highly reactive with metals. Reactive with oxidizing agents, organic materials, alkalis, water.

**Corrosivity:**
Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**
Reacts with water especially when water is added to the product. Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C. Sodium reacts very violently with gaseous hydrogen chloride. Calcium phosphide and hydrochloric acid undergo very energetic reaction. It reacts with oxidizers releasing chlorine gas. Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates. Reacts with most metals to produce flammable Hydrogen gas. Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalies (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure) Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. Adsorption of Hydrochloric Acid onto silicon dioxide results in exothmeric reaction. Hydrogen chloride causes aldehydes and epoxides to violently polymerize. Hydrogen chloride or Hydrochloric Acid in contact with the folloiwng can cause explosion or ignition on contact or

**Special Remarks on Corrosivity:**

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Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinium, tantalum, silver, and certain alloys are exceptions). It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys. No corrosivity data on zinc, steel. Severe Corrosive effect on brass and bronze

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation.

**Toxicity to Animals:**
Acute oral toxicity (LD50): 900 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse]. Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

**Chronic Effects on Humans:**
CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.

**Other Toxic Effects on Humans:**
Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

**Special Remarks on Toxicity to Animals:**
Lowest Published Lethal Doses (LDL/LCL) LDL [Man] -Route: Oral; 2857 ug/kg LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

**Special Remarks on Chronic Effects on Humans:**
May cause adverse reproductive effects (fetoxicity). May affect genetic material.

**Special Remarks on other Toxic Effects on Humans:**
Acute Potential Health Effects: Skin: Corrosive. Causes severe skin irritation and burns. Eyes: Corrosive. Causes severe eye irritation/conjuntivitis, burns, corneal necrosis. Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and larryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well has headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure,  occur, particularly if exposure is prolonged. May affect the liver. Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomitting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophogeal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis). Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel. Chronic Potential Health Effects: dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

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## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** Class 8: Corrosive material

**Identification:** : Hydrochloric acid, solution UNNA: 1789 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
Connecticut hazardous material survey.: Hydrochloric acid Illinois toxic substances disclosure to employee act: Hydrochloric acid Illinois chemical safety act: Hydrochloric acid New York release reporting list: Hydrochloric acid Rhode Island RTK hazardous substances: Hydrochloric acid Pennsylvania RTK: Hydrochloric acid Minnesota: Hydrochloric acid Massachusetts RTK: Hydrochloric acid Massachusetts spill list: Hydrochloric acid New Jersey: Hydrochloric acid New Jersey spill list: Hydrochloric acid Louisiana RTK reporting list: Hydrochloric acid Louisiana spill reporting: Hydrochloric acid California Director's List of Hazardous Substances: Hydrochloric acid TSCA 8(b) inventory: Hydrochloric acid TSCA 4(a) proposed test rules: Hydrochloric acid SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid SARA 313 toxic chemical notification and release reporting: Hydrochloric acid CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 kg)

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**
CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

**DSCL (EEC):**
R34- Causes burns. R37- Irritating to respiratory system. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 0

**Reactivity:** 1

**Personal Protection:**

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 0

**Reactivity:** 1

**Specific hazard:**

**Protective Equipment:**
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

## Section 16: Other Information

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**References:**
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:45 PM

**Last Updated:** 05/21/2013 12:00 PM

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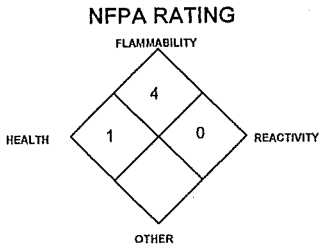
# MATERIAL SAFETY DATA SHEET

*Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards*




## PART I *What is the material and what do I need to know in an emergency?*

### 1. PRODUCT IDENTIFICATION

| | |
|---|---|
| CHEMICAL NAME; CLASS: | **ISOBUTYLENE - $C_4H_8$**<br>Document Number: Isobutylene |
| PRODUCT USE: | For general analytical/synthetic chemical uses. |
| SUPPLIER/MANUFACTURER'S NAME:<br>ADDRESS: | MESA Specialty Gases & Equipment<br>3619 Pendleton Avenue, Suite C<br>Santa Ana, CA 92704 |
| BUSINESS PHONE:<br>EMERGENCY PHONE: | 1-714-434-7102<br>INFOTRAC: 1-800-535-5053 |
| DATE OF PREPARATION: | May 10, 1999 |

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### 2. COMPOSITION and INFORMATION ON INGREDIENTS

| CHEMICAL NAME | CAS # | mole % | EXPOSURE LIMITS IN AIR | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | ACGIH | | OSHA | | | |
| | | | TLV ppm | STEL ppm | PEL ppm | STEL ppm | IDLH ppm | OTHER |
| Isobutylene | 115-11-7 | > 99.0% | There are no specific exposure limits for Isobutylene. Isobutylene is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%. | | | | | |
| Maximum Impurities | | < 1.0% | None of the trace impurities in this mixture contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalent standards. | | | | | |

NE = Not Established C = Ceiling Limit See Section 16 for Definitions of Terms Used

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

## 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** Isobutylene is a colorless, liquefied, flammable gas with an unpleasant odor similar to burning coal. The liquefied gas rapidly turns into a gas at standard atmospheric temperatures and pressures. Isobutylene is an asphyxiant and presents a significant health hazard by displacing the oxygen in the atmosphere. Rapid evaporation of liquid from the cylinder may cause frostbite. Both the liquid and gas pose a serious fire hazard when accidentally released. The gas is heavier than air and may travel to a source of ignition and flash back to a leak or open container. Flame or high temperature impinging on a localized area of a cylinder of Isobutylene can cause the cylinder to rupture without activating the cylinder's relief devices. Provide adequate fire protection during emergency response situations.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant route of overexposure for this gas is by inhalation. The following paragraphs describe symptoms of exposure by route of exposure.

INHALATION: High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of overexposure, death may occur. Isobutylene also has some degree of anesthetic action and can be mildly irritating to the mucous membranes. The effects associated with various levels of oxygen are as follows:

| CONCENTRATION | SYMPTOMS OF EXPOSURE |
|---|---|
| 12-16% Oxygen: | Breathing and pulse rate increased, muscular coordination slightly disturbed. |
| 10-14% Oxygen: | Emotional upset, abnormal fatigue, disturbed respiration. |
| 6-10% Oxygen: | Nausea and vomiting, collapse or loss of consciousness. |
| Below 6%: | Convulsive movements, possible respiratory collapse, and death. |

OTHER POTENTIAL HEALTH EFFECTS: Contact with liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after such contact can quickly subside.

HAZARDOUS MATERIAL INFORMATION SYSTEM

| | | |
|---|---|---|
| HEALTH | (BLUE) | 1 |
| FLAMMABILITY | (RED) | 4 |
| REACTIVITY | (YELLOW) | 0 |
| PROTECTIVE EQUIPMENT | | B |

| EYES | RESPIRATORY | HANDS | BODY |
|---|---|---|---|
| | See Section 8 | | See Section 8 |

For routine industrial applications

See Section 16 for Definition of Ratings

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Overexposure to Isobutylene may cause the following health effects:

**ACUTE:** The most significant hazard associated with this gas is inhalation of oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, headache, dizziness, and nausea. At high concentrations, unconsciousness or death may occur. Contact with liquefied gas or rapidly expanding gases may cause frostbite.

**CHRONIC:** There are currently no known adverse health effects associated with chronic exposure to Isobutylene.

**TARGET ORGANS:** Respiratory system.

# PART II *What should I do if a hazardous situation occurs?*

## 4. FIRST-AID MEASURES

**RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO ISOBUTYLENE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus and Fire-Retardant Personal Protective equipment should be worn. Adequate fire protection must be provided during rescue situations.**

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## 4. FIRST-AID MEASURES (Continued)

Remove victim(s) to fresh air as quickly as possible. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Only trained personnel should administer supplemental oxygen.

In case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

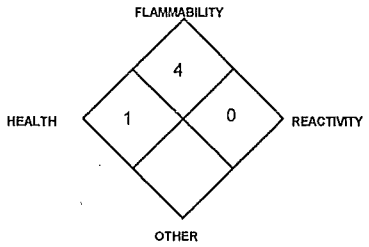
Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

## 5. FIRE-FIGHTING MEASURES

FLASH POINT (Closed Cup): -10°C (< 14°F)
AUTOIGNITION TEMPERATURE: 465°C (869°F)
FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): 1.8%
Upper (UEL): 9.6%

**NFPA RATING**




**See Section 16 for Definition of Ratings**

FIRE EXTINGUISHING MATERIALS: Extinguish Isobutylene fires by shutting off the source of the gas. Use water spray or a foam agent to cool fire-exposed containers, structures, and equipment.

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material may ignite and produce toxic gases, including carbon monoxide and carbon dioxide.

**DANGER!** Fires impinging (direct flame) on the outside surface of unprotected pressure storage vessels of Isobutylene can be very dangerous. Direct flame exposure on the cylinder wall can cause an explosion either by BLEVE (Boiling Liquid Expanding Vapor Explosion), or by exothermic decomposition. This is a catastrophic failure of the vessel releasing the contents into a massive fireball and explosion. The resulting fire and explosion can result in severe equipment damage and personnel injury or death over a large area around the vessel. For massive fires in large areas, use unmanned hose holder or monitor nozzles; if this is not possible, withdraw from area and allow fire to burn.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Static discharge may cause Isobutylene to ignite explosively if released.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. The best fire-fighting technique may be simply to let the burning gas escape from the pressurized cylinder, tank car, or pipeline. Stop the leak before extinguishing fire. If the fire is extinguished before the leak is sealed, the leaking gas could explosively re-ignite without warning and cause extensive damage, injury, or fatality. In this case, increase ventilation (in enclosed areas) to prevent flammable or explosive mixture formation. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Because of the potential for a BLEVE, evacuation of non-emergency personnel is essential. If water is not available for cooling or protection of vessel exposures, evacuate the area. Refer to the North American Emergency Response Guidebook for additional information. Other information for pre-planning can be found in the American Petroleum Institute Publications 2510 and 2510A.

## 6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area, protect people, and respond with trained personnel. Adequate fire protection must be provided. Minimum Personal Protective Equipment should be **Level B: fire-retardant protective clothing, gloves resistant to tears, and Self-Contained Breathing Apparatus.**

Use only non-sparking tools and equipment. Locate and seal the source of the leaking gas. Protect personnel attempting the shut off with water spray. Allow the gas to dissipate. Monitor the surrounding area for combustible gas levels and oxygen. Combustible gas concentration must be below 10% of the LEL (LEL = 1.8%) prior to entry. The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in place or remove it to a safe area and allow the gas to be released there.

**THIS IS AN EXTREMELY FLAMMABLE GAS.** Protection of all personnel and the area must be maintained.

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# PART III *How can I prevent hazardous situations from occurring?*

## 7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting Isobutylene IN YOU. Do not eat or drink while handling chemicals. Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of Isobutylene could occur without any significant warning symptoms.

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits. Post "No Smoking or Open Flames" signs in storage or use areas.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated area, away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52°C (125°F). Isolate from oxidizers such as oxygen, chlorine, or fluorine. Use a check valve or trap in the discharge line to prevent hazardous backflow. Post "No Smoking or Open Flame" signs in storage and use areas. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Never tamper with pressure relief devices in valves and cylinders. Electrical equipment should be non-sparking or explosion proof. The following rules are applicable to situations in which cylinders are being used:

**Before Use:** Move cylinders with a suitable hand truck. Do not drag, slide, or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap, if provided, in place until cylinder is ready for use.

**During Use:** Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

**After Use:** Close main cylinder valve. Replace valve protection cap, if provided. Mark empty cylinders "EMPTY".

**NOTE:** Use only DOT or ASME code containers. Earth-ground and bond all lines and equipment associated with Isobutylene. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. Additionally, refer to CGA Bulletin SB-2 "*Oxygen Deficient Atmospheres*".

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (e.g., nitrogen) before attempting repairs.

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents Isobutylene dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the presence of potentially explosive air-gas mixtures and level of oxygen.

RESPIRATORY PROTECTION: Maintain oxygen levels above 19.5% in the workplace. Maintain level of gas below the level listed in Section 2 (Composition and Information on Ingredients). Use supplied air respiratory protection if oxygen levels are below 19.5% or during emergency response to a release of Isobutylene. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134) or equivalent State standards.

EYE PROTECTION: Splash goggles or safety glasses, for protection from rapidly expanding gases and splashes of liquid Isobutylene.

HAND PROTECTION: Wear gloves resistant to tears when handling cylinders of Isobutylene. Use low-temperature protective gloves (e.g., Kevlar) when working with containers of liquid Isobutylene.

BODY PROTECTION: Use body protection appropriate for task. Transfer of large quantities under pressure may require protective equipment appropriate to protect employees from splashes of liquefied product, as well as fire retardant items.

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## 9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY @ 21.1°C (70°F): 2.396 kg/m$^3$ (0.1496 lb/ft$^3$)
SPECIFIC GRAVITY ( air = 1): 1.997
SOLUBILITY IN WATER: Insoluble.
EVAPORATION RATE (nBuAc = 1): Not applicable.
ODOR THRESHOLD: Not established.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.
pH: Not applicable.
FREEZING POINT: -140°C (-220.6°F)
BOILING POINT @ 1 atm: -6.9°C (19.6°F)
EXPANSION RATIO: Not applicable
VAPOR PRESSURE (psia): 39
SPECIFIC VOLUME (ft$^3$/lb): 6.7

APPEARANCE AND COLOR: Colorless gas with the unpleasant odor of burning coal. The liquid is also colorless and has the same unpleasant odor of burning coal.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no distinct warning properties. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

## 10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: When ignited in the presence of oxygen, this gas will burn to produce carbon monoxide and carbon dioxide.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers (e.g., chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials and exposure to heat, sparks, and other sources of ignition. Cylinders exposed to high temperatures or direct flame can rupture or burst.

# PART IV *Is there any other useful information about this material?*

## 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following information is for pure Isobutylene.

**ISOBUTYLENE:**
$LC_{50}$ (rat, inhalation) = 620 g/m$^3$/4 hours
$LC_{50}$ (mouse, inhalation) = 415 g/m$^3$/2 hours

SUSPECTED CANCER AGENT: Isobutylene is not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA, and therefore is neither considered to be nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: Isobutylene may be mildly irritating to the mucous membranes. In addition, contact with rapidly expanding gases can cause frostbite to exposed tissue.

SENSITIZATION TO THE PRODUCT: Isobutylene is not known to cause sensitization in humans.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of Isobutylene on the human reproductive system.

Mutagenicity: No mutagenic effects have been described for Isobutylene.
Embryotoxicity: No embryotoxic effects have been described for Isobutylene.
Teratogenicity: No teratogenic effects have been described for Isobutylene.
Reproductive Toxicity: No reproductive toxicity effects have been described for Isobutylene.

*A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e., within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.*

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by overexposure to Isobutylene.

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## 11. TOXICOLOGICAL INFORMATION (Continued)

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary. Treat symptoms and eliminate exposure.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for Isobutylene.

## 12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas will be dissipated rapidly in well-ventilated areas.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Any adverse effect on animals would be related to oxygen-deficient environments. No adverse effect is anticipated to occur to plant life, except for frost produced in the presence of rapidly expanding gases. See Section 11, Toxicological Information, for additional information on effects on animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of Isobutylene on aquatic life.

## 13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to MESA Specialty Gases & Equipment Do not dispose of locally.

## 14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

**For Isobutylene Gas:**

| | |
|---|---|
| PROPER SHIPPING NAME: | Isobutylene |
| HAZARD CLASS NUMBER and DESCRIPTION: | 2.1 (Flammable Gas) |
| UN IDENTIFICATION NUMBER: | UN 1055 |
| PACKING GROUP: | Not Applicable |
| DOT LABEL(S) REQUIRED: | Flammable Gas |

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 115

**Alternate Description:**

| | |
|---|---|
| PROPER SHIPPING NAME: | Petroleum gases, liquefied |
| HAZARD CLASS NUMBER and DESCRIPTION: | 2.1 (Flammable Gas) |
| UN IDENTIFICATION NUMBER: | UN 1075 |
| PACKING GROUP: | Not Applicable |
| DOT LABEL(S) REQUIRED: | Flammable Gas |

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 115

MARINE POLLUTANT: Isobutylene is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

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## 15. REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: Isobutylene is not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

CANADIAN DSL/NDSL INVENTORY STATUS: Isobutylene is on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: Isobutylene is listed on the TSCA Inventory.

## 15. REGULATORY INFORMATION (Continued)

OTHER U.S. FEDERAL REGULATIONS: Isobutylene is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 lb. Depending on specific operations involving the use of Isobutylene, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Under this regulation Isobutylene is not listed in Appendix A; however, any process that involves a flammable gas on-site, in one location, in quantities of 10,000 lb (4,553 kg) or greater is covered under this regulation unless it is used as a fuel.

U.S. STATE REGULATORY INFORMATION: Isobutylene is covered under specific State regulations, as denoted below:

**Alaska - Designated Toxic and Hazardous Substances:** Liquefied Petroleum Gas.
**California - Permissible Exposure Limits for Chemical Contaminants:** Liquefied Petroleum Gas.
**Florida - Substance List:** Isobutylene.
**Illinois - Toxic Substance List:** No.
**Kansas - Section 302/313 List:** No.
**Massachusetts - Substance List:** Isobutylene.
**Michigan - Critical Materials Register:** No.
**Minnesota - List of Hazardous Substances:** Liquefied Petroleum Gas.
**Missouri - Employer Information/Toxic Substance List:** No.
**New Jersey - Right to Know Hazardous Substance List:** Isobutylene.
**North Dakota - List of Hazardous Chemicals, Reportable Quantities:** No.
**Pennsylvania - Hazardous Substance List:** Isobutylene.
**Rhode Island - Hazardous Substance List:** Liquefied Petroleum Gas.
**Texas - Hazardous Substance List:** Liquefied Petroleum Gas.
**West Virginia - Hazardous Substance List:** Liquefied Petroleum Gas.
**Wisconsin - Toxic and Hazardous Substances:** Liquefied Petroleum Gas.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Isobutylene is not on the California Proposition 65 lists.

LABELING:

**DANGER:** FLAMMABLE LIQUID AND GAS UNDER PRESSURE.
CAN FORM EXPLOSIVE MIXTURES WITH AIR.
MAY CAUSE FROSTBITE.

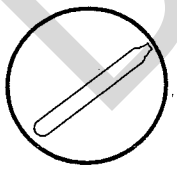
Keep away from heat, flames, and sparks.
Store and use with adequate ventilation.
Cylinder temperature should not exceed 52°C (125°F).
Do not get liquid in eyes, on skin, or clothing.
Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

**FIRST AID:** **IF INHALED**, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**IN CASE OF FROSTBITE,** obtain immediate medical attention.

DO NOT REMOVE THIS PRODUCT LABEL.

CANADIAN WHMIS SYMBOLS: **Class A:** Compressed Gas
**Class B1**: Flammable Gas



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## 16. OTHER INFORMATION

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. MESA Specialty Gases & Equipment assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, MESA Specialty Gases & Equipment assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

## DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

**CAS #**: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

**EXPOSURE LIMITS IN AIR:**

**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration. **PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

**IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration **(OSHA)**. NIOSH issues exposure guidelines called Recommended Exposure Levels **(RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

**HAZARD RATINGS:**

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:** Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

**NATIONAL FIRE PROTECTION ASSOCIATION:** Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure causes death or major residual injury).

**NATIONAL FIRE PROTECTION ASSOCIATION (Continued):** Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

**FLAMMABILITY LIMITS IN AIR:**

Much of the information related to fire and explosion is derived from the National Fire Protection Association **(NFPA)**. Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

**TOXICOLOGICAL INFORMATION:**

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **$LD_{50}$** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **$LC_{50}$** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **$mg/m^3$** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo, LDLo**, and **LDo**, or **TC, TCo, LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

**REGULATORY INFORMATION:**

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations.

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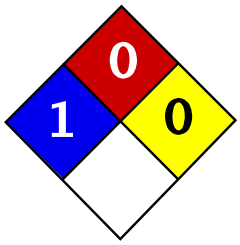


| | |
|---|---|
| Health | 1 |
| Fire | 0 |
| Reactivity | 0 |
| Personal Protection | E |

# Material Safety Data Sheet
## Lead MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Lead

**Catalog Codes:** SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

**CAS#:** 7439-92-1

**RTECS:** OF7525000

**TSCA:** TSCA 8(b) inventory: Lead

**CI#:** Not available.

**Synonym:** Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

**Chemical Name:** Lead

**Chemical Formula:** Pb

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:** 1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Lead | 7439-92-1 | 100 |

**Toxicological Data on Ingredients:** Lead LD50: Not available. LC50: Not available.

## Section 3: Hazards Identification

**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

**Potential Chronic Health Effects:**
Slightly hazardous in case of skin contact (permeator).
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to blood, kidneys, central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

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## Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Non-flammable in presence of open flames and sparks, of shocks, of heat.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** When heated to decomposition it emits highly toxic fumes of lead.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:**
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not

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present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States]
TWA: 0.05 (mg/m3) from OSHA (PEL) [United States]
TWA: 0.03 (mg/m3) from NIOSH [United States]
TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

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## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Metal solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 207.21 g/mole

**Color:** Bluish-white. Silvery. Gray

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 1740°C (3164°F)

**Melting Point:** 327.43°C (621.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 11.3 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, excess heat

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**
Can react vigorously with oxidizing materials.
Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

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## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Inhalation. Ingestion.

**Toxicity to Animals:**
LD50: Not available.
LC50: Not available.

**Chronic Effects on Humans:**
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC.
May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

**Other Toxic Effects on Humans:** Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:**
Acute Potential:
Skin:
Lead metal granules or dust: May cause skin irritation by mechanical action.
Lead metal foil, shot or sheets: Not likely to cause skin irritation
Eyes:
Lead metal granules or dust: Can irritate eyes by mechanical action.

Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation.
Inhalation:
In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes.
Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death.
Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count.
Ingestion:
Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases.
Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead
California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead
California prop. 65: This product contains the following ingredients for which the State of California has found to

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cause reproductive harm (male) which would require a warning under the statute: Lead
California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value)
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead
Connecticut hazardous material survey.: Lead
Illinois toxic substances disclosure to employee act: Lead
Illinois chemical safety act: Lead
New York release reporting list: Lead
Rhode Island RTK hazardous substances: Lead
Pennsylvania RTK: Lead

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**
R20/22- Harmful by inhalation and if swallowed.
R33- Danger of cumulative effects.
R61- May cause harm to the unborn child.
R62- Possible risk of impaired fertility.
S36/37- Wear suitable protective clothing and gloves.
S44- If you feel unwell, seek medical advice (show the label when possible).
S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

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Safety glasses.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:21 PM

**Last Updated:** 11/06/2008 12:00 PM

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.*

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# SAFETY DATA SHEET

Version 6.12
Revision Date 04/28/2025
Print Date 04/29/2025

## SECTION 1. IDENTIFICATION

### 1.1 Product identifiers

Product name : Benz[*a*]anthracene

Product Number : B2209
Brand : Aldrich
Index-No. : 601-033-00-9
CAS-No. : 56-55-3

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

## SECTION 2. HAZARDS IDENTIFICATION

**GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)**

Carcinogenicity : Category 1B

Short-term (acute) : Category 1



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aquatic hazard

Long-term (chronic) aquatic hazard : Category 1

**Other hazards**

None known.

**GHS label elements**

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements :

**Prevention:**

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.

**Storage:**

P405 Store locked up.

**Disposal:**

P501 Dispose of contents/ container to an approved waste disposal plant.

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## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

**Components**

| Chemical name | CAS No./Unique ID | Concentration (% w/w) | Trade secret |
|---|---|---|---|
| Benz[a]anthracene | 56-55-3* | >= 90 - <= 100 | - |

* Indicates that the identifier is a CAS No.



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Actual concentration is withheld as a trade secret

## SECTION 4. FIRST AID MEASURES

| | | |
|---|---|---|
| General advice | : | Show this material safety data sheet to the doctor in attendance. |
| If inhaled | : | After inhalation: fresh air. Call in physician. |
| In case of skin contact | : | In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician. |
| In case of eye contact | : | After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses. |
| If swallowed | : | After swallowing: immediately make victim drink water (two glasses at most). Consult a physician. |
| Most important symptoms and effects, both acute and delayed | : | The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11 |
| Protection of first-aiders | : | For personal protection see section 8. |
| Notes to physician | : | No data available |

## SECTION 5. FIRE-FIGHTING MEASURES

| | | |
|---|---|---|
| Unsuitable extinguishing media | : | For this substance/mixture no limitations of extinguishing agents are given. |
| Hazardous combustion products | : | Carbon oxides<br><br>Nature of decomposition products not known. |
| Specific extinguishing methods | : | No data available |
| Further information | : | Prevent fire extinguishing water from contaminating surface water or the ground water system. |
| Special protective equipment for fire-fighters | : | Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing. |

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## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Advice for non-emergency personnel:<br>Avoid generation and inhalation of dusts in all circumstances.<br>Avoid substance contact.<br>Ensure adequate ventilation.<br>Evacuate the danger area, observe emergency procedures, consult an expert.<br>Advice for emergency responders:<br>For personal protection see section 8. |
| Environmental precautions | : | Do not let product enter drains. |
| Methods and materials for containment and cleaning up | : | Cover drains. Collect, bind, and pump off spills.<br>Observe possible material restrictions (see sections 7 and 10).<br>Take up carefully. Dispose of properly. Clean up affected area.<br>Avoid generation of dusts. |

## SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

| | | |
|---|---|---|
| Advice on safe handling | : | Work under hood. Do not inhale substance/mixture. |
| Further information on storage conditions | : | Tightly closed.<br>Dry.<br>Keep in a well-ventilated place.<br>Keep locked up or in an area accessible only to qualified or authorized persons. |
| Storage class | : | 6.1C, Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects |
| Recommended storage temperature | : | Recommended storage temperature see product label. |

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Ingredients with workplace control parameters**

Contains no substances with occupational exposure limit values.

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**Biological occupational exposure limits**

| Components | CAS-No. | Control parameters | Biological specimen | Sampling time | Permissible concentration | Basis |
|---|---|---|---|---|---|---|
| Benz[a]anthracene | 56-55-3 | 1-Hydroxypyrene | Urine | End of shift at end of workweek | 2.5 µg/l | ACGIH BEI |

**Engineering measures** : No data available

**Personal protective equipment**

Respiratory protection : required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter type P3

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Hand protection

Material : Nitrile rubber
Break through time : 480 min
Glove thickness : 0.11 mm
Protective index : Full contact
Manufacturer : Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Material : Nitrile rubber
Break through time : 480 min
Glove thickness : 0.11 mm
Protective index : Splash contact
Manufacturer : Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Manufacturer : data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

Remarks : Handle with gloves. Gloves must be inspected prior to

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use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

| | | |
|---|---|---|
| Eye protection | : | Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).<br>Safety glasses |
| Skin and body protection | : | protective clothing |
| Hygiene measures | : | Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. |

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| Appearance | : | solid |
| Color | : | No data available |
| Odor | : | No data available |
| Odor Threshold | : | No data available |
| pH | : | No data available |
| Melting point/ range | : | 315 - 318 °F / 157 - 159 °C |
| Boiling point/boiling range | : | 819.7 °F / 437.6 °C |
| Flash point | : | No data available |
| Evaporation rate | : | No data available |
| Flammability (solid, gas) | : | No data available |
| Flammability (liquids) | : | No data available |

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| | | |
|---|---|---|
| Burning rate | : | No data available |
| Upper explosion limit / Upper flammability limit | : | No data available |
| Lower explosion limit / Lower flammability limit | : | No data available |
| Vapor pressure | : | No data available |
| Relative vapor density | : | No data available |
| Relative density | : | No data available |
| Density | : | No data available |
| Water solubility | : | No data available |
| Partition coefficient: n-octanol/water | : | No data available |
| Autoignition temperature | : | No data available |
| Decomposition temperature | : | No data available |
| Viscosity, dynamic | : | No data available |
| Viscosity, kinematic | : | No data available |
| Flow time | : | No data available |
| Explosive properties | : | No data available |
| Oxidizing properties | : | No data available |
| Molecular weight | : | 228.29 g/mol |
| Particle characteristics | | |
| Particle size | : | No data available |

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## SECTION 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| Reactivity | : | No data available |
| Chemical stability | : | The product is chemically stable under standard ambient conditions (room temperature) . |
| Possibility of hazardous reactions | : | No data available |



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| | | |
|---|---|---|
| Conditions to avoid | : | no information available |
| Incompatible materials | : | Strong oxidizing agents |
| Hazardous decomposition products | : | In the event of fire: see section 5 |

## SECTION 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

**Acute toxicity**
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

**Skin corrosion/irritation**
No data available

**Serious eye damage/eye irritation**
No data available

**Respiratory or skin sensitization**
No data available

**Germ cell mutagenicity**
No data available

**Carcinogenicity**
This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.
Possible human carcinogen

| | |
|---|---|
| IARC: | 2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene) |
| NTP: | RAHC - Reasonably anticipated to be a human carcinogen (Benz[a]anthracene) |
| OSHA: | No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens. |

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

### 11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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## SECTION 12. ECOLOGICAL INFORMATION

### Ecotoxicity

**Components:**

**Benz[a]anthracene:**

| | | |
|---|---|---|
| Toxicity to fish | : | Remarks: No data available |
| M-Factor (Acute aquatic toxicity) | : | 10 |
| M-Factor (Chronic aquatic toxicity) | : | 10 |

### Ecotoxicology Assessment

| | | |
|---|---|---|
| Acute aquatic toxicity | : | Very toxic to aquatic life. |
| Chronic aquatic toxicity | : | Very toxic to aquatic life with long lasting effects. |

### Persistence and degradability

No data available

### Bioaccumulative potential

No data available

### Mobility in soil

No data available

### Other adverse effects

**Components:**

**Benz[a]anthracene:**

| | | |
|---|---|---|
| Additional ecological information | : | Discharge into the environment must be avoided. |

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## SECTION 13. DISPOSAL CONSIDERATIONS

### Disposal methods

| | | |
|---|---|---|
| Waste from residues | : | Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. |

## SECTION 14. TRANSPORT INFORMATION

### International Regulations



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**IATA-DGR**

| | | |
|---|---|---|
| UN/ID No. | : | UN 3077 |
| Proper shipping name | : | Environmentally hazardous substance, solid, n.o.s. (Benz[a]anthracene) |
| Class | : | 9 |
| Packing group | : | III |
| Labels | : | Class 9 - Miscellaneous dangerous substances and articles |
| Packing instruction (cargo aircraft) | : | 956 |
| Packing instruction (passenger aircraft) | : | 956 |

**IMDG-Code**

| | | |
|---|---|---|
| UN number | : | UN 3077 |
| Proper shipping name | : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benz[a]anthracene) |
| Class | : | 9 |
| Packing group | : | III |
| Labels | : | 9 |
| EmS Code | : | F-A, S-F |
| Marine pollutant | : | yes |

**Transport in bulk according to IMO instruments**

Not applicable for product as supplied.

**National regulation**

**49 CFR Road**

Not regulated as a dangerous good

| | | |
|---|---|---|
| Poison Inhalation Hazard | : | No |

**Special precautions for user**

| | | |
|---|---|---|
| Remarks | : | EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids. Packages smaller than or equal to 5 kg / L , not dangerous goods of Class 9 |

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

## SECTION 15. REGULATORY INFORMATION

**CERCLA Reportable Quantity**

| Components | CAS-No. | Component RQ (lbs) | Calculated product RQ (lbs) |
|---|---|---|---|



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| | | | |
|---|---|---|---|
| Benz[a]anthracene | 56-55-3 | 10 | 10 |

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards** : Chronic Health Hazard

**SARA 313** : The following components are subject to reporting levels established by SARA Title III, Section 313:

| | | |
|---|---|---|
| Benz[a]anthrac ene | 56-55-3 | >= 90 - <= 100 % |

**US State Regulations**

**Massachusetts Right To Know**

Benz[a]anthracene 56-55-3

**Pennsylvania Right To Know**

Benz[a]anthracene 56-55-3

**Maine Chemicals of High Concern**

Product does not contain any listed chemicals

**Vermont Chemicals of High Concern**

Product does not contain any listed chemicals

**Washington Chemicals of High Concern**

Product does not contain any listed chemicals

**California Prop. 65**

WARNING: This product can expose you to chemicals including Benz[a]anthracene, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

**The ingredients of this product are reported in the following inventories:**

TSCA : On TSCA Inventory

**TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

## SECTION 16. OTHER INFORMATION

**Full text of other abbreviations**

ACGIH BEI : ACGIH - Biological Exposure Indices (BEI)



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AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
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Revision Date : 04/28/2025

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in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

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# SAFETY DATA SHEET

Based on Directive 2001/58/EC of the Commission of the European Communities

# BENZO[e]PYRENE

## 1. Identification of the substance/preparation and of the company/undertaking

**1.1 Identification of the substance or preparation:**

**Synonyms:** none
**CAS No.** : 192-97-2
**EC index No.** : 601-049-00-6
**EINECS No.** : 205-892-7
**RTECS No.** : DJ4200000
**BCR number** : BCR-50
**NFPA code** : N.D.
**Molecular weight** : 252.32
**Formula** : C20H12

**1.2 Use of the substance or the preparation:**
Certified reference material for laboratory use only

**1.3 Company/undertaking identification:**
Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

**1.4 Telephone number for emergency:**
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

## 2. Composition/information on ingredients

| Hazardous ingredients | CAS No.<br>EINECS No. | Conc. in % | Hazard symbol | Risks (R-phrases) |
|---|---|---|---|---|
| benzo[e]pyrene | 192-97-2<br>205-892-7 | 100 | T;N | 45-50/53 (1) |

(1) For R-phrases in full: see heading 16

## 3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

## 4. First aid measures

**4.1 Eye contact:**
- Consult a doctor/medical service if irritation persists
- Rinse immediately with plenty of water
- Do not apply neutralizing agents

**4.2 Skin contact:**
- Consult a doctor/medical service if irritation persists
- Soap may be used
- Consult a doctor/medical service
- Wash immediately with lots of water

**4.3 After inhalation:**
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

**4.4 After ingestion:**
- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink
- Never give water to an unconscious person
- Do not induce vomiting

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## 5. Fire-fighting measures

**5.1 Suitable extinguishing media:**
- Water spray
- Alcohol foam
- Polymer foam
- ABC powder
- Carbon dioxide

**5.2 Unsuitable extinguishing media:**
- No data available

**5.3 Special exposure hazards:**
- It's dust is explosive with air
- Upon combustion CO and CO2 are formed

**5.4 Instructions:**
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

**5.5 Special protective equipment for firefighters:**
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

## 6. Accidental release measures

**6.1 Personal protection/precautions:** see heading 8.1/8.3/10.3

**6.2 Environmental precautions:**
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

**6.3 Methods for cleaning up:**
- Stop dust cloud by humidifying
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Spill must not return in its original container
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

## 7. Handling and storage

**7.1 Handling:**
- Observe strict hygiene
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately
- Clean contaminated clothing

**7.2 Storage:**
- Keep container tightly closed. Store at room temperature. Keep out of direct sunlight. Store in a dry area.
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

| | | | |
|---|---|---|---|
| **Storage temperature** | : | N.D. | **°C** |
| **Quantity limits** | : | N.D. | **kg** |
| **Storage life** | : | N.D. | |
| **Materials for packaging** | : | | |

- suitable : no data available
- to avoid : no data available

**7.3 Specific uses:**
- See information supplied by the manufacturer

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## 8. Exposure controls/Personal protection

**8.1 Exposure limit values:**

| | | |
|---|---|---|
| **TLV-TWA** | : | not listed |
| **TLV-STEL** | : | not listed |
| **TLV-Ceiling** | : | not listed |
| **OES-LTEL** | : | not listed |
| **OES-STEL** | : | not listed |
| **MEL-LTEL** | : | not listed |
| **MEL-STEL** | : | not listed |
| **MAK** | : | not listed |
| **TRK** | : | not listed |
| **MAC-TGG 8 h** | : | not listed |
| **MAC-TGG 15 min.** | : | not listed |
| **MAC-Ceiling** | : | not listed |
| **VME-8 h** | : | not listed |
| **VLE-15 min.** | : | not listed |
| **GWBB-8 h** | : | not listed |
| **GWK-15 min.** | : | not listed |
| **Momentary value** | : | not listed |
| **EC** | : | not listed |
| **EC-STEL** | : | not listed |

**Sampling methods:**

| | |
|---|---|
| - Benzo(e)pyrene (Polynuclear aromatic hydrocarbons) | NIOSH 5515 |
| - Benzo(e)pyrene (Polynuclear aromatic hydrocarbons) | NIOSH 5506 |
| - Benzo(e)pyrene | OSHA CSI |

**8.2 Exposure controls:**

**8.2.1 Occupational exposure controls:**
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

**8.2.2 Environmental exposure controls:** see heading 13

**8.3 Personal protection:**

**8.3.1 respiratory protection:**
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

**8.3.2 hand protection:**
- Gloves
  Suitable materials: No data available
- Breakthrough time: N.D.

**8.3.3 eye protection:**
- Face shield
- In case of dust production: protective goggles

**8.3.4 skin protection:**
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

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## 9. Physical and chemical properties

**9.1 General information:**

| | | |
|---|---|---|
| Appearance (at 20°C) | : | Crystalline solid |
| Odour | : | Odourless |
| Colour | : | Light yellow |

**9.2 Important health, safety and environmental information:**

| | | | |
|---|---|---|---|
| pH value | : | N.D. | |
| Boiling point/boiling range | : | (13hPa) 311 | **°C** |
| Flashpoint | : | N.D. | **°C** |
| Explosion limits | : | N.D. | **vol%** ( **°C**) |
| Vapour pressure (at 20°C) | : | N.D. | **hPa** |
| Vapour pressure (at 50°C) | : | N.D. | **hPa** |
| Relative density (at 20°C) | : | N.D. | |
| Water solubility | : | 0.0000004 | **g/100 ml** |
| Soluble in | : | Ether, acetone | |
| Relative vapour density | : | N.D. | |
| Viscosity | : | N.D. | **Pa.s** |
| Partition coëfficient n-octanol/water | : | 6.30 | |
| Evaporation rate | | | |
| ratio to butyl acetate | : | N.D. | |
| ratio to ether | : | N.D. | |

**9.3 Other information:**

| | | | |
|---|---|---|---|
| Melting point/melting range | : | 179 | **°C** |
| Auto-ignition point | : | N.D. | **°C** |
| Saturation concentration | : | N.D. | **g/m³** |

## 10. Stability and reactivity

**10.1 Conditions to avoid/reactivity:**
- Unstable on exposure to light
- Unstable on exposure to air

**10.2 Materials to avoid:**
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

**10.3 Hazardous decomposition products:**
- Decomposes slowly on exposure to air and on exposure to UV light
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

## 11. Toxicological information

**11.1 Acute toxicity:**

| | | | |
|---|---|---|---|
| **LD50 oral rat** | : | N.D. | **mg/kg** |
| **LD50 dermal rat** | : | N.D. | **mg/kg** |
| **LD50 dermal rabbit** | : | N.D. | **mg/kg** |
| **LC50 inhalation rat** | : | N.D. | **mg/l/4 h** |
| **LC50 inhalation rat** | : | N.D. | **ppm/4 h** |

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**11.2 Chronic toxicity:**

| | | |
|---|---|---|
| **EC carc. cat.** | : | 2 |
| **EC muta. cat.** | : | not listed |
| **EC repr. cat.** | : | not listed |
| **Carcinogenicity (TLV)** | : | not listed |
| **Carcinogenicity (MAC)** | : | K |
| **Carcinogenicity (VME)** | : | not listed |
| **Carcinogenicity (GWBB)** | : | not listed |
| **Carcinogenicity (MAK)** | : | 2 |
| **Mutagenicity (MAK)** | : | not listed |
| **Teratogenicity (MAK)** | : | - |
| **IARC classification** | : | 3 |

**11.3 Routes of exposure:** ingestion, inhalation, eyes and skin

**11.4 Acute effects/symptoms:**

No specific information available

**SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS**:

**AFTER SKIN CONTACT**
- Slight irritation
- Photoallergy

**AFTER EYE CONTACT**
- Slight irritation

**11.5 Chronic effects:**

- Probably human carcinogenic

## 12. Ecological information

**12.1 Ecotoxicity:**

- LC50 (15 h) : 0.0007 mg/l (DAPHNIA MAGNA)

**12.2 Mobility:**

- **Volatile organic compounds (VOC):** N.D.%

- Forming sediments in water
- Insoluble in water

For other physicochemical properties see heading 9.

**12.3 Persistence and degradability:**

- **biodegradation $BOD_5$** : N.D. **% ThOD**
- **water** : - Not readily biodegradable in water
- **soil** : **T ½:** > 292 **days**

**12.4 Bioaccumulative potential:**

- **log $P_{ow}$** : 6.30
- **BCF** : 240 h : 10000 (AMPHIPODA)
- Highly bioaccumulative

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**12.5 Other adverse effects:**

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

## 13. Disposal considerations

**13.1 Provisions relating to waste:**
- Waste material code (Flanders): 001, 045
- Hazardous waste (91/689/EEC)

**13.2 Disposal methods:**
- Specific preliminary treatment
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber

**13.3 Packaging/Container:**
- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

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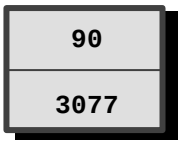
## 14. Transport information




**14.1 Classification of the substance in compliance with UN Recommendations**

| | |
|---|---|
| **UN number** | : 3077 |
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **PROPER SHIPPING NAME** | : UN 3077, Environmentally hazardous substance, solid, n.o.s. (benzo[e]pyrene) |

**14.2 ADR (transport by road)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.3 RID (transport by rail)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.4 ADNR (transport by inland waterways)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.5 IMDG (maritime transport)**

| | |
|---|---|
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **MFAG** | : - |
| **EMS** | : - |
| **MARINE POLLUTANT** | : P |

**14.6 ICAO (air transport)**

| | |
|---|---|
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **PACKING INSTRUCTIONS PASSENGER AIRCRAFT** | : |
| **PACKING INSTRUCTIONS CARGO AIRCRAFT** | : |

**14.7 Special precautions in connection with transport** : none

**14.8 Limited quantities (LQ)** :

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

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## 15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens

Toxic

Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

## 16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

**N.A.** = NOT APPLICABLE
**N.D.** = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

**Full text of any R-phrases referred to under heading 2:**

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

**Exposure limits:**
**TLV** : Threshold Limit Value - ACGIH USA 2000
**OES** : Occupational Exposure Standards - United Kingdom 1999
**MEL** : Maximum Exposure Limits - United Kingdom 1999
**MAK** : Maximale Arbeitsplatzkonzentrationen - Germany 2001
**TRK** : Technische Richtkonzentrationen - Germany 2001
**MAC** : Maximale aanvaarde concentratie - The Netherlands 2002
**VME** : Valeurs limites de Moyenne d'Exposition - France 1999
**VLE** : Valeurs limites d'Exposition à court terme - France 1999
**GWBB** : Grenswaarde beroepsmatige blootstelling - Belgium 1998
**GWK** : Grenswaarde kortstondige blootstelling - Belgium 1998
**EC** : Indicative occupational exposure limit values - directive 2000/39/EC

**Chronic toxicity:**
**K** : List of the carcinogenic substances and processes - The Netherlands 2002

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# SAFETY DATA SHEET

Based on Directive 2001/58/EC et seq. of the Commission of the European Communities

# BENZO[b]FLUORANTHENE

## 1. Identification of the substance/preparation and of the company/undertaking

**1.1 Identification of the substance or preparation:**

**Synonyms:** benz[e]acephenanthrylene

| | | | |
|---|---|---|---|
| **CAS No.** | : 205-99-2 | **BCR number** | : BCR-47 |
| **EC index No.** | : 601-034-00-4 | **NFPA code** | : N.D. |
| **EINECS No.** | : 205-911-9 | **Molecular weight** | : 252.32 |
| **RTECS No.** | : CU1400000 | **Formula** | : $C_{20}H_{12}$ |

**1.2 Use of the substance or the preparation:**
Certified reference material for laboratory use only

**1.3 Company/undertaking identification:**
Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

**1.4 Telephone number for emergency:**
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

## 2. Composition/information on ingredients

| Hazardous ingredients | CAS No.<br>EINECS No. | Conc. in % | Hazard symbol | Risks (R-phrases) |
|---|---|---|---|---|
| benzo[b]fluoranthene | 205-99-2<br>205-911-9 | 100 | T;N | 45-50/53 (1) |

(1) For R-phrases in full: see heading 16

## 3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

## 4. First aid measures

**4.1 Eye contact:**
- Consult a doctor/medical service if irritation persists
- Rinse immediately with water
- Do not apply neutralizing agents

**4.2 Skin contact:**
- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Remove clothing before washing
- Do not apply (chemical) neutralizing agents

**4.3 After inhalation:**
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

**4.4 After ingestion:**
- Consult a doctor/medical service if you feel unwell

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- Immediately give lots of water to drink
-- Never give water to an unconscious person
- Do not induce vomiting

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## 5. Fire-fighting measures

**5.1 Suitable extinguishing media:**
- Water spray
- Polymer foam
- ABC powder
- Carbon dioxide

**5.2 Unsuitable extinguishing media:**
- Solid water jet ineffective as extinguishing medium

**5.3 Special exposure hazards:**
- Not easily combustible
- Upon combustion CO and CO2 are formed

**5.4 Instructions:**
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

**5.5 Special protective equipment for firefighters:**
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

## 6. Accidental release measures

**6.1 Personal protection/precautions:** see 8.1/8.3/10.3

**6.2 Environmental precautions:**
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

**6.3 Methods for cleaning up:**
- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

## 7. Handling and storage

**7.1 Handling:**
- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Clean contaminated clothing

**7.2 Storage:**
- Keep container tightly closed.
- Store in a cool area
- Store in a dry area
- Store in a dark area
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

| | | | |
|---|---|---|---|
| **Storage temperature** | : | N.D. | **°C** |
| **Quantity limits** | : | N.D. | **kg** |
| **Storage life** | : | N.D. | |
| **Materials for packaging** | : | N.D. | |

**7.3 Specific uses:** N.D.

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## 8. Exposure controls/Personal protection

**8.1 Exposure limit values:**

| | | |
|---|---|---|
| **TLV-TWA** | : | not listed |
| **TLV-STEL** | : | not listed |
| **TLV-Ceiling** | : | not listed |
| **OES-LTEL** | : | not listed |
| **OES-STEL** | : | not listed |
| **MEL-LTEL** | : | not listed |
| **MEL-STEL** | : | not listed |
| **MAK** | : | not listed |
| **TRK** | : | not listed |
| **MAC-TGG 8 h** | : | not listed |
| **MAC-TGG 15 min.** | : | not listed |
| **MAC-Ceiling** | : | not listed |
| **VME-8 h** | : | not listed |
| **VLE-15 min.** | : | not listed |
| **GWBB-8 h** | : | not listed |
| **GWK-15 min.** | : | not listed |
| **Momentary value** | : | not listed |

**Sampling methods:**

- Benzo(b)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5515
- Benzo(b)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5506

**8.2 Exposure controls:**

**8.2.1 Occupational exposure controls:**
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

**8.2.2 Environmental exposure controls:** see 13

**8.3 Personal protection:**

**8.3.1 respiratory protection:**
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

**8.3.2 hand protection:**
- Gloves
  Suitable materials: No data available

- Breakthrough time: N.D.

**8.3.3 eye protection:**
- Safety glasses
- In case of dust production: protective goggles

**8.3.4 skin protection:**
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

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## 9. Physical and chemical properties

**9.1 General information:**

| | | |
|---|---|---|
| Appearance (at 20°C) | : | Crystalline solid / Needles |
| Odour | : | Odourless |
| Colour | : | Colourless to off-white |

**9.2 Important health, safety and environmental information:**

| | | | |
|---|---|---|---|
| pH value | : | N.D. | |
| Boiling point/boiling range | : | N.D. | **°C** |
| Flashpoint | : | N.D. | **°C** |
| Explosion limits | : | N.D. | **vol%** ( **°C**) |
| Vapour pressure (at 20°C) | : | 0.00000067 | **hPa** |
| Vapour pressure (at 50°C) | : | N.D. | **hPa** |
| Relative density (at 20°C) | : | N.D. | |
| Water solubility | : | 0.00000012 | **g/100 ml** |
| Soluble in | : | Acetone, oils/fats | |
| Relative vapour density | : | N.D. | |
| Viscosity | : | N.D. | **Pa.s** |
| Partition coëfficient n-octanol/water | : | 6.57 | |
| Evaporation rate | | | |
| ratio butyl acetate | : | N.D. | |
| ratio ether | : | N.D. | |

**9.3 Other information:**

| | | | |
|---|---|---|---|
| Melting point/melting range | : | 168 | **°C** |
| Auto-ignition point | : | N.D. | **°C** |
| Saturation concentration | : | N.D. | **g/m³** |

## 10. Stability and reactivity

**10.1 Conditions to avoid/reactivity:**
- Stable under normal conditions

**10.2 Materials to avoid:**
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

**10.3 Hazardous decomposition products:**
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

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## 11. Toxicological information

**11.1 Acute toxicity:**

| | | | |
|---|---|---|---|
| **LD50 oral rat** | : | N.D. | **mg/kg** |
| **LD50 dermal rat** | : | N.D. | **mg/kg** |
| **LD50 dermal rabbit** | : | N.D. | **mg/kg** |
| **LC50 inhalation rat** | : | N.D. | **mg/l/4 h** |
| **LC50 inhalation rat** | : | N.D. | **ppm/4 h** |

**11.2 Chronic toxicity:**

benzo[b]fluoranthene

| | | |
|---|---|---|
| **EC carc. cat.** | : | 2 |
| **EC muta. cat.** | : | not listed |
| **EC repr. cat.** | : | not listed |
| **Carcinogenicity (TLV)** | : | A2 |
| **Carcinogenicity (MAC)** | : | K |
| **Carcinogenicity (VME)** | : | not listed |
| **Carcinogenicity (GWBB)** | : | not listed |
| **Carcinogenicity (MAK)** | : | 2 |
| **Mutagenicity (MAK)** | : | not listed |
| **Teratogenicity (MAK)** | : | - |
| **IARC classification** | : | 2B |

**11.3 Routes of exposure:** ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

**11.4 Acute effects/symptoms:**

- **AFTER SKIN CONTACT**
  Slight irritation

**11.5 Chronic effects:**

- Probably human carcinogenic
- Not classified as toxic to reproduction (EC)

- **ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:**
  No specific information available

- SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
  Feeling of weakness
  Cracking of the skin
  Skin rash/inflammation
  Photoallergy
  Skin cancer
  Lung tissue affection/degeneration
  Enlargement/affection of the liver
  Affection of the renal tissue

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## 12. Ecological information

**12.1 Ecotoxicity:**

- - No data available

**12.2 Mobility:**

- **Volatile organic compounds (VOC):** 0%

- Photolysis in water
- Forming sediments in water
- Insoluble in water

For other physicochemical properties see heading 9.

**12.3 Persistence and degradability:**

- **biodegradation $BOD_5$** : N.D. **% ThOD**

- **water** : - Not readily biodegradable in water
  - test: E 1/2 > 100 d.

- **soil** : **T ½:** > 87 **days**

**12.4 Bioaccumulative potential:**

- **log $P_{ow}$** : 6.57
- **BCF** : 168 h : 2800 (LAMELLIBRANCHIATA)
- Highly bioaccumulative

**12.5 Other adverse effects:**

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) No 3093/94, O.J. L333 of 22/12/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

## 13. Disposal considerations

**13.1 Provisions relating to waste:**

- Waste material code (91/689/EEC, Council Decision 201/118/EC, O.J. L47 of 16/2/2001):16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

**13.2 Disposal methods:**

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council Decision 2455/2001/EC, O.J. L331 of 15/12/2001)

**13.3 Packaging/Container:**

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

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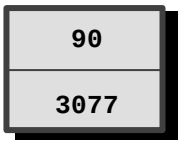
## 14. Transport information




**14.1 Classification of the substance in compliance with UN Recommendations**

| | |
|---|---|
| **UN number** | : 3077 |
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **PROPER SHIPPING NAME** | : UN 3077, Environmentally hazardous substance, solid, n.o.s. (benz[e]acephenanthrylene) |

**14.2 ADR (transport by road)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.3 RID (transport by rail)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.4 ADNR (transport by inland waterways)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.5 IMDG (maritime transport)**

| | |
|---|---|
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **MFAG** | : - |
| **EMS** | : - |
| **MARINE POLLUTANT** | : P |

**14.6 ICAO (air transport)**

| | |
|---|---|
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **PACKING INSTRUCTIONS PASSENGER AIRCRAFT** | : |
| **PACKING INSTRUCTIONS CARGO AIRCRAFT** | : |

**14.7 Special precautions in connection with transport** : none

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

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## 15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens

Toxic

Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

## 16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

**N.A.** = NOT APPLICABLE
**N.D.** = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

**Full text of any R-phrases referred to under heading 2:**

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

**Exposure limits:**
**TLV** : Threshold Limit Value - ACGIH USA 2000
**OES** : Occupational Exposure Standards - United Kingdom 1999
**MEL** : Maximum Exposure Limits - United Kingdom 1999
**MAK** : Maximale Arbeitsplatzkonzentrationen - Germany 2001
**TRK** : Technische Richtkonzentrationen - Germany 2001
**MAC** : Maximale aanvaarde concentratie - The Netherlands 2002
**VME** : Valeurs limites de Moyenne d'Exposition - France 1999
**VLE** : Valeurs limites d'Exposition à court terme - France 1999
**GWBB** : Grenswaarde beroepsmatige blootstelling - Belgium 1998
**GWK** : Grenswaarde kortstondige blootstelling - Belgium 1998
**EC** : Indicative occupational exposure limit values - directive 2000/39/EC

**Chronic toxicity:**
**K** : List of the carcinogenic substances and processes - The Netherlands 2002

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# SAFETY DATA SHEET

Based on Directive 2001/58/EC of the Commission of the European Communities

# BENZO[k]FLUORANTHENE

## 1. Identification of the substance/preparation and of the company/undertaking

**1.1 Identification of the substance or preparation:**

**Synonyms:** none

| | | | |
|---|---|---|---|
| **CAS No.** | : 207-08-9 | **BCR number** | : BCR-48R |
| **EC index No.** | : 601-036-00-5 | **NFPA code** | : N.D. |
| **EINECS No.** | : 205-916-6 | **Molecular weight** | : 252.32 |
| **RTECS No.** | : DF6350000 | **Formula** | : C20H12 |

**1.2 Use of the substance or the preparation:**
Certified reference material for laboratory use only

**1.3 Company/undertaking identification:**
Institute for Reference Materials and Measurements
Retieseweg
2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 59 04 06

**1.4 Telephone number for emergency:**
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

## 2. Composition/information on ingredients

| Hazardous ingredients | CAS No.<br>EINECS No. | Conc. in % | Hazard symbol | Risks (R-phrases) |
|---|---|---|---|---|
| benzo[k]fluoranthene | 207-08-9<br>205-916-6 | 100 | T;N | 45-50/53 (1) |

(1) For R-phrases in full: see heading 16

## 3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

## 4. First aid measures

**4.1 Eye contact:**
- Consult a doctor/medical service if irritation persists
- Rinse immediately with water
- Do not apply neutralizing agents

**4.2 Skin contact:**
- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Wipe off dry product from skin
- Remove clothing before washing

**4.3 After inhalation:**
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

**4.4 After ingestion:**
- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink

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- Never give water to an unconscious person
- Do not induce vomiting

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## 5. Fire-fighting measures

**5.1 Suitable extinguishing media:**
- Water spray
- Polyvalent foam
- ABC powder
- Carbon dioxide

**5.2 Unsuitable extinguishing media:**
- No data available

**5.3 Special exposure hazards:**
- Not easily combustible
- Upon combustion CO and CO2 are formed

**5.4 Instructions:**
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

**5.5 Special protective equipment for firefighters:**
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

## 6. Accidental release measures

**6.1 Personal protection/precautions:** see heading 8.1/8.3/10.3

**6.2 Environmental precautions:**
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

**6.3 Methods for cleaning up:**
- Prevent dust cloud formation
- Carefully collect the spill/leftovers
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

## 7. Handling and storage

**7.1 Handling:**
- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately

**7.2 Storage:**
- Keep container tightly closed. Store in a cool area. Store in a dry area.
- Store in a dark area.
- Keep away from: heat sources, ignition sources, oxidizing agents

**Storage temperature** : N.D. **°C**
**Quantity limits** : N.D. **kg**
**Storage life** : N.D.
**Materials for packaging** :
- suitable : no data available
- to avoid : no data available

**7.3 Specific uses:**
- See information supplied by the manufacturer

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## 8. Exposure controls/Personal protection

**8.1 Exposure limit values:**

| | | |
|---|---|---|
| **TLV-TWA** | : | not listed |
| **TLV-STEL** | : | not listed |
| **TLV-Ceiling** | : | not listed |
| **OES-LTEL** | : | not listed |
| **OES-STEL** | : | not listed |
| **MEL-LTEL** | : | not listed |
| **MEL-STEL** | : | not listed |
| **MAK** | : | not listed |
| **TRK** | : | not listed |
| **MAC-TGG 8 h** | : | not listed |
| **MAC-TGG 15 min.** | : | not listed |
| **MAC-Ceiling** | : | not listed |
| **VME-8 h** | : | not listed |
| **VLE-15 min.** | : | not listed |
| **GWBB-8 h** | : | not listed |
| **GWK-15 min.** | : | not listed |
| **Momentary value** | : | not listed |
| **EC** | : | not listed |
| **EC-STEL** | : | not listed |

**Sampling methods:**

- Benzo(k)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5515
- Benzo(k)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5506

**8.2 Exposure controls:**

**8.2.1 Occupational exposure controls:**
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

**8.2.2 Environmental exposure controls:** see heading 13

**8.3 Personal protection:**

**8.3.1 respiratory protection:**
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

**8.3.2 hand protection:**
- Gloves
  Suitable materials: No data available

- Breakthrough time: N.D.

**8.3.3 eye protection:**
- Safety glasses
- In case of dust production: protective goggles

**8.3.4 skin protection:**
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

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## 9. Physical and chemical properties

**9.1 General information:**

| | | |
|---|---|---|
| Appearance (at 20°C) | : | Crystalline solid / Needles |
| Odour | : | N.D. |
| Colour | : | Light yellow |

**9.2 Important health, safety and environmental information:**

| | | | |
|---|---|---|---|
| pH value | : | N.D. | |
| Boiling point/boiling range | : | 480 | **°C** |
| Flashpoint | : | N.D. | **°C** |
| Explosion limits | : | N.D. | **vol%** ( **°C**) |
| Vapour pressure (at 20°C) | : | 0.00000067 | **hPa** |
| Vapour pressure (at 50°C) | : | N.D. | **hPa** |
| Relative density (at 20°C) | : | N.D. | |
| Water solubility | : | 0.000000076 | **g/100 ml** |
| Soluble in | : | Ethanol, oils/fats, acetic acid | |
| Relative vapour density | : | N.D. | |
| Viscosity | : | N.D. | **Pa.s** |
| Partition coëfficient n-octanol/water | : | 6.84 | |
| Evaporation rate | | | |
| ratio to butyl acetate | : | N.D. | |
| ratio to ether | : | N.D. | |

**9.3 Other information:**

| | | | |
|---|---|---|---|
| Melting point/melting range | : | 217 | **°C** |
| Auto-ignition point | : | N.D. | **°C** |
| Saturation concentration | : | N.D. | **g/m³** |

## 10. Stability and reactivity

**10.1 Conditions to avoid/reactivity:**
- No data available

**10.2 Materials to avoid:**
- Keep away from: heat sources, ignition sources, oxidizing agents

**10.3 Hazardous decomposition products:**
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers

## 11. Toxicological information

**11.1 Acute toxicity:**

| | | | |
|---|---|---|---|
| **LD50 oral rat** | : | N.D. | **mg/kg** |
| **LD50 dermal rat** | : | N.D. | **mg/kg** |
| **LD50 dermal rabbit** | : | N.D. | **mg/kg** |
| **LC50 inhalation rat** | : | N.D. | **mg/l/4 h** |
| **LC50 inhalation rat** | : | N.D. | **ppm/4 h** |

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**11.2 Chronic toxicity:**

| | | |
|---|---|---|
| **EC carc. cat.** | : | 2 |
| **EC muta. cat.** | : | not listed |
| **EC repr. cat.** | : | not listed |
| **Carcinogenicity (TLV)** | : | not listed |
| **Carcinogenicity (MAC)** | : | K |
| **Carcinogenicity (VME)** | : | not listed |
| **Carcinogenicity (GWBB)** | : | not listed |
| **Carcinogenicity (MAK)** | : | 2 |
| **Mutagenicity (MAK)** | : | not listed |
| **Teratogenicity (MAK)** | : | - |
| **IARC classification** | : | 2B |

**11.3 Routes of exposure:** ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

**11.4 Acute effects/symptoms:**

**AFTER SKIN CONTACT**
- Slight irritation

**11.5 Chronic effects:**

- Probably human carcinogenic

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- No specific information available

SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
- Feeling of weakness
- Cracking of the skin
- Skin rash/inflammation
- Photoallergy
- Skin cancer
- Lung tissue affection/degeneration
- Enlargement/affection of the liver
- Affection of the renal tissue

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## 12. Ecological information

**12.1 Ecotoxicity:**

- LC50 (23 h) : 0.0048 mg/l (DAPHNIA MAGNA)

**12.2 Mobility:**

- **Volatile organic compounds (VOC):** 0%

- Ozonation in water
- Forming sediments in water
- Insoluble in water

For other physicochemical properties see heading 9.

**12.3 Persistence and degradability:**

- **biodegradation $BOD_5$** : N.D. **% ThOD**
- **water** : - Not readily biodegradable in water
- **soil** : **T ½:** 65/1400 **days**

**12.4 Bioaccumulative potential:**
- **log $P_{ow}$** : 6.84
- **BCF** : 8750 (PISCES)
- Highly bioaccumulative

**12.5 Other adverse effects:**

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

## 13. Disposal considerations

**13.1 Provisions relating to waste:**

- Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

**13.2 Disposal methods:**

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council Decision 2455/2001/EC)

**13.3 Packaging/Container:**

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

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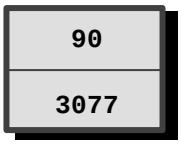
## 14. Transport information




**14.1 Classification of the substance in compliance with UN Recommendations**

| | |
|---|---|
| **UN number** | : 3077 |
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **PROPER SHIPPING NAME** | : UN 3077, Environmentally hazardous substance, solid, n.o.s. (benzo[k]fluoranthene) |

**14.2 ADR (transport by road)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.3 RID (transport by rail)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.4 ADNR (transport by inland waterways)**

| | |
|---|---|
| **CLASS** | : 9 |
| **PACKING** | : III |
| **DANGER LABEL TANKS** | : 9 |
| **DANGER LABEL PACKAGES** | : 9 |

**14.5 IMDG (maritime transport)**

| | |
|---|---|
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **MFAG** | : - |
| **EMS** | : - |
| **MARINE POLLUTANT** | : P |

**14.6 ICAO (air transport)**

| | |
|---|---|
| **CLASS** | : 9 |
| **SUB RISKS** | : - |
| **PACKING** | : III |
| **PACKING INSTRUCTIONS PASSENGER AIRCRAFT** | : |
| **PACKING INSTRUCTIONS CARGO AIRCRAFT** | : |

**14.7 Special precautions in connection with transport** : none

**14.8 Limited quantities (LQ)** :

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

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## 15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens

Toxic

Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

## 16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

**N.A.** = NOT APPLICABLE
**N.D.** = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

**Full text of any R-phrases referred to under heading 2:**

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

**Exposure limits:**
**TLV** : Threshold Limit Value - ACGIH USA 2000
**OES** : Occupational Exposure Standards - United Kingdom 1999
**MEL** : Maximum Exposure Limits - United Kingdom 1999
**MAK** : Maximale Arbeitsplatzkonzentrationen - Germany 2001
**TRK** : Technische Richtkonzentrationen - Germany 2001
**MAC** : Maximale aanvaarde concentratie - The Netherlands 2002
**VME** : Valeurs limites de Moyenne d'Exposition - France 1999
**VLE** : Valeurs limites d'Exposition à court terme - France 1999
**GWBB** : Grenswaarde beroepsmatige blootstelling - Belgium 1998
**GWK** : Grenswaarde kortstondige blootstelling - Belgium 1998
**EC** : Indicative occupational exposure limit values - directive 2000/39/EC

**Chronic toxicity:**
**K** : List of the carcinogenic substances and processes - The Netherlands 2002

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# SAFETY DATA SHEET

Version 6.12
Revision Date 09/07/2024
Print Date 09/08/2024

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifiers

Product name : Beryllium

Product Number : 265063
Brand : Aldrich
Index-No. : 004-001-00-7
CAS-No. : 7440-41-7

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

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## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 3), H301
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319



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Skin sensitization (Category 1), H317
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

### 2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

| | |
|---|---|
| H301 | Toxic if swallowed. |
| H315 | Causes skin irritation. |
| H317 | May cause an allergic skin reaction. |
| H319 | Causes serious eye irritation. |
| H350 | May cause cancer. |
| H372 | Causes damage to organs through prolonged or repeated exposure. |

Precautionary Statements

| | |
|---|---|
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P260 | Do not breathe dust. |
| P264 | Wash skin thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P272 | Contaminated work clothing must not be allowed out of the workplace. |
| P280 | Wear protective gloves/ protective clothing/ eye protection/ face protection. |
| P301 + P310 + P330 | IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth. |
| P302 + P352 | IF ON SKIN: Wash with plenty of soap and water. |
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P308 + P313 | IF exposed or concerned: Get medical advice/ attention. |
| P333 + P313 | If skin irritation or rash occurs: Get medical advice/ attention. |
| P337 + P313 | If eye irritation persists: Get medical advice/ attention. |
| P362 | Take off contaminated clothing and wash before reuse. |
| P405 | Store locked up. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Formula : Be



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| | | |
|---|---|---|
| Molecular weight | : | 9.01 g/mol |
| CAS-No. | : | 7440-41-7 |
| EC-No. | : | 231-150-7 |
| Index-No. | : | 004-001-00-7 |

| Component | Classification | Concentration |
|---|---|---|
| **Beryllium foil** | | |
| | Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 1B; STOT RE 1; H301, H315, H319, H317, H350, H372 | <= 100 % |

For the full text of the H-Statements mentioned in this Section, see Section 16.

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

**General advice**
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

**If swallowed**
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

### 4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### 4.3 Indication of any immediate medical attention and special treatment needed
No data available

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## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media**
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture

Beryllium oxides
Not combustible.
Ambient fire may liberate hazardous vapours.

### 5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### 5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

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## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

### 6.2 Environmental precautions

Do not let product enter drains.

### 6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

### 6.4 Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

**Advice on safe handling**
Work under hood. Do not inhale substance/mixture.

**Hygiene measures**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.



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For precautions see section 2.2.

### 7.2 Conditions for safe storage, including any incompatibilities

**Storage conditions**
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

**Storage class**
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

### 7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Ingredients with workplace control parameters**

| Component | CAS-No. | Value | Control parameters | Basis |
|---|---|---|---|---|
| Berylium foil | 7440-41-7 | TWA | 0.0002 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | | STEL | 0.002 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | | TWA | 2microgram per cubic meter | USA. Occupational Exposure Limits (OSHA) - Table Z-2 |
| | | CEIL | 5microgram per cubic meter | USA. Occupational Exposure Limits (OSHA) - Table Z-2 |
| | | Peak | 25microgram per cubic meter | USA. Occupational Exposure Limits (OSHA) - Table Z-2 |
| | | PEL | 0.0002 mg/m3 | OSHA Specifically Regulated Chemicals/Carcinogens |
| | Remarks | OSHA specifically regulated carcinogen | | |
| | | STEL | 0.002 mg/m3 | OSHA Specifically Regulated Chemicals/Carcinogens |
| | | OSHA specifically regulated carcinogen | | |
| | | Potential Occupational Carcinogen | | |

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| | | | | |
|---|---|---|---|---|
| | | PEL | 0.0002 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | STEL | 0.002 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | C | 0.025 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |

## 8.2 Exposure controls

**Appropriate engineering controls**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

**Personal protective equipment**

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Skin protection**
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

**Body Protection**
protective clothing

**Respiratory protection**
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.

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Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| a) | Appearance | Form: Chunks |
| b) | Odor | No data available |
| c) | Odor Threshold | No data available |
| d) | pH | No data available |
| e) | Melting point/freezing point | Melting point/ range: 1,278 °C (2,332 °F) - lit. |
| f) | Initial boiling point and boiling range | 2,970 °C 5,378 °F - lit. |
| g) | Flash point | ()Not applicable |
| h) | Evaporation rate | No data available |
| i) | Flammability (solid, gas) | The product is not flammable. |
| j) | Upper/lower flammability or explosive limits | No data available |
| k) | Vapor pressure | No data available |
| l) | Vapor density | No data available |
| m) | Density | 1.85 g/cm3 at 25 °C (77 °F) - lit. |
| | Relative density | No data available |
| n) | Water solubility | No data available |
| o) | Partition coefficient: n-octanol/water | Not applicable for inorganic substances |
| p) | Autoignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | none |

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### 9.2 Other safety information
No data available

## SECTION 10: Stability and reactivity

### 10.1 Reactivity
No data available

### 10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

### 10.3 Possibility of hazardous reactions
No data available

### 10.4 Conditions to avoid
no information available

### 10.5 Incompatible materials
Strong oxidizing agents

### 10.6 Hazardous decomposition products
In the event of fire: see section 5

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

**Acute toxicity**
Oral: No data available
Inhalation: No data available
Dermal: No data available

**Skin corrosion/irritation**
Remarks: No data available

**Serious eye damage/eye irritation**
Remarks: No data available

**Respiratory or skin sensitization**
No data available

**Germ cell mutagenicity**
No data available

**Carcinogenicity**
Possible human carcinogen

| | |
|---|---|
| IARC: | 1 - Group 1: Carcinogenic to humans (Berylium foil) |
| NTP: | Known - Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Berylium foil) |
| OSHA: | OSHA specifically regulated carcinogen (Berylium foil) |

**Reproductive toxicity**

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No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
Causes damage to organs through prolonged or repeated exposure.

**Aspiration hazard**
No data available

### 11.2 Additional Information

RTECS: DS1750000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

## SECTION 12: Ecological information

### 12.1 Toxicity
No data available

### 12.2 Persistence and degradability
Not applicable for inorganic substances

### 12.3 Bioaccumulative potential
No data available

### 12.4 Mobility in soil
No data available

### 12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

### 12.6 Endocrine disrupting properties
No data available

### 12.7 Other adverse effects
No data available

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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**Product**
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.



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## SECTION 14: Transport information

### DOT (US)

UN number: 3288 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, inorganic, n.o.s. (Berylium foil)
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

### IMDG

UN number: 3288 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, INORGANIC, N.O.S. (Berylium foil)

### IATA

UN number: 3288 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, inorganic, n.o.s. (Berylium foil)

## SECTION 15: Regulatory information

### CERCLA Reportable Quantity

| Components | CAS-No. | Component RQ (lbs) | Calculated product RQ (lbs) |
|---|---|---|---|
| Berylium foil | 7440-41-7 | 10 | 10 |
| Berylium foil | 7440-41-7 | 10 | 10 |

### SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

### SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards** : Acute Health Hazard
Chronic Health Hazard

**SARA 313** : The following components are subject to reporting levels established by SARA Title III, Section 313:

Berylium foil 7440-41-7 >= 90 - <= 100 %

### US State Regulations

### Massachusetts Right To Know

Berylium foil 7440-41-7

### Pennsylvania Right To Know

Berylium foil 7440-41-7

### Maine Chemicals of High Concern

Product does not contain any listed chemicals

### Vermont Chemicals of High Concern

Product does not contain any listed chemicals

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**Washington Chemicals of High Concern**

Product does not contain any listed chemicals

**California Prop. 65**

WARNING: This product can expose you to chemicals including Berylium foil, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

**The ingredients of this product are reported in the following inventories:**

TSCA : All substances listed as active on the TSCA inventory

**TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

## SECTION 16: Other information

**Further information**

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.12 Revision Date: 09/07/2024 Print Date: 09/08/2024

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# SAFETY DATA SHEET

Version 6.10
Revision Date 04/28/2025
Print Date 04/29/2025

## SECTION 1. IDENTIFICATION

### 1.1 Product identifiers

Product name : Chrysene

Product Number : 35754
Brand : Sigma-Aldrich
Index-No. : 601-048-00-0
CAS-No. : 218-01-9

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

## SECTION 2. HAZARDS IDENTIFICATION

**GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)**

Germ cell mutagenicity : Category 2

Carcinogenicity : Category 1B

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Short-term (acute) aquatic hazard : Category 1

Long-term (chronic) aquatic hazard : Category 1

**Other hazards**

None known.

**GHS label elements**

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H341 Suspected of causing genetic defects.
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements :

**Prevention:**

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P273 Avoid release to the environment.
P281 Use personal protective equipment as required.

**Response:**

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.

**Storage:**

P405 Store locked up.

**Disposal:**

P501 Dispose of contents/ container to an approved waste disposal plant.

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## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

**Components**

| Chemical name | CAS No./Unique ID | Concentration (% w/w) | Trade secret |
|---|---|---|---|
| chrysene | 218-01-9* | >= 90 - <= 100 | - |



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| | | | |
|---|---|---|---|
| | | | |

* Indicates that the identifier is a CAS No.
Actual concentration is withheld as a trade secret

## SECTION 4. FIRST AID MEASURES

| | | |
|---|---|---|
| General advice | : | Show this material safety data sheet to the doctor in attendance. |
| If inhaled | : | After inhalation: fresh air. Call in physician. |
| In case of skin contact | : | In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician. |
| In case of eye contact | : | After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses. |
| If swallowed | : | After swallowing: immediately make victim drink water (two glasses at most). Consult a physician. |
| Most important symptoms and effects, both acute and delayed | : | The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11 |
| Protection of first-aiders | : | For personal protection see section 8. |
| Notes to physician | : | No data available |

## SECTION 5. FIRE-FIGHTING MEASURES

| | | |
|---|---|---|
| Unsuitable extinguishing media | : | For this substance/mixture no limitations of extinguishing agents are given. |
| Hazardous combustion products | : | Carbon oxides |
| Specific extinguishing methods | : | No data available |
| Further information | : | Prevent fire extinguishing water from contaminating surface water or the ground water system. |
| Special protective equipment for fire-fighters | : | Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing. |

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## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Advice for non-emergency personnel:<br>Avoid generation and inhalation of dusts in all circumstances.<br>Avoid substance contact.<br>Ensure adequate ventilation.<br>Evacuate the danger area, observe emergency procedures, consult an expert.<br>Advice for emergency responders:<br>For personal protection see section 8. |
| Environmental precautions | : | Do not let product enter drains. |
| Methods and materials for containment and cleaning up | : | Cover drains. Collect, bind, and pump off spills.<br>Observe possible material restrictions (see sections 7 and 10).<br>Take up carefully. Dispose of properly. Clean up affected area.<br>Avoid generation of dusts. |

## SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

| | | |
|---|---|---|
| Advice on safe handling | : | Work under hood. Do not inhale substance/mixture. |
| Further information on storage conditions | : | Tightly closed.<br>Dry.<br>Keep in a well-ventilated place.<br>Keep locked up or in an area accessible only to qualified or authorized persons. |
| Storage class | : | 6.1C, Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects |
| Recommended storage temperature | : | Recommended storage temperature see product label. |

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## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Ingredients with workplace control parameters**

| Components | CAS-No. | Value type (Form of exposure) | Control parameters / Permissible concentration | Basis |
|---|---|---|---|---|



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| | | | | |
|---|---|---|---|---|
| chrysene | 218-01-9 | TWA | 0.2 mg/m3 | OSHA Z-1 |
| | | TWA | 0.1 mg/m3 | NIOSH REL |

**Biological occupational exposure limits**

| Components | CAS-No. | Control parameters | Biological specimen | Sampling time | Permissible concentration | Basis |
|---|---|---|---|---|---|---|
| chrysene | 218-01-9 | 1-Hydroxypyrene | Urine | End of shift at end of workweek | 2.5 µg/l | ACGIH BEI |

**Engineering measures** : No data available

**Personal protective equipment**

Respiratory protection : required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter type P3

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Hand protection

Material : Nitrile rubber
Break through time : 480 min
Glove thickness : 0.11 mm
Protective index : Full contact
Manufacturer : Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Material : Nitrile rubber
Break through time : 480 min
Glove thickness : 0.11 mm
Protective index : Splash contact
Manufacturer : Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Manufacturer : data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

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| | | |
|---|---|---|
| Remarks | : | Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.<br>If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario. |
| Eye protection | : | Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).<br>Safety glasses |
| Skin and body protection | : | protective clothing |
| Hygiene measures | : | Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. |

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| Appearance | : | solid |
| Color | : | No data available |
| Odor | : | No data available |
| Odor Threshold | : | No data available |
| pH | : | No data available |
| Melting point/ range | : | 486 - 489 °F / 252 - 254 °C<br>Method: lit. |
| Boiling point/boiling range | : | 838 °F / 448 °C<br>Method: lit. |
| Flash point | : | No data available |
| Evaporation rate | : | No data available |
| Flammability (solid, gas) | : | No data available |

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| | | |
|---|---|---|
| Flammability (liquids) | : | No data available |
| Burning rate | : | No data available |
| Upper explosion limit / Upper flammability limit | : | No data available |
| Lower explosion limit / Lower flammability limit | : | No data available |
| Vapor pressure | : | No data available |
| Relative vapor density | : | No data available |
| Relative density | : | No data available |
| Density | : | No data available |
| Solubility(ies) | | |
| Water solubility | : | insoluble |
| Partition coefficient: n-octanol/water | : | log Pow: 5.73 |
| Autoignition temperature | : | No data available |
| Decomposition temperature | : | No data available |
| Viscosity, dynamic | : | No data available |
| Viscosity, kinematic | : | No data available |
| Flow time | : | No data available |
| Explosive properties | : | No data available |
| Oxidizing properties | : | No data available |
| Molecular weight | : | 228.29 g/mol |
| Particle characteristics | | |
| Particle size | : | No data available |

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## SECTION 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| Reactivity | : | No data available |
| Chemical stability | : | The product is chemically stable under standard ambient conditions (room temperature) . |



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| | | |
|---|---|---|
| Possibility of hazardous reactions | : | No data available |
| Conditions to avoid | : | no information available |
| Incompatible materials | : | Strong oxidizing agents |
| Hazardous decomposition products | : | In the event of fire: see section 5 |

## SECTION 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

**Acute toxicity**
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

**Skin corrosion/irritation**
No data available

**Serious eye damage/eye irritation**
No data available

**Respiratory or skin sensitization**
No data available

**Germ cell mutagenicity**
In vitro tests showed mutagenic effects
Test Type: Ames test
Test system: Salmonella typhimurium
Result: positive
Remarks: (Lit.)

**Carcinogenicity**
Possible human carcinogen

| | |
|---|---|
| IARC: | 2B - Group 2B: Possibly carcinogenic to humans (chrysene) |
| NTP: | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |
| OSHA: | OSHA specifically regulated carcinogen (chrysene) |

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

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### 11.2 Additional Information

RTECS: GC0700000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Property that cannot be excluded on the basis of structure- effect considerations:

Nausea
Vomiting
Risk of methaemoglobin formation with headache, cardiac dysrhythmia, drop in blood pressure, dyspnoea and spasms, principal symptom: cyanosis (blue discolouration of the blood).

This substance should be handled with particular care.

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

**Components:**

**chrysene:**

| | | |
|---|---|---|
| Toxicity to fish | : | LC50 : 0.1 mg/l<br>Exposure time: 96 h |
| M-Factor (Acute aquatic toxicity) | : | 10 |
| M-Factor (Chronic aquatic toxicity) | : | 10 |

**Ecotoxicology Assessment**

| | | |
|---|---|---|
| Acute aquatic toxicity | : | Very toxic to aquatic life. |
| Chronic aquatic toxicity | : | Very toxic to aquatic life with long lasting effects. |

**Persistence and degradability**

**Components:**

**chrysene:**

| | | |
|---|---|---|
| Biodegradability | : | Remarks: No data available |

**Bioaccumulative potential**

**Components:**

**chrysene:**

| | | |
|---|---|---|
| Partition coefficient: n- | : | log Pow: 5.73 |

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| | | |
|---|---|---|
| octanol/water | | Remarks: Potential bioaccumulation (HSDB) |

**Mobility in soil**

No data available

**Other adverse effects**

**Components:**

**chrysene:**

| | | |
|---|---|---|
| Additional ecological information | : | Discharge into the environment must be avoided. |

## SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal methods**

| | | |
|---|---|---|
| Waste from residues | : | Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. |

## SECTION 14. TRANSPORT INFORMATION

**International Regulations**

**IATA-DGR**

| | | |
|---|---|---|
| UN/ID No. | : | UN 3077 |
| Proper shipping name | : | Environmentally hazardous substance, solid, n.o.s. (chrysene) |
| Class | : | 9 |
| Packing group | : | III |
| Labels | : | Class 9 - Miscellaneous dangerous substances and articles |
| Packing instruction (cargo aircraft) | : | 956 |
| Packing instruction (passenger aircraft) | : | 956 |

**IMDG-Code**

| | | |
|---|---|---|
| UN number | : | UN 3077 |
| Proper shipping name | : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (chrysene) |
| Class | : | 9 |
| Packing group | : | III |
| Labels | : | 9 |
| EmS Code | : | F-A, S-F |
| Marine pollutant | : | yes |

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**Transport in bulk according to IMO instruments**

Not applicable for product as supplied.

**National regulation**

**49 CFR Road**

| | | |
|---|---|---|
| UN/ID/NA number | : | UN 3077 |
| Proper shipping name | : | Environmentally hazardous substance, solid, n.o.s. (chrysene) |
| Class | : | 9 |
| Packing group | : | III |
| Labels | : | Class 9 - Miscellaneous dangerous substances and articles |
| ERG Code | : | 171 |
| Marine pollutant | : | no |
| Poison Inhalation Hazard | : | No |

**Special precautions for user**

| | | |
|---|---|---|
| Remarks | : | EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids. |

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

## SECTION 15. REGULATORY INFORMATION

**CERCLA Reportable Quantity**

| Components | CAS-No. | Component RQ (lbs) | Calculated product RQ (lbs) |
|---|---|---|---|
| chrysene | 218-01-9 | 100 | 100 |

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

| Components | CAS-No. | Component TPQ (lbs) |
|---|---|---|

| | | |
|---|---|---|
| **SARA 311/312 Hazards** | : | Chronic Health Hazard |
| **SARA 313** | : | The following components are subject to reporting levels established by SARA Title III, Section 313: |

chrysene 218-01-9 100 %

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**US State Regulations**

**Massachusetts Right To Know**

| | |
|---|---|
| chrysene | 218-01-9 |

**Pennsylvania Right To Know**

| | |
|---|---|
| chrysene | 218-01-9 |

**Pennsylvania Right To Know**

| | |
|---|---|
| chrysene | 218-01-9 |

**New Jersey Right To Know**

| | |
|---|---|
| chrysene | 218-01-9 |

**California Prop. 65**

WARNING! This product contains a chemical known in the State of California to cause cancer.

**The ingredients of this product are reported in the following inventories:**

TSCA : All substances listed as active on the TSCA inventory

**TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

## SECTION 16. OTHER INFORMATION

**Full text of other abbreviations**

| | | |
|---|---|---|
| ACGIH BEI | : | ACGIH - Biological Exposure Indices (BEI) |
| NIOSH REL | : | USA. NIOSH Recommended Exposure Limits |
| OSHA Z-1 | : | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| NIOSH REL / TWA | : | Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek |
| OSHA Z-1 / TWA | : | 8-hour time weighted average |

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO -



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International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
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Revision Date : 04/28/2025

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# SAFETY DATA SHEET

Version 6.11
Revision Date 09/06/2024
Print Date 09/07/2024

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifiers

Product name : Manganese

Product Number : 463728
Brand : Aldrich
CAS-No. : 7439-96-5

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

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## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Chemicals which, in contact with water, emit flammable gases (Category 1), H260
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.



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## 2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

| | |
|---|---|
| H260 | In contact with water releases flammable gases which may ignite spontaneously. |
| H411 | Toxic to aquatic life with long lasting effects. |

Precautionary Statements

| | |
|---|---|
| P223 | Do not allow contact with water. |
| P231 + P232 | Handle under inert gas. Protect from moisture. |
| P273 | Avoid release to the environment. |
| P280 | Wear protective gloves/ eye protection/ face protection. |
| P335 + P334 | Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages. |
| P370 + P378 | In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish. |
| P391 | Collect spillage. |
| P402 + P404 | Store in a dry place. Store in a closed container. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

## 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

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# SECTION 3: Composition/information on ingredients

## 3.1 Substances

Formula : Mn
Molecular weight : 54.94 g/mol
CAS-No. : 7439-96-5
EC-No. : 231-105-1

| Component | Classification | Concentration |
|---|---|---|
| **Manganese** | | |
| | 1; Aquatic Acute 2; Aquatic Chronic 2; H260, H401, H411 | <= 100 % |

For the full text of the H-Statements mentioned in this Section, see Section 16.

# SECTION 4: First aid measures

## 4.1 Description of first-aid measures

### General advice

Show this material safety data sheet to the doctor in attendance.



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**If inhaled**
After inhalation: fresh air.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Remove contact lenses.

**If swallowed**
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

**4.2 Most important symptoms and effects, both acute and delayed**
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

**4.3 Indication of any immediate medical attention and special treatment needed**
No data available

## SECTION 5: Firefighting measures

**5.1 Extinguishing media**

**Suitable extinguishing media**
Carbon dioxide (CO2) Dry powder

**Unsuitable extinguishing media**
Water Foam

**5.2 Special hazards arising from the substance or mixture**
Manganese/manganese oxides
Combustible.
May not get in touch with: Water
Development of hazardous combustion gases or vapours possible in the event of fire.

**5.3 Advice for firefighters**
In the event of fire, wear self-contained breathing apparatus.

**5.4 Further information**
Prevent fire extinguishing water from contaminating surface water or the ground water system.

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## SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures**
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

**6.2 Environmental precautions**
Do not let product enter drains. Risk of explosion.



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### 6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

### 6.4 Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

**Advice on safe handling**

Keep workplace dry. Do not allow product to come into contact with water.

**Hygiene measures**

Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

### 7.2 Conditions for safe storage, including any incompatibilities

**Storage conditions**

Tightly closed. Keep away from heat and sources of ignition.
Never allow product to get in contact with water during storage.

Moisture sensitive.

**Storage class**

Storage class (TRGS 510): 4.3: Hazardous materials, which set free flammable gases upon contact with water

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Ingredients with workplace control parameters**

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| Component | CAS-No. | Value | Control parameters | Basis |
|---|---|---|---|---|
| Manganese | 7439-96-5 | TWA | 1 mg/m3 | USA. NIOSH Recommended Exposure Limits |
| | | ST | 3 mg/m3 | USA. NIOSH Recommended Exposure Limits |
| | | C | 5 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | | PEL | 0.2 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | STEL | 3 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | TWA | 0.1 mg/m3 | USA. ACGIH Threshold Limit Values (TLV) |
| | Remarks | Not classifiable as a human carcinogen | | |
| | | TWA | 0.02 mg/m3 | USA. ACGIH Threshold Limit Values (TLV) |
| | | Not classifiable as a human carcinogen | | |

## 8.2 Exposure controls

**Appropriate engineering controls**
Change contaminated clothing. Wash hands after working with substance.

**Personal protective equipment**

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Skin protection**
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

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**Body Protection**
protective clothing

**Respiratory protection**
Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains. Risk of explosion.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| a) | Appearance | Form: powder<br>Color: gray |
| b) | Odor | No data available |
| c) | Odor Threshold | No data available |
| d) | pH | No data available |
| e) | Melting point/freezing point | Melting point/ range: 1,244 °C (2,271 °F) - lit. |
| f) | Initial boiling point and boiling range | 1,962 °C 3,564 °F - lit. |
| g) | Flash point | ()Not applicable |
| h) | Evaporation rate | No data available |
| i) | Flammability (solid, gas) | No data available |
| j) | Upper/lower flammability or explosive limits | No data available |
| k) | Vapor pressure | No data available |
| l) | Vapor density | No data available |
| m) | Density | 7.3 g/mL at 25 °C (77 °F) - lit. |
| | Relative density | 7.419 °C - Regulation (EC) No. 440/2008, Annex, A.3 |
| n) | Water solubility | 0.001 g/l at 20 °C (68 °F) - Regulation (EC) No. 440/2008, Annex, A.6 - slightly soluble |
| o) | Partition coefficient: n-octanol/water | Not applicable for inorganic substances |

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| | | |
|---|---|---|
| p) | Autoignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | Not classified as explosive. |
| t) | Oxidizing properties | none |

**9.2 Other safety information**
No data available

## SECTION 10: Stability and reactivity

**10.1 Reactivity**
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

**10.2 Chemical stability**
The product is chemically stable under standard ambient conditions (room temperature) .

**10.3 Possibility of hazardous reactions**
No data available

**10.4 Conditions to avoid**
Avoid moisture.
Moisture.

**10.5 Incompatible materials**
acids, Halogens, Bases, Phosphorus, Sulfur oxides, Peroxides

**10.6 Hazardous decomposition products**
In the event of fire: see section 5

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## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**
LD50 Oral - Rat - female - > 2,000 mg/kg
(OECD Test Guideline 420)
LC50 Inhalation - Rat - male and female - 4 h - > 5.14 mg/l - dust/mist

(OECD Test Guideline 403)
Dermal: No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation - 4 h



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(OECD Test Guideline 404)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: No eye irritation - 72 h
(OECD Test Guideline 405)

**Respiratory or skin sensitization**
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

**Germ cell mutagenicity**
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

**Carcinogenicity**

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

**Reproductive toxicity**
May cause reproductive disorders.

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

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**Aspiration hazard**
No data available

### 11.2 Additional Information

RTECS: OO9275000
Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

## SECTION 12: Ecological information

### 12.1 Toxicity

| | |
|---|---|
| Toxicity to fish | semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 3.6 mg/l - 96 h<br>(OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - > 1.6 mg/l - 48 h<br>(OECD Test Guideline 202) |
| Toxicity to algae | static test ErC50 - Desmodesmus subspicatus (green algae) - 4.5 mg/l - 72 h<br>(OECD Test Guideline 201) |
| Toxicity to bacteria | static test EC50 - activated sludge - 1,000 mg/l - 3 h<br>(OECD Test Guideline 209) |
| Toxicity to fish(Chronic toxicity) | LC50 - Oncorhynchus mykiss (rainbow trout) - 0.17 - 15.61 mg/l - 28 d<br>Remarks: (ECHA) |
| Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity) | static test NOEC - Ceriodaphnia dubia (water flea) - 1.7 mg/l - 8 d<br>(OECD Test Guideline 211) |

### 12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

### 12.3 Bioaccumulative potential

No data available

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### 12.4 Mobility in soil
No data available

### 12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

### 12.6 Endocrine disrupting properties
No data available

### 12.7 Other adverse effects
No data available

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**Product**
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

## SECTION 14: Transport information

**DOT (US)**
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

**IMDG**
UN number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)

**IATA**
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
IATA Passenger: Not permitted for transport

## SECTION 15: Regulatory information

**CERCLA Reportable Quantity**
This material does not contain any components with a CERCLA RQ.

**SARA 304 Extremely Hazardous Substances Reportable Quantity**
This material does not contain any components with a section 304 EHS RQ.



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**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards** : Reactivity Hazard
Chronic Health Hazard

**SARA 313** : The following components are subject to reporting levels established by SARA Title III, Section 313:

| | | |
|---|---|---|
| Manganese | 7439-96-5 | >= 90 - <= 100 % |

**Clean Air Act**

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61):

| | | |
|---|---|---|
| Manganese | 7439-96-5 | >= 90 - <= 100 % |

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

**Clean Water Act**

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307
This product does not contain any priority pollutants related to the U.S. Clean Water Act

**US State Regulations**

**Massachusetts Right To Know**

| | |
|---|---|
| Manganese | 7439-96-5 |

**Pennsylvania Right To Know**

| | |
|---|---|
| Manganese | 7439-96-5 |

**Maine Chemicals of High Concern**

Product does not contain any listed chemicals

**Vermont Chemicals of High Concern**

Product does not contain any listed chemicals

**Washington Chemicals of High Concern**

Product does not contain any listed chemicals

**The ingredients of this product are reported in the following inventories:**

TSCA : All substances listed as active on the TSCA inventory

**TSCA list**

No substances are subject to a Significant New Use Rule.



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No substances are subject to TSCA 12(b) export notification requirements.

## SECTION 16: Other information

**Further information**

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.11 Revision Date: 09/06/2024 Print Date: 09/07/2024

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# SAFETY DATA SHEET

Version 6.11
Revision Date 09/08/2024
Print Date 09/09/2024

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifiers

Product name : Thallium

Product Number : 277932
Brand : Aldrich
Index-No. : 081-001-00-3
CAS-No. : 7440-28-0

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

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## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 2), H330
Specific target organ toxicity - repeated exposure (Category 2), H373



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Short-term (acute) aquatic hazard (Category 3), H402
Long-term (chronic) aquatic hazard (Category 4), H413

For the full text of the H-Statements mentioned in this Section, see Section 16.

### 2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

| | |
|---|---|
| H300 + H330 | Fatal if swallowed or if inhaled. |
| H373 | May cause damage to organs through prolonged or repeated exposure. |
| H402 | Harmful to aquatic life. |
| H413 | May cause long lasting harmful effects to aquatic life. |

Precautionary Statements

| | |
|---|---|
| P260 | Do not breathe dust. |
| P264 | Wash skin thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P273 | Avoid release to the environment. |
| P284 | Wear respiratory protection. |
| P301 + P310 + P330 | IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth. |
| P304 + P340 + P310 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor. |
| P314 | Get medical advice/ attention if you feel unwell. |
| P403 + P233 | Store in a well-ventilated place. Keep container tightly closed. |
| P405 | Store locked up. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

| | | |
|---|---|---|
| Formula | : | Tl |
| Molecular weight | : | 204.38 g/mol |
| CAS-No. | : | 7440-28-0 |
| EC-No. | : | 231-138-1 |
| Index-No. | : | 081-001-00-3 |

| Component | Classification | Concentration |
|---|---|---|
| **Thallium** | | |
| | Acute Tox. 2; STOT RE 2; Aquatic Acute 3; Aquatic Chronic 4; H300, H330, H373, H402, H413 | <= 100 % |

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For the full text of the H-Statements mentioned in this Section, see Section 16.

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

**General advice**
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

**If swallowed**
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

### 4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### 4.3 Indication of any immediate medical attention and special treatment needed
No data available

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## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media**
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture
thallium oxides
Not combustible.
Ambient fire may liberate hazardous vapours.



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### 5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### 5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

### 6.2 Environmental precautions
Do not let product enter drains.

### 6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

### 6.4 Reference to other sections
For disposal see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

**Advice on safe handling**
Work under hood. Do not inhale substance/mixture.

**Hygiene measures**
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

### 7.2 Conditions for safe storage, including any incompatibilities

**Storage conditions**
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

**Storage class**
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

### 7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Ingredients with workplace control parameters**

| Component | CAS-No. | Value | Control parameters | Basis |
|---|---|---|---|---|
| Thallium | 7440-28-0 | TWA | 0.1 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | Remarks | Skin designation | | |
| | | TWA | 0.02 mg/m3 | USA. ACGIH Threshold Limit Values (TLV) |
| | | Danger of cutaneous absorption | | |
| | | TWA | 0.1 mg/m3 | USA. NIOSH Recommended Exposure Limits |
| | | Potential for dermal absorption | | |
| | | PEL | 0.1 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | Skin | | |

### 8.2 Exposure controls

**Appropriate engineering controls**
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

**Personal protective equipment**

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Body Protection**
protective clothing

**Respiratory protection**
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.

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## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| a) | Appearance | Form: granular<br>Color: light gray |
| b) | Odor | No data available |
| c) | Odor Threshold | No data available |
| d) | pH | No data available |
| e) | Melting point/freezing point | Melting point/ range: 303 °C (577 °F) - lit. |
| f) | Initial boiling point and boiling range | 1,457 °C 2,655 °F - lit. |
| g) | Flash point | ()Not applicable |
| h) | Evaporation rate | No data available |
| i) | Flammability (solid, gas) | The product is not flammable. |
| j) | Upper/lower flammability or explosive limits | No data available |
| k) | Vapor pressure | No data available |
| l) | Vapor density | No data available |
| m) | Density | No data available |
| | Relative density | No data available |
| n) | Water solubility | No data available |
| o) | Partition coefficient: n-octanol/water | No data available |
| p) | Autoignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | No data available |

### 9.2 Other safety information

No data available

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## SECTION 10: Stability and reactivity

**10.1 Reactivity**
No data available

**10.2 Chemical stability**
The product is chemically stable under standard ambient conditions (room temperature) .

**10.3 Possibility of hazardous reactions**
No data available

**10.4 Conditions to avoid**
Air sensitive.
no information available

**10.5 Incompatible materials**
Strong acids, Strong oxidizing agents

**10.6 Hazardous decomposition products**
In the event of fire: see section 5

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**
Acute toxicity estimate Oral - 5.1 mg/kg
(Expert judgment)
Oral: No data available
Acute toxicity estimate Inhalation - 4 h - 0.051 mg/l - dust/mist

(Expert judgment)
Dermal: No data available
No data available

**Skin corrosion/irritation**
Remarks: No data available

**Serious eye damage/eye irritation**
Remarks: No data available

**Respiratory or skin sensitization**
No data available

**Germ cell mutagenicity**
No data available

**Carcinogenicity**

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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**Reproductive toxicity**
Possible risk of congenital malformation in the fetus.
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
May cause damage to organs through prolonged or repeated exposure.

**Aspiration hazard**
No data available

### 11.2 Additional Information

RTECS: XG3425000
The most characteristic symptom of thallium exposure is alopecia (loss of hair). Cutaneous effects may include dry, scaly skin and impairment of nail growth often resulting in the appearance of crescent-shaped strips across fingernails and toenails (Mees' line). Other symptoms in acute poisoning relate chiefly to the gastrointestinal tract, nervous system, skin, eyes, and cardiovascular system. Acute poisoning results in swelling of the feet and legs, arthralgia, vomiting, insomnia, hyperesthesia and paresthesia of the hands and feet, mental confusion, polyneuritis with severe pain in the legs and loins, partial paralysis of the legs, angina-like pains, nephritis, wasting and weakness, and lymphocytosis and eosinophilia. In chronic poisoning, central and peripheral nervous system abnormalities may persist including ataxia, tremor, incoordination, paralysis of extremities, endocrine disorders, memory loss, and psychoses may develop., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

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## SECTION 12: Ecological information

### 12.1 Toxicity

| | |
|---|---|
| Toxicity to fish | LC50 - Cyprinodon variegatus (sheepshead minnow) - 21.0 mg/l - 96.0 h |
| | mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 14.0 mg/l - 96.0 h |

### 12.2 Persistence and degradability
No data available

### 12.3 Bioaccumulative potential
No data available

### 12.4 Mobility in soil
No data available

### 12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted



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### 12.6 Endocrine disrupting properties

No data available

### 12.7 Other adverse effects

No data available

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**Product**

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

## SECTION 14: Transport information

**DOT (US)**

UN number: 3288 Class: 6.1 Packing group: II
Proper shipping name: Toxic solid, inorganic, n.o.s. (Thallium)
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

**IMDG**

UN number: 3288 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, INORGANIC, N.O.S. (Thallium)

**IATA**

UN number: 3288 Class: 6.1 Packing group: II
Proper shipping name: Toxic solid, inorganic, n.o.s. (Thallium)

## SECTION 15: Regulatory information

**CERCLA Reportable Quantity**

| Components | CAS-No. | Component RQ (lbs) | Calculated product RQ (lbs) |
|---|---|---|---|
| Thallium | 7440-28-0 | 1000 | 1000 |

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312** : Acute Health Hazard

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**Hazards** Chronic Health Hazard

**SARA 313** : The following components are subject to reporting levels established by SARA Title III, Section 313:

| | | |
|---|---|---|
| Thallium | 7440-28-0 | >= 90 - <= 100 % |

**US State Regulations**

**Massachusetts Right To Know**

| | |
|---|---|
| Thallium | 7440-28-0 |

**Pennsylvania Right To Know**

| | |
|---|---|
| Thallium | 7440-28-0 |

**Maine Chemicals of High Concern**

Product does not contain any listed chemicals

**Vermont Chemicals of High Concern**

Product does not contain any listed chemicals

**Washington Chemicals of High Concern**

Product does not contain any listed chemicals

**The ingredients of this product are reported in the following inventories:**

TSCA : All substances listed as active on the TSCA inventory

**TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

## SECTION 16: Other information

**Further information**

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.11 Revision Date: 09/08/2024 Print Date: 09/09/2024



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# Safety data for indeno[1,2,3-cd]pyrene

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

## General

Synonyms: 1,10-(1,2-phenylene)pyrene, 1,10-(o-phenylene)pyrene, o-phenylenepyrene, 2,3-phenylenepyrene, 2,3,o-phenylenepyrene, IP
Use:
Molecular formula: $C_{22}H_{12}$
CAS No: 193-39-5
EINECS No: 205-893-2

## Physical data

Appearance: solid
Melting point: 161 - 163 C
Boiling point: 536 C
Vapour density:
Vapour pressure:
Density (g $cm^{-3}$):
Flash point:
Explosion limits:
Autoignition temperature:
Water solubility:

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## Stability

Stable. Incompatible with strong oxidizing agents.

## Toxicology

Limited evidence that this material may be carcinogenic.

### Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

### Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R40.

## Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
Non-hazardous for air, sea and road freight.

## Personal protection

Treat as potentially hazardous - many multi-ring aromatic compounds are suspected carcinogens.

### Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)
S36 S37 S45.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

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This information was last updated on May 10, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

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# APPENDIX C

Heat Illness Prevention Program

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# HEAT ILLNESS
# PREVENTION PROGRAM

| | | |
|---|---|---|
| **CORPORATE HEALTH AND SAFETY DIRECTOR** | : | **Brian Hobbs, CIH, CSP** |
| **EFFECTIVE DATE** | : | **10/2019** |
| **REVISION DATE** | : | **03/2024** |
| **REVISION NUMBER** | : | **3** |

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## 1. PURPOSE

Roux Associates, Inc. and its affiliated **companies**, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has established this heat illness prevention program to assist in preventing workplace accidents, injuries, and illnesses associated with temperature extremes. Roux is committed to taking every precaution to protect employees who might be exposed to heat stress, including establishing safe work practices, heat illness prevention controls, and emergency preparedness, which will be detailed in this plan.

## 2. SCOPE AND APPLICABILITY

Roux's Heat Illness Prevention Program applies to all employees who may be exposed to heat stress in the field.

## 3. ROLES AND RESPONSIBILITIES

The Heat Illness Prevention Program Administrator for Roux is the Corporate Health and Safety Director (CHSD), Brian Hobbs, CIH, CSP. The daily administration of the program is delegated to the Operations Manager (OM) and Office Health and Safety Manager (OHSM). The CHSD has the authority, responsibility, and overall accountability for the comprehensive implementation of this program.

All managers and supervisors shall implement and maintain the heat illness prevention program in work areas where there is a potential for heat stress.

### Management Responsibilities

Management (i.e., Project Managers, Project Principals, OM) must provide the following to promote compliance and foster a good safety culture:

- Comply with applicable standards.
- Inform employees of the provisions of the heat illness prevention program and ensure understanding.
- Provide sufficient water, shade, rest areas, and other heat illness controls for employees.
- Assist with establishing work practices to minimize heat stress risks, such as acclimatization, required rest periods, employee monitoring, and strategic scheduling.
- Encourage employees to report hazardous conditions or heat illness symptoms.
- Provide training to any employee who could possibly be exposed to the risk of heat illness.

### Employee Responsibilities

Employees are expected to actively participate in the organization's heat illness prevention program, which includes the following responsibilities:

- Receive appropriate training with regard to heat stress.
- Understand core concepts of heat illness prevention and follow guidelines to mitigate risks.
- Recognize the signs and symptoms of heat illness and immediately report them.
- Cooperate with workplace inspections and incident investigations.

### Effective Communication

All Roux employees shall be accountable for ensuring there is effective communication with both the field team and their subcontractors. Communication between Roux employees project leads (e.g., Project Principal, Project Managers) and subcontractors (if applicable) will be established and maintained so that employees can quickly

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contact should there be a change in condition or someone at the Site exhibits signs/symptoms of heat stress. These types of incidents would follow Roux's Incident Investigation and Reporting Management Program 2.12 and Roux's Injury Illness Prevention Program 2.22.

## 4. HAZARD IDENTIFICATION AND ASSESSMENT

Prior to scheduled fieldwork, the project team shall ensure a hazard assessment is conducted as it relates to heat stress. This will include a determination of how much heat and exertion employees are likely to be exposed to based on the work activity.

Factors that can increase heat stress include the following:

- Temperatures at the work site;
- Humidity;
- A lack of air movement or exchange;
- The amount of time employees spend working in the heat;
- The time of day work takes place;
- Sources of radiant heat (e.g., sunlight, fire, or hot furnace);
- Work activities that produce heat (e.g., welding);
- Physical contact with warm or hot objects or liquids;
- The clothing and PPE employees are required to wear; and/or
- Physically strenuous work.

Results of the hazard analysis should be used to determine appropriate controls for mitigating heat stress, whenever possible, for planning acclimatization, and for developing work schedules that rotate workers to limit employee exposure. Typically, the Site Supervisor (SS) or Site Health and Safety Officer (SHSO) shall conduct worksite observations to ensure all employees follow heat illness prevention procedures and that hazards are sufficiently controlled. However, all employees should be continuously evaluating work site conditions and be able to recognize heat stressors in order to prevent heat illnesses.

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## 5. TRAINING

All Roux employees shall be trained on the topics listed below prior to beginning work, which may potentially expose workers to heat stress.

### Training Topics

- The environmental, behavioral, and personal risk factors for heat illness, such as radiant heat sources, exertion, clothing and PPE, and use of alcohol or drugs.
- Types of heat illnesses, common symptoms, and appropriate emergency response for each.
- The knowledge that mild symptoms may quickly become more severe or life-threatening.
- The importance of immediately reporting any signs or symptoms of heat illness to the supervisor.
- The employer's responsibility to provide shade, water, access to first aid, and cool-down rests during work and the employee's freedom to exercise their rights under this standard without fear of retaliation.

- The employer's heat stress plan and its procedures:
  - Procedures for employees who are newly assigned to work in high-heat areas.
  - The organization's acclimatization methods, as applicable.
  - Heatwave procedures.
  - Heat illness and emergency response, including contact information.
- The importance of frequent consumption of water and the taking of rest breaks.
- How heat illness prevention applies to employees' specific tasks.

**Increasing Training Effectiveness:**

- The SS/SHSO will hold daily tailgates with the field team to go over daily work tasks and basic safety information including Job Safety Analysis (JSA) review as well as incorporate elements such as current weather and effects on the work activities for the day.
- If a heat wave or high heat is anticipated, OHSMs and/or OMs will provide communications to Roux employees prior to their shifts and remind them of any special high heat procedures.

## 6. DRINKING WATER

Employees shall be given access to potable drinking water. Access to water will be provided as near as possible to where employees are working, and there shall be enough locations so employees will have sufficient water. Water should be fresh and pure, free of taste or smell that would discourage employees from drinking, comfortably cool, and obtained from an approved source.

The recommendation is that during warm or hot weather, employees drink four 8-ounce glasses of water, or a total of one quart per hour, throughout the entire work shift. Easy access to sufficient potable drinking water throughout the work shift encourages employees to drink.

During a heat wave, water shall be replenished more often to keep available and cool. Water containers (and all spouts and levers) must be kept clean. If able, provide single-use drinking cups with appropriate waste receptacles. Accessible sanitation facilities shall also be maintained at work Sites as appropriate.

**SS/SHSO is responsible for the following:**

- Drink sufficient water before, during, and after work shifts to maintain hydration.
- Encourage frequent drinking of small amounts of water throughout the shift. In high-heat environments, remind field staff and subcontractors that drinking extra water may be necessary.
- Discourage the choice of drinks with caffeine or sugar that may possibly dehydrate employees instead of water. Also, discourage the drinking of alcohol.
- Monitor the water supply.
- If employees become dehydrated and are unable to alleviate symptoms with the steps below, get them immediate medical attention.

**Field Staff/Subcontractors are responsible for the following:**

- Drink sufficient water before, during, and after work shifts to maintain hydration. Drink up to 4 cups of water per hour, especially during hot weather.
- Be aware that in high-heat situations, you may need to drink more water.

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- Monitor yourself and others for signs of dehydration. If you feel dehydrated:
  - Follow Roux's Incident Notification Flowchart;
  - Rest in the shaded resting area; and
  - Drink water in small amounts, but frequently.

## 7. ACCESS TO SHADE

Access to shaded areas will be provided to Roux staff, as needed. Employees are encouraged to use these areas when they feel overheated. Roux's SS/SHSO shall oversee the proper implementation of shaded areas and will communicate these locations on a daily basis with the Field Team.

Depending on the Site, shaded areas can include the following:

- Pop-up Tents
- Canopies
- Umbrellas
- Structures mechanically ventilated or open to air movement
  - Garage
- Conex-mounted RV canopies
- Full and thick tree canopies that block direct sunlight
- Buildings
- Enclosed areas only if they provide cooling comparable to shade in open-air
  - Vehicles with air conditioning

### Shaded Area Requirements

The shade shall be strong enough to cool employees down and other shadows should not be visible in the shade. The shade will be provided by Roux when the air temperature exceeds 80°F. If the temperature is less than 80°F, shade will be available and provided upon request. The SS/SHSO will monitor conditions to determine when the air will exceed (and is exceeding) 80°F. For most Sites, air will be monitored hourly and shade will be set up immediately if 80°F is exceeded.

Shade shall be located as close as practical to areas where employees are working and is easily accessible. These areas will be considered safe and free from other hazards. Shaded areas should be large enough to accommodate all employees who are on a break, resting, or recovering without crowding. Should natural vegetation be used for shade, the SS/SHSO will evaluate shade for effectiveness.

### Field Staff Responsibilities

Field Staff should take ordinary rest breaks in the shaded areas and monitor themselves for signs of heat stress, and go to the shaded area when they need to cool down. Any issues or problems with shaded areas should be reported to the SS/SHSO for the Site.

If shaded areas are used for a preventative cool-down, the SS/SHSO will ensure the affected employees will remain in the shade until they begin to feel better. The SS/SHSO will continue to monitor the employees and ask them if

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they are experiencing symptoms of a heat illness. Employees shall not be sent back to work before symptoms have ended and at a minimum at least 10 minutes of rest.

## 8. MONITORING AND SCHEDULING

### Monitoring

The SS/SHSO and Field Team will continue to monitor themselves and others for signs of heat illness. The SS/SHSO will monitor when the air temperature exceeds 80°F. Throughout the summer, weather and temperature will be monitored at least two weeks ahead, and the work schedule will be planned to accommodate the expected weather.

### Scheduling

Scheduling accommodations may include:

- Working during cooler hours of the day
- Working at night
- Stopping work early
- Rescheduling work activities
- Increasing frequency of breaks

In general, strenuous work activities shall be rescheduled to the coolest parts of the day.

Special precautions are required for temperatures above 80°F, 95°F, and heat waves. These precautions are provided in the sections below.

## 9. ACCLIMATIZATION AND NEW EMPLOYEE PROCEDURES

Roux requires employees to be acclimatized in order for them to better tolerate heat in the workplace. Acclimatization is the physical process of adapting to a different thermal environment, allowing a better toleration of heat. Acclimatization procedures require gradual exposure that gives the employee time to adjust to each level of exposure. Acclimatization is essential for new employees but is necessary for all employees when the temperature significantly changes. Heat stress is much more likely if these procedures are not followed.

The SS/SHSO is responsible for observing new employees during their first 14 days of employment in high-heat areas.

Re-acclimatization is necessary if employees are absent from high-heat environments for a week or more or the temperature increases significantly.

## 10. HEATWAVE AND EXTREME HEAT PROCEDURES

### Heat Wave Procedures

A heat wave is defined as consistent temperatures over 80°F or if the temperature is 10° higher than the average daily temperatures in the preceding 5 days.

SS/SHSO and Project Management (e.g., PP, PM) shall closely observe and monitor employees during a heat wave. The Field Teams should institute a ratio of one SS to 20 or fewer employees, a mandatory buddy system, or

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a consistent practice for supervisors to check on employees. Pre-shift meetings to review high-heat procedures with employees will be carried out to emphasize work-rest schedules, drinking water, shade, etc.

**Extreme Heat Procedures**

When work-site temperatures equal or exceed 95°F, the employer will enact extreme heat procedures:

- Employees will be closely observed by the SS/SHSO for signs of heat illness. New employees will be supervised for acclimatization.
- Effective communication and monitoring will be assured through the use of periodic check-ins with the SS/SHSO via phone. Communications between employees and Project Management (e.g., PP/PM) will be established and maintained. Mandatory 10-minute break periods are required for every two hours worked. SS/SHSO must enforce this rule.
- Pre-shift safety tailgate meetings will occur to review procedures and to remind employees to drink water and take cool-down rests if needed. SS/SHSO shall remind employees to rest and drink water. Employees should drink more water than usual.

## 11. EMERGENCY RESPONSE PROCEDURES

Roux is dedicated to providing prompt appropriate care for all employees who report or show symptoms of heat illness. If an employee shows signs of heat illness, they will be monitored and shall not be left alone or sent home without being offered first aid or emergency medical services. If on-Site personnel require any medical treatment, the following steps will be taken:

1. Notify Roux's Project and Corporate Management Team for any work-related injury and/or illness occurrence, and communicate with the contracted Occupational Health Care Management Provider, AllOne Health (AOH), immediately following the notifications provided above.
2. Based on discussions with the Project Team, Corporate Management, and the AOH evaluation, if medical attention beyond onsite First Aid is warranted, transport the injured / ill person (IP) to the Urgent Care Center, or notify the Fire Department or Ambulance Emergency service and request an ambulance or transport the victim to the hospital, and continue communications with Corporate Management Team. An Urgent Care/Hospital Route map with locations and directions is provided within Site Specific Health and Safety Plans.
3. First aid medical support will be provided by onsite personnel trained and certified in First Aid, Cardio Pulmonary Resuscitation (CPR), Automatic External Defibrillation (AED), and Blood-Borne Pathogens (BBP) Awareness, until relieved by emergency medical services (EMS).
4. The SHSO and Project Manager will perform a Loss Investigation (LI) and the Project Team will complete the final Loss Report.

## 12. HEAT-RELATED ILLNESSES

**Heat Stress**

Heat stress is a significant potential hazard and can be associated with heavy physical activity and/or the use of personal protective equipment (PPE) in hot-weather environments. For these reasons, the company will provide potable drinking water and access to shade or other areas of relief (i.e., air-conditioned vehicles and work trailers). Supervisors, prior to supervising personnel in the field as well as all personnel involved with the fieldwork of a project, are trained in this HASP that includes preventing heat-related illnesses and the below procedures in response to heat-related symptoms and illness. Since much of our work is dependent upon environmental factors beyond our control, we must closely monitor air temperature and humidity and be aware of avoiding radiant heat sources and providing as much air circulation as possible wherever we work. Physical factors that need to be evaluated as part of our Job Safety Analysis (JSA) reviews include the level of physical activity and duration of work

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and the type (i.e., color, weight breathability) of the clothing we select. In addition, personal factors such as age, weight, fitness, drug/alcohol use, and prior history of heat-related illness need to be considered.

Heat cramps are brought on by prolonged exposure to heat. As an individual sweats, water and salts are lost by the body, resulting in painful muscle cramps. The signs and symptoms of heat stress are as follows:

- Severe muscle cramps, usually in the legs and abdomen;
- Exhaustion, often to the point of collapse; and
- Dizziness or periods of faintness.

First aid treatment includes, but is not limited to, shade, rest, and fluid replacement. Typically, the individual should recover within one-half hour while being monitored constantly. If the individual has not improved substantially within 30 minutes and the body temperature has not decreased, the individual should be transported to a hospital for medical attention.

**Heat Exhaustion**

Heat exhaustion may occur in a healthy individual who has been exposed to excessive heat while working or exercising. The circulatory system of the individual fails as blood collects near the skin to rid the body of excess heat through transference. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing;
- Weak pulse;
- Cold and clammy skin with heavy perspiration;
- Skin appears pale;
- Fatigue and weakness;
- Dizziness; and
- Elevated body temperature.

First aid treatment includes, but is not limited to, cooling the victim, elevating the feet, and replacing fluids. If the individual is not substantially improved within 30 minutes and the body temperature has not decreased, the individual should be transported to the hospital for medical attention.

**Heat Stroke**

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a MEDICAL EMERGENCY requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot red skin;
- Body temperature approaching or above 105 degrees F;
- Confusion, altered mental state, slurred speech;
- Seizures;
- Large (dilated) pupils; and
- Loss of consciousness – the individual may go into a coma.

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First aid treatment requires immediate cooling and transportation to a medical facility. Heat stress is a significant hazard if any type of protective equipment (semi-permeable or impermeable) that prevents evaporative cooling is worn in hot-weather environments.

## 13. OTHER HEAT CONTROLS

### Clothing and PPE

Employees should choose clothing that is reflective, light-colored, lightweight, loose-fitting, and breathable. Clothing should cover the exposed parts of the body. In direct sun, hard hats with a brim or bill may be helpful. Should specialized cooling garments be applicable, please consult with your OM/OHSM/CHSD.

### Managing Employee Risk Factors

It is recommended that employees are aware of how their health can affect their risk of heat stress. The following increases ones risk for a heat related illness:

- A poor level of physical fitness
- Obesity
- Chronic or acute illnesses
- Conditions such as diabetes, heart disease, or high blood pressure
- Certain medications, such as diuretics
- Age (60+)

Employees should:

- Maintain their health outside of work
- Be aware of the effects of medications
- Drink adequate amounts of water
- Eat light, cool meals during work shifts and save heavy meals until after the shift is over
- Do not skip meals:  food helps replace electrolytes when sweating
- Take breaks as needed
- Do not consume alcohol prior to working in a hot environment

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# APPENDIX D

Personal Protective Equipment (PPE) Management Program

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# PERSONAL PROTECTIVE EQUIPMENT MANAGEMENT PROGRAM

| | | |
|---|---|---|
| **CORPORATE HEALTH AND SAFETY DIRECTOR** | : | **Brian Hobbs, CIH, CSP** |
| **EFFECTIVE DATE** | : | **01/2019** |
| **REVIEW DATE** | : | **03/2024** |
| **REVISION NUMBER** | : | **5** |

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## 1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C., and Remedial Engineering (collectively, "Roux") has instituted the following program to establish guidelines for the selection of personal protective equipment (PPE) for use by Roux personnel performing field activities in hazardous environments. PPE is not meant to be a substitute for engineering, work practice, and/or administrative controls, but PPE should be used in conjunction with these controls to protect employees in the workplace. Clothing, body coverings, and other accessories designed to prevent worker exposure to workplace hazards are all types of PPE. To ensure adequate PPE employee-owned PPE is evaluated on a case-by-case basis to insure its adequacy, maintenance and sanitation.

## 2. SCOPE AND APPLICABILITY

These guidelines apply to all PPE selection decisions to be made in implementing the Roux program. The foundations for this program are the numerous Occupational Health and Safety Administration (OSHA) standards related to PPE cited in 29 CFR 1910 Subpart I, 29 CFR 1926 Subpart E, and the hazardous environment work employee protection requirements under the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 and 1926.65. To ensure hazard assessments are documented, the levels of protection, types of protection, and tasks requiring protection are covered in site-specific Health and Safety Plans (HASPs) and Job Safety Analyses (JSAs).

## 3. PROCEDURES

Due to the varied nature of site activities and the different potential hazards associated with different sites, several aspects must be considered when selecting PPE. The following text describes PPE selection logic and provides guidelines and requirements for the appropriate selection and use of PPE.

### 3.1 Introduction

To harm the body, chemicals must first gain entrance. The intact skin and respiratory tract are usually the first body tissues that are exposed to chemical contaminants. These tissues provide barriers to some chemicals but, in many cases, are damaged themselves or are highly permeable by certain chemical compounds. PPE, therefore, is used to minimize or eliminate chemical compounds from coming into contact with these first barrier tissues.

Proper PPE selection is essential in preventing exposures. The Project Manager (PM) or health and safety personnel making the selection will have to consider several factors. The level of protection, type, and kind of equipment selected depends on the hazardous conditions. In some cases, additional selection factors include cost, availability, compatibility with other equipment, and performance. All these factors must be accurately assessed before work can be safely carried out.

#### 3.1.1 Training

Training shall be provided to all field-based employees in properly using and caring for PPE. Training shall include, but not be limited to, the initial 40-hour HAZWOPER training, annual 8-hour HAZWOPER refresher training, and site-specific PPE training. The training program includes when PPE is necessary, what types of PPE are required; how to don, doff, adjust, and wear PPE; the limitations of PPE; the proper care, maintenance, useful life, signs of PPE failure and emergency procedures to follow in the event of PPE failure and disposal of PPE. In addition, retraining shall be conducted when workplace changes require a change in PPE when an employee demonstrates a lack of knowledge or improper use of PPE is identified.

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### 3.2 Types of PPE

The type and selection of PPE must meet certain general criteria and requirements as required under OSHA 29 CFR 1910.132 (General Industry) and 1926.95 (Construction). In addition to these general requirements, specific requirements and specifications exist for some types of PPE that form the basis of the protective clothing scheme. All manufacturer's recommendations for PPE care and use shall be followed. All PPE shall be maintained in a sanitary and reliable condition. Additionally, proper fit and size shall be evaluated to ensure adequate employee protection. Should PPE become defective, it shall be immediately removed from service and discarded.

The following is a list of the common types of specific PPE and the specific requirements for the PPE type, where applicable:

1. Hard Hats - Regulated by 29 CFR 1910.135 and 1926.100; and specified in ANSI Z89.1.
2. Face Shields and Safety Glasses - Regulated by 29 CFR 1910.133 and 1926.102; and specified in ANSI Z87.1.
3. Respiratory Protection - Regulated by 29 CFR 1910.134 and 1926.103.
4. Hand Protection - Regulated by 29 CFR 1910.138
5. Foot Protection - Regulated by 29 CFR 1910.136 and 1926.96; and specified in ANSI Z41.1.
6. Protective Clothing (e.g., fully encapsulated suits, aprons) - Specified in NFPA 1991/1992/1994.

#### 3.2.1 PPE Inspection, Cleaning Maintenance, and Storage

The Office Health and Safety Manager (OHSM) or their designee is responsible for procuring PPE, in accordance with this management program. Single-use/disposable PPE should be purchased and used whenever practicable.

##### 3.2.1.1 PPE Inspection

Roux employees must inspect PPE regularly, before and after each use, to check for defects and damage. Garments and other PPE in central storage must be inspected at least annually or as recommended by the manufacturer by the OHSM, Equipment Manager and/or their designee. Defective or damaged equipment must be tagged as out-of-service, immediately removed from the work site and discarded.

##### 3.2.1.2 PPE Cleaning and Maintenance

All Roux employees are responsible for routine cleaning of their assigned PPE. Decontamination of PPE is addressed within Roux's Site Control and Decontamination Program as well as specified within site-specific health and safety plans. As appropriate, Roux employees should be issued single-use PPE when practicable to minimize the requirement for decontamination. When performing routine cleaning of reusable PPE:

- Always follow the manufacturer's recommendations to avoid damaging the PPE. For example, some cleaning solutions compromise the integrity of protective helmets' shells.
- Clean and maintain PPE according to the manufacturer's recommendations. Before being re-issued, PPE should be thoroughly sanitized.
- Disassemble, wash, and sanitize reusable respirators after each use, refer to Roux's Respiratory Protection Management Program.

Employees are not authorized to repair PPE without prior approval from the Health and Safety Department. Reusable PPE may require maintenance by the manufacturer to maintain integrity and certification. Many

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manufacturers specify which repairs, if performed by the end-user, will void product warranty, therefore Roux employees are not typically authorized to perform such maintenance or repairs.

#### 3.2.1.3 PPE Storage

Certain equipment failures can be directly attributed to improper storage. The OHSM or Equipment Manager (or another designated person) is responsible for implementing procedures for appropriate PPE storage, for equipment that is centrally stored. Both central storage and dedicated PPE provided to employees should be stored using the following:

- Store goggles and safety glasses in protective cases.
- Store PPE (such as helmets, boots, etc.) in clean, dust-proof containers or bags out of direct sunlight.
- PPE should ideally be stored under climate-controlled conditions. PPE, stocked gear bags, and/or go-kits should not be stored in hot, cold, or other extreme environmental conditions, and they should not be stored in vehicles (government-owned or rentals) for even short periods of time. Do not store helmets on the rear window shelf of a vehicle.
- Store different kinds of clothing and gloves separately to prevent errors in selection.
- Hang or fold protective clothing in accordance with manufacturers' recommendations.
- Never store contaminated PPE near new protective clothing or street clothing. Potentially contaminated, reusable clothing must be stored (usually bagged) away from new PPE, in a well-ventilated area, with good air flow around each item, until the garment is decontaminated or disposed.
- See Roux's Respiratory Protection Management Program for detailed procedures on storing respirators.

### 3.3 Fitting, Donning and Doffing PPE

Roux shall provide appropriately sized PPE for Roux employees. Improper fitting such as tight-fitting garments, can tear, especially at the knees, crotch, shoulders, back, and elbows due to movement. Protective clothing that is too large can easily snag and/or limit a user's dexterity. The Roux PM shall ensure site/project-specific PPE is kept in a sufficient stock of appropriately sized PPE (e.g., Level C ensembles). The OHSM, Equipment Manager and/or their designee shall ensure a sufficient stock of appropriately sized PPE is maintained in central storage locations.

The Site Supervisor (SS)/Site Health and Safety Officer (SHSO) is responsible for ensuring that site-specific procedures for donning and doffing PPE are incorporated into site-specific HASPs. Donning and doffing procedures may differ depending on the type of PPE and clothing (e.g., Level D, Modified Level D, Level C) utilized. Figures 1-4, provide examples of procedures that can be used to don and doff Levels A through D and are provided as a reference. Site-specific conditions may warrant adjustments to such procedures. Consult the CHSD for additional information.

Site-specific donning and doffing procedures should include the use of an assistant where necessary. Donning and doffing certain types of PPE without assistance could risk PPE failure or damage. Care must be taken to prevent the spread of contaminants on the PPE. Decontamination procedures should limit the potential for cross contamination and may include gross decontamination of outer boots, gloves, and suits as necessary to prevent tracking of contaminants into the contamination reduction zone (CRZ) and clean zone(s).

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### 3.4 Controlling Hazards Associated with PPE Use

PPE use can pose potential health and safety hazards, which range from minor discomfort to life-threatening height stroke. The magnitude of the potential hazard can vary and will depend on various factors, including an individual's fitness level, the type of PPE worn, the work demands, individual work practices, duration of work and environmental conditions. The use of PPE can also lead to reduced efficiency and work performance.

Among hazards associated with PPE use, heat stress emerges as a prevalent and significant hazard. Particularly, the use of substantial and/or impermeable attire, such as heavy coveralls, Tyvek suits, splash suits, or Level A or B suits, alongside strenuous work, amplifies the risk of heat stress. Regular monitoring for indications of heat stress is imperative for workers operating in such conditions. Roux's Heat Illness Prevention Program lays out requirements for signs and symptoms as well as preventative measures to mitigate the potential for heat illness. In addition, cold environments can pose adverse risk, such examples include use of non-insulated steel-toe safety shoes in frigid conditions which has the potential to increase the risk of frostbite, while safety gloves worn for chemical protection may inadequately insulate hands from the cold.

It is the responsibility of Project Teams to integrate site-specific protocols to manage PPE hazards into such site-specific HASPs. These protocols can encompass considerations like work/rest ratios, crew rotations, and other accommodations for exceptionally demanding conditions.

The following measures are recommended for controlling hazards posed by PPE use:

- Prioritize through the hierarchy of controls with a focus on elimination, substitution, engineering, work practice and administrative control implementation rather than sole reliance on PPE. PPE shall be considered the last line of worker protection.
- Workers should maintain physical fitness to be able to withstand the potential physical strain of PPE use. A physically fit individual will endure less physiological strain, manifesting in a lower heart rate, reduced body temperature (indicating diminished retained body heat), more effective sweating, slightly lower oxygen consumption, and carbon dioxide production. Furthermore, acclimatization to extreme environmental conditions, such as high temperatures, can influence work performance and physical capacity.
- Understand the symptoms of PPE failure. Workers encountering any of these symptoms while donning PPE should promptly notify their onsite SHSO and/or SS:
    - Perception of odors when wearing a respirator
    - Skin irritation
    - Acute discomfort
    - Difficulty breathing
    - Unusual fatigue
    - Dizziness
    - Inability to see, hear, or speak clearly
    - Uncomfortable restriction of movement
    - Rapid pulse, nausea, or chest pain
- Implement a buddy system. Especially in situations where there is a need for increased level of protection (e.g. Level A-C) workers should work in pairs or teams, and are instructed to monitor the integrity of their team/partners gear and remain alert for symptoms of PPE failure.

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### 3.5 PPE Selection

For site-specific work, the Project Manager in consultation with the Health and Safety Department has overall responsibility for coordinating the selection and distribution of PPE to field staff and for ensuring that the selected PPE is appropriate for the site-specific hazards. Generally speaking Roux employees are not engaged in emergency response or perform work at uncontrolled hazardous waste sites, if the case the CHSD shall be made aware of the work and consult with the Project Team on appropriate PPE selection. Most work falls under environmental sampling of low concentration water/soil/perimeter air. Therefore work is carried out in Level D PPE. Upgrades would be based on more information as it becomes available. The United States Environmental Protection Agency (EPA) has created Guidelines for PPE Ensemble Selection to assist workers in selecting PPE ensembles for specific activities and tasks and determining which ensembles and air monitoring equipment should be used to address specific chemicals. Guidelines to Ensembles for Specific Activities/Tasks Where Chemical Exposure is Possible is provided as a reference as Appendix A.

### 3.6 Protective Clothing Selection Criteria

#### 3.6.1 Chemicals Present

The most important factor in selecting PPE is the determination of what chemicals the employee may be exposed to. The number of chemicals on field investigations may range from a few to several hundred. The exact chemicals or group of chemicals present at the site (certain groups tend to require similar protection) can be determined by collecting and analyzing air, soil, water, or other site media samples. When data are lacking, research into the hazardous materials used or stored at the site can be used to infer potential chemical exposures on the site.

The most appropriate clothing shall be selected once the known or suspected chemicals have been identified and considered based on the type of work to be performed.

Protective garments are made of several different substances for protection against specific chemicals. There is no universal protective material. All will decompose, permeate, or otherwise fail to protect under given circumstances. Fortunately, most manufacturers make guides to using their products (i.e., Dupont's Tyvek™ Permeation Guide). These guides are usually for gloves and coveralls and typically provide information regarding chemical degradation rates (failure of the material to maintain structural integrity when in contact with the chemical) and may provide information on the permeation rate (whether or not the material allows the chemical to pass through). When permeation tables are available, they shall be used with degradation tables to determine the most appropriate protective material for the specific chemical hazard(s).

During most site work, chemicals are usually in mixed combinations, and the protective materials are not in continuous contact with pure chemicals for long periods; therefore, the selected material may be adequate for the particular chemical of most concern and type of work being performed, yet not the "best" protecting material for all site chemicals and activities. Selection shall depend upon the most hazardous chemicals based on their hazards and concentrations. Sometimes, layering (i.e., using several layers of protective materials) affords the best protection.

#### 3.6.2 Concentration of the Chemical(s)

One of the major criteria for selecting protective material is the concentration of the chemical(s) in air, liquid, and solid state. Airborne and liquid chemical concentrations should be compared to the OSHA standards and American Conference of Governmental Industrial Hygienists (ACGIH) and National Institute for Occupational Safety and Health (NIOSH) guidelines to determine the level of skin or other absorptive

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surface (e.g., eyes) protection needed. While these standards are not designed specifically for skin exposed directly to the liquid, they may provide skin designations indicative of chemicals known to have significant skin or dermal absorption effects. For example, airborne levels of PCBs on-site may be low because they are not very volatile, so the inhalation hazard may be minimal; however, PCB-containing liquid coming in direct contact with the skin may cause overexposure. Thus, PCBs have been assigned a skin designation in the OSHA and ACGIH exposure limit tables.

### 3.6.3 Physical State

The characteristics of a chemical may range from nontoxic to highly toxic, depending on its physical state. Inorganic lead in soil would not be considered toxic to site personnel unless it became airborne since it is generally not absorbed through the intact skin. However, organic lead in a liquid could be readily absorbed through the skin. Soil is frequently contaminated with hazardous materials. Concentrations will vary from a few parts per million to nearly one hundred percent by volume. The degree of hazard depends on the type of soil and concentration of the chemical. Generally speaking, "dry" soils that have not become airborne do not pose a hazard to site personnel if they take minimal precautions, such as wearing lightweight gloves.

### 3.6.4 Length of Exposure

The length of time a material is exposed to a chemical increases the probability of a breakthrough. Determinations of actual breakthrough times for short-term exposures indicate that several materials that would be considered inadequate under long-term exposures can be used. Different materials that would be considered inadequate under long-term exposures can be used. It should be kept in mind that during the manufacturer’s permeation testing, a pure (100% composition) liquid is usually placed in direct contact with the material, producing a worst-case situation.

### 3.6.5 Abrasion

When selecting protective clothing, the job the employee is engaged in must be taken into consideration. Persons moving drums or performing other manual tasks may require added protection for their hands, lower chest, and thighs. Using leather gloves and a heavy apron over other normal protective clothing will help prevent damage to the normal PPE and thus reduce worker exposures.

### 3.6.6 Dexterity

Although protection from skin and inhalation hazards is the primary concern when selecting PPE, the ability to perform the assigned task must be maintained. For example, personnel cannot be expected to perform work that requires fine dexterity if they must wear thick gloves. Therefore, the PPE selection process must consider the task being performed and provide PPE alternatives or techniques that maintain dexterity while still protecting the worker (e.g., wearing tight latex gloves over more bulky hand protection to increase dexterity).

### 3.6.7 Ability to Decontaminate

If disposable clothing cannot be used, the ability to decontaminate the materials selected must be taken into consideration. Once a chemical makes contact with the material, the PPE must be cleaned before reusing it. If the chemical has completely permeated the material, the clothing cannot be adequately decontaminated, and the material should be discarded.

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### 3.6.8 Climactic Conditions

The human body works best with few restraints from clothing. Protective clothing adds a body burden by increasing weight, restricting movement, and preventing the body's natural cooling process. In severe situations, a modified work program must be used.

Some materials act differently when they are very hot and very cold. For example, PVC becomes almost brittle in frigid temperatures. If there are any questions about the stability of the protective materials under different conditions, the manufacturer should be contacted before using PPE in the field.

### 3.6.9 Work Load

Like climactic conditions, the type of work activity may affect work duration and personnel's ability to perform certain tasks. Similarly, the amount of protective materials a person wears will affect their ability to perform certain tasks. For example, a person in a total encapsulating suit, even at 72˚F, cannot work for more than a short period of time without requiring a break.

The work schedule should be adjusted to maintain the health of the employees. Modified work practices may include allowing more time for individual job tasks and implementing work/rest cycles per NIOSH and ACGIH thermal stress recommendations. Special consideration should be given to the selection of clothing that protects the worker and adds the least burden when personnel are required to perform strenuous tasks. Excessive bodily stress frequently represents the most significant hazard encountered during fieldwork.

### 3.6.10 Types of Protective Materials

1. Cellulose or Paper: suitable for nuisance dust and coarse fibers.
2. Natural and Synthetic Fibers
    a. Tyvek™: suitable small-sized hazardous particles, including lead, asbestos, and mold.
    b. Tychem™: is suitable for a variety of hazards, from light liquid splashes to heavy exposures to industrial chemicals and agents.
    c. Nomex™: is suitable for flame-resistance, radiation resistance, acids, alkalis, fluorocarbon refrigerants (CFCs), and non-polar solvents.
3. Elastomers
    a. Polyethylene: suitable for polar substances and solvents.
    b. Saran™ : suitable for flame-resistance, acids, alkalis, oils, and organic solvents.
    c. Polyvinyl Chloride (PVC): suitable for alcohols, oils, inorganic acids, alkalis, and salts.
    d. Neoprene: suitable for polar/non-polar substances, petroleum mixtures, and ≤ 200 F heat resistance.
    e. Butyl Rubber: suitable for polar substances and solvents.
    f. Viton: suitable for non-polar substances, petroleum mixtures, and ≤ 200 F heat resistance.
    g. Nitrile: suitable for polar/non-polar substances and petroleum mixtures.

## 3.7 Protection Levels

### 3.7.1 Level A Protection

Level A protection (a fully encapsulated suit) is used when skin hazards exist or when no known data positively rule out skin and other absorption hazards. Per the Roux Respiratory Protection Management

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Program, Roux employees are not authorized to enter an IDLH atmosphere; therefore, the program does not allow supplied air respirators (SARs) or self-contained breathing apparatus (SCBA). At no time will Level A work be performed without the consent of the CHSD and OM.

The following conditions warrant the use of Level A protection:

- Hazardous substances have been identified and require the highest level of protection for skin, eyes, and the respiratory system;
- The atmosphere contains less than 19.5% oxygen or an atmosphere immediately dangerous to life and health (IDLH) that have not been ruled out;
- Site operations involve a high potential for splash, skin immersion, or exposure to suspected skin hazards;
- Direct-reading instruments indicate high levels of unidentified but potentially hazardous vapors or gases in the air (e.g., Total atmospheric readings on the Photoionization Detector (PID), Flame Ionization Detector (FID), and similar instruments indicate 500 to 1,000 ppm of unidentified substances); and
- Direct-reading instruments are not available to test the air and suspected highly toxic substances may be present.

It may be necessary to base the decision to use Level A protection on indirect evidence. Other conditions that may indicate the need for Level A protection include:

- Confined spaces;
- Sites containing known skin hazards;
- Sites with no established history to rule out skin and other absorption hazards;
- Site exhibiting signs of acute mammalian toxicity (e.g., dead animals, illnesses associated with past entry into the site by humans);
- Sites at which sealed drums of unknown materials must be opened;
- Visible indicators such as leaking containers or smoking chemical fires; and
- Extremely hazardous substances (e.g., cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens, and infectious substances) are known or suspected to be present, and skin contact is possible.

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| Table 1: Recommended Level A Ensemble Components | | | |
|---|---|---|---|
| **Component** | **Type** | **Manufacturer / Recommended Material** | **Notes** |
| Respirator | Positive-pressure full- facepiece SCBA or positive-pressure supplied-air respirator with escape SCBA[1] | NIOSH approved respirator | See Roux's Respiratory Protection Program. Roux employees are not approved to utilize Supplied Air (SAR) and/or Self-contained breathing apparatus (SCBA). |
| Suit | Totally encapsulated chemical- and vapor-protective suit | DuPont® Tychem™ or Responder CSM™ | Other material types may be substituted based on known contaminants. |
| Inner Gloves | Light weight | Nitrile, Neoprene, PVC, or Viton® | Other material types may be substituted based on known contaminants. |
| Outer Gloves | Integral part of suit | See Appendix A for additional information | Confirm chemical performance rating for suspected contaminants. Glove material may have different performance ratings than suit material. All fully-encapsulating suit materials must be compatible with substances involved. |
| Inner Boot | Integral Part of Suit | - | - |
| Outer Boot | HazMat boot[2] | – | Confirm chemical performance rating of outer boot for suspected contaminants. Provides slip/abrasion resistance. |
| Hard Hat | Standard[3] | - | - |

[1] Must be NIOSH approved.
[2] Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
[3] Must comply with the applicable ANSI standard.

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### 3.7.2 Level B Protection

Level B protection is utilized when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body is unlikely. At no time will Level B work be performed by Roux personnel without the consent of the CHSD and OM.

The following conditions suggest a need for Level B protection:

- The type and atmospheric concentration of toxic substances have been identified, and they require the highest level of respiratory protection;

- IDLH atmospheres where the substance or concentration in the air does not present a severe skin hazard;
- The type and concentrations of toxic substances do not meet the selection criteria permitting the use of air-purifying respirators and
- It is highly unlikely that the work being done will generate high concentrations of vapors, gases, particulates, or splashes of materials that will affect personnel's skin.

**Table 2: Recommended Level B Ensemble Components**

| Component | Type | Manufacturer / Recommended Material | Notes |
|---|---|---|---|
| Respirator | Positive-pressure full- facepiece SCBA or positive-pressure supplied-air respirator with escape SCBA[1] | NIOSH approved respirator | See Roux's Respiratory Protection Program. Roux employees are not approved to utilize Supplied Air (SAR) and/or Self-contained breathing apparatus (SCBA). |
| Suit | Chemical-resistant clothing (liquid-splash protective suit with integral boot and hood)[2] | DuPont® Tychem® CPF 3 | Other material types may be substituted based on known contaminants. |
| Inner Gloves | Light/medium weight | Nitrile, Neoprene, PVC, Viton®, or PE/EVAL | Other material types may be substituted based on known contaminants. |
| Outer Gloves | Medium/heavy weight | Butyl MIL-G12223, Nitrile, Neoprene, PVC, Viton®, PE/EVAL, or heavy weight Nitrile or Neoprene | Confirm chemical performance rating. Other material types may be substituted based on known contaminants. |
| Inner Boot | Safety work boot | – | Other boot types may be substituted based on known contaminants and physical hazards. Puncture resistant shanks may be required. |
| Outer Boot | Heavy weight Latex booties or outer boots[2] | Latex booties are used to protect suit for light duty applications. NFPA-rated outer boots may be required based on anticipated site conditions and tasks. | Other outer boot coverings may be substituted based on known contaminants/anticipated tasks. |
| Hard Hat | Standard[3] | - | - |

[1] Must be NIOSH approved.
[2] Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
[3] Must comply with the applicable ANSI standard.

### 3.7.3 Level C Protection

Level C protection is utilized when skin and respiratory hazards are well defined, and the criteria for using negative pressure respirators have been fulfilled (i.e., known contaminants and contaminant concentrations, acceptable oxygen levels, approved filter/cartridge available, known cartridge service

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life, etc.). Level C protection may require an emergency escape respirator during specific initial entry and site reconnaissance situations or when applicable after that.

**Table 3: Recommended Level C Ensemble Components**

| Component | Type | Manufacturer / Recommended Material | Notes |
|---|---|---|---|
| Respirator | Full-face air-purifying respirator with appropriate cartridge[1] | NIOSH approved respirator | See Roux's Respiratory Protection Program for information about the brand, model, acceptable configurations, and specific care instructions for the standard issue respirator. Half-faced respirators may be donned if hazard assessment warrants. |
| Suit | Puncture/tear resistant suit material with boot and hood[2] | DuPont® Tychem® CPF 2/CPF 3 or Saranex | Other material types may be substituted based on known contaminants, if considered more appropriate. |
| Inner Gloves | Light weight | Nitrile, Neoprene | Other material types like Neoprene, PVC, Viton®, or PE/EVAL may be substituted based on known contaminants, if considered more appropriate. |
| Outer Gloves | Medium/heavy weight | Butyl, Nitrile, or other work glove | Confirm chemical performance rating. Other material types may be substituted based on known contaminants, if considered more appropriate. |
| Inner Boot | Safety work boot | – | Other boot types may be substituted based on known contaminants and physical hazards. Puncture resistant shanks may be required. |
| Outer Boot | Heavy weight Latex booties or outer boots[2] | Latex booties are used to protect suit for light duty applications. NFPA rated outer boots may be required based on anticipated site conditions and tasks. | Other outer boot coverings may be substituted based on known contaminants. |
| Hard Hat | Standard[3] | - | - |
| Eye Protection | Safety glasses/goggles[3,4] | - | - |

1 Must be NIOSH approved.
2 Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
3 Must comply with the applicable ANSI standard.
4 In the case a ½ face respirator is worn eye protection is required.

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### 3.7.4 Level D Protection

Level D is the basic work uniform. Level D is worn when the atmosphere contains no known hazard. Work functions preclude splashes, immersion, potential for inhalation, or direct contact with hazard chemicals. For most Roux field jobs Level D is the standard minimum level of protection worn.

**Table 4: Recommended Level D Ensemble Components**

| Component | Type | Manufacturer / Recommended Material | Notes |
|---|---|---|---|
| Respirator | None | - | - |
| Suit | Coveralls, street clothes, or disposable Tyvek suit | – | Other types may be substituted as appropriate. |
| Inner Gloves | N/A | | |
| Outer Gloves | As appropriate for physical hazards and for comfort | – | - |
| Boot | Safety work boot | – | Roux's standard safety boot is 6", steel/composite safety toe, and electrical hazard (EH) rated. |
| Outer Boot Covering | As appropriate | – | – |
| Hard Hat | Standard[3] | - | - |
| Eye Protection | Safety glasses/goggles[3] | - | - |
| High Visibility Clothing | High Visibility Vest /Jacket[3] | - | ANSI Class 2 Safety Vests/Jackets are the standard. Class 3 Safety vests/jackets shall be worn in worksites with 50+ MPH traffic. |
| Hearing Protection | Ear muffs/plugs | - | Workers exposed to excessive noise shall don hearing protection. Refer to Roux's Hearing Conservation Program for more information. |

[1] Must be NIOSH approved.
[2] Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
[3] Must comply with the applicable ANSI standard.

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### 3.7.5 Level E Protection

Level E protection is used when radioactivity above 10 millirems per hour (mrems/hr) is detected at the site. Personal protective equipment for Level E includes:

- Coveralls;
- Air purifying respirator (i.e., P100 or equivalent);
- Time limits on exposure;
- Appropriate dermal protection for the type of radiation present, and

- Radiation dosimetry and ambient monitoring.

### 3.7.6 Additional Considerations

Fieldwork will contain a variety of situations due to chemicals in various concentrations and combinations. These situations may be partially ameliorated by following the work practices listed below:

1. Foot protection is needed on every site. If the ground to be worked on is contaminated with liquid, and it is necessary to walk in the chemicals, some sort of protective shoe coverings or "booties" can be worn over the boots. Shoe coverings should be designed with soles to help prevent slips. Using disposable shoe coverings when contacting liquid contamination can on and reduce overall decontamination requirements. If non-liquids are to be encountered, a Tyvek™ bootie could be used. The advantage of booties is questionable if the ground contains any sharp objects. Boots should be worn with either cotton or wool socks to help absorb perspiration.
2. If the site requires hard hats, chin straps should be used if a person will be stooping over where his/her hat may fall off. Respirator straps should not be placed over the hard hats, as this will affect the respirator's fit.

   Some types of protective materials conduct heat and cold readily. In cold conditions, natural material clothing should be worn under protective clothing. Protective clothing should be removed before allowing a person "to get warm." Applying heat, such as with a space heater, to the outside of the protective clothing may drive contaminant permeation. In hot weather, under clothing will absorb sweat. It is recommended that workers use all cotton undergarments.
3. Body protection should be worn and taped to prevent anything from running into the top of the boot. Gloves should be worn and taped to prevent substances from entering the top of the glove. Duct tape is preferred, but masking tape can be used. When aprons are used, they should be taped across the back for added protection. However, this should be done so that the person has mobility.
4. Atmospheric conditions such as precipitation, temperature, wind direction, humidity, wind velocity, and pressure determine the behavior of contaminants in air or the potential for volatile materials to become airborne. These parameters should be considered in determining the need for and the level of protection.
5. A program must be established for periodic air monitoring during site operations. Without an air monitoring program, any changes to air quality would go undetected and might jeopardize on-site personnel. Monitoring can be done with various types of air pumps and filtering devices, followed by laboratory analysis of the filtration media, personnel dosimeters, and periodic walk-throughs by personnel carrying real-time direct-reading survey instruments.
6. For operations in the exclusion zone, different levels of protection may be selected, and various types of chemical-resistant clothing may be worn. This selection should be based on the job function, reason for being in the area, and the potential for skin contact with, or inhalation of, the chemicals present.
7. Escape masks must be readily available when levels of respiratory protection do not include an SCBA and the possibility of an IDLH atmosphere exists. The use and placement of escape masks should be made on a case-by-case basis. Escape masks should be strategically located at the site in areas with higher potential for vapors, gases, or particulates.

## 3.8 Decontamination of PPE

Roux prefers the use of single use PPE to minimize the requirement for significant decontamination. The following procedures shall be considered should a field project require the need for decontamination of PPE. Roux has also developed a Site Control and Decontamination Management Program.

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### 3.8.1 Site-Specific Decontamination Plans

The Project Manager (or another authorized individual) is responsible for formulating the site-specific PPE decontamination plan as an integral part of the Health and Safety Plan (HASP). The SHSO/SS' responsibilities include ensuring the plan's implementation and adapting it as site conditions evolve. Refer to Roux's Site Control and Decontamination Management program for additional requirements.

The decontamination plan, often created in conjunction with PPE selection, must be established prior to workers entering potentially contaminated areas. The plan should address the following key aspects:

- Decontamination Hazard Evaluation and Risk Assessment: Assessing risks associated with decontamination processes.
- PPE for Decontamination Line Assistants: Specifying appropriate PPE for personnel involved in decontamination.
- Roles and Responsibilities During Decontamination: Defining tasks and duties during the decontamination process.
- Layout and Quantity of Decontamination Stations: Determining the number and arrangement of decontamination stations, along with the designated PPE decontamination procedures at each station.
- Decontamination Equipment: Identifying the necessary equipment for effective decontamination.
- Decontamination Methods: Describing the methods and protocols for decontaminating personnel and equipment.
- Preventing Contamination of Clean Areas: Outlining procedures to prevent contamination of uncontaminated zones.
- Minimizing Contact with Contaminants During CPC Removal: Providing guidelines to reduce wearer exposure during the removal of Chemical Protective Clothing (CPC).
- Disposal Procedures for Inadequately Decontaminated Clothing and Equipment: Ensuring proper disposal practices for items that have not been adequately decontaminated.

The initial decontamination plan, which is developed in conjunction with the initial site hazard assessment, should be based on worst-case assumptions about the extent and type of contamination.

### 3.8.2 Emergency Decontamination of PPE

The designated SHSO/SS (or another authorized individual) assumes responsibility for addressing emergency decontamination within the site-specific Health and Safety Plan (HASP). Emergency decontamination may become necessary due to events such as fires, explosions, sudden violent storms, or medical emergencies. The emergency decontamination plan must clearly delineate emergency egress routes, as well as procedures for both decontamination and egress.

Some key points to consider regarding emergency decontamination.

- Immediate Notification: The SHSO/SS (or their designated counterpart) must be promptly informed of any circumstances requiring emergency decontamination. Additionally, they are accountable for tracking all personnel during the process.
- Urgent Medical Treatment: If urgent medical attention is necessary, decontamination of PPE may be delayed until the victim's condition stabilizes.
- Balancing Priorities: When feasible, decontamination should occur without hindering essential first aid. However, if a worker is exposed to an extremely toxic or corrosive substance, immediate decontamination is crucial to prevent severe injury or fatality.

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- Heat-Related Illness: In cases of heat-related illness, protective clothing must be promptly removed (refer to Roux's Heat Illness Prevention Program).

Emergency Facilities:

- For workers potentially exposed to corrosive materials, quick drenching or flushing facilities must be provided in accordance with 29 CFR 1910.151(c) and 1926.50(g).
- Similarly, if workers face other hazards (such as splash or dust) that could harm the eyes or body, readily accessible wash stations are essential. These stations should be properly located and maintained, including regular water changes, as per the manufacturer's instructions.

### 3.8.3 Protection of Decontamination Line Assistants

Should work require a decontamination corridor the following shall be used as guidance. The SHSO/SS (or other designated person) must for ensuring that decontamination line assistants receive appropriate PPE and addressing their protection within the site-specific HASP. Key zones—namely, the Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Clean Support Zone—must be clearly marked both in the field and within the site-specific HASP. The following should be considered when preparing for protection of decontamination line assistants.

1. Task Hazard Analysis: A thorough analysis must be conducted for line assistants to determine the optimal PPE level required. Factors influencing this decision include:
    - Expected or Visible Contamination on Responders
    - Type of Contaminant and associated respiratory and skin hazards
    - Total Vapor/Gas Concentrations in the CRZ
    - Presence of Particulates and specific inorganic or organic vapors in the CRZ
    - Results of Wipe Tests (refer to Section 5.4)
    - Slope and Configuration of the CRZ
2. PPE Levels: Depending on the situation:
    - Line assistants may need to wear the same PPE level as workers in the EZ.
    - Alternatively, line assistants may be adequately protected by using PPE one level lower (e.g., wearing Level C protection while decontaminating workers who are wearing Level B)."

### 3.8.4 Procedures to Minimize PPE Contamination

Proper work practices and procedures should be implemented at sites to minimize the potential for contact with chemicals of concern while onsite. The following guidance should be considered when developing site specific procedures:

- Opt for single-use Personal Protective Equipment (PPE) when feasible to minimize decontamination needs.
- Ensure complete sealing of PPE closures and interfaces, including pockets, zippers, and other potential openings.
- Position gloves and boots underneath the sleeves and pant legs of outerwear to reduce exposure.
- Place hoods outside the collar if they are not already attached.
- Utilize disposable outerwear and equipment when suitable to facilitate easy disposal and reduce decontamination efforts.
- Secure all junctions with tape to block contaminants from entering gloves, boots, jackets, and suits.

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- Adopt work practices that limit contact with hazardous substances, such as avoiding unnecessary exposure.
- Employ remote techniques for sampling, handling, and opening containers, like using drum grapples and pneumatic impact wrenches.
- Store monitoring and sampling devices in bags designed with openings for sample ports and sensors.
- Cover contaminant sources with plastic sheeting or overpacks to shield PPE from contamination.

### 3.8.5 PPE Disposal

The PM in coordination with the field team shall ensure the safe disposal of all wastes generated from PPE use. PPE must be placed in appropriate containers, labeled, and prepared for disposal separately from other forms of waste. Refer to Roux's General Waste Corporate Management Program for further guidance.

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# APPENDIX A
# EPA's
# GUIDELINES TO ENSEMBLES FOR SPECIFIC ACTIVITIES/TASKS WHERE CHEMICAL EXPOSURE IS POSSIBLE

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**GUIDELINES TO ENSEMBLES FOR SPECIFIC ACTIVITIES/TASKS**
**WHERE CHEMICAL EXPOSURE IS POSSIBLE**

**IMPORTANT: READ FOOTNOTES AND ASSUMPTIONS/JUSTIFICATIONS PRIOR TO USING TABLE**

**Notes:**

1. This table is for use by trained environmental professionals only. To use this table:
   a. Scan the activity description to find activities (bolded) that most closely matches those you plan to engage in.
   b. Review Hazard/Conditions section to make sure the hazards of the planned activity match those listed. Note the Required Work Practices and be ready to follow them.
   c. For those activities most likely to be conducted as part the response, select Targeted Minimum PPE (Personal Protective Equipment).
   d. Necessary equipment needs to be available and used unless other information becomes available which necessitates an upgrade or allows a downgrade in the protection level. The work area must be continuously re-evaluated to ensure workers have the proper safety equipment.
   e. When working in hazardous environments, workers must always be aware of their surroundings. In addition to this Table, workers entering these environments need to use "common sense" prior to proceeding.
2. These ensembles focus on chemical protection and may not be adequate for all hazards. This Table can be used as a starting point but does not circumvent proper evaluation by an industrial hygienist in appropriate situations. See Table 2 for more specific chemical agents.
3. Suits, gloves, boots listed in the Minimum PPE column will not be appropriate for all activities, hazards and conditions. The listings should be used as a guide only. Confirm PPE compatibility with specific chemical contaminants.
4. A comprehensive Task Hazard Analysis must be performed prior to final selection of ensembles/PPE material types.
5. Hardhat (Class A or C), safety glasses/other eye protection are typically required but may not be specified here. In noisy environments (above 85dB) hearing protection is required. In areas where there is traffic, heavy machinery, or other hazards involving worker visibility problems a Class 2 High Visibility Vest must be worn. Activities requiring vests include natural disaster responses, demolitions, and excavations.
6. PPE makes and models referenced in these tables are only suggestions. Other comparable, adequate makes and models may be used.

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Emergency Response and/or Initial Entry/Assessment – Low Hazard Expected (Sites/Facilities):**<br>• Air and Radiation Monitoring Sweep<br>• Visual Assessment<br>• Note Taking<br>• Photo-documentation | • Suspected low hazard based on site history/visual evidence.<br>• No CBRN suspected.<br>• No visible/suspected vapors.<br>• No potential for IDLH atmosphere.<br>• Unknown physical hazards.<br>• Some site background information.<br>• No intrusive work expected.<br>• Low potential for chemical splash/contact (based on expected tasks/ known conditions).<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Level B** (Downgrade/upgrade based on knowledge of contaminants and monitoring with PID/FID, radiation detector, LEL/$O_2$ per HASP/ SOSGs)<br>**Respirator: Scott or MSA Full Face**<br>**Suit Type:** [I]Tychem CPF-3 (with boot, hood)/ChemTape<br>**Inner Glove:** [II]Nitrile (6 mil min recommended)<br>**Outer Glove:** [II]Neoprene, Nitrile, (28 mil min recommended)<br>**Outer Steel Toe Boot:** [IV]Tingley HazProof Model 82330 **or**<br>**Steel Toe Boot Cover**: [V]Latex HazMaster Booty and rely on suit boot material for permeation protection.<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br>**DECON**: Dry or soap & water |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Emergency Response and/or Initial Entry/Assessment of Unknown – Potential Moderate Hazard (Sites/Facilities):**<br>• Air and Radiation Monitoring Sweep<br>• Visual Assessment<br>• Note Taking<br>• Photo-documentation | • Possible high hazard chemicals based on site history/visual evidence (spills, corrosion, industrial practices, etc.).<br>• No CBRN suspected.<br>• No visible/suspected vapors.<br>• **No** reasonable potential for **IDLH** atmosphere.<br>• Unknown physical hazards.<br>• Little/ no site background information.<br>• No intrusive work expected.<br>• Low potential for chemical splash/contact.<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Level B** (Downgrade/upgrade based on knowledge of contaminants and monitoring with PID/FID, radiation detector, LEL/$O_2$ per HASP/ SOSGs)<br>**Respirator: Scott or MSA Full Face**<br>**Suit Type:** [I]Tychem Responder (with boot, hood)/ChemTape<br>**Inner Glove:** [II]Nitrile (6 mil min recommended)<br>**Outer Glove:** [II]Neoprene, Nitrile, (28 mil min recommended)<br>**Outer Steel Toe Boot:** [IV]Tingley HazProof Model 82330 **or**<br>**Steel Toe Boot Cover**: [V]Latex HazMaster Booty and rely on suit boot material for permeation protection.<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br>**DECON**: Dry or soap & water |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Emergency Response and/or Initial Entry/Assessment of Unknown - Suspected High Hazard (Sites/Facilities):**<br>• Air and Radiation Monitoring Sweep<br>• Visual Assessment<br>• Note Taking<br>• Photo-documentation | • Potential for high hazard chemicals/ IDLH based on site history/visual evidence (visible/expected reactions, spills, vapors, fumes, smoke, known releases, etc.).<br>• No CBRN suspected.<br>• Potential for chemical reactions.<br>• Unknown physical hazards.<br>• Little/ no site background information or information suggesting high hazard.<br>• Intrusive work possible.<br>• Potential for chemical splash/contact.<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Level A** (Downgrade/upgrade (Trelleborg, etc.) based on knowledge of contaminants and monitoring with PID/FID, radiation detector, LEL/$O_2$ per HASP/ SOSGs)<br>**Respirator: Scott or MSA Full Face**<br>**Suit Type:** Encapsulating [I]Tychem Responder/Responder CSM (with boot, hood, gloves)/ChemTape<br>**Inner Glove:** [II]Nitrile (6 mil min recommended)<br>**Outer Glove:** [II]Neoprene, Nitrile, (28 mil min recommended)<br>**Outer Steel Toe/Steel Shank Boot:** [IV]Tingley HazProof Model 82330 and rely on suit boot material for permeation protection.<br>(ASTM F-2413/ANSI Z41)<br>**DECON**: Dry or soap & water: water source for emergency DECON; other DECON agents on hand. |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Drum/Tank Sampling**<br>• Container opening<br>• Continuous air monitoring<br>• Product sampling | • Unknown chemicals.<br>• No CBRN.<br>• Potential splash hazard.<br>• Physical hazard controls in place.<br>• Assumes no initial hazardous atmosphere.<br>• Ensure availability of water source for emergency DECON/shower/eyewash.<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Level B** (Upgrade/Downgrade based on knowledge of contaminants and monitoring with PID/FID, radiation detector, LEL/$O_2$ per HASP/ SOSGs)<br>**Respirator: Scott or MSA Full Face**<br>**Suit Type:** [I]Tychem Responder (with boot, hood)/ChemTape<br>**Inner Glove:** [II]Nitrile, Neoprene, Viton, PVC<br>**Outer Glove:** [II]Heavy Duty Butyl, Nitrile,<br>**Other:** ANSI Approved Splash Shield<br>**Outer Steel Toe Boot:** [IV]Tingley HazProof Model 82330 **or**<br>**Steel Toe Boot Cover**: [V]Latex HazMaster Booty and rely on suit boot material for permeation protection.<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br>**DECON:** Dry DECON or soap and water; water source for emergency DECON and eyewash suggested. |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Hazardous Categorization Testing** (**HAZCAT**)<br>• Opening sample containers in controlled environment<br>• Working with small sample quantities in well ventilated area<br>• Conducting HAZCAT testing with appropriate lab equipment | • Assumes known chemical classes and site situation/background.<br>• No CBRN suspected.<br>• Assumes immediate suit removal if contaminated and frequent glove changes.<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Level B** (Upgrade/Downgrade based on knowledge of contaminants and monitoring with PID/FID, radiation detector, LEL/$O_2$ per HASP/ SOSGs)<br>**Respirator: Scott or MSA Full Face**<br>**Suit Type:** [I]Tychem CPF4 (with hood, boot)<br>**Inner Glove:** [II]Nitrile<br>**Outer Glove:** [II]Viton or 4-H (use surgie over the 4-H for dexterity)<br>**Outer Steel Toe Boot:** [IV]Tingley HazProof Model 82330 **or**<br>**Steel Toe Boot Cover**: [V]Latex HazMaster Booty and rely on suit boot material for permeation protection.<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br>**DECON:** Dry or soap and water; water source for emergency DECON and eyewash suggested |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Oil Spill Response/Recovery Operations – Fresh Product:**<br>• Recovery operations (vac truck, skimmers, boom deployment where direct contact expected)<br>• Product sampling<br>• Continuous air monitoring at/near source of spill | • Crude oil/diesel/kerosene/gasoline spill.<br>• Assumes fresh/ongoing spill, close proximity to source.<br>• Assumes early phase while evaporation of light organics, benzene/other aromatics is still occurring (24-48 hours or if spill is on-going).<br>• Assumes down-wind location.<br>• Continuous air monitoring required for %LEL, Organics, $\%O_2$ (and $H_2S$ as necessary for sour crude).<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Modified Level C:** 1/2 face respirator w/safety glasses/goggles as needed for splash protection. Downgrade as appropriate based on air monitoring.<br>**Respirator: Scott or MSA ½ Face**<br>**Respirator Cartridge:** [III] Multi-Phase Cartridge (Scott 642 Multi-purpose; MSA with/GME P-100 or equivalent).<br>**Suit Type:** [I]Tychem CPF4 w/boot [jet fuel use Tychem BR]<br>**Inner Glove:** [II]Neoprene (for protection at DECON line only, not for prolonged contact)<br>**Outer Glove:** [II]Viton-Butyl Rubber (assumes potential for direct contact with fresh material – based on benzene/aromatic constituents) SEE NEXT ROW FOR WEATHERED PRODUCT.<br>**Outer Steel Toe Boot:** [IV]Tingley HazProof Model 82330 **or**<br>**Steel Toe Boot Cover**: [V]Latex HazMaster Booty and rely on suit boot material for permeation protection.<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br>**DECON:** Dry DECON/ Soap and water as feasible |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Oil Spill Response Assessment/Recovery – Weathered Product**<br>• Shoreline clean-up assessment (SCAT)<br>• Environmental sampling/weathered product sampling<br>• Recovery Operations for weathered material<br>• Assessment via boat/on or near water – use appropriate flotation device with ensemble. | • Crude oil/diesel/kerosene/gasoline spill.<br>• Assumes weathered oil (over 24-48 hours, depending on spilled material and ambient temperatures).<br>• Assumes operations are remote from source of spill.<br>• Assumes no other potential for airborne aromatics/benzene/flammable vapors. | **Modified Level D** (Upgrade/Downgrade based on potential for contact and air monitoring with FID/PID, LEL/$O_2$ Meter.<br><br>**If contact with material suspected, use following:**<br>**Suit Type:** [I]Tychem F w/boot [jet fuel-Tychem BR] (Tychem SL may be an option for weathered crude/diesel – see manufacturer's information)<br>**Inner Glove:** [II]Nitrile<br>**Outer Glove:** [II]Nitrile (Best Nitri-solv 727)<br><br>**Outer Boot Cover:** [V]Latex HazMaster Booty<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br>**DECON:** Dry DECON/Soap and water as feasible |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Demolition/Excavation Operations:**<br>• Heavy equipment operation<br>• Excavation/Trenching<br>• Continuous air monitoring when soil is disturbed or demolition activities conducted.<br>• Fuel Oil underground tank removal.<br>• Drum Excavation activities EXCLUDED. | • Demolition activities generating potentially hazardous particulates (asbestos, lead, silica, etc.).<br>• Excavation activities that could expose soil contaminated with low levels of known hazardous chemicals to the surrounding area /in the trench/ excavation.<br>• No potential for IDLH atmosphere.<br>• Site background information available.<br>• Known physical hazards.<br>• Workers will have minimal/ no contact with contaminants (i.e., operators in a cab, inspectors/ observers at a safe distance).<br>• Continuous air monitoring required in trench for %LEL, Toxics, and $\%O_2$ when workers are in trench and for particulate when activities generating particulate are conducted.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Modified Level C:** 1/2 face respirator w/safety glasses. Downgrade or upgrade as appropriate based on air monitoring.<br>**Respirator: Scott or MSA ½ Face**<br>**Respirator Cartridge:** [III] Multi-Phase Cartridge (Scott 642 Multi-purpose P-100; MSA with/GME P-100 or equivalent).<br>**Suit Type:** [I]Proshield Next Gen<br>**Inner Glove:** NA<br>**Outer Glove:** Leather<br><br>**Outer Steel Toe Boot: NA**<br>**Steel Toe Boot Cover**: [V]Latex HazMaster Booty (if chemical in soil is possible)<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br>**DECON:** Dry DECON/ Soap and water as feasible |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Natural Disaster Response (Hurricane, Tornado, Flood, Earthquake) - Orphan Container Recovery:**<br>• Routine hand collection/pick-up of small containers from debris piles/lines<br>• Land based operations - conducted on foot<br><br>**Note:** Physical Hazards may necessitate PPE modifications. | • Unknown materials – confident identification based on visual observations.<br>• **Required Work practice:** re-evaluate prior to moving suspicious containers. Air monitoring and PPE upgrade may be required.<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Modified Level D:** Upgrade/downgrade based on suspicious containers (not easily identified visually) and air monitoring with PID/FID, radiation detector, LEL/$O_2$ per HASP/ SOSGs<br><br>**Suit Type:** [I]Tychem CPF-3 w/boot<br>**Inner Glove:** [II]Nitrile<br>**Outer Glove:** [II]Nitrile (Best Nitri-solv 727) or Leather<br>**Outer Boot Cover:** [V]Latex HazMaster Booty<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br><br>**DECON:** Dry DECON/Soap and water as feasible |
| **Natural Disaster Response (Hurricane, Tornado, Flood, Earthquake) - Orphan Container Recovery:**<br>• Routine Drum recovery from debris lines/piles/ other – conducted on land<br><br>**Note:** Physical Hazards may necessitate PPE modifications. | • Unknown materials – confident identification based on visual observations.<br>• **Required Work practice:** re-evaluate prior to moving suspicious containers. Air monitoring and PPE upgrade may be required.<br>• **Required Work Practice:** Immediate PPE Change-out (i.e., gloves, etc.) upon contact with chemicals.<br>• **Required Work Practice:** Must follow standard air monitoring protocol. | **Modified Level D:** Upgrade/downgrade based on suspicious containers (not easily identified visually) and air monitoring with PID/FID, radiation detector, LEL/$O_2$ per HASP/ SOSGs<br><br>**Suit Type:** [I]Tychem CPF-3 w/boot<br>**Inner Glove:** [II]Nitrile<br>**Outer Glove:** [II]Nitrile (Best Nitri-solv 727) or Leather<br>**Outer Boot Cover** [V]Latex HazMaster Booty<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br><br>**DECON:** Dry DECON/Soap and water as feasible |

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| Activity Description | Hazards/Conditions | Targeted Minimum PPE |
|---|---|---|
| **Natural Disaster Response (Hurricane, Tornado, Flood, Earthquake) – Flood water sampling:**<br>• Water Sampling of flood waters where potential for contact with hands/feet is high<br><br>**Note:** Physical Hazards may necessitate PPE modifications. | • Unknown contaminants<br>• Potential for pathogens suspected<br>• Low potential for acute exposure to hazardous chemicals<br>• Assumes open air/well ventilated areas<br>**Required Work Practice:** Monitor all poorly ventilated areas in appropriate PPE/Respiratory Protection for organic vapors (PID & FID), %LEL/flammable atmospheres, $H_2S$ prior to entry | **Modified Level D:** Upgrade based on more information as it becomes available.<br><br>**Suit Type:** [I]Proshield Next Gen<br>**Inner Glove:** [II]Nitrile<br>**Outer Glove:** [II]Nitrile (Best Nitri-solv 727)<br>**Outer Boot**: Waders (butyl, neoprene) as needed.<br>**Steel Toe/Steel Shank Boots:** ASTM F-2413/ANSI Z41<br><br>**DECON:** Dry DECON/Soap and water as feasible |
| **Environmental Sampling (Low Concentration Water/Soil/Perimeter Air):**<br>• Multi-media Sampling<br>• Documentation (written/photo)<br>• Inspection of clean-up operations | • Known Chemical Contaminants.<br>• Airborne concentrations well below PELs.<br>• Minimal chance of skin exposure to chemicals.<br>• Insects possible. | **Level D:** Upgrade based on more information as it becomes available.<br>**Suit Type:** [I]Proshield 1 (if ticks, etc. maybe a problem)<br>**Inner Glove:** [II]Nitrile<br>**Outer Glove:** NA<br>**Outer Boot:** NA<br>**Steel Toe Boots:** ASTM F-2413/ANSI Z41<br>**DECON:** NA |

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i. Tychem and Proshield suits can be purchased from Safeware: 800-331-6707, http://www.safewareinc.com , (see also LSS, http://www.labsafety.com, Dupont: 1-800-931-3456, http://www2.dupont.com/Personal_Protection/en_US/index.html )

ii. Nitrile Inner/Outer Gloves; Viton; Butyl Rubber; 4-H (polymeric) can be purchased from Safeware: 800-331-6707, http://ww.safewareinc.com ; Airgas: 1-866-718-0685, http://www.airgas.com (see also North Safety, http://www.northsafety.com); Best Gloves, http://www.bestglove.com ; Lab Safety Supply (LSS), http://www.labsafety.com; Airbill, http://www.airbill.com)

iii. Multi-Phase Cartridge (Scott 642 Multi-purpose; MSA with/GME P-100 or equivalent) can be purchased from LSS: 1-800-356-0673, http://www.labsafety.com (see also Safeware, http://www.safewareinc.com; Scott Safety, http://www.scotthealthsafety.com/; MSA, http://www.msanet.com/)

iv. Tingley HazProof Overboots or similar can be purchased from LSS: 1-800-356-0673, http://www.labsafety.com; National Safety, Inc.: 1-800-213-7092, http://www.nationalsafetyinc.com

v. Latex Hazmaster Booties, Nuke Boot or similar can be purchased from Safeware: 800-331-6707, http://www.safewareinc.com; Airbill: 1-215-632-2000, http://www.airbill.com; (see also Airgas, http://www.airgas.com; LSS, http://www.labsafety.com

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# APPENDIX E

Subsurface Utility Clearance Management Program

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# SUBSURFACE UTILITY CLEARANCE MANAGEMENT PROGRAM

| | | |
|---|---|---|
| **CORPORATE HEALTH AND SAFETY DIRECTOR** | : | **Brian Hobbs, CIH, CSP** |
| **EFFECTIVE DATE** | : | **01/2019** |
| **REVIEW DATE** | : | **03/2024** |
| **REVISION NUMBER** | : | **4** |

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## APPENDICES

Appendix A – Roux Subsurface Utility Clearance Checklist/ Utility Verification/Site Walkthrough Record

Appendix B – Private Utility Technology Applications and Considerations

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## 1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C., and Remedial Engineering (collectively, "Roux") has instituted the following program for completing proper utility mark-outs and for conducting subsurface clearance activities. This establishes a method to ensure, to the greatest extent possible, that utilities have been identified and contact and/or damage to underground utilities and other subsurface structures will be avoided. For the purpose of this program, a structure is defined as any underground feature that may present a potential source(s) of energy, such as, but not limited to, utility vaults, bunkers, piping, electrical boxes, wires, conduits, culverts, utility lines, underground tanks, and ducts.

## 2. SCOPE AND APPLICABILITY

The Subsurface Utility Clearance Management Program applies to all Roux employees, its contractors, and subcontractors. Employees are expected to follow this program for all intrusive work involving Roux or other personnel (e.g., contractors/subcontractors) working for Roux unless the client's requirements are more stringent. Intrusive work activities can include, but are not limited to, digging or scraping the ground surface, including, but not limited to, excavation; test pitting or trenching; soil vapor sampling or the installation of soil borings, soil vapor monitoring points and wells, or monitoring wells; and drilling within concrete slabs on grade.

Deviation from the program, regardless of the specific work activity or location, must be pre-approved based on the client's site knowledge, experience, site conditions, and additional documentation on the site. Any exceptions shall be documented through the Roux Subsurface Utility Clearance Variance Form located within the Roux Health & Safety Online Application or through OKTA. Approval is required by the Project Principal (PP) and the Operations Manager (OM) in consultation with the Office Health and Safety Manager (OHSM) or Corporate Health and Safety Director (CHSD) prior to mobilization. Depending on the work location, more stringent federal, state, local, or client requirements may apply. It is the responsibility of the Project Team to identify such requirements prior to mobilization.

## 3. PROCEDURES

### 3.1 Before Intrusive Activities/Job Planning Process

Prior to intrusive work at a site, the Project Manager (PM) shall ensure that the notification of the State One Call or equivalent service (Nationwide-811) is completed a minimum of 48-72 hours (One-Call State Law Directory) before intrusive work activities (this timeline excludes Saturdays, Sundays, Legal Holidays and 811 observed holidays). This notification is required by law for all states. State-specific/local laws related to utility location may vary. The project team is responsible for understanding requirements that may affect their work site.

Obtain, review, and field verify relevant historical site data that may include: as-builts/site plans; easement/right-of-way information; historical aerial photos/development plans; local/state permitting records; previous site investigation/boring logs; and/or interviews with site representative/client. Interviews with site or client personnel should ask the following:

- Employee(s) Name and Relationship with the site;
- Types of utilities, including structure and location of utilities on-site;
- Depth of known utilities; and

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- Any other relevant information as it pertains to the site.

Prior to intrusive work activities, information pertaining to the site should be included in Roux's Subsurface Utility Clearance Checklist and Utility Verification/Site Walkthrough forms. This form is located within the Roux Health & Safety Online Application or through OKTA.

***If there is the potential for unexploded ordinances or munitions, consultation with your OM and CHSD is required prior to site operations.***

### 3.1.1 Project Kick-Off Meeting

During the project kick-off meeting for intrusive activities, the PM will review the Roux Subsurface Utility Clearance Checklist, Utility Verification / Site Walkthrough Record (Appendix A) and the below bullet points with the project field team:

- Confirm that the State One Call or equivalent is received and that the ticket number is confirmed, reviewed, and valid for the time of work. If intrusive work activities are not conducted during this valid time period, the One Call ticket must be renewed, and the site must be remarked;
- Review the work scope to be performed with the site owner/tenant to determine if it may impact any utilities;
- Determine the need for utility owner companies to be contacted or to have their representatives on site;
- Where mark-outs terminate at the property boundary, consider the use of private utility locating / (e.g., Radio Frequency Detection, Electromagnetic Induction), Ground Penetrating Radar (GPR) , and other applicable geophysical inspection services. The use of private utility locating firms, however, does not eliminate the legal requirement for the subcontractor (e.g., driller, excavation firm) to submit a request for Public Utility Mark-outs. Also, the information provided by the service may be inaccurate and unable to locate subsurface utilities and structures in urban areas, landfills, urban fill areas, below-reinforced slabs, etc. They should not be relied upon as the only means of performing utility clearance;
    - A mark-out is defined as the process of contracting with a competent and qualified company to confirm the presence or absence of underground utilities and structures. This process will clearly mark out and delineate identified utilities so that intrusive work activities can be performed without causing disturbance or damage to the subsurface utilities and structures. After utility mark-outs are completed, soft Digging must completed prior to intrusive work. Section 3.4 Preferred Methods of Clearing the Subsurface (Pre-Clearing) outlines requirements for pre-clearing techniques in order of preference.
- Documented description of the dig site, which is included in the project's Health and Safety Plan (HASP), and one call report will be maintained in the field and distributed amongst Roux personnel, its contractors, and subcontractors; and
- Documentation of the actual placement of mark outs in the field shall be collected using dated pictures, videos, and/or sketches with distance from markings to fixed objects. All documentation shall be maintained within the project file.

## 3.2 Utility Mark Out

- Ensure the Mark-out / Stake-out Request Information Sheet (or one-call report) is complete and accurate for the site, including address and cross streets, and review for missing utilities. Ensure ticket life is still valid for work.

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  - Note: utility mark-out organizations do not have contracts with all utilities, and it is often necessary to contact certain utilities separately, such as the local water and sewer authorities, local transportation departments, and railroad operators. In the event the Project Teams anticipate subsurface work will impact public utilities, railroad operations, or public roadways, coordination with the utility owners/operators is required.

- Have written confirmation prior to mobilizing to the site that the Project Team or Roux personnel performing the intrusive activity has correctly completed the mark-out notification process, including requesting mark-outs, waiting for mark-outs to be applied to ground surfaces at the site, and receiving written confirmation of findings (via fax or email) from utility operators for all known or suspected utilities in the proposed area of intrusive activity, and provided utility owner written confirmation to Roux personnel for review and project files documentation.
- Do not begin any intrusive activity until all utility mark-outs have been completed (i.e., Did all utilities mark-out the site?) and any unresolved mark-out issues are finalized. Perform a site walk to review the existing utilities and determine if the utility locators have located said utilities.

  (Note: The Tolerance Zone is defined as three feet from the outside edge of any subsurface structure.)
- For non-subscribing utility owners or if public one-call service is not available, perform due diligence and request further information regarding utility type, construction details, location, and burial depth directly from public service providers/utility owners. Request utility mark-out by each public service provider/utility owner as applicable. Confirm contact and response by each public utility owner on the Subsurface Utility Clearance Checklist.
- If utilizing a Private Mark out, ensure the contractor has a plan regarding what types of technology will be used based on Table 1 in Appendix B: Private Utility Technology Applications and Considerations. If possible, it is recommended that multiple technologies be used to sweep each location/work area. Use a tracer wire to locate the utility (when tracer wires are present). Record the results of the private utility mark-out on the Utility Verification/Site Walkthrough Record form.

### 3.3 Site Visit/Utility Walkthrough

Before mobilization with the subcontractor or during the pre-work safety tailgate with the subcontractor, perform a site walkthrough after utility mark-outs have been completed to determine whether additional potential hazards are present and look for visible signs of utilities that may be present. Outlined below are considerations regarding a site walk before intrusive activities. Before initiating any intrusive work, verify that the utilities marked on-site align with the information provided in the One Call response notification/ticket and with site plans and documents. If any discrepancies arise, address them promptly to ensure accuracy and do not start intrusive work until they are rectified.

- Identify overhead utilities that may impede equipment mobilization or work zones to ensure adequate Occupational Safety and Health Administration (OSHA) clearance distance(s), as specified within the site-specific Health and Safety Plan (HASP) and 29 CFR 1926.1408 Table A.

The presence of any of the following may indicate potential subsurface structures:

- Locations of buildings, equipment, and features like area lights, signs, sprinkler systems, phones, drains, natural gas meters, manholes, etc.;
- Warning tape, which is often a sign of underground services;
- Material like pea gravel, sand, or other non-native materials can indicate the presence of tanks or lines or any deviations from the established native soil or backfill conditions;

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- Red concrete, which is often used for electrical duct banks;
- Evidence of damaged utilities, such as piping materials, insulation, or odors present in the work area; and
- Other utilities, including fire hydrants, electrical transformers, pipeline markers, valve covers, steam lines, valve box covers, clean-outs, etc.

By observing the path between the main service line and the connection point (e.g., a utility meter at the exterior of the site building), it may be possible to determine the likely routing of on-site utilities. However, this method should not be relied upon solely, and proper risk mitigation strategies should be in place before proceeding with any ground disturbance activities. Look outside your work zone for other potential utilities that may cross through your work zone.

For sites with potential underground storage tanks present (UST), the following guidance applies:

- Identify if the product piping is either rigid or flexible.
- Conduct a visual examination of the tank field, observation wells, dispensers, vent stacks, and UST fill points to determine their location.
- Locate and become familiar with the emergency shutoff button/switch, if present.
- Determine the orientation, arrangement, and location of the tanks, as well as their size and capacity, through the examination of visible features at grade, such as fill ports and extractor covers, and by consulting any available as-built drawings.

Before commencing any subsurface intrusive work, field staff should thoroughly address any discrepancies in utility company mark-outs or the absence of mark-outs.

### 3.3.1 Project Management-Field Personnel

Whenever possible, it is advisable to assign the same project personnel to both utility location and clearance tasks as well as intrusive activities. This continuity ensures that site knowledge and utility information gathered during the clearance phase remain up-to-date. Having this historical perspective helps minimize the risk potential of utility strikes.

In cases where maintaining the same personnel throughout the project isn't feasible, a thorough knowledge transfer regarding site utilities, locations, clearance results, and proposed intrusive activities becomes essential. The PM must ensure that there is a successful handoff of information when there is a change in field personnel.

### 3.3.2 Utility Markings

The utility marking color code includes various uniform colors. The following APWA uniform color code (ANSI Z535.1) is provided below. While certain government agencies or large industrial facilities may use additional colors, Roux's policy is to consider any unlisted paint marking or pin flag color as a subsurface utility marking unless proven otherwise.

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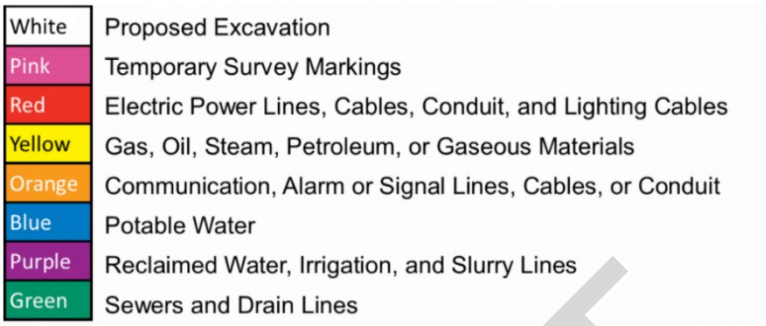
If utilities or subsurface anomalies are identified but their type or classification remains uncertain, it is advised to employ pink paint or pin flag (Temporary Survey Marking) for marking. Once the utility type is definitively established, the pink marks should be updated to accurately represent the correct type of utility.




Understanding the markings left by locators during the 811 process is crucial for avoiding utility-related issues. Typically, these markings are done when Roux staff members are not physically present on-site. To enhance understanding/accuracy, it is advisable for staff to be present during the 811 process or engage in conversations with locators, both public and private, while on-site. Additionally, utility marks must adhere to the proper standards outlined in the Uniform Color Code.

***Common Abbreviations***

*Source: Common Ground Alliance*

| **Facility Identifier** | | **Underground Construction Descriptions** | | **Infrastructure Materials** | |
|---|---|---|---|---|---|
| CH | Chemical | C | Conduit | ABS | Acrylonitrile - Butadiene - Styrene |
| E | Electric | CDR | Corridor | ACP | Asbestos Cement Pipe |
| FO | Fiber Optic | D | Distribution Facility | CL | Cast Iron |
| G | Gas | DB | Direct Buried | CMC | Cement Mortar Coated |
| LPG | Liquefied Petroleum | DE | Dead End | CML | Cement Mortar Lined |
| PP | Petroleum Products | JT | Joint Trench | CPP | Corrugated Plastic Pipe |
| RR | Railroad Signal | HP | High Pressure | CMP | Corrugated Metal Pipe |
| S | Sewer | HH | Hand Hole | CU | Copper |
| SD | Storm Drain | MH | Manhole | CWD | Creosote Wood Duct |
| SS | Storm Sewer | PB | Pull Box | HDPE | High Density Polyethylene |
| SL | Street Lighting | R | Radius | MTD | Multiple Tile Duct |
| STM | Steam | STR | Structure (vaults, junction inlets, lift station) | PLA | Plastic (conduit or pipe) |
| SP | Slurry System | T | Transmission Facility | RCB | Reinforced Concrete Box |
| TEL | Telephone | | | RCP | Reinforced Concrete Pipe |
| TS | Traffic Signal | | | RF | Reinforced Fiberglass |
| TV | Television | | | SCCP | Steel Cylinder Concrete Pipe |
| W | Water | | | STL | Steel |
| W | Reclaimed Water "Purple" | | | VCP | Vertrified Clay Pipe |

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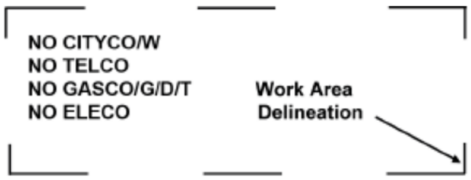


### 3.4 Preferred Methods of Clearing the Subsurface (Pre-Clearing)

At least one of the methods listed below shall be carried out during pre-clearing activities. The Project Team is responsible for evaluating risks associated with the Scope of Work to determine which method is selected. If none of the following pre-clearing activities are performed, a Subsurface Utility Clearance Variance must be submitted to the OM. This Subsurface Utility Clearance Variance must provide clear lines of evidence that there are no utilities present within the intrusive work zone. Examples include demolition permits of the site, utility closure documents indicating no live utilities on-site, as-builts, site history, etc.

The following approaches shall be considered and implemented based on the Scope of Work.

- ***Soft Digging***
  - This is the preferred method of utility clearance when clearing higher-risk utilities. Soil should be cleared through the use of a vacuum truck/equivalent, an accompanying air knife (preferred), or a water lance to break up and loosen the soil for removal with the vacuum.
- ***Hand Digging***
  - Soil should be broken up and removed using a shovel or other appropriate hand tools without excessive force. Limit the use of dig bars or other tools that, if used incorrectly, can significantly damage utilities.
- ***Hand Augering***
  - The hand auger must be turned slowly using even hand pressure without excessive force. Rounded edge augers are preferred. Hand augers should not be used in pea stone/pea gravel where utilities may be present and could potentially be damaged by the hand auger. The abrupt absence of soil recovery in a hand auger could indicate utilities as pea gravel or sand may have spilled out of the auger (exception: native soil conditions that typically result in poor hand auger recoveries). If any resistance is encountered while operating the hand auger for pre-clearance, the equipment will be removed, and the exploratory test hole will be visually inspected by onsite personnel for any obstructions or indications of subsurface structures.

#### 3.4.1 Guidance for Tools and Equipment

Personnel performing pre-clearance activities shall keep tools and equipment in safe working order and be properly inspected before use. If tools or equipment are broken, they will be tagged and removed from service. The following specify additional guidelines regarding tools and equipment:

- Hand-digging tools must have a non-conductive handle, such as fiberglass, wood, or composite, or fully insulated handles and potential contact surfaces.
- Blades on shovels and post-hole diggers should have rounded or blunt edges.
- Pick axes or pointed spades should not be used for physical clearance.
- Crowbars, pinch-bars, or pry bars should not be used to break hardened soil or backfill except when authorized by the Site Supervisor (SS). This should only be used to loosen materials like bricks or larger stones.

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- Electric-powered equipment must have ground fault protection.
- Should there be refusal or difficulty with advancing hand tools, the contractor shall stop work and notify the Roux SS or Site Health and Safety Officer (SHSO) immediately.

### 3.5 During Intrusive Activities

#### 3.5.1 Concrete/Paving Surface Removal

Remove any surface coverings (i.e., pavement, brush, debris, etc.) to ensure workers have clear visibility of the work area and subsurface conditions. Avoid mechanical jackhammering over known lines unless they are de-energized, locked-out/tagged-out, and potential repairs are planned or if the utility has been completely disconnected prior. When cutting or coring, go only as far as needed to penetrate the surface cover. When removing a large surface area, begin at the perimeter of the removal zone. This initial step helps identify any utilities passing through the work zone. For extensive areas, using a concrete saw might not be practical. Instead, heavy equipment is often employed. During this process, a designated spotter should guide the heavy equipment. Their role is to watch for warning signs of utilities. It's crucial that the heavy equipment does not have "teeth" that could potentially pass through the surface and damage utilities.

#### 3.5.2 Pre-Clearance Procedures

Install pre-clearance exploratory test holes using one of the techniques, as outlined in Section 3.4, for the first 5-ft below land surface (BLS) at each location before conducting intrusive mechanized activities. Should utilities be located at a greater depth than 5-ft BLS consult with the OM, OHSM and CHSD regarding adjustments to the pre-clearance requirements to go greater than 5-ft BLS. Some Clients may require greater than 5-ft BLS for pre-clearance test holes; Project teams should be aware of such Client requirements prior to work.

***Pre-clearance exploratory test holes should be defined in the SOW/proposal provided to the client to prevent project delays and to allow adequate time for the PM and PP to evaluate alternative approaches for the project. Alternative approaches will need to be pre-approved by the OM through a Subsurface Utility Clearance Variance.***

Both single-point and three-point clearance are acceptable as long as the following criteria are met below. For single-point clearance, the exploratory test hole is advanced at the exact location of the proposed borehole. If three-point clearance is performed, it must be done in a triangular pattern around the proposed borehole and in a configuration that would not allow utilities to enter the borehole.

- The size of the pre-clearance exploratory test hole should be, at a minimum, twice the diameter of any downhole tool or boring device.
- For direct push applications (CPT, Geoprobe®, etc.), the borehole clearance diameter shall be at least 125% of the diameter of the largest tool being pushed through the subsurface (e.g., tip, rod, sampler, etc.), to the minimum required depth.
- For excavations, all utilities need to be marked and then exposed by soft-digging or by hand following the protocols in this program. Pre-clearing for excavations may be performed by the "moat" technique (i.e., soft Digging around the perimeter). In these cases, dig in small lifts (<12" for first 5 feet) using a dedicated spotter.)
- For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of pre-clearance test holes specified in Section 3.4 to expose the utility. Once structures have been verified, a minimum clearance of three feet must be maintained between the utility and any powered equipment. If considered a high-risk utility, additional requirements may be necessary and required by the Operator of the utility. Consultation with the OM and CHSD may be appropriate.

The PM, field team lead, or personnel performing oversight is to:

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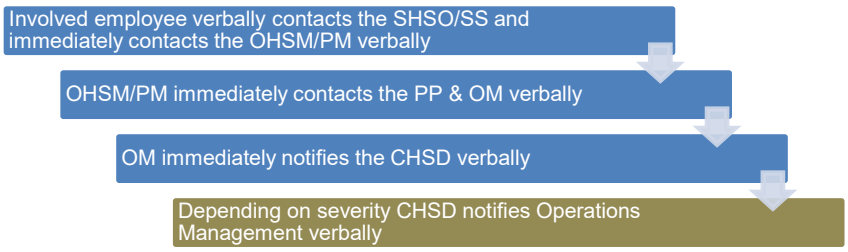
- Ensure the mark-out remains valid. (In certain states, there are limits regarding the duration of time after the mark-out was applied to the ground surface work can be started or interrupted.) Additionally, the mark-outs must be maintained, documented, and in many cases, refreshed periodically to be considered valid. This will be accomplished through calls to the one call center.
- Ensure intrusive activities are only performed within the safe boundaries of the mark-out as detailed in the One-Call Report.
- Halt all work if intrusive activities have resulted in the discovery of an unmarked utility. Roux personnel shall notify the facility owner/operator and the one call center. All incidents such as this will be reported as per Roux Incident Investigation and Reporting Management Program.
- Halt all work if intrusive activities must take place outside of the safe boundaries of a mark-out and only proceed after new mark-outs and subsurface utility clearance are performed.
- Halt the intrusive activities and immediately consult with the PP if an unmarked utility is encountered.
- Complete any loss reports associated with subsurface utility strikes as necessary.
- If a utility cannot be found as marked, Roux personnel shall notify the facility owner/operator directly or through the one-call center. If the facility operator is not responsive, then the one-call center must be notified. Following notification, the excavation/mechanical intrusive work may continue unless otherwise specified in state law.
- Contractors/subcontractors must contact the one-call center to refresh the ticket when the excavation continues past the life of the ticket. State law dictates ticket life. Project teams must be aware of their state-specific requirements.

### 3.6 Stop Work Authority

Each Roux employee has Stop Work Authority that he or she will execute upon determination of any imminent safety hazard, emergency situation, or other potentially dangerous situation, such as hazardous weather conditions. This Stop Work Authority includes subsurface clearance issues such as the adequacy of a mark-out or identification during intrusive operations of an unexpected underground utility. Authorization to proceed with work will be issued by the PM/PP in consultation with the OHSM after such action is reviewed and resolved. The PM will initiate and execute all management notifications and contact emergency facilities and personnel when this action is appropriate.

### 3.7 Reporting Utility Incidents

Roux field personnel engaged in any utility strike (e.g., subsurface/aboveground) must promptly stop work, shutdown any equipment and get to a safe location at the Site. Then notify the PM to discuss the incident. In case of injuries, field personnel must call 911 or the local emergency services number and then inform the PM. Additional notifications shall follow Roux's Incident Notification Process. Depending on the utility strike additional notifications shall be made to utility operators and/or clients/site contacts.

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# Appendix A
# Roux Subsurface Utility Clearance Checklist

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## Appendix A

## Roux Subsurface Utility Clearance Checklist/Utility Verification/Site Walkthrough Record

***Roux Subsurface Utility Clearance Checklist*** ***Date of Revision: 3/2024***

**Work site set-up and work execution**

| ACTIVITY | Yes | No | N/A | COMMENTS INCLUDING JUSTIFICATION IF RESPONSE IS NO OR NOT APPLICABLE |
|---|---|---|---|---|
| Daily site safety meeting conducted, SPSAs performed, JSAs reviewed, appropriate work permits obtained (if applicable). | | | | |
| HASP is available and reviewed by site workers / visitors. | | | | |
| Subsurface Utility Clearance Procedure has been reviewed with all site workers. | | | | |
| Mechanical intrusive work activities may not be performed at any location without authorization from the Roux Site Supervisor (SS). Clearance activities may not be performed at any location unless the SS is physically present. | | | | |
| Work area secured; traffic control established as needed. Emergency shut-off switch located. Fire extinguishers / other safety equipment available as needed. | | | | |
| Utility mark-outs (public / private) clear and visible. Provide Excavator's Stake-Out Reference Number / Request Date / Time. | | | | |
| Tolerance zone work identified. Intrusive work activities cannot be performed in areas that are in direct conflict with any markings made by public or private locators. | | | | |
| Unless the PP & OM authorizes it, all boreholes and test pit locations must be physically cleared before using mechanized equipment. Required minimum physical clearance depths and diameters are as follows:<br>• Physically clear to a depth of 5 feet bls.<br>• The size of the pre-clearance exploratory test hole must be, at a minimum, twice the diameter of any downhole tool or boring device.<br>• For direct push applications (CPT, Geoprobe®, etc.) the borehole clearance diameter shall be at least 125% to the diameter of the largest tool being pushed through the subsurface (e.g., tip, rod, sampler, etc.). | | | | |
| Work execution plan reviewed and adhered to (ground disturbance methods, clearance depths, any special utility protection requirements, or any other execution requirements; especially for Tolerance Zone work). | | | | |

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| | | | | |
|---|---|---|---|---|
| Mechanical intrusive work is prohibited within 3-feet distance in all directions from subsurface structures that will be intentionally exposed during pre-clearance. Any removal of material within 3-feet of the subsurface structure may only proceed by hand using non-conductive tools/compressed air if authorized by state law and the owner/operator of the utility. | | | | |
| All equipment onsite must maintain the appropriate horizontal distance from any point on the equipment to the nearest overhead electrical power line. Refer to site-specific HASP and local/utility company requirements. | | | | |
| Verbal endorsement received from Roux PM and OM for any required field deviations to work execution plan. | | | | |

**Key Reminders for Execution**

The Subsurface Utility Clearance Protocol should be referenced to determine all requirements while executing subsurface work. The bullet points below are intended as general reminders only and should not be relied upon solely.

- The size of the pre-clearance exploratory test hole must be at a minimum twice the diameter of any downhole tool or boring device to minimum required depth of 5 feet bls.
- For direct push applications (CPT, Geoprobe®, etc.) the borehole clearance diameter shall be at least 125% of the diameter of the largest tool being pushed through the subsurface (e.g., tip, rod, sampler, etc.), to the minimum required depth of 5 feet bls.
- The tolerance zone is defined as three feet plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct banks, and other non-cylindrical utilities) of a utility and three feet from the outside of any subsurface structure.
- For excavations, all utilities need to be marked and then exposed by hand, following the protocols in this program. Pre-clearing for excavations may be performed by the “moat” technique (i.e., soft digging around the perimeter). In these cases, dig in small lifts (<12” for first five feet) using a dedicated spotter.) For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of hand-dug test holes to expose the utility. Once structures have been verified, a minimum clearance of three feet must be maintained between the utility and any powered equipment.

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## Utility Verification/Site Walkthrough Record

**Employee Name:**_____

**Date:** _____

**Instructions:** For each utility suspected at the job site, indicate the location on the job site, approximate burial depth, and means of detecting the utility. Leave blank if that utility is not believed to be present.

| Utility | Description of Utility Location Identified Onsite | Approx. Depth (bls) | Method / Instrumentation used to determine Utility Location | Utility Owner Response (Date/Time) | Mark Out Indicates (Clear / Conflict) |
|---|---|---|---|---|---|
| **Electrical Lines** | | | | | |
| **Gas Lines** | | | | | |
| **Pipelines** | | | | | |
| **Steam Lines** | | | | | |
| **Water Lines** | | | | | |
| **Sanitary and Stormwater Sewer lines** | | | | | |
| **Pressured Air-Lines** | | | | | |
| **Tank Vent Lines** | | | | | |
| **Fiber Optic Lines** | | | | | |
| **Underground Storage Tanks** | | | | | |
| **Phone Lines/ Other** | | | | | |

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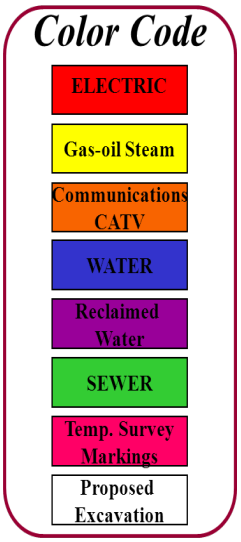
* bls - below land surface

**Site Sketch Showing Utilities:**

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**Other Comments / Findings:**

Completed by: _____

Signature: _____ Date: _____

# Appendix B
# Private Utility Technology Applications and Considerations

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## Appendix B – Private Utility Technology Applications and Considerations

| **Technology ⇒ Utility/Object ⇓** | Radio Frequency Electro-Magnetic Detector (connection to utility, or induction without connection) | Radio Frequency Electro-Magnetic Detector (passive sweep) | Ground Penetrating Radar (GPR)⊙ | Acoustic Plastic Pipe Locator | Beacon, Sonde or Conductive Rodder Insertion | EM-61 (time domain electromagnetics) Ξ | |
|---|---|---|---|---|---|---|---|
| Power/Instrument Line (Energized/Signaled) □ | ✱ G | G | G | R | R | G | |
| Power Line (Non-energized) □ | ✱ G | R | G | R | R | G | |
| Sewer/Water Line (Metallic) □ | ✱ G | Y | G | Y | G | G | |
| Sewer/Water Line (Non-metallic) | R | R | G | G | ✱ G | R | |
| Instrument / Telecomm Lines (Non-energized) | ✱ G | R | G | R | R | Y Only if metallic | |
| Hydrocarbon Transmission Line (Pipeline)◆ □ | ✱ G | R | G | R | R | G | |
| Metallic/Non-Metallic Line (with Tracer Wire) | ✱ G | Y | G | Y | Y | G metallic | Y non-metallic |
| Metallic/Non-Metallic Line (without Tracer Wire) | G metallic | R non-metallic | R | ✱ G | Y | Y | G metallic | R non-metallic |
| Metal or Fiberglass UST | R | R | ✱ G | R | R | G metallic | R non-metallic |

### Additional Considerations

| **Technology ⇒ Variable ⇓** | Radio Frequency Electro-Magnetic Detector | Ground Penetrating Radar (GPR)⊙ | Acoustic Pipe Locator | Beacon, Sonde, or Conductive Rodder Insertion | EM-61 Ξ |
|---|---|---|---|---|---|
| Moist Soil | G | Y | G | G | G |
| Dry Soil | Y | G | Y | G | G |
| Clay | Y | R | G | G | G |
| Concrete w/Rebar | R | Y | G | G | R |
| Long Horizontal Profile | G | G | G | G | G |
| Short Horizontal but Deep Vertical Profile | Y | G | R | R | G |
| Access to Line✚ | G | N/A | G | G | G |
| No Access to Line✚ | G (induction or passive) | G | R | R | G |
| | R (direct connect) | | | | G |
| Ferrous Metal | G | G | G | G | G |
| Non-ferrous Metal | Y | G | G | G | G |
| Adjacent or crossing conductive utility(ies) | Y | N/A | N/A | N/A | Y |

Each site will be unique. Do not use this table as the sole criteria for technology selection. Use it as a starting point to assess available, applicable technology(s).

✱ Indicates best technology for given object. Site structures, rebar in concrete, shallow groundwater tables, perched storm water, etc. can significantly affect performance and reliability of any electro/magnetic method. Other utilities which cross or are adjacent to the target line can cause the EM signal to bleed or jump to the other utility line.

□ Metallic lines that have power running through them or can be connected to a tracer signal generator.

◆ Natural gas pipeline locating technicians must be trained/certified (in the U.S. requires DOT and Office of Pipeline Safety standards, other regions may have similar certification or requirements).

⊙ Most sensitive to interpretation. The skill, training and experience of operator are critical.

Ξ Emerging technology with limited availability.

✚ Access: induce unique electronic signature, apply acoustical impulse or insert conductive rodder/beacon/sonde.

**Green** Generally, an applicable technology **Yellow** May or may not be applicable **Red** Not generally applicable

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# APPENDIX F

Heavy Equipment Exclusion Zone Policy

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# HEAVY EQUIPMENT EXCLUSION ZONE MANAGEMENT PROGRAM

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| | | |
|---|---|---|
| **CORPORATE HEALTH AND SAFETY DIRECTOR** | : | **Brian Hobbs, CIH, CSP** |
| **EFFECTIVE DATE** | : | **01/2019** |
| **REVIEWED DATE** | : | **03/2024** |
| **REVISION NUMBER** | : | **3** |

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## 1. PURPOSE

The Exclusion Zone Management Program aims to establish the minimum clearance distance that must be maintained between workers and heavy equipment while equipment is in operation (i.e., engaged or moving). The intent is to have no personnel or equipment entering the Exclusion Zone while the equipment is in operation or moving to ensure that Roux and Subcontractor employees are unnecessarily exposed to the hazards of the equipment.

## 2. SCOPE AND APPLICABILITY

This Management Program applies to all Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C., and Remedial Engineering (collectively, "Roux") employees and their subcontractors performing fieldwork and are potentially exposed to heavy equipment. Heavy equipment includes, but is not necessarily limited to, excavation equipment, drill rigs, vacuum trucks, forklifts, lull telehandlers, man lifts, bobcats, delivery trucks, etc.

## 3. PROCEDURES

As specified in the following sections of this program, Exclusion Zones must be established and maintained during activities involving the movement/operation of heavy equipment. The Exclusion Zone requirements apply to all personnel on the site but are primarily focused on personnel required to work near the equipment. The exclusion zone is in effect when heavy equipment is moving or engaged (e.g., movement of an arm or bucket of an excavator, rotation of an auger, lifting of a load with a forklift, raising/lowering of a man lift, etc.).

1. The Exclusion Zone must meet the following minimum requirements:
   - A minimum distance of 10 feet from all heavy equipment and loads being moved by the equipment;
   - Greater than the swing/reach radius of any moving part on the heavy equipment (i.e., for large equipment, this may mean an exclusion zone distance larger than 20 feet);
   - Greater than the fall zone of equipment and their contents; and
   - Greater than the tip-over distance of the heavy equipment.

   The size of the Exclusion Zone will need to be determined on a task-specific basis considering the size of the heavy equipment in use and the task being performed. Prior to all heavy equipment operations, the Exclusion Zone(s) distance must be specifically identified in the Job Planning Process and incorporated in the pre-job tailgate meeting with the subcontractor(s), including any updates to our Job Safety Analysis (JSA).
2. The spotter (or another authorized individual) is responsible for enforcing the Exclusion Zone and not conducting any other task. The spotter should be positioned immediately outside of the Exclusion Zone within a clear line of sight of the equipment operator. The spotter must signal the operator to stop work if anyone or anything has the potential to enter or compromise the Exclusion Zone. The operator should stop work if the spotter is not within their line of sight. If a spotter must be within the Exclusion Zone, they must be in a designated area outside the swing/tip radius, fall zone, line of fire of lifted loads, etc. If multiple pieces of equipment are being used, one spotter may be adequate so long as there is a clear line of sight and the spotter can control the zone(s). Radios would be required since hand signals would not be adequate if two pieces of equipment are in operation at the same time in the Exclusion Zone.

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3. If an individual must enter the Exclusion Zone, the designated Spotter must signal the Equipment Operator to stop the equipment. Once the equipment is no longer moving (e.g., movement of an arm of an excavator is STOPPED, lifting of a load with a forklift STOPPED, raising/lowering of a man lift is STOPPED, etc.), the operator must bring the boom/arm to the ground ensuring a “Zero Energy State” and DISENGAGE THE CONTROLS and STOP and SIGNAL BY “SHOWING HIS HANDS.” This signal will indicate that it is safe for the person to enter the limits of the Exclusion Zone to perform the required activity. The equipment must remain completely stopped/disengaged until all personnel exited the Exclusion Zone's boundaries and the designated Spotter has signaled by “SHOWING HIS HANDS” to the Equipment Operator that it is safe to resume operations.
4. When entering the limits of the Exclusion Zone, personnel must, at a minimum:
    - Establish eye contact with the operator and approach the heavy equipment in a manner that is in direct line of sight to the Equipment Operator;
    - Never walk under any suspended loads or raised booms/arms of the heavy equipment; and
    - Identify a travel path free of Slip/Trip/Fall hazards.
5. The Exclusion Zone should be delineated using cones with orange snow fences or solid poles between the cones, barrels, tape, or other measures. For work in rights-of-way, rigid barriers, such as Jersey barriers or temporary chain link fences, should be used. For certain types of widespread or moving/mobile equipment operations, such delineation may not be practicable around equipment or individual work areas. In such instances, it is expected that the entire operation will be within a larger secure work area or that additional means will be utilized to ensure the security of the work zone.

All subcontractors who provide heavy equipment operations to field projects must implement a program that meets or exceeds the expectations described above as well as any additional requirements that may be required on a client or site-specific basis. Logistics involving heavy equipment should be understood and discussed prior to the field event during the job planning phase.

### 3.1 Exceptions

It is recognized that certain heavy equipment activities may require personnel to work within the limits of the Exclusion Zone as specified in this program. Such activities may include certain excavation clearance tasks, drill crew activities, or construction tasks. However, any such activity must be pre-planned, emphasizing limiting the amount and potential exposure of any activity required within the zone. The critical safety steps to mitigate the hazards associated with working within the Exclusion Zone must be defined in the JSA and potentially other project-specific plans (i.e., critical lift plans, etc.), and approved by the Roux Project Principal (PP), Office Health and Safety Manager (OHSM) and client representative, if required, prior to implementation.

## 4. TRAINING

Many Roux projects have different requirements that are client-specific or site-specific in nature. However, all Roux employees are provided initial training, as well as annually thereafter, on our Heavy Equipment Exclusion zone policy.

## 5. STOP WORK AUTHORITY

All Roux employees and their subcontractors have stop-work authority. Upon initial hire, all Roux employees are provided initial safety orientation, including stop work authority. All Roux employees and subcontractors are encouraged to stop work whenever any task or operation presents unreasonable risk or employees are

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unsure how to carry out work safely. This includes upon observing any questionable safety-related behavior or condition, they are to stop work immediately and discuss the behavior or condition with the individual(s) involved. Upon stopping work, the following actions will be taken:

- Notify the affected parties to include the Project Manager (PM) and Site Health and Safety Officer (SHSO);
- Work to correct the situation or not proceed until the situation is corrected by the PM or SHSO;
- Resume work only when told to proceed by either the PM or SHSO;
- The SHSO will document the Stop-Work intervention in the field logbook;
- Stop-Work interventions will be reported to the PP for review to ensure the interventions are closed; and
- The PP will share learnings from the interventions, as appropriate, throughout the firm, to demonstrate the importance of the Stop-Work interventions.

Please note: Any form of retribution or intimidation directed at any individual or company for exercising their right to issue a stop work authority will not be tolerated.

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# APPENDIX G

New York State Department of Health (NYSDOH) Community Air Monitoring Plan (CAMP)

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**New York State Department of Health (NYSDOH)**
**Generic Community Air Monitoring Plan (CAMP)**

## Overview

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

The generic CAMP presented below will be sufficient to cover many, if not most sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

## Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

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

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

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**VOC Monitoring, Response Levels, and Actions**

VOCs must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

**Particulate Monitoring, Response Levels, and Actions**

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/$m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/$m^3$ above the upwind level and provided that no visible dust is migrating from the work area.
2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/$m^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/$m^3$ of the upwind level and in preventing visible dust migration.
3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

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# APPENDIX H

Special Requirements CAMP

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## Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

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

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). 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 mcg/$m_3$, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/$m_3$ or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

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.

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# APPENDIX E

Quality Assurance Project Plan/Field Sampling Plan

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# Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP)

310 East 161st Street
Bronx, New York

July 2, 2026

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Prepared for:

**TEG Morrisania Development LLC**

Prepared by:

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2. NYSDEC PFAS Guidance
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# 1. Introduction

Roux Environmental Engineering and Geology, D.P.C. (Roux), on behalf of TEG Morrisania Development LLC (Volunteer), has prepared this Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP) to describe the measures that will be taken to ensure that the data generated during performance of the Remedial Action Work Plan (RAWP) for the property located at 310 East 161st Street, Bronx, New York (Site) are of quality sufficient to meet project-specific data quality objectives (DQOs). This QAPP/FSP also includes field sampling procedures.

This QAPP/FSP was prepared in accordance with the guidance provided in NYSDEC's DER-10, Technical Guidance for Site Investigation and Remediation (DER-10) dated May 2010, the NYSDEC BCP Guide, and the United States Environmental Protection Agency's (USEPA's) Guidance on Systematic Planning using the Data Quality Objectives Process (EPA QA/G-4) dated February 2006.

## 1.1 Purpose

This QAPP/FSP describes in detail the field sampling and quality assurance/quality control (QA/QC) methods to be used during the endpoint soil sampling tasks performed during the Remedial Action (RA).

This QAPP/FSP was prepared in accordance with the NYSDEC's DER-10 and provides guidelines and procedures to be followed by field personnel during performance of sampling during the remedial action. Information contained in this QAPP/FSP relates to:

- Sampling objectives (Section 2);
- Project organization (Section 3);
- Sample media, locations, analytical suites, and frequency (Section 4);
- Field sampling procedures (Section 5);
- Sample handling, sample analysis, and QA/QC (Section 6); and
- Site control procedures and decontamination (Section 7).

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# 2. Sampling Objectives

The objective of the sampling program is designed to meet the DQOs set forth in DER-10. Specifically, analytical parameters selected for each sample, as described in Section 4, are comprehensive, and are intended to meet the following objectives:

- Analyze confirmation bottom samples and side wall samples for 1,2,4 Trimethylbenzene at Spot 1 and Hot Spot 2 against Protection of Groundwater Soil Cleanup Objectives (PGWSCOs), and Mercury at Hot Spot 3 areas against Unrestricted Use Soil Cleanup Objectives (UUSCOs);
- Analyze bottom documentation samples following removal of the USTs in the UST area for Part 375 TCL/TAL analyte suite (volatile organic compounds [VOCs], semivolatile organic compounds [SVOCs], metals, pesticides, polychlorinated biphenyls [PCBs], and emerging contaminants);
- Analyze bottom documentation samples in the Track 4 area for Part 375 TCL/TAL analyte suite (VOCs, SVOCs, metals, pesticides, PCBs, and emerging contaminants);
- Analyze bottom confirmation samples in the Track 2 area for Part 375 TCL/TAL analyte suite (VOCs, SVOCs, metals, pesticides, PCBs, and emerging contaminants) against UUSCOs;
- Analyze offsite backfill/on-Site reuse soil to evaluate its suitability for use as backfill that meets the combined Track 2 UUSCOs and Track 4 RRSCOs presented in Table 6.8 (a) of the latest revision of Title 6 of New York Code of Rules and Regulations (NYCRR) Part 375 (Part 375).

Field sampling procedures are discussed in Section 5 of this QAPP/FSP. A discussion of the DQOs and QA/QC is provided in Section 6.

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# 3. Project Organization

A general and generic summary of the overall management structure and responsibilities of project team members are presented below. Professional profiles for the team are provided in Attachment 1.

Project Principal

Frank Cherena, P.G. of Roux will serve as the Project Principal. The Project Principal is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the investigation.

Remedial Engineer

Charles J. McGuckin, P.E. of Roux will serve as the Remedial Engineer. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the RIWP and future remedial program for the Site. The Remedial Engineer will certify that the investigation activities were observed by qualified environmental professionals (QEPs) under supervision and that any other relevant provisions of Environmental Conservation Law (ECL) 27-1419 have been achieved in full conformance with the RIWP.

Project Manager

Lauren Dolginko of Roux will serve as the Project Manager. The Project Manager is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the work. This individual will provide overall management for the implementation of the scope of work and will coordinate all field activities. The Project Manager is also responsible for data review/interpretation and report preparation.

Field Team Leader

The Field Team Leader will be determined prior to the implementation of the RAWP. The Field Team Leader bears the responsibility for the successful execution of the field program. The Field Team Leader will direct the activities of the technical staff in the field, as well as all subcontractors. The Field Team Leader will also assist in the interpretation of data and in report preparation. The Field Team Leader reports to the Project Manager.

Laboratory Project Manager

Laboratory analysis will be completed by TestAmerica Laboratories of Edison, New Jersey, Sacramento, California, and Burlington, Vermont, New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratories (11452, 11666, and 10391, respectively). The Laboratory Project Manager is Elizabeth Flannery. The Laboratory Project Manager is responsible for sample container preparation, sample custody in the laboratory, and completion of the required analysis through oversight of the laboratory staff. The Laboratory Project Manager will ensure that QA procedures are followed and that an acceptable laboratory report is prepared and submitted. The Laboratory Project Manager reports to the Project Principal and Project Manager.

Quality Assurance Officer

Dana Hignell of Roux will serve as the Quality Assurance Officer (QAO) for this project. The QAO is responsible for conducting reviews, inspections, and audits to ensure the data collection is conducted in accordance with this QAPP/FSP. The QAO's responsibilities range from ensuring effective field equipment decontamination procedures and proper sample collection to the review of all laboratory analytical data for

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completeness and usefulness. The QAO reports to the Project Manager and makes independent recommendations to the Field Team Leader.

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# 4. Sample Media, Locations, Analytical Suites, and Frequency

The media to be sampled during implementation of the RAWP will include endpoint soil samples. The proposed sample locations, depths, analytical suites, and rationale for sampling are provided below. Specifics regarding the collection of samples at each location and for each task are provided in Section 5 of this QAPP/FSP.

## 4.1 Endpoint Soil Sampling

A summary of the proposed combined Track 2 and Track 4 Restricted Residential Use cleanup confirmation and documentation endpoint designations, sample depths, and analytical parameters are summarized in **Table 19** of the RAWP. The location of confirmation and documentation endpoint samples are included in **Figure 12** of the RAWP.

**Track 4 Remediation Area**

Bottom documentation sampling will be conducted in the Track 4 remediation area (29 samples total) at a frequency of approximately one sample per 900 square feet of excavation area. Within Hot Spot 1 and Hot Spot 2, additional bottom and sidewall confirmation sampling will be conducted following completion of excavation to demonstrate that exceedances of the PGWSCO for 1,2,4-trimethylbenzene have been removed. One bottom confirmation sample will be collected, and four sidewall confirmation samples will be collected from the interval of the initial exceedance of 1,2,4-trimethylbenzene above PGWSCOs.

Bottom documentation samples collected within the Track 4 remediation area will be analyzed for the full NYSDEC Part 375 TCL/TAL analytical suite (VOCs, SVOCs, metals, pesticides, PCBs, and emerging contaminants). Bottom and sidewall confirmation samples collected at Hot Spot 1 and Hot Spot 2 will be analyzed for 1,2,4-trimethylbenzene only. If bottom or sidewall confirmation samples within Hot Spot 1 or Hot Spot 2 do not meet the PGWSCO for 1,2,4-trimethylbenzene, an additional 2 feet of soil will be removed, and an additional confirmation sample will be collected and analyzed for 1,2,4-trimethylbenzene only.

In the UST area, two bottom documentation samples will be collected following tank removal and will be analyzed for the full NYSDEC Part 375 TCL/TAL analytical suite.

If competent bedrock is encountered in any portion of the Track 4 excavation, it will be cleared and photo-documented, and no endpoint samples will be collected in areas where competent bedrock is encountered.

The proposed sampling frequency is consistent with the guidance provided in NYSDEC DER-10 Sections 5.4 and 5.5.

**Track 2 Remediation Area**

Bottom confirmation sampling will be conducted in the Track 2 remediation area (15 samples total) at a frequency of approximately one sample per 900 square feet of excavation area.

Within Hot Spot 3, additional bottom and sidewall confirmation sampling will be conducted following completion of excavation to demonstrate that exceedances of the UUSCO for mercury have been removed.

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One bottom confirmation sample will be collected, and four sidewall confirmation samples will be collected from the interval of the initial exceedance of mercury above UUSCOs.

Bottom confirmation samples collected within the Track 2 remediation area will be analyzed for the full NYSDEC Part 375 TCL/TAL analytical suite. Bottom and sidewall confirmation samples collected at Hot Spot 3 will be analyzed for mercury only. If bottom or sidewall confirmation samples from the Track 2 remediation area and Hot Spot 3 do not meet UUSCOs, an additional 2 feet of soil will be removed, and an additional confirmation sample will be collected and analyzed for the exceeding parameter only.

If competent bedrock is encountered in any portion of the Track 2 excavation, it will be cleared and photo documented, and no endpoint samples will be collected in areas where competent bedrock is encountered.

The proposed sampling frequency is consistent with the guidance provided in NYSDEC DER-10 Sections 5.4 and 5.5.

## 4.2 Offsite Backfill/On-Site Reuse Soil Sampling

Although not planned, onsite soil may be reused for backfill. For offsite fill/on-Site reuse soil materials requiring chemical testing, the following samples shall be collected:

- One sample for pre-qualification chemical testing at the source location, including the following:
  1. Chemical testing shall be performed at a minimum for the parameters listed in Table 375-6.8(a) of the latest revision of Part 375. Samples will be analyzed for the same parameters and by the same methods listed in Section 4.1.
  2. Backfill/on-Site reuse soil materials excluding those materials that do not require sampling as described below, shall meet criteria presented in Section 2.0.
  3. Backfill/on-Site reuse soil materials that exceed the criteria presented in Section 2.0 shall not be imported to the Site without prior approval of the NYSDEC.
  4. The backfill/on-Site reuse soil material will be free of extraneous debris or solid waste.
  5. If the NYSDEC agrees that the material originated from a virgin source, then a minimum of one sample (i.e., the pre-qualification sample) will be collected and analyzed per source.

B. If the source is not virgin, the sampling frequency will comply with DER-10 Table 5.4(e)10 shown below:

**Table 5.4(e)10**
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site

| **Contaminant** | **VOCs** | **SVOCs, Inorganics & PCBs/Pesticides** | |
|---|---|---|---|
| **Soil Quantity (cubic yards)** | **Discrete Samples** | **Composite** | **Discrete Samples/Composite** |
| 0-50 | 1 | 1 | 3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis |
| 50-100 | 2 | 1 | |
| 100-200 | 3 | 1 | |
| 200-300 | 4 | 1 | |
| 300-400 | 4 | 2 | |
| 400-500 | 5 | 2 | |
| 500-800 | 6 | 2 | |
| 800-1000 | 7 | 2 | |
| ➢ 1000 | Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER | | |

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The source of the offsite fill/on-Site reuse soil must be documented by the supplier, including the location where the fill/on-Site reuse soil was obtained and a brief history of the site that is the source of the fill.

Samples of offsite backfill/on-Site reuse soil will be analyzed for the same list of parameters in Section 4.1.

All PFAS compounds, listed above, in soil will be analyzed and reported to 0.5 ug/kg. 1,4-Dioxane will be analyzed and reported to 0.1 mg/kg.

The following materials may be imported, without chemical testing, to be used as backfill beneath pavement, buildings or as part of the site cover, provided that it contains less than 10 percent by weight material that would pass through a size 80 sieve and consists of:

C. gravel, rock or stone, consisting of virgin material from a permitted mine or quarry; or

D. recycled concrete or brick from a NYSDEC registered construction and demolition debris processing facility if the material conforms to the requirements of Section 304 of the 2002 New York State Department of Transportation Standard Construction and Materials Volume 1.

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# 5. Field Sampling Procedures

This section provides a detailed discussion of the field procedures to be used during sampling of the various media being evaluated as part of the RAWP implementation (i.e., soil and fill material).

Additional details regarding sampling procedures and protocols are described in Roux's relevant SOPs, which are provided in Attachment 3.

## 5.1 Soil Sampling

Details for the collection of soil samples is provided below. Additional necessary precautions will be taken when sampling for ECs in the field, incuding but not limited to:

- Using the proper field clothing or personal protective equipment (i.e. no materials will contain Gore-Tex or Tyvek);
- Avoid sampling equipment components/containers making contact with aluminum foil, low density polyethylene (LDPE), glass, or polytetrafluoroethylene materials;
- Following PFAS field sampling guidelines (i.e., using sampling materials made from high density polyethylene [HDPE], silicon, or stainless steel and avoid using equipment containing Teflon and using sharpies, permanent markers, adhesives, and waterproof/plastic clipboards and notebooks); and
- Utilizing regular ice cubes for sample presevation and only Alconox for decontamination.

### 5.1.1 Bottom and Sidewall Documentation and Confirmation Sampling

Bottom and sidewall documentation and confirmation soil samples will be observed for lithology and evidence of contamination (e.g., staining, odors, and/or visible free product) and placed immediately thereafter into large Ziploc® bags for recording headspace using a PID. After a minimum of 15 minutes for equilibration with the headspace in the Ziploc® bag, each sample will be screened for organic vapors using a PID equipped with a 10.6 eV lamp. Samples for possible VOC analysis will be placed in a laboratory-supplied jar or encore sampler prior to screening, due to the potential for loss of VOCs through volatilization. These samples will be placed in the laboratory-supplied containers and shipped to the laboratory under chain of custody procedures in accordance with Roux's SOPs in Attachment 2.

## 5.2 Offsite Backfill/On-Site Reuse Soil Sampling

Although not planned, onsite soil may be reused for backfill. All imported fill/on-Site reuse soil material samples will be collected using pre-cleaned stainless steel sampling tools (i.e., trowels, spatulas, etc.) or new Ziploc® bags. In general, where composite samples are required for offsite fill/on-Site reuse soil material samples, composite samples will be collected from a minimum of three locations across the stockpiled materials. The exception is for VOC samples, which will be collected as grab samples.

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# 6. Sample Handling, Sample Analysis, and QA/QC

To ensure quality data acquisition and collection of representative samples, there are selective procedures to minimize sample degradation or contamination. These include procedures for preservation of the samples, as well as sample packaging, shipping procedures, and QA/QC.

## 6.1 Field Sample Handling

A discussion of the proposed number and types of samples to be collected during each task, as well as the analyses to be performed, can be found in Section 4 of this QAPP/FSP. The types of containers, volumes, and preservation techniques for the aforementioned testing parameters are presented in Table 4.

## 6.2 Sample Custody Documentation

The purpose of documenting sample custody is to ensure the integrity and handling of the samples is not subject to question. Sample custody will be maintained from the point of sampling through the analysis (and return of unused sample portion, if applicable).

Each individual collecting samples is personally responsible for the care and custody of the samples. All sample labels should be pre-printed or filled out using waterproof ink (waterproof ink is not to be used on PFAS sample container labels). The technical staff will review all field activities with the Field Team Leader to determine whether proper custody procedures were followed during the fieldwork and to decide if additional samples are required.

All samples being shipped offsite for analysis must be accompanied by a properly completed chain of custody form. All sample identification information will be listed on the chain of custody form. When transferring the possession of samples, individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to/from a secure storage area, and to the laboratory.

Samples will be packaged for shipment and dispatched to the appropriate laboratory for analysis with a separate signed custody record enclosed in each sample box or cooler. Shipping containers will be locked and/or secured with strapping tape in at least two locations for shipment to the laboratory.

## 6.3 Sample Shipment

Laboratory analysis will be completed by Eurofins TestAmerica Edison of Edison, New Jersey. Samples are anticipated to be transported to the laboratory via courier, however, if sample shipment is necessary, sample packaging and shipping procedures are based upon USEPA specifications, as well as DOT regulations. The procedures vary according to potential sample analytes, concentration, and matrix and are designed to provide optimum protection for the samples and the public. Sample packaging and shipment must be performed using the general outline described below.

All samples will be shipped within 24 hours of collection and will be preserved appropriately from the time of sample collection. A description of the sample packing and shipping procedures is presented below:

1. Prepare cooler(s) for shipment:
   - tape drain(s) of cooler shut;

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- affix “This Side Up” arrow labels and “Fragile” labels on each cooler; and
- place mailing label with laboratory address on top of cooler(s).

2. Arrange sample containers in groups by sample number.
3. Ensure that all bottle labels are completed correctly. Place clear tape over bottle labels to prevent moisture accumulation from causing the label to peel off.
4. Arrange containers in front of assigned coolers.
5. Place packaging material at the bottom of the cooler to act as a cushion for the sample containers.
6. Arrange containers in the cooler so that they are not in contact with the cooler or other samples.
7. Fill remaining spaces with packaging material.
8. Ensure all containers are firmly packed in packaging material.
9. If ice is required to preserve the samples, ice cubes should be repackaged in Zip-lock™ bags and placed on top of the packaging material. Blue Ice cannot be used for cooling inside containers being used for shipping PFAS samples.
10. Sign chain of custody form (or obtain signature) and indicate the time and date it was relinquished to courier as appropriate.
11. Separate chain of custody forms. Seal proper copies within a large Zip-loc™ bag and tape to inside cover of cooler. Retain copies of all forms.
12. Close lid and latch.
13. Secure each cooler using custody seals.
14. Tape cooler shut on both ends.
15. Relinquish to overnight delivery service as appropriate. Retain air bill receipt for project records. (Note: All samples will be shipped for “NEXT A.M.” delivery).

## 6.4 QA/QC

Judy Harry, a third-party data validator, will review the analytical data for QA/QC and prepare the Data Usability Summary Report (DUSR) in accordance with NYSDEC standards. Validator resume is included in Attachment 1. A laboratory SOP for analysis of PFAS is included in Attachment 4.

The primary intended use for the Remedial Action data is to confirm if remediation has been performed in accordance with the RAWP at the Site. The primary DQO of the soil program, therefore, is that data be accurate and precise, thus, representative of the actual Site conditions. Accuracy refers to the ability of the laboratory to obtain a true value (i.e., compared to a standard) and is assessed through the use of laboratory quality control (QC) samples, including laboratory control samples and matrix spike samples, as well as through the use of surrogates, which are compounds not typically found in the environment that are injected into the samples prior to analysis. Precision refers to the ability to replicate a value and is assessed through both field and laboratory duplicate samples.

Sensitivity is also a critical issue in generating representative data. Laboratory equipment must be of sufficient sensitivity to detect target compounds and analytes at levels below NYSDEC standards and guidelines whenever possible. Equipment sensitivity can be decreased by field or laboratory contamination of samples and by sample matrix effects. Assessment of instrument sensitivity is performed through the analysis of reagent blanks, near-detection-limit standards, and response factors. Potential field and/or laboratory contamination is assessed through use of trip blanks, method blanks, and equipment rinse blanks (also called “field blanks”).

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**Table 1** lists the number/type of field and QA/QC samples that will be collected during implementation of the RAWP. **Table 2** lists the reporting limits for the EC compounds to be analzyed in soil. **Table 3** lists the requirements for field and laboratory QC samples that will be analyzed to assess data accuracy and precision, as well as to determine if equipment sensitivity has been compromised. Table 4 lists the preservation, holding times, and sample container information.

All “assessment” analyses will be performed in accordance with the NYSDEC Analytical Services Protocol (ASP), using USEPA SW 846 methods.

All laboratory data are to be reported in NYSDEC ASP Category B deliverables and will be delivered to NYSDEC in electronic data deliverable (EDD) format as described on NYSDEC’s website (http://www.dec.ny.gov/chemical/62440.html). A DUSR will be prepared meeting the requirements in Section 2.2(a)1.ii and Appendix 2B of DER-10 for all data packages generated during implementation of the RAWP.

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# 7. Site Control Procedures and Decontamination

Site control procedures, including decontamination, waste handling, and waste disposal, are discussed below. Site control procedures have been developed to minimize both the risk of exposure to contamination and the spread of contamination during field activities at the Site. All personnel who come into designated work areas, including contractors and observers, will be required to adhere strictly to the conditions imposed herein and to the provisions of a Site-specific Health and Safety Plan (HASP). The HASP is included as Appendix D to the RAWP.

## 7.1 Decontamination

In an attempt to avoid the spread of contamination, all drilling and sampling equipment must be decontaminated at a reasonable frequency in a properly designed and located decontamination area. Detailed procedures for the decontamination of field and sampling equipment are included in Roux's SOPs located in Attachment 3. The location of the decontamination area will be determined prior to the start of field operations. The decontamination area will be constructed to ensure that all wash water generated during decontamination can be collected and containerized for proper disposal.

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# TABLES

1. Remedial Action Endpoint Sampling Summary
2. Reporting Limits for EC Compounds in Soil
3. Field and Laboratory QC Summary
4. Preservation, Holding Times, and Sample Containers

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| Sample Medium | Target Analytes | Field Samples | Duplicates[1] | Trip Blanks[2] | Field Blanks[1] | Matrix Spikes[1] | Spike Duplicates[1] | Total No. of Samples |
|---|---|---|---|---|---|---|---|---|
| Track 4 Bottom Documentation Soil Samples | TCL/Part 375 VOCs | 31 | 2 | 15 | 2 | 2 | 2 | 54 |
| | TCLPart 375 SVOCs | 31 | 2 | 0 | 2 | 2 | 2 | 39 |
| | TCLPart 375 Pesticides | 31 | 2 | 0 | 2 | 2 | 2 | 39 |
| | Total Cyanide | 31 | 2 | 0 | 2 | 2 | 2 | 39 |
| | PCBs | 31 | 2 | 0 | 2 | 2 | 2 | 39 |
| | TAL/Part 375 Metals | 31 | 2 | 0 | 2 | 2 | 2 | 39 |
| | PFAS, 1,4 Dioxane | 31 | 2 | 0 | 15 | 2 | 2 | 52 |
| Track 2 Bottom Confirmation Soil Samples | TCL/Part 375 VOCs | 15 | 1 | 6 | 1 | 1 | 1 | 25 |
| | TCLPart 375 SVOCs | 15 | 1 | 0 | 1 | 1 | 1 | 19 |
| | TCLPart 375 Pesticides | 15 | 1 | 0 | 1 | 1 | 1 | 19 |
| | Total Cyanide | 15 | 1 | 0 | 1 | 1 | 1 | 19 |
| | PCBs | 15 | 1 | 0 | 1 | 1 | 1 | 19 |
| | TAL/Part 375 Metals | 15 | 1 | 0 | 1 | 1 | 1 | 19 |
| | PFAS, 1,4 Dioxane | 15 | 1 | 0 | 6 | 1 | 1 | 24 |
| Hot Spot 1 and Hot Spot 2 Bottom/Sidewall Confirmation Soil Samples | 1,2,4 - Trimethylbenzene | 10 | 0 | 2 | 2 | 0 | 0 | 14 |
| Hot Spot 1 and Hot Spot 2 Bottom/Sidewall Confirmation Soil Samples | Mercury | 5 | 0 | 1 | 1 | 0 | 0 | 7 |
| Soil (Import for Backfill/On-Site Reuse) | TCL/Part 375 VOCs | 9 | 1 | 1 | 1 | 1 | 1 | 14 |
| | TCLPart 375 SVOCs | 9 | 1 | 0 | 1 | 1 | 1 | 13 |
| | TCLPart 375 Pesticides | 9 | 1 | 0 | 1 | 1 | 1 | 13 |
| | Total Cyanide | 9 | 1 | 0 | 1 | 1 | 1 | 13 |
| | PCBs | 9 | 1 | 0 | 1 | 1 | 1 | 13 |
| | TAL/Part 375 Metals | 9 | 1 | 0 | 1 | 1 | 1 | 13 |
| | PFAS, 1,4 Dioxane | 9 | 1 | 0 | 1 | 1 | 1 | 13 |

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Totals are estimated based on scope of work as written, actual sample quantities may vary based on field conditions. QA/QC sample quantities will be adjusted accordingly.

[1] Based on 1 per day for PFAS or 1 per 20 samples or 1 per Sample Delivery Group for all other parameters.

[2] Based on 1 cooler per day. Assumes 25 sampling events conducted over time as the excavation progress.

USEPA - United States Environmental Protection Agency

VOCs - Volatile Organic Compounds

SVOCs - Semivolatile Organic Compounds

PCBs - Polychlorinated Biphenyls

PFAS - Per- and Polyfluoroalkyl Substances

TAL - USEPA Contract Laboratory Program Target Analyte List

**Table 2 - Reporting Limits for EC Compounds in Soil**

| Method Description | Method Code | Prep Method | Analyte Description | CAS Number | RL | MDL | LOD | Units | ICL - Low | ICL - High | ICL - RPD % | MS - Low | MS - High | MS - RPD % | Surrogate Low | Surrogate High |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Per- and Polyfluoroalkyl Substances by LC/MS/MS 1633A | 1633A | 1633A Shake | Perfluorobutanoic acid (PFBA) | 375-22-4 | 0.400 | 0.130 | | ug/Kg | 70 | 140 | 30 | 70 | 140 | 30 | | |
| | | | Perfluoropentanoic acid (PFPeA) | 2706-90-3 | 0.200 | 0.0500 | | ug/Kg | 60 | 150 | 30 | 60 | 150 | 30 | | |
| | | | Perfluorohexanoic acid (PFHxA) | 307-24-4 | 0.200 | 0.0600 | | ug/Kg | 65 | 140 | 30 | 65 | 140 | 30 | | |
| | | | Perfluoroheptanoic acid (PFHpA) | 375-85-9 | 0.200 | 0.0700 | | ug/Kg | 65 | 145 | 30 | 65 | 145 | 30 | | |
| | | | Perfluorooctanoic acid (PFOA) | 335-67-1 | 0.200 | 0.0400 | | ug/Kg | 70 | 150 | 30 | 70 | 150 | 30 | | |
| | | | Perfluorononanoic acid (PFNA) | 375-95-1 | 0.200 | 0.0600 | | ug/Kg | 70 | 155 | 30 | 70 | 155 | 30 | | |
| | | | Perfluorodecanoic acid (PFDA) | 335-76-2 | 0.200 | 0.0500 | | ug/Kg | 70 | 155 | 30 | 70 | 155 | 30 | | |
| | | | Perfluoroundecanoic acid (PFUnA) | 2058-94-8 | 0.200 | 0.0500 | | ug/Kg | 70 | 155 | 30 | 70 | 155 | 30 | | |
| | | | Perfluorododecanoic acid (PFDoA) | 307-55-1 | 0.200 | 0.0900 | | ug/Kg | 70 | 150 | 30 | 70 | 150 | 30 | | |
| | | | Perfluorotridecanoic acid (PFTrDA) | 72629-94-8 | 0.200 | 0.0700 | | ug/Kg | 65 | 150 | 30 | 65 | 150 | 30 | | |
| | | | Perfluorotetradecanoic acid (PFTeDA) | 376-06-7 | 0.200 | 0.0700 | | ug/Kg | 65 | 150 | 30 | 65 | 150 | 30 | | |
| | | | Perfluorobutanesulfonic acid (PFBS) | 375-73-5 | 0.200 | 0.0700 | | ug/Kg | 65 | 145 | 30 | 65 | 145 | 30 | | |
| | | | Perfluoropentanesulfonic acid (PFPeS) | 2706-91-4 | 0.200 | 0.0400 | | ug/Kg | 55 | 160 | 30 | 55 | 160 | 30 | | |
| | | | Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | 0.200 | 0.0500 | | ug/Kg | 60 | 150 | 30 | 60 | 150 | 30 | | |
| | | | Perfluoroheptanesulfonic acid (PFHpS) | 375-92-8 | 0.200 | 0.0700 | | ug/Kg | 65 | 155 | 30 | 65 | 155 | 30 | | |
| | | | Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | 0.200 | 0.110 | | ug/Kg | 65 | 160 | 30 | 65 | 160 | 30 | | |
| | | | Perfluorononanesulfonic acid (PFNS) | 68259-12-1 | 0.200 | 0.0700 | | ug/Kg | 55 | 140 | 30 | 55 | 140 | 30 | | |
| | | | Perfluorodecanesulfonic acid (PFDS) | 335-77-3 | 0.200 | 0.0500 | | ug/Kg | 40 | 155 | 30 | 40 | 155 | 30 | | |
| | | | Perfluorododecanesulfonic acid (PFDoS) | 79780-39-5 | 0.200 | 0.0600 | | ug/Kg | 25 | 160 | 30 | 25 | 160 | 30 | | |
| | | | 1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | 0.400 | 0.100 | | ug/Kg | 60 | 150 | 30 | 60 | 150 | 30 | | |
| | | | 1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | 0.400 | 0.160 | | ug/Kg | 55 | 200 | 30 | 55 | 200 | 30 | | |
| | | | 1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | 0.400 | 0.130 | | ug/Kg | 70 | 150 | 30 | 70 | 150 | 30 | | |
| | | | Perfluorooctanesulfonamide (PFOSA) | 754-91-6 | 0.200 | 0.0900 | | ug/Kg | 70 | 160 | 30 | 70 | 160 | 30 | | |
| | | | N-methylperfluorooctane sulfonamide (NMeFOSA) | 31506-32-8 | 0.200 | 0.0900 | | ug/Kg | 70 | 155 | 30 | 70 | 155 | 30 | | |
| | | | N-ethylperfluorooctane sulfonamide (NEtFOSA) | 4151-50-2 | 0.200 | 0.160 | | ug/Kg | 70 | 160 | 30 | 70 | 160 | 30 | | |
| | | | N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA) | 2355-31-9 | 0.200 | 0.0800 | | ug/Kg | 65 | 155 | 30 | 65 | 155 | 30 | | |
| | | | N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA) | 2991-50-6 | 0.200 | 0.110 | | ug/Kg | 65 | 165 | 30 | 65 | 165 | 30 | | |
| | | | N-methylperfluorooctane sulfonamidoethanol (NMeFOSE) | 24448-09-7 | 1.60 | 0.300 | | ug/Kg | 70 | 140 | 30 | 70 | 140 | 30 | | |
| | | | N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE) | 1691-99-2 | 1.60 | 0.300 | | ug/Kg | 70 | 130 | 30 | 70 | 130 | 30 | | |
| | | | Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) | 13252-13-6 | 0.200 | 0.110 | | ug/Kg | 70 | 145 | 30 | 70 | 145 | 30 | | |
| | | | 4,8-Dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | 0.200 | 0.0400 | | ug/Kg | 70 | 160 | 30 | 70 | 160 | 30 | | |
| | | | Perfluoro-3-methoxypropanoic acid (PFMPA) | 377-73-1 | 0.200 | 0.0700 | | ug/Kg | 20 | 140 | 30 | 30 | 140 | 30 | | |
| | | | Perfluoro-4-methoxybutanoic acid (PFMBA) | 863090-89-5 | 0.200 | 0.0500 | | ug/Kg | 60 | 150 | 30 | 60 | 150 | 30 | | |
| | | | Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) | 151772-58-6 | 0.200 | 0.0700 | | ug/Kg | 60 | 155 | 30 | 60 | 155 | 30 | | |
| | | | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | 0.200 | 0.0900 | | ug/Kg | 70 | 150 | 30 | 70 | 150 | 30 | | |
| | | | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) | 763051-92-9 | 0.200 | 0.0800 | | ug/Kg | 65 | 160 | 30 | 45 | 160 | 30 | | |
| | | | Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA) | 113507-82-7 | 0.200 | 0.0500 | | ug/Kg | 70 | 140 | 30 | 70 | 140 | 30 | | |
| | | | 3-Perfluoroheptanoylpropanoic acid (I-3 FTCA) | 356-02-5 | 0.400 | 0.200 | | ug/Kg | 65 | 130 | 30 | 65 | 130 | 30 | | |
| | | | 3-Perfluoropentylpropanoic acid (C-3 FTCA) | 914637-49-3 | 1.00 | 0.500 | | ug/Kg | 60 | 130 | 30 | 60 | 130 | 30 | | |
| | | | 3-Perfluoroheptylpropanoic acid (C-3 FTCA) | 812-70-4 | 1.00 | 0.400 | | ug/Kg | 60 | 150 | 30 | 60 | 150 | 30 | | |
| | | | 13C4 PFBA | STL00992 | 10.0 | 4.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C5 PFPeA | STL01893 | 5.00 | 2.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C5 PFHxA | STL02977 | 2.50 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C4 PFHpA | STL01892 | 2.50 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C8 PFOA | STL02952 | 2.50 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C9 PFNA | STL02278 | 1.25 | 0.500 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C6 PFDA | STL02979 | 1.25 | 0.500 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C7 PFUnA | STL02980 | 1.25 | 0.500 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C2 PFTeDA | STL02169 | 1.25 | 0.500 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C3 PFBS | STL02337 | 2.13 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C2 PFHxS | STL03081 | 2.27 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C8 PFOS | STL01954 | 2.40 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C8 FOSA | STL01956 | 2.50 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | d3-N-MeFOSAA | STL02118 | 5.00 | 2.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | d5-N-EtFOSAA | STL02117 | 5.00 | 2.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C2 4:2 FTS | STL02365 | 4.68 | 2.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C2 6:2 FTS | STL02979 | 4.76 | 2.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C2 8:2 FTS | STL03280 | 4.80 | 2.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | 13C3 HFPO-DA | STL02265 | 10.0 | 4.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | d7-N-MeFOSE-M | STL02277 | 25.0 | 10.0 | | ug/Kg | | | 30 | | | 30 | | |
| | | | d9-N-EtFOSE-M | STL02278 | 25.0 | 10.0 | | ug/Kg | | | 30 | | | 30 | | |
| | | | d5-3:3FTCA | STL03764 | 2.50 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | d3-NMeFOSA | STL02765 | 2.50 | 1.00 | | ug/Kg | | | 30 | | | 30 | | |
| | | | | | | | | | | | | | | | | |
| Semivolatile Organic Compounds (GC/MS) | 8270E | 3546 | 1,4-Dioxane | 123-91-1 | 0.0330 | 0.0284 | | mg/Kg | 31 | 105 | 30 | 31 | 108 | 30 | | |
| | | | 2,4,6-Tribromophenol (Surr) | 118-79-6 | | | | mg/Kg | | | 30 | | | 30 | 18 | 137 |
| | | | 2-Fluorobiphenyl | 321-60-8 | | | | mg/Kg | | | 30 | | | 30 | 31 | 117 |
| | | | 2-Fluorophenol (Surr) | 367-12-4 | | | | mg/Kg | | | 30 | | | 30 | 24 | 120 |
| | | | Nitrobenzene-d5 (Surr) | 4165-60-0 | | | | mg/Kg | | | 30 | | | 30 | 27 | 120 |
| | | | Phenol-d5 (Surr) | 4165-62-2 | | | | mg/Kg | | | 30 | | | 30 | 26 | 118 |
| | | | Terphenyl-d14 (Surr) | 1718-51-0 | | | | mg/Kg | | | 30 | | | 30 | 33 | 124 |

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## Table 3. Field and Laboratory QC Summary

| QC Check Type | Minimum Frequency | Use |
|---|---|---|
| Field QC | | |
| Duplicate** | 1 per matrix per 20 samples | Precision |
| Trip Blank** | 1 per VOC cooler | Sensitivity |
| Field Blank** | 1 per matrix per 20 samples | Sensitivity |
| Laboratory QC | | |
| Laboratory Control Sample | 1 per matrix per SDG | Accuracy |
| Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate** | 1 per matrix per 20 samples | Accuracy/Precision |
| Surrogate Spike | All organic samples | Accuracy |
| Laboratory Duplicate | 1 per matrix per SDG | Precision |
| Method Blank | 1 per matrix per SDG | Sensitivity |

**Notes**:
QC - Quality Control
SDG - Sample Delivery Group - Assumes a single extraction or preparation
** Provided to lab by field sampling personnel

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## Table 4. Preservation, Holding Times, and Sample Containers

| Analysis | Matrix | Bottle Type | Preservation(a) | Holding Time(b) |
|---|---|---|---|---|
| TAL/Part 375 Metals (total) | Soil | 4 oz glass jar | Cool to 0-6°C | 180 days, Hg 28 days |
| SW-846 6020B/7471B/7470A | Water | 250 mL plastic | Nitric acid | 180 days, Hg 28 days |
| Total Cyanide | Soil | 4 oz glass jar | Cool to 0-6°C | 14 days |
| SW-846 9012B | Water | 250 mL plastic | NaOH, Cool to 0-6°C | 14 days |
| PFAS via USEPA 1633A | Soil | 4 oz plastic jar | Cool to 0-6°C | 90 days to extract, 28 days to analysis |
| PFAS via USEPA 1633A | Water | 2 x 125mL HDPE | Cool to 0-6°C | 28 days to extract, 28 days to analysis |
| 1,4-Dioxane via 8270E | Soil | 4 oz glass jar | Cool to 0-6°C | 14 days to extract, 40 days to analysis |
| 1,4-Dioxane via 8270E SIM | Water | 2 x 250 mL amber glass | Cool to 0-6°C | 7 days to extract, 40 days to analysis |
| TCL/Part 375 VOCs | Soil | 3 x 5 gram EnCore | Cool to 0-6°C | 48 hours from sample collection, 14 days if frozen to -7°C or extruded into methanol |
| SW-846 8260D | Water | 3 x 40 mL voa vial | ydrochloric Acid, Cool to 0-6 | 14 days |
| TCL/Part 375 SVOCs | Soil | 4 oz glass jar | Cool to 0-6°C | 14 days to extract, 40 days to analysis |
| SW-846 8270E | Water | 2 x 250 mL amber glass | Cool to 0-6°C | 7 days to extract, 40 days to analysis |
| Part 375 Pesticides | Soil | 4 oz glass jar | Cool to 0-6°C | 14 days to extract, 40 days to analysis |
| SW-846 8081B | Water | 2 x 250 mL amber glass | Cool to 0-6°C | 7 days to extract, 40 days to analysis |
| PCBs | Soil | 4 oz glass jar | Cool to 0-6°C | 365 days to extract, 40 days to analysis |
| SW-846 8082A | Water | 2 x 250 mL amber glass | Cool to 0-6°C | 365 days to extract, 40 days to analysis |

[a] All soil and groundwater samples to be preserved on ice during collection and transport
[b] Days from date of sample collection.
TAL - USEPA Contract Laboratory Program Target Analyte List
PFAS - Per- and Polyfluoroalkyl Substances
USEPA - United States Environmental Protection Agency
TCL - USEPA Contract Laboratory Program Target Compound List
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCBs - Polychlorinated Biphenyls

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# FIGURE

1. Proposed Sample Locations

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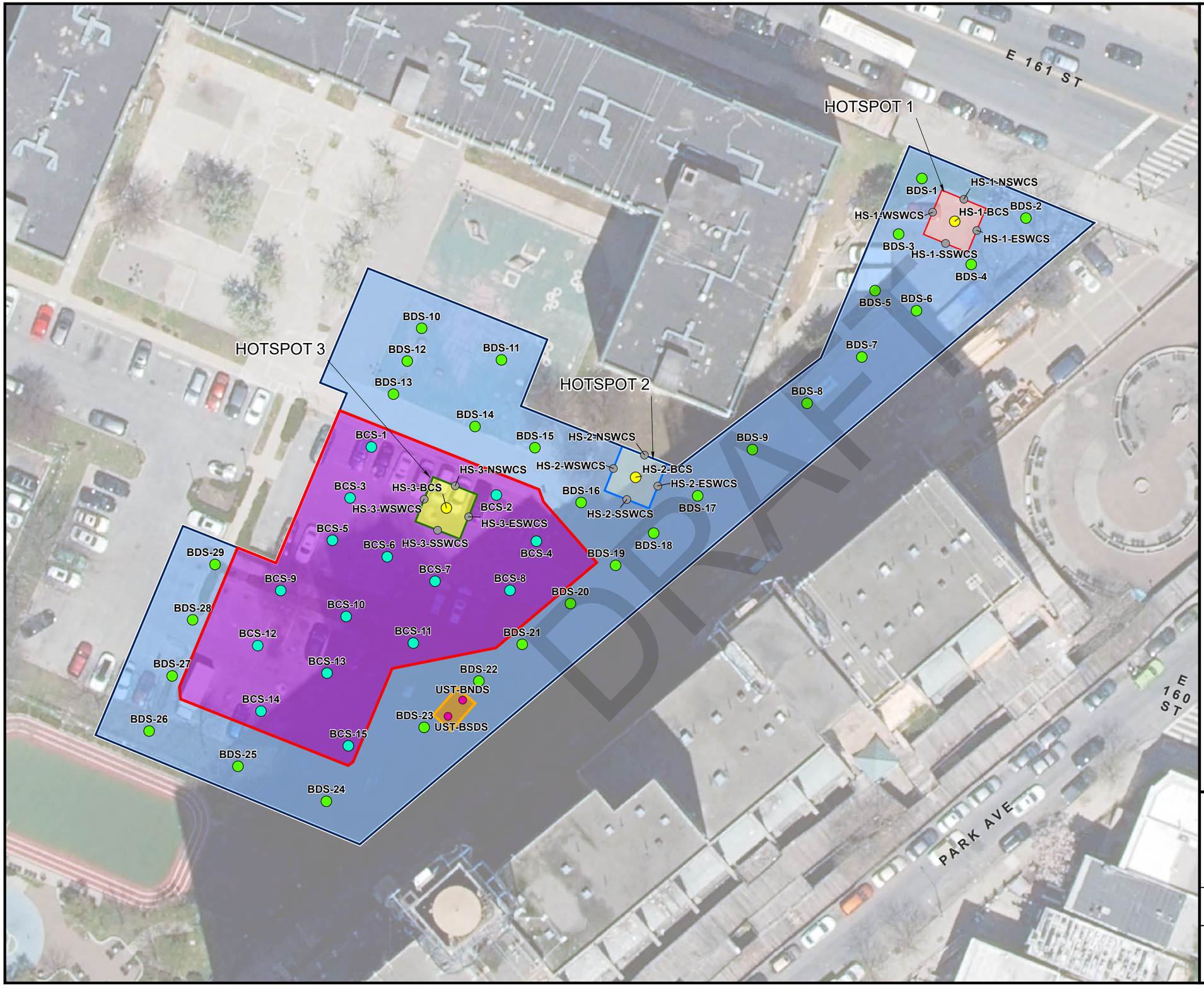


LEGEND

- CONFIRMATION ENDPOINT SAMPLE
- DOCUMENTARY ENDPOINT SAMPLE
- HOT SPOT BOTTOM CONFIRMATION ENDPOINT SAMPLE
- HOT SPOT SIDEWALL CONFIRMATION ENDPOINT SAMPLE
- UNDERGROUND STORAGE TANK DOCUMENTARY ENDPOINT SAMPLE
- SUPPORT OF EXCAVATION BOUNDARY
- SITE BOUNDARY

**EXCAVATION AREAS**

- EXCAVATE 4 FT BLS - TRACK 2 CLEANUP
- EXCAVATE 2 FT BLS - TRACK 4 CLEANUP
- EXCAVATE 6 FT BLS - UNDERGROUND STORAGE TANK REMOVAL
- EXCAVATE TO 5 FT BLS - HOTSPOT 1
- EXCAVATE TO 8 FT BLS - HOTSPOT 2
- EXCAVATE TO 14 FT BLS - HOTSPOT 3

N

NOTES
1. AERIAL SOURCE: NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO)
2. FT BLS - FEET BELOW LAND SURFACE

40 0 40'

Title:

# REMEDIAL ALTERNATIVE 2: TRACK 2 & TRACK 4 CLEANUP

310 EAST 161ST STREET
BRONX, NEW YORK 10451

Prepared for:

TEG MORRISANIA DEVELOPMENT LLC

ROUX

| | | |
|---|---|---|
| Compiled by: P.P. | Date: 06/11/26 | FIGURE |
| Prepared by: M.S.R. | Scale: AS SHOWN | 12 |
| Project Mgr: L.D. | Project: 3868.0005Y000 | |
| File: 3868.0005Y111.12 | | |

V:\GIS\PROJECTS\3868\0005Y\111\3868i0005Y111.APRX

# ATTACHMENTS

1. Professional Profiles
2. NYSDEC PFAS Guidance
3. Roux's Standard Operating Procedures
4. Laboratory's Standard Operating Procedures

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# ATTACHMENT 1

Professional Profiles

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# PROFESSIONAL PROFILE

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## EDUCATION

BA, Geology, Colgate University, 2003

## PROFESSIONAL LICENSES

New York Licensed Professional Geologist #720
Connecticut Licensed Environmental Professional #610
Accredited AHERA Inspector, 2004
NJ UST Subsurface Evaluator Certification #491925
Waterfront Edge Design Guidelines Professional

# Frank Cherena, PG, LEP, WEDG

## National Director of Real Estate Services

## Vice President | Principal Geologist

### EXPERIENCE SUMMARY

Twenty years of experience: Vice President/Principal Geologist with Roux, Islandia, New York; Staff Geologist with RTP Environmental Associates, Inc., Green Brook, New Jersey.

### TECHNICAL SPECIALTIES

Conducted, managed, or overseen Phase I and Phase II investigations and remediation at contaminated sites, specializing in developing innovative cost-saving solutions that focus on integrating remedies into redevelopment scenarios. Experience working with multiple agencies and stakeholders including negotiation and coordination with lenders, tenants, and community stakeholders to secure funding and approvals.

### REPRESENTATIVE PROJECTS

- Principal-in-charge of large university tech development project in New York City. The project consists of the demolition and decommissioning of a former hospital building, and excavation for redevelopment of four separate buildings for the first phase of campus construction. Environmental considerations on the project included site assessment, remediation design and oversight, SDPES permitting (construction dewatering and geothermal well discharge), soil characterization for reuse and capping of soils. Coordinated with NYCDEP, and other project stakeholders concerning community protection and monitoring concerns.
- Principal-in-charge of redevelopment of a former powerplant into an industrial arts complex. Remediation consisted of removal and containment of TSCA-regulated PCB-impacted soils, groundwater, and building material, and remediation waste. Successfully obtained Certificate of Completion for NYSDEC BCP, clean up and continue to coordinate Site redevelopment activities under a Site Management Plan. Included significant coordination and correspondence with USEPA to negotiate installation of a consent order for bulkhead installation along the Gowanus Canal Superfund Site.
- Principal-in-charge of redevelopment of shopping mall in Staten Island, New York. The Site will consist of the construction of two commercial out parcel buildings, a new parking deck, and an expansion of the existing mall building. Areas of concern include historical fill, site-wide soil contamination (arsenic and pesticides). In addition, also responsible for agency coordination with FDNY, NYSDEC, and NYCOER for mitigation of methane and chlorinated volatile organic compounds vapor issues.
- Principal-in-charge for the redevelopment of a 5-acre live-work-play campus in Hunts Point, Bronx. The residential component of the Project is comprised of 100% affordable housing and is currently enrolled in the NYSDEC BCP. Mr. Cherena has also negotiated/coordinated with lenders, coordinated with multiple disciplines on the design team to create a RAP to comply with NYCOER air/noise requirements, and assisted in remedial design and estimation.
- Principal-in-charge for new development of a large regional mall in Norwalk, Connecticut with underground parking. The proposed redevelopment will result in the construction of retail shops, restaurants, hotel, and entertainment. Previous usage of the property included over 30 different parcels including three establishments, gasoline filling stations, fuel oil terminal storage, hazardous waste disposal areas. The project includes investigation and subsequent remediation of petroleum and hazardous waste releases, filing of the Environmental Conditions Assessment Form (ECAF) associated with the three transfer act parcels, and coordination with the CT DEEP and CT DECD to obtain CT Brownfields Grant funds.

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- Principal-in-charge for two adjoining multifamily NYSDEC BCP redevelopment sites in Mott Haven, Bronx, New York along the Harlem River. Project includes characterization, excavation, and disposal of over 40,000 tons of soil, support for obtaining a SPDES discharge permit for construction water, along with attending public meetings and creating public participation plans. Project tasks include community air monitoring, shoreline permitting, and construction monitoring while minimizing cost impact by sharing resources between both projects.
- Principal-in-charge for the largest redevelopment project in New York City (over $4.5 billion). Project includes Phase I and Phase II ESAs (investigation of soil, groundwater, and soil vapor) at over 75 properties; Construction support for excavation of one million cubic yards of soil including implementing an in situ waste characterization program; Environmental support for demolition, asbestos and lead abatement, site remediation using In Situ Chemical Oxidation, and relocating of an active 9-acre 100-year old railyard; Property acquisition support throughout the project (7 city blocks); and Agency support for NYSDEC, NYCDEP, MTA (LIRR/NYCT), and ESDC. The environmental data was used as an integral component of the New York State Environmental Quality Review Act (SEQRA) final Environmental Impact Statement (EIS). The project encompasses 336,000 sq ft of office space, 6.4 million sq ft of residential space, an 18,000 seat sports and entertainment venue: the Barclays Center (home of the Nets professional basketball team), 247,000 sq ft of retail space, a 165,000 square-foot hotel, and over 8 acres of intricately designed publicly accessible open space.
- Principal-in-charge of redevelopment and rehabilitation of the Nassau Coliseum Event Center in Uniondale, Long Island, New York. Services included Phase I and Phase II ESA to obtain approvals and entitlements, along with providing consulting services for asbestos abatement and operations and maintenance. Also was responsible for diesel generator tank removal and replacement tank design and installation.
- Principal-in-charge for a remedial investigation and real estate transaction negotiation for a contaminated former industrial property in Glen Cove, Long Island, New York. Activities included due diligence including document review and historical research to develop and implement a cost efficient investigation scope that was able to identify presence of contamination that was used to negotiate property transaction. Investigation was also designed to develop red mediation and construction budget to support future mixed use redevelopment of the over 12 acre property.
- Principal-in-charge of numerous due diligence projects for owners, developers, managers, municipalities, and lenders at commercial and industrial properties throughout the Northeast. Activities included performance of UST evaluations and closures, hot spot remediations, Phase I and Phase II Site Assessments, vapor intrusion studies and mitigation, lead based paint, asbestos and hazardous materials surveys, interaction with regulatory agencies on behalf of clients and development of remedial cost estimates for planning and negotiation.
- Principal-in-charge for investigation and review of a former electroplating facility in Bay Shore, New York with chlorinated solvent DNAPL. Activities included historical document review, subsurface investigation, and coordination with outside legal counsel and NYSDEC.
- Project manager for a property transfer support project at a heavily contaminated state-of-the-art distribution facility in the Bronx, New York. The site was a former MGP being handled under the VCP in central office, the site had an open spill under the regional spills group and the site was attempting to apply to the BCP through the regional office. Roux performed a Phase I for the buyer, a Phase II and remedial cost estimate for the owner and negotiated with the buyer's consultant and NYSDEC to limit the scope of the investigation and cleanup.
- Principal-in-charge of NYSDEC BCP redevelopment project in Island Park, Long Island, New York. Property was the location of a former oil terminal with extensive degraded petroleum contamination. Contracted services included, management of contaminated soil, import of recycled soil to bring the site above the flood plain, and negotiation with the NYSDEC. Project remediation schedule was extremely tight, and a COC was achieved before the requisite deadline.
- Served as Environmental Professional on hundreds of Phase I Environmental Site Assessments according to ASTM E1527-00, ASTM E1527-05, and ASTM E1527-13 for due diligence of large retail shopping centers, industrial facilities, and office buildings. Associated activities included agency contact, database management and interpretation, report preparation, and recommendations for additional work.
- Implemented GIS analysis and mapping for a remedial study and alternative analysis report (AAR) for an active petroleum storage terminal in Buffalo, New York under jurisdiction of the NYSDEC. The AAR required spatial analyses in order to categorize and analyze contaminant data from multiple investigations, investigate remedial alternatives, and to help focus ongoing additional investigations.

**PROFESSIONAL TRAININGS**

OSHA 40-Hour Hazardous Materials Training, 2003

OSHA 8-Hour Supervisor Training, 2004

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# PROFESSIONAL PROFILE

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**EDUCATION**
BCE, Civil Engineering,
University of Delaware, 1987
MBA, Management, Adelphi
University, 1992

**PROFESSIONAL LICENSES**
Professional Engineer:
New York, New Jersey, Pennsylvania, Rhode Island, Connecticut, Vermont, Virginia, North Carolina, Ohio, Michigan, and Montana

## Charles J. McGuckin, PE

### Vice President | Principal Engineer

**EXPERIENCE SUMMARY**
Thirty-five years of experience: Principal, Senior and Project Engineer with Roux Associates, Inc.; President of Remedial Engineering, P.C.; and Design Engineer at Dvirka and Bartilucci Consulting Engineers.

**TECHNICAL SPECIALTIES**
Engineering design of soil and groundwater remediation systems. Brownfields clean-up plans, stormwater studies and engineered natural treatment systems.

**REPRESENTATIVE PROJECTS**

- Principal Engineer for remedial investigation scoping, fate and transport analysis, and feasibility study preparation for a 1300+ acre Former Aluminum Smelter USEPA Superfund Site in Montana. Due to the size, complexity, and unique exposure areas of the Site it was broken up into multiple decision units including landfills, percolation ponds, operational areas, river area, soil, and groundwater. The contaminants of concern included metals, PAHs, cyanide, and fluoride. Remedial technologies evaluated in detail included landfill capping, groundwater extraction and treatment, pond and river dredging, soil excavation, slurry wall containment, *in situ* stabilization, and *in situ* groundwater treatment. Detailed effectiveness, implementability, and cost evaluations were prepared to support preferred remedial alternatives for each decision unit.
- Principal Engineer for remedial action implementation for a 2.5-acre former subway transit power station in Brooklyn along the Gowanus Canal. The project remedial action was completed under an extremely tight deadline to obtain the certificate of completion under the NYSDEC BCP program. The project also involves close coordination with USEPA due to the adjacent canal superfund status. The investigation required in depth review of historic facility operations and sampling of subsurface tunnel structures. The remedy included excavation of PCB impacted soils, LNAPL recovery, shoreline stabilization, concrete scarification, sewer cleaning and capping. The project has required close coordination with the development team to ensure management of impacted materials in conformance with the Site Management Plan.
- Principal Engineer for the preparation of field implementation plans, construction monitoring, and Engineers Certification Report for a former manufactured gas Plant (MGP) site in West Chelsea, Manhattan, New York. The site was one of the first projects completed under the NYS Brownfields Clean-up Program. The remedy included soil excavation and offsite thermal treatment, a sheet pile barrier wall, a vapor barrier, and basement ventilation system. A comprehensive air monitoring program was conducted due to the concerns over coal tar residue emissions and odors on the surrounding community. The remedy was incorporated into the design and construction of the headquarters office building of an international media company.
- Principal engineer for the preparation of the feasibility study, IRM plans, and remedial design/remedial action plans for a 40-acre former manufacturing facility in Rensselaer, New York. IRM Soil remediation included excavation of over 10,000 cubic yards of CVOC and metals source material for disposal at multiple facilities based on waste characteristics. Basement cleaning was performed in three large buildings to remove accumulated process sludges. Lagoon closure plans included sediment removal, dewatering, soil washing, and soil capping. The final remedy for the site includes a groundwater perimeter containment trench and 40 gpm treatment system for metals and VOCs and a 9-acre vegetated cap for a former landfill.

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- Principal Engineer for the feasibility studies and remedial action work plans for multiple operable units of a large railyard located in Sunnyside, Queens, New York under the NYSDEC Inactive hazardous waste program. For the former engine house and maintenance area unit, pre-design studies included product plume thickness data collection and modeling, ex situ biopiles treatment, *in situ* enhanced bioremediation, and *in situ* chemical oxidation. The final design consisted of decontamination and removal of structures, excavation of hot spot soils for PCBs and lead, UST closures, a dual phase high vacuum extraction system and *in situ* bioremediation.
- Project Engineer for the design and construction management of a 600 gpm groundwater extraction and treatment system to prevent offsite migration at a petroleum storage and pipeline transfer facility in Providence, Rhode Island. The treatment system was designed to remove iron, BTEX, and naphthalene from the groundwater to below surface water discharge standards for the Providence River. The system processes consisted of equalization, aeration, de-aeration, flocculation, clarification, air stripping, dual media filtration, granular activated carbon adsorption (liquid and vapor phase), and sludge thickening and dewatering. The system included an outfall diffuser designed in accordance with the CORMIX computer model.
- Senior Engineer responsible for the design, construction management, and O&M of a 60,000-gpd constructed wetlands treatment system for a former manufacturing facility in Virginia. The 16-acre treatment system was designed within an existing phragmites wetland to remove zinc and iron from landfill leachate prior to discharge to an adjacent creek. The treatment system consisted of alkalinity producing cells, toxic ponds, compost and limestone berms, anaerobic cells, and aerobic cells. The design included a 400-foot reinforced earthen dike together with hydraulic control structures and piping to maintain cell water levels and flow rates. The system also includes a pump station and force main for both effluent discharge and irrigation purposes. Joint wetlands and local permit approvals were obtained for the project.
- Senior Engineer for the performance of a feasibility study and remedial design for the closure of a concrete oil/water separator filled with refinery sludge and demolition materials impacted with lead at a former refinery in Providence, Rhode Island. Remedial alternatives were developed and evaluated including capping and containment using a perimeter slurry wall, sheet piling or concrete wall sealing; excavation and disposal; and *in situ* solidification. The capping and containment using a slurry wall alternative was selected for implementation of the remedial design. The design consisted of removal and replacement of existing monitoring wells, sealing of separator wall openings, a 2-acre multi-layer cap, a 1200-foot long by 30-foot deep soil-bentonite slurry wall, and a perimeter drainage swale. The multi-layer cap included a 40-mil HDPE geomembrane and a geosynthetic clay liner. The slurry wall was keyed into the existing clay confining layer beneath the separator. The design incorporated disposal of an additional 10,000 cubic yards of petroleum impacted soil under the cap.
- Principal Engineer for environmental consulting support services for a large landfill O&M contract under review by the New York City Department of Investigation. The work entailed reviewing the scope of routine vs. non-routine work performed over a one-year period for compliance with contract requirements. The O&M Work included routine cover maintenance, groundwater and gas monitoring, landfill gas extraction, major system repairs and waste handling. Memos of findings were prepared assessing acceptability of work, compliance with permit regulations and providing recommendations for improvements.
- Principal Engineer for the independent engineering review of change orders for the New York MTA Office of the Inspector General associated with electric utility substations reconstruction damaged during the 2012 Superstorm Sandy. The cost review focused on contracting procedures, waste classification of impacted structures and soils, proper waste management and disposal. Findings were compiled in a report to determine if costs were legitimate and justifiable and providing recommendations for improved specifications for bidding and of management waste handling contracts.
- Principal Engineer for remedial action plan implementation oversight and certification for the CornellTech campus development on Roosevelt Island, New York. The first phase of the campus development included lead paint and ACM abatement and demolition of the former Goldwater Hospital, construction of six main campus buildings, new utilities, roadways, and lawn/landscaped areas. Responsibilities include oversight of soil/subsurface structures excavation handling, disposal, and reuse; community air monitoring; dewatering permit compliance; and SWPPP inspections.
- Senior and Principal Engineer for the decommissioning and decontamination of a pharmaceutical facility covering seven city blocks as a part of a NYSDEC Voluntary Cleanup Agreement in Brooklyn, New York. The former office and laboratory complex would be decontaminated for reuse as a school and small business space. Multiple other buildings were demolished. Responsibilities included preparation of interior abatement plans to address mercury, lead and PCBs in building materials and review of Interim Remedial Measure (IRM) work plans for lead, benzene and mercury-contaminated soil excavation and disposal. Groundwater remediation design

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included air sparge/soil vapor extraction, *in situ* oxidation and a reactive barrier wall using colloidal carbon and ZVI.

- Principal Engineer for the performance of a Brownfields Demonstration Pilot Program in the Hamlet of New Cassel for the Town of North Hempstead, New York. Under an EPA grant, Roux Associates created an inventory of 50 potential commercial/industrial properties within New Cassel and evaluated these properties based on perceived contamination and potential for redevelopment/reuse. Eight sites exhibiting the greatest potential for redevelopment were selected to perform Phase I Environmental Site Assessments. Of these eight sites, four sites were selected for Brownfield Site investigations to identify the nature and extent of contamination in soil and groundwater and provide potential remedial alternatives and cleanup costs to revitalize these properties. The Brownfields Demonstration Pilot Program also included community outreach activities to promote a unified approach to the redevelopment of Brownfields in new Cassel.
- Principal Engineer responsible for engineering certification of all remediation activities related to the seven-city-block Barclay's Arena and Atlantic Yards redevelopment in Brooklyn, New York. This multi-billion-dollar redevelopment includes the Arena, which will be focal point of the largest redevelopment project in Brooklyn, consisting of an urban complex of housing, commercial and retail space, as well as several acres of landscaped public open space. The existing properties being redeveloped are residential, commercial, and industrial properties, including a large railroad yard. Engineering certification included multiple RAWPs under NYSDEC Spills Program, UST removals, soil excavation, *in situ* groundwater treatment and remedy oversight services. The project also includes ACM abatement, building demolition, soil pre-waste-classification, coordination (with the receiving facilities), and oversight of the removal of 1,000,000 cubic yards of soil (~550,000 yards removed to date), representing one of the largest excavation and soil removal projects performed in New York City.
- Principal Engineer responsible for the preparation of the remediation completion report at Captain's Cove former municipal landfill State Superfund Site located in Glen Cove, New York. This work has been performed in accordance with Title 3 of the NYS Environmental Quality Bond Act under contract to the City of Glen Cove. Design elements included excavation plans, radiological waste monitoring, demo debris and waste separation and screening, dewatering water management, waste disposal, and site restoration. Additional work included the delisting of a six acre "clean" portion of the site to allow the development of a ferry terminal and esplanade and development of alternative cleanup standards consistent with future site uses. Site remediation will accommodate site redevelopment as a commercial waterfront and operating ferry service and seaport area.
- Principal Engineer providing program management of interior building materials surveys for 22 residential buildings along the south shore of long island under an Army Corps of Engineers contract for dune reconstruction. Building materials surveys included testing and analysis of suspect contaminants and reporting in support of building abatement and demolition planning. Testing was completed using multiple teams on a tight timeline to meet project schedule requirements.
- Principal Engineer for the remediation of a former Manufactured Gas Plant (MGP) facility in Brooklyn, NY, including oversight of the excavation of both the former gasholders, and adjacent contaminated hotspots requiring offsite thermal desorption of over 30,000 tons of coal tar impacted soil. Directed the Community Air Monitoring Program (CAMP) specific to the MGP impacted soil removal, as required by both New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH). Remedial activity met all substantive requirements of the NYSDEC approved Remedial Action Work Plan for the Site. The remedy included design of a passive subsurface vapor monitoring/recovery system for a 500,000 sq. ft. retail structure in Brooklyn, NY. The system design integrated a perforated piping system complemented by a protective vapor barrier below the structural floor slab to monitor and mitigate volatile organic compound vapors. Multiple vapor barrier options were evaluated to determine the optimum design based on the site conditions.
- Principal Engineer providing expert settlement support services to a county municipality in New York State. The case involved an EPA Order for underground storage tank (UST) compliance for over 50 county operated facilities with over 125 USTs. The project involved the field inventory of the USTs at each facility and development of both Interim and final compliance plans to comply with EPA, NYSDEC and local UST regulations. Detailed cost estimates were prepared for multiple scenarios for upgrading USTs including tightness testing, manway repairs, leak detection and overfill protection monitoring systems, UST removal and replacement, and new piping. The upgrade evaluation and negotiations included incorporation of Supplemental Environmental Project (SEPs) in accordance with EPA requirements. SEPs included centralized monitoring systems for leak detection and inventory control.
- Principal Engineer for preparation of a site management plan for redevelopment of a former watch case factory in Sag Harbor, New York. The primary engineering controls for the former factory conversion to a residential building consisted of a vapor barrier and an active sub slab depressurization system

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(SSDS) to address chlorinated VOCs. The SSDS system was complicated due to the existing 100-year-old structure. A unique raised floor approach was designed to allow for the SSDS installation. The system design, approved by NYSDEC and NYSDOH includes multiple legs, dual blowers, low vacuum alarms and monitoring points.

- Principal Engineer for the Remedial Action Work Plan (RAWP) for redevelopment of a shopping center in the Bronx, New York. The RAWP elements included soil and groundwater management plans, stormwater management, air monitoring and vapor mitigation systems. To address vapor intrusion, active sub slab depressurization systems were designed for two pad buildings. One system for a new retail building construction and one retrofit system for an existing building to be used as a restaurant. Closure reports were prepared and certified documenting all remediation work and approved by NYC Mayor's Office of Environmental Remediation (OER).
- Principal Engineer for the preparation of a preliminary remedial design for the remediation and restoration of a pond and surface water tributaries to Canaan Lake that have been impacted from leachate generated from an upgradient former municipal landfill located in Holtsville, New York. Completed a preliminary remedial design for the construction of a compost-based permeable reactive barrier for the removal and treatment of leachate prior to discharge to the surface water, followed by restoration of the surface water body and surrounding wetlands. The project included development of a long term remedial strategy to reduce rainfall infiltration into the landfill and minimize leachate generation. Current plans to reduce rainfall infiltration include the planting of 3,250 hybrid poplars, regrading and lining of drainage swales, and the resurfacing of low lying areas consistent with recreational facilities.
- Principal Engineer for final capping elements and wetlands restoration work and completion of the Final Engineering Report for an inactive hazardous waste site in Syracuse, New York. The project included onsite consolidation of lead impacted waste; 7-acre landfill cap with vegetated layer, cover soil, and geomembrane; stormwater runoff controls; reconstruction of wastewater ponds; and an 8-acre wetland restoration. An O &M Plan was prepared and implemented consisting of groundwater, surface water and landfill gas monitoring, and annual cap and wetland inspections.
- Principal Engineer for the preparation of the remedial action work plan for an 11-acre former Department of Defense owned Site that manufactured airplane parts along Hempstead Harbor in Manorhaven, New York. The project is regulated under the NYSDEC Voluntary Cleanup Program. The remedial design consisted of both soil vapor extraction/air sparging and *in situ* enhanced bioremediation systems for Site groundwater impacted by chlorinated VOCs. The final remedial design and site management plan are expected to include soil capping, vapor barriers and passive ventilation systems to be incorporated into a residential redevelopment with waterfront access.
- Senior Engineer for the performance of a stormwater runoff evaluation for a manufacturing facility in Watertown, New York. Roux Associates was retained as third party to evaluate the drainage design and construction elements for an industrial landfill cap. The evaluation was performed for the facility owner in support of potential litigation arising from onsite building flooding incidents following a severe snow and rainstorm event. The scope of work included an evaluation of the existing onsite storm sewer system capacity, calculation of runoff flow rates for the 300-acre contributing area, review of landfill cap surface drainage design, review of erosion control measures implemented during construction, and analysis of specific flooding incident causes. The runoff analyses were performed using the TR 55 Method for three conditions: pre-capped, capping under construction prior to establishment of vegetation, and final vegetated cap design. Recommendations were made to improve the site drainage including design of surface drainage swales, temporary berms and sediment traps during construction and modification of snow handling practices.
- Principal Engineer for the management of a soil and ground-water remediation system for a nationwide overnight delivery distribution center in Brooklyn, New York as part of the NYSDEC Voluntary Cleanup Program. A risk-based remedial approach that called for the remediation of "hot spot" source area soils, and mass-reduction of VOCs was successfully utilized for the Site. As a result, the focus of remediation was on reducing the mass of VOCs in on-site groundwater to a level where natural attenuation would be effective in remediation of VOCs. To address the contamination in the source area, a soil vapor extraction (SVE) and air sparge (AS) system consisting of 8 SVE wells and 17 AS wells was designed, constructed, operated and maintained for a period of approximately 3 years. Permanent shutdown of the system was approved by the NYSDEC.
- Senior Engineer for the design and construction management of a soil remediation and stormwater management project at a 16-acre former pesticide warehouse facility in Dayton, New Jersey. The Site was redeveloped for storage and trailer parking. The project consisted of consolidation of pesticide contaminated soils; asphalt capping of the 3.5-acre contaminated soils area; stormwater collection, conveyance, and detention; and site regrading. The evaluation included TR-55 runoff modeling for pre and post capping and development conditions. The storm sewer system consisted of

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multiple catch basins, over 2,000 linear feet of reinforced concrete pipe ranging in size from 15 to 30 inches, and a recharge basin. A Soil Erosion and Sedimentation Control Plan and a NJPDES General Permit were prepared for the project.

- Project Principal for the performance of LNAPL remediation studies at the New Jersey Transit former Lake Street Bus Garage in Newark, New Jersey. The studies involved evaluating remedial alternatives for free product recovery, performance of an LNAPL recovery pilot test and cost estimating. A RAWP and engineering design plans were prepared for both the bus garage and the adjacent park properties. The remedy included excavation of the source area, horizontal recovery wells, a vertical recovery trench, *in situ* oxidation injections and product recovery using vacuum extraction.
- Senior Engineer for the performance of a stormwater management analysis for a 28-acre industrial landfill in Virginia. The principal objective of the study was to identify engineering controls to minimize stormwater runoff to a metals-contaminated sediment impoundment. The study included TR-55 runoff modeling and storage analyses for multiple detention ponds. Three engineering control alternatives were identified including landfill cap regrading, diversion using berms and swales, and diking and weir raising.
- Senior Engineer for the investigation, design, and construction management of the closure of a 2-acre fire-water supply pond and modification of the stormwater conveyance system at a former manufacturing facility in Williamsburg, Virginia. The investigation phase of the project was focused on determining the sources and loading of metals influent to the pond. Field activities included examination of the existing stormwater drainage system, sub watershed delineation, groundwater monitoring, and installation of automatic stormwater sampling devices. The final design included 400 feet of open concrete channels, 250 feet of culvert replacement, slip lining of 370 feet of 36-inch RCP culvert, reconstruction of five catch basins, placement of 10,000 cubic yards of clay fill within the pond and regrading of existing drainage ditches. Erosion control measures and slope stabilization were also included as well as the design of a special outlet structure for minimizing erosion at the outfall.
- Project Principal for the investigation and closure of five USTs at the New Jersey Transit Broad Street Station site in Summit, New Jersey. Tank sizes ranged from 20,000 to 30,000-gallon capacity. UST closure program completed in accordance with the NJDEP Technical Requirements for Site Remediation. Closure report prepared and submitted to the NJDEP and subsequent issuance of a No Further Action letter from the NJDEP.
- Project Engineer of the underground storage tank (UST) program for a major retail chain store in the New York, New Jersey, and Pennsylvania region. Responsibilities included preparation of a UST management plan based on federal, state, and local regulations and costs to prioritize UST maintenance. The tank designs included plans and specifications for the removal and replacement, or upgrading, of USTs to meet regulatory requirements. The engineering design involved fuel requirements for dual heating and back-up generator usage, mechanical pumping equipment and fire wall design.
- Project Engineer for the design and construction management of a 1,000 sq. ft. hazardous and flammable materials storage facility in Syosset, New York. The facility included concrete secondary containment dikes, access ramps, sprinkler system modifications, and lighting. The separate flammable materials area included 2-hour fire rated concrete block walls and doors, ventilation equipment and a fire alarm system. Permitting services were performed for the Nassau County Department of Health, the Nassau County Fire Marshall, and the Building Department.
- Project Engineer for the design of a 2,000 sq. ft. hazardous waste storage facility in Astoria, New York. Prior to construction, demolition of an existing building was required and included removal of asbestos and lead paint. The project included driving treated timber piles and excavation and removal of contaminated soil and groundwater. The structure consisted of a steel frame with a metal standing seam roof system, decorative masonry block walls, and a roll-up door. Temporary and permanent fencing were required along with concrete sidewalk replacement.
- Senior Engineer providing construction management services in support of the BNYCP Cogeneration Facility construction and Brooklyn Navy Yard facility decommissioning. Work included preparation of construction management plans, supervision of soil, concrete, and sediment disposal activities, asbestos surveys, and PCB sampling and analysis work. A NYCDEP wastewater discharge permit was prepared for the million gallon per day stream condensate and wastewater backwash flow rate.
- Project Principal for performing remedial alternative cost estimating for a New Jersey Transit site in Montclair, New Jersey, which is to be redeveloped as a firehouse. A cost estimate prepared by another consultant was reviewed as part of the scope of work. The proposed remedial alternative for the site consisted of excavation and disposal of PAH-impacted fill material and capping. The alternative remedy proposed by Roux Associates was a more risk-based approach, resulting in a cost savings of approximately $100,000 for New Jersey Transit.

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- Project Engineer for the design and construction management of cap repair and drainage improvement measures for an industrial hazardous waste landfill in Tennessee. Components of the design included replacement of the primary clay cover material, temporary and permanent erosion and sedimentation control measures, and a lined drainage channel to minimize the generation of landfill leachate. The project included the performance of a focused feasibility study to characterize the flow, quality, and treatability of the leachate. A feasibility study was also performed in order to evaluate constructed wetlands remedial technology as a method of effective and economical treatment of leachate.
- Senior Engineer for the remedial design and construction management of a 7-acre off-spec asphalt waste pond at a former refinery in New England. The asphalt material exhibited a low load bearing capacity combined with a viscous, tacky surface. An *in situ* solidification mix design was developed consisting of liquification using hot water and a 2-stage lime kiln dust reagent injection and mixing step. Gravel was added to the mix when the existing subgrade material was of insufficient bearing capacity. Solidified material was tested for unconfined compressive strength, durability, and TCLP. The final cover material consisted of a 6-inch vegetated layer.
- Principal Engineer for the performance of LNAPL remediation studies for a former bus maintenance facility and a segment of a Metropolitan Subway System in Newark, New Jersey. The studies involved evaluating groundwater and soil monitoring data, performance of LNAPL recovery pilot tests, evaluation of remedial alternatives and cost estimating. Recommendations included the use of mobile high vacuum extraction methods to collect LNAPL while minimizing capital expenditures and permanent low vacuum extraction methods to minimize odors to subway cars and surrounding communities.

### Litigation Support Experience

- Project Engineer for the evaluation of remedial investigations and remedial cost estimates for a 30-acre former book publishing facility in Poughkeepsie, New York. The evaluation included the review of Phase I and Phase II investigation reports, remedial investigation (RI) and feasibility study (FS) reports, and the remedial investigation work plan. The findings included the presence of chlorinated volatile organic compounds in the soil and groundwater as well as identification of underground storage tanks. Deficiencies were identified in both the RI and FS reports by comparing with the NYSDEC's required criteria and recommendations were proposed for the RI work plan to further delineate source areas. Based on the remedial investigation review, revised costing assumptions were made, and remedial cost estimates were prepared totaling $3.6 million.
- Project Engineer for the evaluation of expected remedial costs for nine hazardous waste sites, two of which are federal superfund sites. The evaluation of both single and multiple PRP sites was performed to identify costs for an insurance claim. The expected remedial costs for nine sites, which include landfills or facility surface impoundments, totalled approximately $65 million. Remedial plans evaluated for multiple site operable units included groundwater pump and treat, alternative water supply systems, soil/sludge *in situ* solidification and treatment, and wetlands restoration. Additional work included evaluating invoices for site work previously performed and allocating expenses into their appropriate operable unit and work type, i.e., defense or indemnity.

### Water Treatment Experience

- Senior Engineer for the engineering design of a 10 gpm groundwater recovery and treatment system at a former tank farm in Rhode Island. The recovery system included a 200-foot slotted HDPE horizontal well, a 400-foot coated concrete swale and curbing, and a series of seepage collection points manifolded to a common receiving structure. The entire system was designed for passive recovery and gravity flow transmission targeting free-product seepage areas. The treatment system consisted of a collection sump retrofitted within an existing separator, a coalescing plate oil/water separator, a surge tank, a bag filter, and carbon adsorption units. The project included a permit modification for discharge to the Providence River.
- Design Engineer for the design and start-up operation of a 2 mgd packed tower aeration system for potable water in Williston Park, New York. The primary contaminants were trichloroethane and tetrachloroethene which were stripped below drinking water standards. The design process included full scale pilot testing to assure proper removal levels.
- Design Engineer for the design, construction, and start-up operation of a 5 mgd industrial cooling water treatment system utilizing mechanical surface aeration. The system consisted of two lined aeration basins operating in series with floating mechanical aerators to remove volatile organic contaminants to levels suitable for recharge into the Long Island groundwater aquifer. The primary contaminants were 1,1-dichloroethene, trichloroethane, tetrachloroethene and vinyl chloride.
- Design Engineer for the design and construction of a 4 mgd granular activated carbon system for potable water in Hempstead, New York. The primary contaminants consisted of more than 8 volatile and semi volatile organic compounds. Responsibilities included site inspection for the installation of the six vessels containing 20,000 lbs. of carbon in each. The

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system was designed for 99.9% removal efficiency with two units operating in series.

### Constructed Wetlands Experience

- Senior engineer for the conceptual design of a constructed wetlands stormwater treatment system for a coal handling freight railroad facility in Norfolk, Virginia. The design consists of treatment of contaminated stormwater runoff generated from maintenance and fuel handling areas onsite. The design treatment performance objective is the reduction of total suspended solids, oil and grease, and selected metals to levels below the SPDES permit discharge standards established for two of the site's outfalls discharging to the Elizabeth River. The 3 acre system consists of a passively operated 200,000 gpd subsurface-type constructed wetlands with a low visual impact and specialized structural design to meet the needs of a busy railyard facility. Additional design components include stormwater bypass structures, jacking beneath tracks, a grit chamber, a lift station, and outfall modifications. A joint wetlands permit will be prepared for the project.
- Senior Engineer for the feasibility study, conceptual design, and construction of four constructed wetlands units and sedimentation basin for a stormwater treatment system along Cedar Swamp Creek for the City of Glen Cove, New York. The project consisted of review of stormwater studies of the 12 square mile contributing watershed, compilation of USGS water quality and flow data, evaluation of stormwater treatment methods and best management practices and optimum site selection along the creek. The constructed wetlands design included a forebay, high and low marsh cells, a micropool, and stormwater bypass structures for removal of sediment, nitrogen, phosphorus, and trace metals during first flush events. Final design for the first 1.8 acre constructed wetlands unit was completed and performance of construction management is ongoing. Design activities include structural and hydraulic design tasks with specific emphasis on storm water bypass. The design has been integrated into an into an intermodal transportation project with the addition of bicycle and walking paths. NYSDEC and Army Corps permits were obtained for the project.
- Project Engineer for the design of a 7,000 gpd subsurface flow-type constructed wetlands treatment system for a refinery site in Rhode Island. The system was designed to treat a surface-water stream impacted by petroleum hydrocarbons. The system's high aesthetic, low visual impact appeal was ideal for its golf course setting. Both phragmites SPP and Typha SPP wetland species were incorporated in the design in order to assess the biodegradation/biotransformation processes effectiveness. A growth and maturation plan and a treatment evaluation plan were developed in order to evaluate the system performance.
- Lead Engineer responsible for technical review of a design for modifications to a constructed wetlands system in Nicholas County, West Virginia. The system was designed to treat the leachate from a solid waste landfill at a maximum capacity of 30 gpm. The complete water-tight treatment system consisted of a sedimentation basin, stabilization basin, a series of three wetland cells and a finishing ditch. The wetland cells consisted of a double liner system with leachate collection piping overlaid with stone fill and a matrix of plant life. The technology combines physical, geochemical, and biological removal mechanisms operating simultaneously.

### Permitting/Compliance Plans

- Project Engineer for the preparation of a Spill Prevention Control and Countermeasure (SPCC) Plan and a Storm Water Pollution Prevention Plan (SWPPP) for an 850-acre petroleum storage terminal in New England. The SPCC Plan involved the inventory of 50 bulk storage tanks and miscellaneous storage vessels and an assessment of barge loading areas, truck loading racks, additive loading areas, pumping stations, and a network of aboveground pipelines. The SWPPP encompassed an inventory and surveying of the existing storm sewer system, an evaluation of oil/water separator performance and identification of storm water management controls and practices.
- Project Engineer for the design of modifications to multiple discharge facilities along the Providence and Runnins Rivers in Rhode Island. Permitting activities were performed with the following agencies: Rhode Island Department of Environmental Management (RIDEM) Pollutant Discharge Elimination System (RPDES), RIDEM Division of Freshwater Wetlands, Coastal Resources Management Council (CRMC), and the Army Corps of Engineers.

### Sanitary Experience

- Design Engineer for the evaluation of a municipal sanitary sewer system consisting of approximately 70 miles of piping ranging in size from 8 inches to 16 inches, in Garden City, New York. The sewer system was evaluated for existing and proposed flow capacity, surcharging, infiltration of groundwater, inflow of storm water, root encroachment, and sewer breaks. Evaluation methods consisted of hydraulic profile analysis, television inspection of piping, field inspection of manholes, and flow measurement. Sewer upgrading methods were evaluated including direct replacement, manhole restoration and pipe slip lining, and a rehabilitation program was implemented.
- Design Engineer for the City of Glen Cove's industrial wastewater pretreatment program which was established to monitor significant industrial users discharging to the city's wastewater treatment plant to minimize upsets to the

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biological treatment mechanisms. The program work included annual facility inspections, wastewater discharge sampling, review and evaluation of quarterly self-monitoring results, calculation of discharge penalty fees, preparation of annual monitoring reports for each facility and development of wastewater discharge permits to comply with City regulations.

- Design Engineer for a heavy metals study for the municipal sanitary sewer system in the City of Glen Cove, New York. The heavy metals study consisted of the development and performance of a city-wide sewer sampling program to identify the sources of heavy metals loadings on the wastewater treatment plant. The evaluation included industrial sources, scavengers, non-industrial sources, the plant operation itself, and review of existing heavy metal studies. Recommendations were provided for minimization of loadings and pretreatment to protect the plant operations.

### Stormwater Experience

- Design Engineer for the evaluation and conceptual design of a water management plan for a 200-acre proposed office complex in Bethpage, New York. The design included inlets, piping and recharge basin sizing for peak storm water runoff flows as well as a system of architectural ponds and level control structures. For dry periods, the design included flow controls connected to an existing cooling water system to maintain pond levels and for utilization as a water supply for an irrigation sprinkler system during the growing season.
- Design Engineer for the design of a municipal storm drainage system for a 200-acre contributing area in Garden City, New York. The purpose of the drainage system was to alleviate severe flooding problems for eight homes located in a local low point of a residential neighborhood. The system included over 4,800 linear feet of reinforced concrete piping ranging in size from 12 to 60 inches. Design considerations included hydraulic gradient analysis, inlet capacity, utility crossings, minimization of removals of established trees, a county road crossing, utilization of existing structures and piping, and a headwall discharge to a recharge basin. Additional design items included pavement restoration, service line relocations, curbs and sidewalks, and maintenance and protection of traffic.

### Site Assessment Experience

- Senior Engineer for coordination and review of Phase I environmental site assessments for five large research and development complexes located throughout the eastern United States for a major chemical company. The site assessments were performed for due diligence prior to engaging in long-term property lease agreements. The site assessments evaluated chemical storage and handling areas and previous site usage.
- Senior Engineer for coordination and review of Phase I environmental site assessments for 12 properties associated with tennis centers acquisition on Long Island, New York. The properties were either active tennis center facilities or vacant parcels available for new construction. All site assessments were conducted in accordance with ASTM standards for commercial real estate transactions. Primary concerns identified were USTs, drum storage areas, and unauthorized dumping.
- Project Manager representing a group of banks investing in a 20 acre commercial property in Westchester, New York. The onsite soil was contaminated with several volatile and semi volatile organics. Performed an evaluation of the remediation plan which included onsite biological treatment of soils and aeration and oil water separation of groundwater.

### Water Main Experience

- Project Engineer for the design of over 6,000 feet of ductile iron water main in sizes from 4 to 16 inches for Town of Hempstead, New York Department of Water and the Nassau County, New York Department of Public Works. The designs included wet and dry connections to existing mains, fittings, valves, copper services and fire hydrants. Restoration work included replacement of asphalt pavement, concrete sidewalk and curbs, and grass areas.
- Design Engineer for the design and construction management of over 10,000 feet of ductile iron water main in sizes from 6 to 12 inches for the Town of Wallkill, New York. The designs included booster pump station upgrades, a stream crossing, a wetlands crossing, jacking of 36-inch casing beneath a state highway, air release chambers, copper service re-connections, fire hydrants, valves, and appurtenances. Restoration work included wetlands restoration, backfilling, and regrading within a NYSDOT right-of-way and grass and pavement replacement.
- Design Engineer for the design and construction management of upgrades to a 3.7 mgd potable water booster pump station for the Town of Wallkill, New York. The design featured the replacement of a hydropneumatic tank and pump system with three larger capacity centrifugal pumps. The upgrades were performed while maintaining the pump station service. The pump station revisions included piping, pump pads, shut-off valves, silent check valves, pressure relief valves, gauges, ventilation equipment and a motor control center.

### Feasibility Study Experience

- Senior Engineer for the performance of a feasibility study and remedial design of a free product containment and recovery system at a former refinery in New England. The areal extent of the free-product plume was approximately 10 acres with a measured thickness of up to eight feet. Pilot testing activities consisted of pump tests, baildown tests, and funnel and gate

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systems with and without sheeting. The selected remedial alternative consisted of re-routing and repair of active storm sewer piping, closure-in place of a former 72-inch storm drain using clay fill material to form a barrier wall, and installation of multiple recovery trenches totaling 450 linear feet. The recovery trenches were installed to a depth of 14 feet using a deep trenching machine and were completed with gravel, horizontal perforated piping, recovery wells, and monitoring wells to accommodate both passive and active product recovery pumping equipment. Product recovery enhancement pilot testing was also performed by using non-ionic surfactants, mechanical reworking of soil and vacuum extraction methods.

- Project Engineer for the performance of a feasibility study for the containment of a free-product plume beneath a refinery site in Rhode Island. The feasibility study included analysis of groundwater modeling, bench and pilot scale treatability studies, groundwater quality characterization, identification and screening of discharge alternatives, and treatment process evaluations. The work also included the evaluation of the discharge of treatment system effluent to several receptors including groundwater, wetlands, sanitary sewers, and storm sewers. Discharge requirements were evaluated for process water, off-gas air, and residual wastes. Several treatment processes were also evaluated including metals precipitation and sludge dewatering, VOC and SVOC removal, and off-gas treatment. Preferred alternatives for each process were selected for remedial design development.
- Project Engineer for the performance of a feasibility study for a hazardous waste landfill located at a Superfund site in Tennessee. The feasibility study focused on the characterization and quantification of landfill leachate consisting of chlorinated organic compounds as well as proprietary pesticide compounds. The remedial technologies which were evaluated included leachate collection alternatives, onsite treatment alternatives and offsite disposal methods. An analysis was performed for onsite treatment technologies which included constructed wetlands, biological fluidized bed reactor, and granular activated carbon adsorption. The technologies were assembled into four feasible remedial alternatives and treatability studies were recommended to confirm the suitability of selected processes.

**PROFESSIONAL AFFILIATIONS**

National Society of Professional Engineers

American Society of Civil Engineers

WEF Hazardous Waste Committee, 1996 – 1998

**PUBLICATIONS**

*Assessment and Remediation of Off-Spec Asphalt Disposal Areas* - Co-authored, Contaminated Soils, Volume 3, Amherst Scientist Publishers, 1998

*Use of a Subsurface Flow Constructed Wetlands for Collection and Removal of Water Containing BTEX*, Co-authored, Proceedings of the 2000 Petroleum Hydrocarbons and Organic Chemicals in Groundwater Conference, National Ground Water Association

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# PROFESSIONAL PROFILE

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**EDUCATION**
BS, Geology, SUNY Oneonta College, 2012
MS, Geology, SUNY Binghamton University, 2014

## Lauren Dolginko

### Senior Geologist I

**EXPERIENCE SUMMARY**
Nine years of experience: Senior, Project, and Staff Geologist at Roux, Islandia, NY.

**TECHNICAL SPECIALTIES**
Design, implementation, and management of Remedial Investigations and Remedial Actions for regulatory programs including New York State Department of Environmental Conservation Brownfield Cleanup Program (NYSDEC BCP) and New York City Office of Environmental Remediation (NYCOER) sites. Management of due diligence Site Assessments; preparation and management of BCP Applications, Remedial Investigation Work Plans, Remedial Investigation Reports, Remedial Action Work Plans, and Remedial Action Reports; investigation and evaluation of petroleum, polychlorinated biphenyl (PCB), and per- and poly fluoroalkyl substances (PFAS)-related contamination; and management of large-scale soil excavation projects including demolition, waste characterization, and construction activities.

**REPRESENTATIVE PROJECTS**

- Project manager for an affordable housing redevelopment site enrolled in the NYSDEC BCP, located in the Hunts Point neighborhood of the Bronx, New York. The site was formally used as a juvenile detention center. This project included due diligence (Phase I and Phase II investigations), remedial investigations (soil, groundwater, and soil vapor), site-wide in situ a waste characterization sampling program to characterize and properly dispose of over 62,000 tons of contaminated soil. Responsibilities also included the implementation and a NYSDEC-approved Remedial Action Work Plan and attainment of a Certificate of Completion under the NYSDEC BCP. The site will be redeveloped into a 100% affordable housing mixed-use campus that includes 740 residential units, 53,000 SF of community space, 15,000 SF of commercial space, and 260 parking spaces. Additional redevelopment responsibilities included coordination and attainment of New York City Department of Environmental Protection discharge permit for dewatering during construction activities and coordination with New York City Office of Environmental Remediation to meet the requirements of a Noise Attenuation and Air Quality E-Designation.

- Project manager for an affordable housing and community art center redevelopment site enrolled in the NYSDEC BCP, located in Brownsville, New York. The site is approximately 1.31 acres and was formerly used for automobile repair, furniture/cabinet manufacturing, residential, and various commercial spaces. Project responsibilities included successful completion of a NYSDEC BCP Eligibility investigation, acceptance into the NYSDEC BCP, approval of the Remedial Investigation Work Plan (RIWP), implementation of the RIWP, and preparation and implementation of an in-situ waste characterization sampling plan for approximately 22,000 CY of soil. Coordination with NYSDEC will continue through Remedial Action Work Plan (RAWP) preparation, RAWP approval, and environmental oversight during redevelopment of the property.

- Project manager for an affordable housing redevelopment under NYCDEP jurisdiction located in the Bedford-Stuyvesant neighborhood of Brooklyn. Responsibilities included environmental oversight and ensuring compliance with the NYCDEP-approved Remedial Action Plan (RAP), development and implementation of an in-situ waste characterization sampling plan for approximately 5,000 CY of soil, support through offsite disposal and soil management coordination, coordination with foundation contractors during submittal review for vapor barrier and sub-slab depressurization (SSDS) construction, and vapor barrier and SSDS installation inspections. The property will be redeveloped into community facility space and 60 affordable housing residential units.

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- Project manager for neighboring sites enrolled in the NYSDEC BCP, located along the Harlem River in the Mott Haven neighborhood of the Bronx, New York. Site contamination included historic fill and petroleum associated with 18 underground storage tanks (USTs), hydraulic lifts, and an oil/water separator. Responsibilities included the preparation and implementation of the NYSDEC-approved RIWP and RAWP, management during construction operations to ensure successful implementation of remedial elements including the proper offsite disposal of over 70,000 tons of contaminated soil, and receipt of a Certificate of Completion under the NYSDEC BCP. Additional redevelopment responsibilities included support during obtainment of a State Pollutant Discharge Elimination System (SPDES) Permit, NYSDEC Water Withdrawal Permit for construction dewatering, and shoreline permitting. The sites will be redeveloped to include over 34,000 square feet (SF) of public waterfront parkland, over 1,350 apartments, a portion of which include affordable housing units, 15,000 SF of retail space, 598 parking spaces, and a technology-oriented community center.
- Project manager for an affordable housing redevelopment under NYCDEP jurisdiction located in the Bushwick neighborhood of Brooklyn. Responsibilities included environmental oversight and ensuring compliance with the NYCDEP-approved Remedial Action Plan (RAP), support through offsite disposal of approximately 2,000 CY of soil, and coordination with foundation contractors during submittal review for vapor barrier installation, and vapor barrier compliance inspections. The property will be redeveloped into community facility space and 155 affordable housing residential units.
- Project manager for the redevelopment of a former powerplant located in the Gowanus neighborhood of Brooklyn, New York. The site is enrolled in the NYSDEC BCP and was remediated to allow for restricted residential use. The industrial site history and proximity to the Gowanus Canal Superfund Site requires a United States Environmental Protection Agency (USEPA)-approved remediation. Project responsibilities included management and disposal of over 30,000 tons of non-hazardous soil and over 8,000 tons of Toxic Substances Control Act (TSCA)-regulated hazardous soil, health and safety oversight, and oversight of contractors during implementation of the NYSDEC-approved Remedial Action Work Plan and Site Management Plan. Additional redevelopment coordination includes obtainment of a NYCDEP Industrial Wastewater Permit, asbestos containing material (ACM) abatement coordination and oversight, and coordination and oversight during installation of a new steel sheet pile bulkhead along the Gowanus Canal.
- Project manager for the redevelopment of a former railyard and freight terminal in Sunset Park, Brooklyn, New York. The redevelopment spans over 30-acres and is under multi-agency jurisdiction including the NYCDEP, NYSDEC under the BCP, and NYSDEC under the State Superfund Program. The portion of the site enrolled in the NYSDEC BCP and will be remediated to allow for future industrial use. Project responsibilities include BCP application preparation; Remedial Investigation Work Plan development and implementation; Remedial Investigation Report preparation; Interim Remedial Measure Work Plan preparation; excavation and construction oversight; and work plan compliance monitoring. NYCDEP coordination includes the preparation of a Remedial Action Plan and Health and Safety Plan; and work plan compliance monitoring. Additional responsibilities include Tidal Wetland Adjacent Area jurisdiction determination support, Tidal Wetland Permit Application preparation, and ensuring compliance of the Site Management Plan during improvement work to the State Superfund Site.
- Project manager for redevelopment of a Federal Superfund Site located on Long Island, New York, for future commercial use. Project responsibilities include coordination and compliance with NYSDEC and USEPA Site Management Plans, support during preparation of the Environmental Assessment Form for the local Town Department of Environmental Resources, infiltration/percolation testing for future stormwater system design, soil management specification preparation, and construction oversight and reporting to all environmental agencies.
- Project manager during the redevelopment of an over 65-acre property formerly utilized as a petroleum oil terminal for over 50 years in Perth Amboy, New Jersey. Site redevelopment will include the demolition of over 30 aboveground storage tanks (ASTs) ranging from 500 gallons to over 10 million gallons, and associated piping, support structures, and repair garage, onsite reuse of over 200,000 CY of soil, and import of over 350,000 CY of soil in order to construct a new 900,000 SF logistics warehouse. Environmental coordination with New Jersey Department of Environmental Protection (NJDEP) includes Phase I/Preliminary Assessment (PA) preparation, Phase II ESA implementation and report preparation, completion of soil sampling in accordance with NJDEP soil sampling protocols/regulatory requirements, preparation of a Remedial Action Workplan (RAW), and remediation oversight.
- Project manager for an over 20-acre property located in Jersey City, New Jersey under adjusted direct oversight of the NJDEP. Redevelopment of the property includes the demolition of three existing onsite warehouse buildings, onsite reuse of over 13,000 CY of demolition debris, onsite reuse of approximately 5,000 CY of soil, and import of over 150,000 CY of soil in order to construct a new 400,000 SF logistics warehouse. Onsite

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remediation includes the preparation of an Area of Concern (AOC)-specific Self-Implementing PCB Clean-up Plan, implementation of the PCB remediation in accordance with TSCA-regulations, proper offsite disposal of TSCA-regulated waste, and implementation of institutional and engineering controls in accordance with USEPA. Additional Site-wide remediation includes the installation of a Site-wide cap and deed notice in accordance with NJDEP Technical Requirements for Site Remediation.

- Project manager for the reconstruction of 1,500 linear feet of esplanade along the East River beneath the Brooklyn Bridge in Manhattan, New York. Responsibilities included coordination with the NYCDEP, New York City Economic Development Corporation (NYCEDC), and the redevelopment team to ensure compliance with the NYCDEP-approved Remedial Action Plan and Construction Health and Safety Plan; completion of an environmental summary report; implementation of a NYCDEP-approved Phase II Environmental Site Assessment; completion of Stormwater Pollution Prevention Plan (SWPPP) inspections and construction oversight; and support and coordination to ensure compliance with the NYSDEC tidal wetland permit. Reconstruction includes updating and improving the existing walkways, enhancing the public's access to the waterfront, restoration and replacement of the existing bulkhead, and improving upon the coastal resiliency of the site.
- Project manager for several redevelopment sites requiring soil transfers totaling over 20,000 cubic yards between sites in and outside of regulatory agencies. Responsibilities included coordination with the New York City Office of Environmental Remediation (NYCOER) Clean Soil Bank and NYSDEC, management and implementation of soil sampling programs in accordance with NYSDEC Part 360 and DER-10, including emerging contaminants (1,4-dioxane and PFAS).
- Field manager at a 1,300-acre former aluminum smelter site in Columbia Falls, Montana, listed as a Superfund site. Field work was completed in accordance with a USEPA-approved Remedial Investigation/Feasibility Study and Sampling and Analysis Plan including the collection of soil samples to characterize and investigate the contaminants of potential concern associated with former industrial uses at the site and investigated contamination levels within former wastewater percolation ponds.
- Field manager for bedrock core drilling for non-aqueous phase liquid (NAPL) delineation at a former manufacturing facility in Queens, New York. Oversight included inspection of bedrock cores for primary and secondary fractures, evidence of contamination, and completion of rock quality designation (RQD) calculations. Project also included oversight and inspection during the installation of the grout secant wall containment area to cut off NAPL source area. Secant wall oversight included, implementation of the Community Air Monitoring Plan (CAMP), health and safety oversight of worker breathing zone, and inspection of drilling secant wall installation to ensure hydraulic seal. The former manufacturing facility was remediated to allow for restricted residential use and was redeveloped into a mixed-used building consisting of 1,800 residential units.
- Field and remedial construction manager for the largest ongoing redevelopment project in New York. Project included subcontractor oversight and health and safety oversight during utility clearance, soil boring installation, and in situ waste characterization sampling. Additional responsibilities consisted of waste disposal and construction management oversight, support for soil excavation, and ensuring compliance with the Site Environmental Management Plan.
- Field manager for an environmental subsurface investigation in Enfield, Connecticut. Project responsibilities included managing subcontractors and health and safety oversight during the investigation of multiple former dry cleaners. Subcontractor oversight was completed during utility clearance, soil boring installation, Membrane Interface Probe/Cone Penetration Test soil screening, and groundwater monitoring well installation. The investigation of the former dry cleaners included the delineation of Tetrachloroethylene (PCE) and Trichloroethylene (TCE) through soil, groundwater, and soil vapor sampling. Investigation responsibilities included soil lithology classification, soil vapor pin installation, preparation of soil boring logs using gINT software, and assistance with project planning and report preparation.
- Field manager responsible for construction and excavation oversight on Roosevelt Island, New York. Responsibilities included coordination between multiple general contractors by attending weekly construction meetings, excavation support and soil inspection, groundwater dewatering oversight, soil sampling, CAMP support, and weekly SWPPP inspections.
- Field manager for a NYCOER Voluntary Cleanup Program (VCP) Remedial Investigation for the redevelopment of a shopping mall in Staten Island, New York. Project responsibilities included health and safety oversight and management of subcontractors during utility clearance, soil boring installation, groundwater monitoring well installation, and soil vapor point installation. Coordinated and managed a field team to complete soil, groundwater, and soil vapor sampling (volatile organic compounds [VOCs] and methane). Office coordination included the preparation of soil boring logs using gINT software and assistance with project planning and report preparation.
- Field manager for in situ waste characterization of over 32,000 CY of soil and collection of endpoint samples in accordance

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with the NYCOER-approved investigation work plan for a redevelopment site in Astoria, Queens, New York. Responsibilities included health and safety oversight and management of subcontractors during utility clearance and soil boring installation. Completed soil lithology classification and collection of waste characterization and endpoint soil samples.

- Support to Expert Witness for an ongoing case between a major insurance carrier and a large multi-national chemical manufacturer. The case involved categorizing past costs for 12 chemical sites across the country. Assisted in the preparation of expert report on behalf of insurance carrier (Defendant).

  Complaint No. 84 Civ. 1968 (JSR); U.S. District Court, Southern District of New York.

**PROFESSIONAL TRAININGS**

OSHA 40-Hour HAZWOPER Training, 2014

OSHA Eight-Hour Refresher Training, Certificate Current

OSHA Ten-Hour Construction Outreach Training, 2015

OSHA 30-hour Construction Safety Training, 2019

Transit Worker Identification Credential Card Holder

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# PROFESSIONAL PROFILE

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**EDUCATION**
BS, Chemical Engineering,
Cornell University, 2000

## Dana M. Hignell

### Senior Engineer II

**EXPERIENCE SUMMARY**
Over twenty years of experience: Staff, Project, and Senior Engineer with Roux.

**TECHNICAL SPECIALTIES**
Engineering services for the investigation, design, construction, and operation and maintenance of remedial systems for the treatment of contaminated soil, sediment, and groundwater. Remedial designs have included excavation, in-situ groundwater remediation, groundwater pump and treat systems, air sparging with soil vapor extraction, vapor barriers and sub slab depressurization systems, and landfill soil cover systems.

**REPRESENTATIVE PROJECTS**

- Senior Engineer and Project Manager of a former wire and conduit manufacturer (former NYS Inactive Hazardous Waste Site) remediation in Syosset, NY. The Site was accepted into the NYSDEC BCP to support additional remediation and future redevelopment. Activities completed included development of RIR/RAWP and manage oversight of construction activities for approved remedy.
- Senior Engineer and Project Manager for the design and installation of a Constructed Treatment Wetlands (CTW) to treat nitrogen loading from a sanitary system in Brentwood, New York.
- Senior Engineer for the investigation of nitrogen loading to a creek in East Hampton, New York that is part of the Peconic Bay Estuary, and evaluation of the use of a permeable reactive barrier to reduce the flux of nitrogen.
- Senior Engineer for the design and start-up of a soil vapor extraction (SVE) and air sparge (AS) system at an active gasoline station in Staten Island, New York. The system was installed to address soil and groundwater contaminants and consists of 17 vertical SVE wells and 10 AS wells. The recovered soil vapor is treated by catalytic oxidation before being discharged. Over 1,200 pounds of hydrocarbon have been recovered since the system start-up.
- Senior Engineer for the design of in-situ groundwater remediation to treat chlorinated volatile organic compounds (CVOCs) at a former dry cleaner in Bronx, New York. In-situ chemical oxidation (ISCO) was selected as the groundwater remedy, with injections completed over a half an acre of property. The ISCO remedy was successful and allowed for redevelopment of the property within the required schedule.
- Senior Engineer for the design and implementation of a passive product-recovery system using horizontal recovery wells at a former bus garage in Newark, New Jersey. The remedial action also included excavation and offsite disposal of approximately 7,000 tons of petroleum contaminated soil, and in-situ chemical oxidation to treat residual soil and groundwater contamination.
- Senior Engineering managing the investigation, design, and implementation of product-recovery skimming systems for a former petroleum refinery in Queens, New York. Over 100,000 gallons of product has been recovered to date.
- Senior Engineer for the design of a sub-slab depressurization system with vapor barrier for the construction of a 19-story residential building in Brooklyn, New York.

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- Senior Engineer for the investigation, design, and implementation of a soil remediation project at a Former Oil Terminal in Sag Harbor, New York. The remedy completed includes excavation and offsite disposal of approximately 2,000 tons of petroleum contaminated soil in an active roadway surrounded by underground utilities.
- Senior Engineer for the investigation, design, and implementation of a soil remediation project at a 4-acre Former Oil Terminal in Cold Spring Harbor, New York. The remedy completed includes excavation and offsite disposal of approximately 20,000 tons of petroleum contaminated and/or hazardous lead contaminated soil in accordance with the future use of the site under an Environmental Easement. Additional activities completed at the site included asbestos remediation followed by building demolition, UST removal, and cesspool remediation.
- Project Engineer for the complete design for a 9-acre landfill in Rensselaer, New York as part of the NYSDEC Voluntary Cleanup Program. The design was in accordance with the future use of the Site as a landfill with an integrated wildlife habitat vegetative cap and included hot spot soil excavation and installation of a vegetative cap.
- Project Engineer for the design of a soil and groundwater remediation system for a Former Oil Terminal in Oceanside, New York. A risk based remedial approach that called for the remediation of "hot spot" source area soils, and mass-reduction of VOCs in groundwater was successfully utilized for the Site. To address the soil contamination in the source areas, "hot spot" soil excavation was completed. A groundwater pump and treat system was designed, constructed, and continues to be operated and maintained to address the VOC contaminants in groundwater. The system consists of seven recovery wells, an oil/water separator, and a packed column air stripping tower. Over 11 million gallons of groundwater have been recovered and treated.
- Project Engineer for the design and startup of a soil vapor extraction (SVE) and air sparge (AS) system at an 11-acre active Oil Terminal in Glenwood Landing, New York. The system was installed to address soil and groundwater contaminants and consists of four horizontal SVE wells and 8 AS wells. The recovered soil vapor is treated by carbon units before being discharged. Approximately 12,000 pounds of hydrocarbon have been recovered since system start up.
- Project Engineer for the design and startup of a soil vapor extraction (SVE) and air sparge (AS) system at an 11-acre active Oil Terminal in Inwood, New York. The system was installed to address soil and groundwater contaminants and consists of 4 vertical SVE wells and six AS wells. The recovered soil vapor is treated by carbon units before being discharged. Approximately 32,000 pounds of hydrocarbon have been recovered since system start up.

### Operation and Maintenance (O&M) Experience

- Project Engineer responsible for the O&M and monitoring of a SVE system and a dual-pump, product recovery system at an active Oil Terminal in Inwood, New York. O&M activities included system operation and maintenance, performance monitoring, and preparation of quarterly status reports for submission to the NYSDEC. The SVE system consists of 5 SVE wells and was designed, constructed, operated, and maintained for a period of approximately 6 years. The SVE system was permanently shut down and this area of the Site is currently in the post-remediation monitoring phase. The dual-pump system, including groundwater and product recovery and packed column air stripping towers, is currently still in operation.
- Project Engineer responsible for the operation and maintenance of soil and groundwater remediation systems for an active Oil Terminal in Glenwood Landing, New York. A groundwater pump and treat system, consisting of 1 recovery well, two packed column air stripping towers, bag filters and granular activated carbon units, has been in operation at the Site to address VOC contaminants in groundwater. In addition, an SVE/AS system, previously installed, was upgraded to further address soil and groundwater contaminants at the Site boundaries. The SVE system consisted of vertical wells in an area of shallow groundwater. The system was upgraded with seven horizontal wells and an additional five AS wells were installed. Following an on-site diesel spill of approximately 5,000 gallons in 2005, free-product recovery efforts were implemented, including removal of saturated soils and installation of a free-product recovery system.
- Staff Engineer responsible for the O&M and monitoring of an SVE/AS system for nationwide distribution center in Brooklyn, New York as part of the NYSDEC Voluntary Cleanup Program. O&M activities included system operation and maintenance, performance monitoring, soil gas monitoring, quarterly monitoring, and preparation of quarterly and annual status reports for submission to the NYSDEC. The SVE and AS system consists of 8 SVE wells and 17 AS wells and was designed, constructed, operated and maintained for a period of approximately 3 years. The SVE and AS system is permanently shut down and the Site is currently in the post-remediation monitoring phase.
- Staff Engineer responsible for the O&M of a 430 gpm, dual-pump, product recovery system in Greenpoint, Brooklyn, New York. Processes and system maintained include dual-pump groundwater and product recovery, low profile air strippers and a catalytic oxidation unit. The Site encompasses one of the nation's largest petroleum releases (18 million gallons).

### UST Experience

- Project Engineer for the management of the excavation and removal of a 10,000-gallon UST and four ASTs ranging from 284,000-gallon capacity to 976,000-gallon capacity at a former Oil Terminal in Cold Spring Harbor, New York. The scope of

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work entailed preparation of a UST and AST closure work plan, project management of the field work, post excavation and tank footprint sampling and preparation of a UST and AST Closure Report.

- Project Engineer for the excavation oversight of a 2,000-gallon heating oil UST at an active Oil Terminal in Glenwood Landing, New York. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs and preparation of a Closure Report.
- Project Engineer for the excavation oversight of a 2,000-gallon heating oil UST at an active Oil Terminal in Inwood, New York. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs and preparation of a Closure Report. Also included was the management and field oversight of the closure of an in-ground oil/water separator at an active Oil Terminal Inwood, New York. The scope of work entailed preparation of an oil/water separator closure work plan, project management of the field work, excavation of petroleum contaminated soils associated with the separator, post-excavation sampling, and preparation of an Oil/Water Separator Closure Report.
- Staff Engineer for the excavation oversight of three 8,000-gallon USTs, two pump islands and three hydraulic lifts and all associated piping at a former service station in Norwalk, Connecticut. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs, and preparation of a Closure Report.
- Staff Engineer for the excavation oversight of three 8,000-gallon USTs, two pump islands and all associated piping at a former service station in Hartford, Connecticut. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs and preparation of a Closure Report.

### Soil and Groundwater Remediation

- Project Engineer for the design of soil remediation at an active Oil Terminal in Stamford, Connecticut to remove contaminated soils following a 30,000-gallon petroleum spill in 2006. The remediation included excavation of approximately 1,000 cubic yards of petroleum-impacted soil with post-excavation sampling.
- Staff Engineer responsible for construction management of remediation of a former major pharmaceutical plant located in Hicksville, New York as part of the State Superfund Program. The project consisted of the excavation of non-hazardous soil from five on-site drywells and a former waste disposal area, implementation of a community air monitoring plan, coordination with the Long Island Rail Road (LIRR) for work performed within the LIRR's right of way, steel sheeting installation and removal, backfilling, monitoring well abandonment and replacement, transportation and disposal of 3,300 tons of VOC, SVOC and metal contaminated soil, and restoration of approximately 9,800 square feet of asphalt. A 7-foot diameter steel caisson was used to support the deeper excavation required at the invert of two drywells. This innovative approach saved the client approximately $50,000 in costs that would have been incurred by using a traditional steel sheeting support system to protect the on-site commercial building.

### Stormwater

- Project Engineer for the design and construction management of a stormwater drainage upgrade project for the parking lot of a former manufacturing facility (costume jewelry and then surgical needles) located in Queens Village, New York. The stormwater drainage system consisted of multiple catch basins, a new drain and curb, and all associated piping.
- Project Engineer for the design and construction of two stormwater management ponds and swales for a former landfill in Rensselaer, New York. The ponds and swales were constructed as part of the landfill cap project to direct stormwater to existing catch basins, allow stormwater overflow control and to enhance the wildlife habitat.

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**JUDY V. HARRY**
**P. O. Box 208**
**120 Cobble Creek Rd.**
**North Creek, NY 12853**

***Occupation:*** Data Validator/Environmental Technical Consultant

***Years Experience:*** 41

***Education:*** B.S., Chemistry, Magna cum laude, 1976, Phi Beta Kappa

***Certifications:*** New York State Woman-Owned Business Enterprise (WBE)

***Relevant Work History:***

**Data Validation Services: September 1989 - present**

Sole proprietor of Data Validation Services, a woman-owned small business registered with SAM, providing consultation/validation services to regulatory and commercial clients.

These services include the review of analytical laboratory data for compliance with respect to specific protocols, accuracy and defensibility of data, verification of reported values, and evaluation of quality parameters for analytical usability of results. Approved by USEPA, NYSDEC, NJDEP, NYSERDA, and NYCDEP as a data validator for projects, including USEPA Superfund, Brownfield, and lead sites, and those contracted through the NYSDEC Division of Hazardous Waste Remediation, Division of Solid Waste, and Division of Water Quality.

Performed validation for compliance with laboratory analytical protocols including USEPA OLM, USEPA OLC, USEPA ILM, USEPA DFLM, USEPA SOW3/90, USEPA SOW 7/87 CLP, USEPA SOW 2/88 CLP, USEPA SW846, RCRA, AFCEE, NYS 6 NYCRR Part 360, 40 CFR, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, including TO-15, 1989/1991/1995/2000/2005 NYSDEC ASPs, and 1987 NYSDEC CLP.

Performed validation according to the USEPA National and Regional SOPs and Functional Guidelines, AFCEE requirements, NYSDEC Validation Scope of Work, NYS DUSR, and NJDEP Division of Hazardous Site Mitigation/Publicly Funded Site Remediation SOPs.

Performed validation for USEPA Superfund Sites including Salem Acres, York Oil, Port Washington L-4 Landfill, Bridgeport Rental and Oil Services, GE-MRFA, MMR/ OTIS AFB, LCP, and Peter Cooper site; and for USEPA lead sites including SJ&J Piconne, Maska, Bowe System, Jones Sanitation, and Syossett Landfill, involving CLP, RAS, and SAS protocols.

Contracted for NYSDEC Superfund Standby Contracts with LMS Engineers, HDR, CDM Smith, Malcolm-Pirnie/ARCADIS, Ecology & Environment, Shaw Environmental, CG&I, O'Brien & Gere Engineers, and EC Jordan, involving samples collected at NYS Superfund Sites and analyzed under the NYSDEC ASP.

Performed validation services for NYSDEC Phase II remedial investigations, RI/FS projects, Brownfield sites, and PRP over-site projects for hazardous waste sites.

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Performed validation services for clients conducting RI/FS activities involving samples of many matrices, including waste, air, sludges, leachates, solids/sediments, aqueous, and biota.

Clients have included AECOM, ARCADIS, Barton & Loguidice, Benchmark Engineering, Bergmann Associates, Blasland, Bouck & Lee, Brown and Caldwell, CDM Smith, CB&I Shaw Environmental, C&S Consulting Engineers, Chazen Companies, Clough Harbour & Associates, Columbia Analytical Services, C.T. Male, Dames & Moore, Day Engineering, EA Engineering, EcolSciences, Ecology & Environment, Ecosystems, EC Jordan, Environmental Chemical Corporation, EHRT, ENSR Consulting, ELM, ERM-Northeast, Fagan Engineers, Fanning Phillips & Molnar, FluorDaniel GTI, Frontier, Foster Wheeler Environmental Corp, Frontier Technical, Galson Consultants, GE&R, Geomatrix Consultants, GZA Environmental, Handex of N, H2M Group, HDR, HRP, IT Corp, Jacques Whitford, JTM Associates, Labella Associates, Langan Engineers, Leader Environmental, Lockwood, Kessler & Bartlett, LMS Engineers, Malcolm-Pirnie, Metcalf & Eddy, NWEC&C, O'Brien & Gere Engineers, Pace, Parsons Engineering-Science, Plumley Engineering, Prescott Environmental, P. W. Grosser, Rizzo Associates, Roux Associates, Sear Brown Group, SECOR, Shaw Environmental, Stantec, ThermoRemediation Inc., TRC Environmental, Turnkey Environmental Restoration, TVGA Engineering, URS Consultants, Wehran Emcon, Weston, YEC, and private firms.

Provided consultation services to laboratories regarding analytical procedures and protocol interpretation, and to law firms for litigation support.

Provided services to firms involving audits of environmental analytical laboratories to determine analytical capability, particularly for compliance with NYSDEC ASP and AFCEE requirements.

Guest speaker on a panel discussing Data Review/Compliance and Usability, for an analysis workshop for the New York Association of Approved Environmental Laboratories, 1993.

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**Adirondack Environmental Services: June 1987 - August 1989**

Senior mass spectroscopist for AES. Responsible for GC/MS analyses of environmental samples by USEPA and NYSDEC protocols, development of the GC/MS laboratory, initiating the instrumental and computer operations from the point of installation, and for implementing the procedures and methodologies for Contract Laboratory Protocol.

**CompuChem Laboratories: May 1982 - January 1987**

Managed a GC/MS production laboratory; developed, implemented, and supervised QA/QC criteria at three different levels of review; and was responsible for the development and production of the analysis of environmental and clinical samples. Directed a staff of 23 technical and clerical personnel, and managed the extraction and GC/MS labs and data review operations.

### Research Triangle Institute: December 1979 - May 1982

Worked as an analytical research chemist responsible for development of analytical methods for the EPA Federal Register at RTI. This involved analysis of biological and environmental samples for priority pollutants, primarily relating to wastewaters and to human sampling studies. Method development included modification and interfacing of the initially developed Tekmar volatile purge apparatus to GC/MS, development and refinement of methods for entrapment and concentration of the air medium for subsequent volatile analysis, and the analysis and resolution/ identification of individual PCB congeners within Aroclor mixtures by capillary column and mass spectra.

### Guardsman Chemical Company: February 1977 - November 1979

Performed all quality control functions for the manufacturing plant. Performed research and development on coatings and dyes.

### Almay Cosmetics: May 1976 - December 1976

Product evaluation chemist. Responsible for analytical QC of manufactured products.

### Publication

Pellizzzari, E.D., Moseley, M.A., Cooper, S.D., Harry, J.V., Demian, B., & Mullin, M. D. (1985). Recent Advances in the Analysis of Polychlorinated Biphenyls in Environmental and Biological Media. *Journal of Chromatography*, 334(3) 277-314.

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# ATTACHMENT 2

NYSDEC PFAS Guidance

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NEW YORK STATE OF OPPORTUNITY.

Department of Environmental Conservation

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

## Under NYSDEC's Part 375 Remedial Programs

April 2023

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ERRATA SHEET for

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

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

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

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

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

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

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

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

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

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

## Objective

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

## Applicability

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

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

## Field Sampling Procedures

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

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

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

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## Analysis and Reporting

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

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

### Routine Analysis

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

### Additional Analysis

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

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

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

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

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

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

## Data Assessment and Application to Site Cleanup

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

### Water Sample Results

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

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

### Soil Sample Results

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

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

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

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

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

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

## Testing for Imported Soil

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

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

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

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

## General Guidelines in Accordance with DER-10

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

## Specific Guidelines for PFAS

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

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

## General

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

## Laboratory Analysis and Containers

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

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

## Equipment

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

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

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

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

## Equipment Decontamination

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

## Sampling Techniques

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

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

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## Sample Identification and Logging

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

## Quality Assurance/Quality Control

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

## Documentation

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

## Personal Protection Equipment (PPE)

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

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

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

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

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# Appendix C - Sampling Protocols for PFAS in Monitoring Wells

## General

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

## Laboratory Analysis and Container

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

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

## Equipment

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

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

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

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

## Equipment Decontamination

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

## Sampling Techniques

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

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## Sample Identification and Logging

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

## Quality Assurance/Quality Control

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

## Documentation

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

## Personal Protection Equipment (PPE)

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

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

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

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

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# Appendix D - Sampling Protocols for PFAS in Surface Water

## General

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

## Laboratory Analysis and Container

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

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

## Equipment

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

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

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

- stainless steel cup

## Equipment Decontamination

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

## Sampling Techniques

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

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

## Sample Identification and Logging

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

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## Quality Assurance/Quality Control

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

## Documentation

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

## Personal Protection Equipment (PPE)

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

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

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

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

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

## General

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

## Laboratory Analysis and Container

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

## Equipment

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

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

## Equipment Decontamination

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

## Sampling Techniques

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

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

## Sample Identification and Logging

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

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## Quality Assurance/Quality Control

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

## Documentation

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

## Personal Protection Equipment (PPE)

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

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

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# Appendix F - Sampling Protocols for PFAS in Fish

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

**Procedure Name:** General Fish Handling Procedures for Contaminant Analysis

**Number:** FW-005

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

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

**Version:** 8

**Previous Version Date:** 21 March 2018

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

**Originator or Revised by:** Wayne Richter, Jesse Becker

**Date:** 26 April 2019

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

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**NEW YORK STATE**
**DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

# GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

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

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

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate “Age” column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish’s tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

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the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

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



Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

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

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

| FOR LAB USE ONLY- LAB ENTRY NO. | COLLECTION OR TAG NO. | SPECIES | DATE TAKEN | LOCATION | AGE | SEX &/OR REPROD. CONDIT | LENGTH ( ) | WEIGHT ( ) | REMARKS |
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richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**CHAIN OF CUSTODY**

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

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

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

Town of _____, in _____ County.

Item(s) _____

_____

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

_____ _____
Signature Date

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

_____ _____
Signature Date

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

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richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

## NOTICE OF WARRANTY

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

## HANDLING INSTRUCTIONS

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

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

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

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

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EQUIPMENT LIST

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

Fish measuring board.

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

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

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# Appendix G – PFAS Analyte List

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

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

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

## General

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

## Preservation and Holding Time

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

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

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

## Initial Calibration

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

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

| | |
|---|---|
| %RSD >20% | J flag detects and UJ non detects |

## Continuing Calibration Verification

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

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

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## Blanks

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

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

## Field Duplicates

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

| | |
|---|---|
| RPD >30% | Apply J qualifier to parent sample |

## Lab Control Spike

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

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

## Matrix Spike/Matrix Spike Duplicate

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

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

## Extracted Internal Standards (Isotope Dilution Analytes)

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

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

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## Signal to Noise Ratio

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

## Reporting Limits

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

## Peak Integrations

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

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# ATTACHMENT 3

Roux's Standard Operating Procedures

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Date: May 5, 2000

## 1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for decontamination of all field equipment potentially exposed to contamination during drilling, and soil and water sampling. The objective of decontamination is to ensure that all drilling, and soil-sampling and water-sampling equipment is decontaminated (free of potential contaminants): 1) prior to being brought onsite to avoid the introduction of potential contaminants to the site; 2) between drilling and sampling events/activities onsite to eliminate the potential for cross-contamination between boreholes and/or wells; and 3) prior to the removal of equipment from the site to prevent the transportation of potentially contaminated equipment offsite.

In considering decontamination procedures, state and federal regulatory agency requirements must be considered because of potential variability between state and federal requirements and because of variability in the requirements of individual states. Decontamination procedures must be in compliance with state and/or federal protocols in order that regulatory agency(ies) scrutiny of the procedures and data collected do not result in non-acceptance (invalidation) of the work undertaken and data collected.

## 2.0 PROCEDURE FOR DRILLING EQUIPMENT

The following is a minimum decontamination procedure for drilling equipment. Drilling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

2.1 The rig and all associated equipment should be properly decontaminated by the contractor before arriving at the test site.

2.2 The augers, drilling casings, rods, samplers, tools, rig, and any piece of equipment that can come in contact (directly or indirectly) with the soil, will be steam cleaned onsite prior to set up for drilling to ensure proper decontamination.

2.3 The same steam cleaning procedures will be followed between boreholes (at a fixed on-site location[s], if appropriate) and before leaving the site at the end of the study.

2.4 All on-site steam cleaning (decontamination) activities will be monitored and documented by a member(s) of the staff of Roux Associates, Inc.

2.5 If drilling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat drilling equipment, then special decontamination procedures may have to be utilized before steam cleaning (e.g., hexane scrub and wash).

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2.6 Containment of decontamination fluids may be necessary (e.g., rinseate from steam cleaning) or will be required (e.g., hexane), and disposal must be in accordance with state and/or federal procedures.

## 3.0 PROCEDURE FOR SOIL-SAMPLING EQUIPMENT

The following is a minimum decontamination procedure for soil-sampling equipment (e.g., split spoons, stainless-steel spatulas). Soil-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

3.1 Wear disposable gloves while cleaning equipment to avoid cross-contamination and change gloves as needed.

3.2 Steam clean the sampler or rinse with potable water. If soil-sampling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat sampling equipment, then special decontamination procedures may have to be utilized before steam cleaning and washing in detergent solution (e.g., hexane scrub and wash).

3.3 Prepare a non-phosphate, laboratory-grade detergent solution and distilled or potable water in a clean bucket.

3.4 Disassemble the sampler, as necessary and immerse all parts and other sampling equipment in the solution.

3.5 Scrub all equipment in the bucket with a brush to remove any adhering particles.

3.6 Rinse all equipment with copious amounts of potable water followed by distilled or deionized water.

3.7 Place clean equipment on a clean plastic sheet (e.g., polyethylene)

3.8 Reassemble the cleaned sampler, as necessary.

3.9 Transfer the sampler to the driller (or helper) making sure that this individual is also wearing clean gloves or wrap the equipment with a suitable material (e.g., plastic bag, aluminum foil.

As part of the decontamination procedure for soil-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

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## 4.0 PROCEDURE FOR WATER-SAMPLING EQUIPMENT

The following is a decontamination procedure for water-sampling equipment (e.g., bailers, pumps). Water-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

4.1 Decontamination procedures for bailers follow:

a. Wear disposable gloves while cleaning bailer to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a bucket.

c. Disassemble bailer (if applicable) and discard cord in an appropriate manner and scrub each part of the bailer with a brush and solution.

d. Rinse with potable water and reassemble bailer.

e. Rinse with copious amounts of distilled or deionized water.

f. Air dry.

g. Wrap equipment with a suitable material (e.g., clean plastic bag, aluminum foil).

h. Rinse bailer at least three times with distilled or deionized water before use.

4.2 Decontamination procedures for pumps follow:

a. Wear disposable gloves while cleaning pump to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a clean bucket, clean garbage can, or clean 55-gallon drum.

c. Flush the pump and discharge hose (if not disposable) with the detergent solution and discard disposable tubing and/or cord in an appropriate manner.

d. Flush the pump and discharge hose (if not disposable) with potable water.

e. Place the pump on clear plastic sheeting.

f. Wipe any pump-related equipment (e.g., electrical lines, cables, discharge hose) that entered the well with a clean cloth and detergent solution, and rinse or wipe with a clean cloth and potable water.

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g. Air dry.

h. Wrap equipment with a suitable material (e.g., clean plastic bag).

As part of the decontamination procedure for water-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

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Date: May 5, 2000

## 1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines for the collection of soil samples for laboratory analysis. This SOP is applicable to soil samples collected from split-spoon samplers during drilling, hand auger samples, grab samples from stockpiled soils, surface samples, test pit samples, etc.

## 2.0 CONSIDERATIONS

Soil samples may be collected in either a random or biased manner. Random samples can be based on a grid system or statistical methodology. Biased samples can be collected in areas of visible impact or suspected source areas. Soil samples can be collected at the surface, shallow subsurface, or at depth. When samples are collected at depth the water content should be noted, since generally "soil sampling" is restricted to the unsaturated zone. Equipment selection will be determined by the depth of the sample to be collected. A thorough description of the sampling locations and proposed methods of sample collection should be included in the work plan.

Commonly, surface sampling refers to the collection of samples at a 0 to 6-inch depth interval. Certain regulatory agencies may define the depth interval of a surface sample differently, and this must be defined in the work plan. Collection of surface soil samples is most efficiently accomplished with the use of a stainless-steel trowel or scoop. For samples at greater depths a decontaminated bucket auger or power auger may be needed to advance the hole to the point of sample collection. Another clean bucket auger should then be used to collect the sample. To collect samples at depths of greater than approximately six feet the use of a drill rig and split spoon samples will usually be necessary. In some situations, sample locations are accessed with the use of a backhoe.

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## 3.0 MATERIALS/EQUIPMENT

a. A work plan which outlines soil sampling requirements.

b. Field notebook, field form(s), maps, chain-of-custody forms, and custody seals.

c. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, brushes, potable water, distilled water, regulatory-required reagents, aluminum foil, plastic sheeting, etc.).

d. Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.).

e. Stainless steel spoons or spatulas.

f. Disposable sampling gloves.

g. Laboratory-supplied sample containers with labels.

h. Cooler with blue or wet ice.

i. Plastic sheeting.

j. Black pen and indelible marker.

k. Zip-lock bags and packing material.

l. Tape measure.

m. Paper towels or clean rags.

n. Masking and packing tape.

o. Overnight (express) mail forms.

## 4.0 DECONTAMINATION

All reusable sampling equipment will be thoroughly cleaned according to the decontamination SOP. Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and plastic sheeting will be changed after each use and discarded in an appropriate manner.

## 5.0 PROCEDURE

5.1 Prior to collecting soil samples, ensure that all sampling equipment has been thoroughly cleaned according to the decontamination SOP. If samples are to be collected at depth, then the boring must be advanced with thoroughly cleaned equipment to the desired sampling horizon and a different thoroughly cleaned sampler must be used to collect the sample.

5.2 Using disposable gloves and a pre-cleaned, stainless steel spatula or spoon, extract the soil sample from the sampler, measure the recovery, and separate the wash from the true sample. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

5.3 Place the sample in a laboratory-supplied, pre-cleaned sample container. This should be done as quickly as possible and this is especially important when sampling for volatile organic compounds (VOCs). Samples to be analyzed for VOCs must be collected prior to other constituents.

5.4 The sample container will be labeled with appropriate information such as, client name, site location, sample identification (location, depth, etc.), date and time of collection, and sampler's initials.

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5.5 Using the remaining portion of soil from the sampler, log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, layering, grain size, etc.).

5.6 If soil samples are to be composited in the field, then equal portions from selected locations will be placed on a clean plastic sheet and homogenized. Alternately, several samples may be submitted to the laboratory for compositing by weight. The method used is dependent upon regulatory requirements. Specific compositing procedures shall be approved by the appropriate regulatory agency and described in the work plan. Samples to be analyzed for VOCs will not be composited unless required by a regulatory agency.

5.7 After the sample has been collected, labeled, and logged in detail, it is placed in a zip-lock bag and stored in a cooler at 4°C.

5.8 A chain-of-custody form is completed for all samples collected. One copy is retained and two are sent with the samples in a zip-lock bag to the laboratory. A custody seal is placed on the cooler prior to shipment.

5.9 Samples collected from Monday to Friday are to be delivered to the laboratory within 24 hours of collection. If Saturday delivery is unavailable, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if any analytes require a shorter delivery time.

5.10 The field notebook and appropriate forms should include, but not be limited to the following: client name, site location, sample location, sample depth, sample identification, date and time collected, sampler's name, method of sample collection, number and type of containers, geologic description of material, description of decontamination procedures, etc. A site map should be prepared with exact measurements to each sample location in case follow-up sampling is necessary.

5.11 All reusable sampling equipment must be thoroughly cleaned in accordance with the decontamination SOP. Following the final decontamination (after all samples are collected) the sampling equipment is wrapped in aluminum foil. Discard any gloves, foil, plastic, etc. in an appropriate manner that is consistent with site conditions.

END OF PROCEDURE

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Date: May 5, 2000

## 1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for sample handling which will allow consistent and accurate results. Valid chemistry data are integral to investigations that characterize media-quality conditions. Thus, this SOP is designed to ensure that once samples are collected, they are preserved, packed and delivered in a manner which will maintain sample integrity to as great an extent as possible. The procedures outlined are applicable to most sampling events and any required modifications must be clearly described in the work plan.

## 2.0 CONSIDERATIONS

Sample containers, sampling equipment decontamination, quality assurance/quality control (QA/QC), sample preservation, and sample handling are all components of this SOP.

### 2.1 Sample Containers

Prior to collection of a sample, considerations must be given to the type of container that will be used to store and transport the sample. The type and number of containers selected is usually based on factors such as sample matrix, potential contaminants to be encountered, analytical methods requested, and the laboratory's internal quality assurance requirements. In most cases, the overriding considerations will be the analytical methodology, or the state or federal regulatory requirements because these regulations generally encompass the other factors. The sample container selected is usually based on some combination of the following criteria:

a. Reactivity of Container Material with Sample

Choosing the proper composition of sample containers will help to ensure that the chemical and physical integrity of the sample is maintained. For sampling potentially hazardous material, glass is the recommended container type because it is chemically inert to most substances. Plastic containers are not recommended for most hazardous wastes because the potential exists for contaminants to adsorb to the surface of the plastic or for the plasticizer to leach into the sample.

In some instances, however, the sample characteristics or analytes of interest may dictate that plastic containers be used instead of glass. Because some metals species will adhere to the sides of the glass containers in an aqueous matrix, plastic bottles (e.g., nalgene) must be used for samples collected for metals analysis. A separate, plastic

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container should accompany glass containers if metals analysis is to be performed along with other analyses. Likewise, other sample characteristics may dictate that glass cannot be used. For example, in the case of a strong alkali waste or hydrofluoric solution, plastic containers may be more suitable because glass containers may be etched by these compounds and create adsorptive sites on the container's surface.

b. Volume of the Container

The volume of sample to be collected will be dictated by the analysis being performed and the sample matrix. The laboratory must supply bottles of sufficient volume to perform the required analysis. In most cases, the methodology dictates the volume of sample material required to complete the analysis. However, individual laboratories may provide larger volume containers for various analytes to ensure sufficient quantities for duplicates or other QC checks.

To facilitate transfer of the sample from the sampler into the container and to minimize spillage and sample disturbance, wide-mouth containers are recommended. Aqueous volatile organic samples must be placed into 40-milliliter (ml) glass vials with polytetrafluoroethylene (PTFE) (e.g., TeflonTM) septums. Non-aqueous volatile organic samples should be collected in the same type of vials or in 4-ounce (oz) wide-mouth jars provided by the laboratory. These jars should have PTFE-lined screw caps.

c. Color of Container

Whenever possible, amber glass containers should be used to prevent photodegradation of the sample, except when samples are being collected for metals analysis. If amber containers are not available, then containers holding samples should be protected from light (i.e., place in cooler with ice immediately after filling).

d. Container Closures

Container closures must screw on and off the containers and form a leak-proof seal. Container caps must not be removed until the container is ready to be filled with the sample, and the container cap must be replaced (securely) immediately after filling it. Closures should be constructed of a material which is inert with respect to the sampled material, such as PTFE (e.g., TeflonTM). Alternately, the closure may be separated from the sample by a closure liner that is inert to the sample material such as PTFE sheeting. If soil or sediment samples are being collected, the threads of the container must be wiped clean with a dedicated paper towel or cloth, so the cap can be threaded properly.

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e. Decontamination of Sample Containers

Sample containers must be laboratory cleaned by the laboratory performing the analysis. The cleaning procedure is dictated by the specific analysis to be performed on the sample. Sample containers must be carefully examined to ensure that all containers appear clean. Do not mistake the preservative as unwanted residue. The bottles should not be field cleaned. If there is any question regarding the integrity of the bottle, then the laboratory must be contacted immediately and the bottle(s) replaced.

f. Sample Bottle Storage and Transport

No matter where the sample bottles are, whether at the laboratory waiting to be packed for shipment or in the field waiting to be filled with sample, care must be taken to avoid contamination. Sample shuttles or coolers, and sample bottles must be stored and transported in clean environments. Sample bottles and clean sampling equipment must never be stored near solvents, gasoline, or other equipment that is a potential source of cross-contamination. When under chain of custody, sample bottles must be secured in locked vehicles, and custody sealed in shuttles or in the presence of authorized personnel. Information which documents that proper storage and transport procedures have been followed must be included in the field notebook and on appropriate field forms.

2.2 Decontamination of Sampling Equipment

Proper decontamination of all re-usable sampling equipment is critical for all sampling episodes. The SOP for Decontamination of Field Equipment and SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for decontamination of various types of equipment.

2.3 Quality Assurance/Quality Control Samples

QA/QC samples are intended to provide control over the proper collection and tracking of environmental measurements, and subsequent review, interpretation and validation of generated analytical data. The SOPs for Collection of Quality Control Samples, for Evaluation and Validation of Data, and for Field Record Keeping and Quality Assurance/Quality Control must be referred to for detailed guidance regarding these respective procedures. SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for QA/QC procedures.

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2.4 Sample Preservation Requirements

Certain analytical methodologies for specific analytes require chemical additives in order to stabilize and maintain sample integrity. Generally, this is accomplished under the following two scenarios:

a. Sample bottles are preserved at the laboratory prior to shipment into the field.

b. Preservatives are added in the field immediately after the samples are collected.

Many laboratories provide pre-preserved bottles as a matter of convenience and to help ensure that samples will be preserved immediately upon collection. A problem associated with this method arises if not enough sample could be collected, resulting in too much preservative in the sample. More commonly encountered problems with this method include the possibility of insufficient preservative provided to achieve the desired pH level or the need for additional preservation due to chemical reactions caused by the addition of sample liquids to pre-preserved bottles. The use of pre-preserved bottles is acceptable; however, field sampling teams must always be prepared to add additional preservatives to samples if the aforementioned situations occur. Furthermore, care must be exercised not to overfill sample bottles containing preservatives to prevent the sample and preservative from spilling and therefore diluting the preservative (i.e., not having enough preservative for the volume of sample).

When samples are preserved after collection, special care must be taken. The transportation and handling of concentrated acids in the field requires additional preparation and adherence to appropriate preservation procedures. All preservation acids used in the field should be trace-metal or higher-grade.

2.5 Sample Handling

After the proper sample bottles have been received under chain-of-custody, properly decontaminated equipment has been used to collect the sample, and appropriate preservatives have been added to maintain sample integrity, the final step for the field personnel is checking the sample bottles prior to proper packing and delivery of the samples to the laboratory.

All samples should be organized and the labels checked for accuracy. The caps should be checked for tightness and any 40-ml volatile organic compound (VOC) bottles must be checked for bubbles. Each sample bottle must be placed in an individual Ziploc® bag to protect the label, and placed on ice. The bottles must be carefully packed to prevent breakage during transport. When several bottles have been collected for an individual sample, they should not be placed adjacent to each other in the cooler to prevent possible breakage of all bottles for a given sample. If there are any samples which are known or suspected to be highly

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contaminated, these should be placed in an individual cooler under separate chain-of-custody to prevent possible cross contamination. Sufficient ice (wet or blue packs) should be placed in the cooler to maintain the temperature at 4 degrees Celsius (°C) until delivery at the laboratory. Consult the work plan to determine if a particular ice is specified as the preservation for transportation (e.g., the United States Environmental Protection Agency does not like the use of blue packs because they claim that the samples will not hold at 4°C). If additional coolers are required, then they should be purchased. The chain-of-custody form should be properly completed, placed in a "zip-lock" bag, and placed in the cooler. One copy must be maintained for the project files. The cooler should be sealed with packing tape and a custody seal. The custody seal number should be noted in the field book. Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time. If overnight mail is utilized, then the shipping bill must be maintained for the files and the laboratory must be called the following day to confirm receipt.

## 3.0 EQUIPMENT AND MATERIALS

3.1 General equipment and materials may include, but not necessarily be limited to, the following:

a. Sample bottles of proper size and type with labels.

b. Cooler with ice (wet or blue pack).

c. Field notebook, appropriate field form(s), chain-of-custody form(s), custody seals.

d. Black pen and indelible marker.

e. Packing tape, "bubble wrap," and "zip-lock" bags.

f. Overnight (express) mail forms and laboratory address.

g. Health and safety plan (HASP).

h. Work plan/scope of work.

i. Pertinent SOPs for specified tasks and their respective equipment and materials.

3.2 Preservatives for specific samples/analytes as specified by the laboratory. Preservatives must be stored in secure, spillproof glass containers with their content, concentration, and date of preparation and expiration clearly labeled.

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3.3 Miscellaneous equipment and materials including, but not necessarily limited to, the following:

a. Graduated pipettes.

b. Pipette bulbs.

c. Litmus paper.

d. Glass stirring rods.

e. Protective goggles.

f. Disposable gloves.

g. Lab apron.

h. First aid kit.

i. Portable eye wash station.

j. Water supply for immediate flushing of spillage, if appropriate.

k. Shovel and container for immediate containerization of spillage-impacted soils, if appropriate.

## 4.0 PROCEDURE

4.1 Examine all bottles and verify that they are clean and of the proper type, number, and volume for the sampling to be conducted.

4.2 Label bottles carefully and clearly with project name and number, site location, sample identification, date, time, and the sampler's initials using an indelible marker.

4.3 Collect samples in the proper manner (refer to specific sampling SOPs).

4.4 Conduct preservation activities as required after each sample has been collected. Field preservation must be done immediately and must not be done later than 30 minutes after sample collection.

4.5 Conduct QC sampling, as required.

4.6 Seal each container carefully and place in an individual "zip lock" bag.

4.7 Organize and carefully pack all samples in the cooler immediately after collection (e.g., bubble wrap). Insulate samples so that breakage will not occur.

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4.8 Complete and place the chain-of-custody form in the cooler after all samples have been collected. Maintain one copy for the project file. If the cooler is to be transferred several times prior to shipment or delivery to the laboratory, it may be easier to tape the chain-of-custody to the exterior of the sealed cooler. When exceptionally hazardous samples are known or suspected to be present, this should be identified on the chain-of-custody as a courtesy to the laboratory personnel.

4.9 Add additional ice as necessary to ensure that it will last until receipt by the laboratory.

4.10 Seal the cooler with packing tape and a custody seal. Record the number of the custody seal in the field notebook and on the field form. If there are any exceptionally hazardous samples, then shipping regulations should be examined to ensure the sample containers and coolers are in compliance and properly labeled.

4.11 Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time.

4.12 Maintain the shipping bill for the project files if overnight mail is utilized and call the laboratory the following day to confirm receipt.

END OF PROCEDURE

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Date: May 5, 2000

## 1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for the sampling of ground-water monitoring wells for dissolved constituents. As part of the SOP for the sampling of ground-water monitoring wells, sample collection equipment and devices must be considered, and equipment decontamination and pre-sampling procedures (e.g., measuring water levels, sounding wells, and purging wells) must be implemented. Sampling objectives must be firmly established in the work plan before considering the above.

Valid water-chemistry data are integral to a hydrogeologic investigation that characterizes ground-water quality conditions. Water-quality data are used to evaluate both current and historic aquifer chemistry conditions, as well as to estimate future conditions (e.g., trends, migration pathways). Water-quality data can be used to construct ground-water quality maps to illustrate chemical conditions within the flow system, to generate water-quality plots to depict conditions with time and trends, and to perform statistical analyses to quantify data variability, trends, and cleanup levels.

## 2.0 EQUIPMENT AND MATERIALS

2.1 In order to sample ground water from monitoring wells, specific equipment and materials are required. The equipment and materials list may include, but not necessarily be limited to, the following:

a. Bailers (Teflon™ or stainless steel).

b. Pumps (centrifugal, peristaltic, bladder, electric submersible, bilge, hand-operated diaphragm, etc.).

c. Gas-displacement device(s).

d. Air-lift device(s).

e. Teflon™ tape, electrical tape.

f. Appropriate discharge hose.

g. Appropriate discharge tubing (e.g., polypropylene, teflon, etc.) if using a peristaltic pump.

h. Appropriate compressed gas if using bladder-type or gas-displacement device.

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i. Portable generator and gasoline or alternate power supply if using an electric submersible pump.

j. Non-absorbent cord (e.g., polypropylene, etc.).

k. Plastic sheeting.

l. Tape measure (stainless steel, steel, fiberglass) with 0.01-foot measurement increments and chalk (blue carpenter's).

m. Electronic water-level indicators (e.g., m-scope, etc.) or electric water-level/product level indicators.

n. Non-phosphate, laboratory-grade detergent.

o. Distilled/Deionized water.

p. Potable water.

q. Paper towels, clean rags.

r. Roux Associates' field forms (e.g., daily log, well inspection checklist, sampling, etc.) and field notebook.

s. Well location and site map.

t. Well keys.

u. Stop watch, digital watch with second increments, or watch with a second hand.

v. Water Well Handbook.

w. Calculator.

x. Black pen and water-proof marker.

y. Tools (e.g., pipe wrenches, screwdrivers, hammer, pliers, flashlight, pen knife, etc.).

z. Appropriate health and safety equipment, as specified in the site health and safety plan (HASP).

aa. pH meter(s) and buffers.

bb. Conductivity meter(s) and standards.

cc. Thermometer(s).

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dd. Extra batteries (meters, thermometers, flashlight).

ee. Filtration apparatus, filters, pre-filters.

ff. Plasticware (e.g., premeasured buckets, beakers, flasks, funnels).

gg. Disposable gloves.

hh. Water jugs.

ii. Laboratory-supplied sample containers with labels.

jj. Cooler(s).

kk. Ice (wet, blue packs).

ll. Masking, duct, and packing tape.

mm. Chain-of-custody form(s) and custody seal(s).

nn. Site sampling and analysis plan (SAP).

oo. Site health and safety plan (HASP).

pp. Packing material (e.g., bubble wrap)

qq. "Zip-lock" plastic bags.

rr. Overnight (express) mail forms.

## 3.0 DECONTAMINATION

3.1 Make sure all equipment is decontaminated and cleaned before use (refer to the SOP for Decontamination of Field Equipment for detailed decontamination methods, summaries for bailers and pumps are provided below). Use new, clean materials when decontamination is not appropriate (e.g., non-absorbent cord, disposable gloves). Document, and initial and date the decontamination procedures on the appropriate field form and in the field notebook.

a. Decontaminate a bailer by: 1) wearing disposable gloves, 2) disassembling (if appropriate) and scrubbing in a non-phosphate, laboratory-grade detergent and distilled/deionized water solution, and 3) rinsing first with potable water and then distilled/deionized water.

b. Decontaminate a pump by: 1) wearing disposable gloves, 2) flushing the pump and discharge hose (if not disposable) first with a non-phosphate, laboratory-grade detergent and potable water solution in an appropriate

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container (clean bucket, garbage can, or 55-gallon drum) and then with distilled/deionized water or potable water, and 3) wiping pump-related equipment (e.g., electrical lines, cables, discharge hose) first with a clean cloth and detergent solution and then rinsing or wiping with a clean cloth and distilled/deionized water or potable water.

3.2 Note that the decontamination procedures for bailers and pumps are the minimum that must be performed. Check the work plan to determine if chemicals specified by individual state regulatory agencies must also be used for decontamination procedures (e.g., hexane, nitric acid, acetone, isopropanol, etc.).

## 4.0 CALIBRATION OF FIELD ANALYSIS EQUIPMENT

Calibrate field analysis equipment before use (e.g., thermometers, pH and conductivity meters, etc.). Refer to the specific SOP for field analysis for each respective piece of equipment. Document, and initial and date the calibration procedures on the appropriate field form, in the field notebook, and in the calibration log book.

## 5.0 PROCEDURE

5.1 Document, and initial and date well identification, pre-sampling information, and problems encountered on the appropriate field form and in the field notebook as needed.

5.2 Inspect the protective casing of the well and the well casing, and note any items of concern such as a missing lock, or bent or damaged casing(s).

5.3 Place plastic sheeting around the well to protect sampling equipment from potential cross contamination.

5.4 Remove the well cap or plug and, if necessary, clean the top of the well off with a clean rag. Place the cap or plug on the plastic sheeting. If the well is not vented, allow several minutes for the water level in the well to equilibrate. If fumes or gases are present, then diagnose these with the proper safety equipment. Never inhale the vapors.

5.5 Measure the depth to water (DTW) from the measuring point (MP) on the well using a steel tape and chalk or an electronic sounding device (m-scope). Refer to the specific SOPs for details regarding the use of a steel tape or a m-scope for measuring water levels. Calculate the water-level elevation. Document, and initial and date the information on the appropriate field form and in the field notebook.

5.6 Measuring the total depth of the well from the MP with a weighted steel tape. Calculate and record the volume of standing water in the well casing on the appropriate field form and in the field notebook.

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5.7 Decontaminate the equipment used to measure the water level and sound the well with a non-phosphate, laboratory-grade detergent solution followed by a distilled/deionized water rinse.

5.8 Purge the well prior to sampling (refer to the SOP for Purging a Well). The well should be pumped or bailed to remove the volume of water specified in the work plan. Usually three to five casing volumes are removed if the recharge rate is adequate to accomplish this within a reasonable amount of time.

If the formation cannot produce enough water to sustain purging, then one of two options must be followed. These include: 1) pumping or bailing the well dry, or 2) pumping or bailing the well to "near-dry" conditions (i.e., leaving some water in the well). The option employed must be specified in the work plan and be in accordance with regulatory requirements.

If the well is purged dry, then all the standing water has been removed and upon recovery the well is ready for sampling. However, depending on the rate of recovery and the time needed to complete the sampling round, one of the following procedures may have to be implemented: 1) the well may have to be sampled over a period of more than one day; 2) the well may not yield enough water to collect a complete suite of samples and only select (most important) samples will be collected; or 3) the well may not recover which will preclude sampling. Regardless of the option that must be followed, the sampling procedure must be fully documented. When preparing to conduct a sampling round, review drilling, development, and previous sampling information (if available) to identify low-yielding wells in order to purge them first, and potentially allow time for the well to recover for sampling.

5.9 Record the physical appearance of the water (i.e. color, turbidity, odor, etc.) on the appropriate field form and in the field notebook, as it is purged. Note any changes that occur during purging.

5.10 If a bailer is used to collect the sample, then:

a. Flush the decontaminated bailer three times with distilled/deionized water.

b. Tie the non-absorbent cord (polypropylene) to the bailer with a secure knot and then tie the free end of the bailer cord to the protective casing or, if possible, some nearby structure to prevent losing the bailer and cord down the well.

c. Lower the bailer slowly down the well and into the water column to minimize disturbance of the water surface. If a bottom-filling bailer is used, then do not submerge the top of the bailer; however, if a top-filling bailer is used, then submerge the bailer several feet below the water surface.

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d. Remove and properly discard one bailer volume from the well to rinse the bailer with well water before sampling. Again, lower the bailer slowly down the well to the appropriate depth depending on the bailer type (as discussed above in 5.11 c). When removing the bailer from the well, do not allow the bailer cord to rest on the ground but coil it on the protective plastic sheeting placed around the well. Certain regulatory agencies require that the first bailer volume collected be utilized for the samples.

5.11 If a pump is used to collect the sample, then use the same pump used to purge the well and, if need be, reduce the discharge rate to facilitate filling sample containers and to avoid problems that can occur while filling sample containers (as listed in Number 5.14, below). Alternately, the purge pump may be removed and a thoroughly decontaminated bailer can be used to collect the sample.

5.12 Remove each appropriate container's cap only when ready to fill each with the water sample, and then replace and secure the cap immediately.

5.13 Fill each appropriate, pre-labeled sample container carefully and cautiously to prevent: 1) agitating or creating turbulence; 2) breaking the container; 3) entry of, or contact with, any other medium; and 4) spilling/splashing the sample and exposing the sampling team to contaminated water. Immediately place the filled sample container in an ice-filled (wet ice or blue pack) cooler for storage. If wet ice is used it is recommended that it be repackaged in zip-lock bags to help keep the cooler dry and the sample labels secure. Check the work plan as to whether wet ice or blue packs are specified for cooling the samples because certain regulatory agencies may specify the use of one and not the other.

5.14 "Top-off" containers for volatile organic compounds (VOCs) and tightly seal with Teflon™-lined septums held in place by open-top screw caps to prevent volatilization. Ensure that there are no bubbles by turning the container upside down and tapping it gently.

5.15 Filter water samples (Procedure 4.6) collected for dissolved metals analysis prior to preservation to remove the suspended sediment from the sample. If water samples are to be collected for total metals analysis, then collect a second set of samples without field filtering.

In the event that the regulatory agency(ies) want unfiltered samples for metals analysis, a second set of filtered samples should also be collected. Because unfiltered samples are indications of total metals (dissolved and suspended) they are not representative of aquifer conditions because ground water does not transport sediment (except in some rare cases). Thus, the results for dissolved metals in ground water should be based on filtered samples even if both filtered and unfiltered sets are presented in a report.

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5.16 Add any necessary preservative(s) to the appropriate container(s) prior to, or after (preferred), the collection of the sample, unless the appropriate preservative(s) have already been added by the laboratory before shipment.

5.17 Collect quality control (QC) samples as required in the work plan to monitor sampling and laboratory performance. Refer to the SOP for Collection of Quality Control Samples.

5.18 Conduct field analyses after sample collection is complete by measuring and recording the temperature, conductivity, pH, etc. (as called for in the work plan). Note and record the "final" physical appearance of the water (after purging and sampling) on an appropriate field form and in the field notebook.

5.19 Wipe the well cap with a clean rag, replace the well cap and protective cover (if present). Lock the protective cover.

5.20 Verify that each sample is placed in an individual "zip-lock" bag, wrapped with "bubble wrap," placed in the cooler, and that the cooler has sufficient ice (wet ice or blue packs) to preserve the samples for transportation to the analytical laboratory.

5.21 Decontaminate bailers, hoses, and pumps as discussed in the decontamination SOP. Wrap decontaminated equipment with a suitable material (e.g., clean plastic bag or aluminum foil). Discard cords, rags, gloves, etc. in a manner consistent with site conditions.

5.22 Complete all necessary field forms, field notebook entries, and the chain-of-custody forms. Retain one copy of each chain-of-custody form. Secure the cooler with sufficient packing tape and a custody seal.

5.23 Samples collected from Monday through Friday will be delivered within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Consult the work plan to determine if any of the analytes require a shorter delivery time.

END OF PROCUDURE

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Date: May 5, 2000

## 1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for screening soil samples for volatile organic vapors using a portable photoionization detector (PID). This SOP is applicable to soil samples collected from split-spoon samplers during drilling, hand auger samples, and grab samples from stockpiled soils.

## 2.0 CONSIDERATIONS

The primary objective of photoionization screening of soil samples is to obtain a qualitative understanding of the distribution of volatile organic compounds (VOCs) in soil. The proper design of an organic vapor screening program requires an understanding of site hydrogeology, potential source areas, and potential constituents of concern. Sample locations and frequency must be fully defined in the work plan. The work plan should outline the type of lamp to be utilized in the PID based on the ionization potentials and response factors of the constituents of concern. The work plan must also clearly describe the heating or equilibration procedures to be employed if they differ from those described in this SOP. Regardless of the specific equilibration procedure employed, it is imperative that each sample be treated identically to allow the photoionization results from different locations to be compared. Observations such as water, clay, and organic content should be noted to facilitate interpretation of the data. Every effort should be made to collect a representative portion of soil from the sampling device.

## 3.0 MATERIALS/EQUIPMENT

a. A work plan which outlines photoionization screening requirements.

b. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, brushes, potable water, distilled water, regulatory-required reagents [e.g., acetone, nitric acid, hexane, etc.], aluminum foil, plastic sheeting, etc.).

c. Field notebook, field form(s), maps, chain-of-custody forms.

d. Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.).

e. Stainless steel spoons or spatulas.

f. Disposable plastic spoons.

g. Plastic sheeting.

h. Aluminum foil.

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i. Mason jars or driller's jars.

j. Water bath (hot plate, extension cord, water tray, thermometer).

k. Photoionization detector with charging unit.

l. Calibration gases with regulator.

m. Indelible marker.

n. Masking tape.

o. Disposable sampling gloves.

## 4.0 DECONTAMINATION

Where possible, thoroughly pre-cleaned and wrapped sampling equipment must be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and sample jars will be changed after each use and discarded in an appropriate manner. If only photoionization results are to be obtained, then split-spoon samples and hand augers may be cleaned with a soap and water wash and potable water rinse or steam cleaning, and a final distilled water rinse. However, if samples are to be collected concurrently for laboratory analytical results, then all reusable sampling equipment must be thoroughly decontaminated according to the SOP for decontamination of field equipment.

## 5.0 CALIBRATION

The PID must be calibrated according to the manufacturer's specifications at a minimum frequency of once per day prior to collecting photoionization readings. In addition, periodic checks (e.g., every 2 hours or every ten samples) with the standard gas will be conducted to confirm that the calibration has not drifted. The time, date, and calibration procedure must be clearly documented in the field notebook and the calibration log. If at any time the photoionization results appear erratic or inconsistent with field observations, then the unit must be recalibrated. If calibration is difficult to achieve, then the unit's lamp should be checked for dirt or moisture and cleaned, as necessary. During humid or wet conditions, the unit should be calibrated on a more frequent basis as determined by field personnel.

## 6.0 PROCEDURE

6.1 Extract the soil sample from the sampler, quickly measure the recovery, and separate the wash from the true sample by using a dedicated, stainless steel spatula. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

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6.2 Place the sample in a pre-cleaned glass jar (as quickly as possible to avoid loss of VOCs) filling the jar half full. Place an aluminum foil seal between the glass and metal cap and screw tight.

6.3 Label jars with the boring number, depth of sample, date of collection and blow counts. In addition, the field personnel will ensure the following: samples are taken at appropriate depths; unrepresentative portions of the sample are discarded properly; that the sampler is decontaminated properly between use; and the driller uses proper methods during sample collection and does not use oil or grease on tools entering the borehole.

6.4 Log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, and layering).

6.5 After the sample has been collected, heat the sample under controlled conditions in a water bath for a 2 minute period.

6.6 Ensure that the PID has been calibrated and that the calibration information is documented in the field book. Pierce the aluminum foil seal with the probe from the PID and measure the relative concentration of VOCs in the headspace of the soil sample. The initial (peak) reading must be recorded.

6.7 Record the PID reading in the field notebook, on an appropriate field form, and on the base map, if appropriate.

6.8 Place any material not representative of the interval sampled in a pile with the other cuttings from the borehole.

6.9 If only photoionization results are to be obtained, then reusable sampling devices may be cleaned with a soap and water wash and a potable water rinse. The sampler will then be rinsed with distilled water, assembled and placed on plastic sheeting for reuse. A more rigorous decontamination procedure is required when samples are also being collected for laboratory analysis. Refer to the SOP for collection of soil samples for laboratory analysis for additional information.

END OF PROCEDURE

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## 1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish guidance to obtain accurate and consistent samples of soil gas.

## 2.0 MATERIALS/EQUIPMENT

- Teflon or Nylaflow tubing, one-quarter or one-eighth inch diameter sample tubing.
- Swagelok® ¼-inch nut and ferrule sets for connecting the probe tubing to the sampling manifold, as appropriate for the collection method
- Helium leak check equipment, as dictated by Site-specific data quality objectives (DQOs), including the enclosure, helium cylinder (high purity helium), and helium detector (Dialectric MGD is preferred). The enclosure and helium detector may be provided by the driller.
- Air pump for purging and electric supply for the pump (either battery, generator, or power inverter with adapter for car battery). Must be capable of a flow of 200 milliliters per minute (mL/min) and a vacuum of 20" Hg.
- Canister, tedlar bag or syringe, as appropriate for the collection method.

## 3.0 DECONTAMINATION

All reusable sampling equipment will be thoroughly cleaned according to the decontamination SOP. Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves and plastic sheeting will be changed after each use and discarded in an appropriate manner.

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## 4.0. SITE-SPECIFIC CONSIDERATIONS

Prior to attempting soil gas sampling there should be an understanding of subsurface conditions at the Site. Soil gas samples should be collected in the vadose zone and generally, soil gas samples should not be collected at a depth less than above 5 feet below ground surface (bgs), unless sub-slab soil gas samples are needed. It may also not be feasible to collect soil gas from tighter grain soils with little pore volume, such as clays, and these layers should be avoided.

Soil gas sampling should not be performed until 24-hours after a significant rain event (>1/2 inch of rainfall).

## 5.0 PROCEDURE

### 5.1 System Set-up

1. Acquire all the necessary hardware and sampling equipment. Be sure to use one-quarter or one-eighth inch diameter Teflon or Nylaflow sample tubing.

2. Assemble or obtain the necessary fittings and vacuum gauge to create a soil gas probe and sampling manifold (vacuum gauge and valving). This manifold must be clean, free of oils, and flushed free of VOCs prior to use. If appropriate, be sure to place the helium leak check enclosure over the probe, and push the sample tubing through the hole in the cap before attaching the sampling manifold.

3. Adjust the purge system evacuation pump sampling rate to achieve the desired flow rate of 200 mL/min. This should be performed at the outlet of the vacuum pump prior to purging, either by using a suitable flow meter, or determining the amount of time required to fill a 1-liter Tedlar bag.

### 5.2 Shut-In Test

Prior to purging or sampling, a shut-in test should be conducted to check for leaks in the above-ground sampling system.

1. Assemble the above-ground valves, lines and fittings downstream from the top of the probe.

2. Evacuate the system to a minimum measured vacuum of about 100 inches of water using the purge pump.

3. Observe the vacuum gauge for 1-2 minutes. If there is any observable loss of vacuum, adjust the above-ground sampling system until the vacuum is maintained.

### 5.3 System Leak Checking and Purging

Perform a leak check of the sample manifold system by:

1. Make sure the gas probe valve is off and the sample valves are closed.

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2. Open the purge valve and start the purge pump. Verify that the flow is set to 200 mL/min until a vacuum of approximately 15" Hg is achieved.

3. Turn off the purge pump and observe the vacuum gauge for 1-2 minutes. If there is any observable loss of vacuum, the leaks must be fixed prior to sampling.

4. Record the leak check date and time on the field notebook.

5.4 Purge Volume Test (Mobile Laboratory Only)

The purpose of the purge volume test is to ensure that stagnant air is removed from the sampling system and to ensure that samples are representative of subsurface conditions. The test well should be located where soil gas concentrations are anticipated to be elevated, if possible.

Perform a purge test of the test well by:

1. Purge the well one purge volume and collect a sample.

2. Have the mobile laboratory analyze the sample for target compounds. Sample procedures are explained in Section 5.6, below.

3. Purge an additional two purge volumes (for a total of 3 purge volumes), collect a sample and submit to the mobile laboratory for analysis.

    a. One purge volume is equal to the sum of the following volumes:

        - The internal volume of tubing;
        - The void space of the sand pack around the probe tip;
        - The void space of the dry bentonite in the annular space.

4. Repeat for a purge of 10 total purge volumes.

5. The site purge volume will be chosen based on the sample with the highest concentration of target compounds from the purge test. All of other sample locations will utilize this purge volume (either one, three, or ten).

5.5 Helium Leak Check (as dictated by DQOs)

The helium leak check procedure is accomplished by:

1. Start the flow of helium under the leak check enclosure. Position the tube so the helium is directed at the interface of the probe and the ground. Let the helium fill the enclosure for a couple of minutes.

2. Turn the helium leak detector on and make sure that the detector is not reading any helium before proceeding.

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3. Verify that the helium concentration inside the leak check enclosure is >10% by placing the probe of the helium detector into the hole where the sample tubing comes out or under the enclosure wall. It is not necessary to verify that the helium concentration is 100% as this is bad for the detector.

4. Purging is carried out by pulling soil gas through the system at a rate of 200 mL/min for a time period sufficient to achieve three purge volumes, equal to the sum of the internal volume of the in-ground annular space, sample line, and sampling manifold system.

   Note: When calculating the purge volume, be sure to take into account the inside diameter and length of the sample tubing, as well as the probe outside diameter and retract distance for the annular space for temporary probes. If during the purge (or sampling) the vacuum exceeds 7 "Hg, then reduce the pump flow rate. The system vacuum must stay below this level at all times.

5. To start the soil gas probe purge, open the gas probe valve and close the sample valve at the same time, and start timing. Verify that the flow rate is still 200 mL/min.

6. During the last 5 minutes of the purge (or the entire purge time if less than 5 minutes), attach a Tedlar bag to the purge pump exhaust and open the bag's valve.

7. At the end of the purge time, close the purge valve, close the valve to the Tedlar bag, and turn off the pump.

8. Attach the Tedlar bag to the helium detector and open the valve. If a helium reading of greater than or equal to 5% of the helium concentration inside the leak check enclosure is observed, then the probe leak check has failed and corrective action should be taken.

9. Record the purge date, time, purge rate, leak check result, and purge volume on the field sampling log.

10. Immediately move on to the sampling phase. Little to no delay should occur between purging and sampling.

5.6 Sample Collection

'Clean' sampling protocols must be followed when handling and collecting samples. This requires care in the shipping, storage, and use of sampling equipment. Sharpie markers should not be used for labeling or note-taking during sampling.

1. Attach the canister, tedlar bag or syringe to the sample tubing.

2. Before taking the sample, confirm that the sampling system valves are set as follows: the purge valve is confirmed to be closed, gas probe valve is open, and the sample valve is open.

3. After sampling for the appropriate amount of time, close the sample valve and the canister/tedlar bag valve. Remove the sample container from the sampling manifold.

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4. Record the sampling date, time, canister identification (ID), flow controller ID, and any other observation pertinent to the sampling event on the field sampling log. The temperature and barometric pressure should be recorded.

5. Fill out all appropriate documentation (sampling forms, sample labels, chain of custody, sample tags, etc.).

6. Disassemble the sampling system.

END OF PROCEDURE

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## 1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to describe the considerations and procedures, and to establish the guidelines for drilling (soil borings, wells, or piezometers) and formation sampling activities in unconsolidated formations. There are several drilling techniques available which include: direct push (Geoprobe® or cone penetrometer testing [CPT]), hollow-stem auger, cable tool, hydraulic rotary, cased-hole rotary, air rotary, and Sonic. Formation (sediment/soil) sample collection options include: disturbed (drill cuttings), intact (split-spoon or continuous core), and undisturbed (Shelby-tube or Denison-core). Borehole abandonment (closure) procedures will also be addressed in this SOP.

The objective of drilling is to collect accurate subsurface information. Consequently, the lithologic data is essential information that characterizes subsurface conditions and describes geologic coefficients qualitatively and/or quantitatively.

## 2.0 DRILLING TECHNIQUE-SELECTION

Verify that the drilling technique is the one specified in the investigation work plan, and that the drilling equipment mobilized by the driller is in good condition and proper working order. Do not permit the driller to use a drilling rig that appears to be substandard, in disrepair, etc., and/or is questionable as to whether or not the rig has the capabilities to accomplish the goals of the drilling program. Complete a drill rig inspection checklist before starting any drilling activities. The drilling rig must be capable of:

a. Penetration of all anticipated subsurface materials and formations at a desired rate, and construction of a borehole of desired diameter.

b. Identification of lithology for development of a geologic log of all unconsolidated formations and materials penetrated, including physical characteristics and visual description of color, grain sizes, sorting and mineralogy.

c. Collection of intact and/or undisturbed soil samples from the center line or sidewall of the borehole. This objective requires the drilling to be halted while soil samples are taken from the bottom or side of the incomplete borehole.

d. Implementation of borehole geophysical logging (when applicable and possible) to enable more accurate vertical and horizontal extrapolation of borehole data to the lithology of the hydrogeologic system.

Drilling will not commence until the following have been completed:

- Development and approval of a drilling specific job safety analysis (JSA)
- a utility mark-out/one call has been conducted at the drilling location(s); and
- the completion of a subsurface clearance procedure checklist.

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## 3.0 DRILLING TECHNIQUE - DESCRIPTION

3.1 Direct Push – The direct push technology includes several types of drilling rigs and drilling equipment that advances a drill string by pushing or hammering without rotating the drill string. Direct push rigs include both Geoprobe® and CPT rigs. Geoprobe® rigs are typically limited to drilling in unconsolidated soil up to approximately 100 feet below ground surface (bgs) under compatible conditions. Formation samples are collected in acetate/plastic sleeves. Advantages include: access and maneuverability due to the rig's small size; fluids are not introduced into the subsurface during drilling; and sampling is relatively inexpensive. Disadvantages include: limitation to drilling depth; limitation to unconsolidated or soft rock drilling; and limitation to small diameter borings. CPT rigs also provide a continuous profile of the soil strata as the rig's sensing equipment is advanced.

3.2 Hollow-Stem Auger - This drilling method is rapid and extremely effective in most cohesive sediments but less so in loose sandy material. A major advantage of this technique is that normally no fluids are introduced into the formation. If the auger flights can be removed and the integrity of the borehole maintained, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If the auger flights must remain in the borehole, then only radiation geophysical logs can be run. Casing, screen, and sampling devices can then be lowered through the hollow stem by removing the removable plug at the bottom of the auger flights, and gravel/sand packing and cementing can be accomplished within the hollow stem. However, this can be difficult especially below the water table. Auger flight outside diameters (OD) range from 5 inches (in.) to 12 in.

3.3 Cable Tool (Percussion) - This drilling method is slow because the borehole is advanced by lifting and dropping a heavy string of drilling tools. Cuttings accumulate in the drill casing and are removed by a sand bailer. A steel casing is driven in as the hole is deepened. Cable-tool rigs can be used in unconsolidated sediment and bedrock to depths of hundreds or thousands of feet and often employ telescoping techniques for drilling deep boreholes. Electrical geophysical logs cannot be run through the steel cased borehole, but radiation logs (e.g., gamma, neutron, etc.) can be run. Well casing and screen can be installed within the cased hole after which the outer casing is pulled back (removed). Because the boring is cased as it is being drilled, cross-contamination between various depths is practically eliminated. The method provides an excellent means to collect good, representative formation samples.

3.4 Hydraulic Rotary - This drilling method uses a rotating bit to drill (advance) the borehole. Drill cuttings are removed using a recirculated drilling fluid (mud or water). Although setting up the drilling equipment is slow, the drilling process is reasonably fast. In the mud-rotary method, drilling mud forms a cake on the borehole wall which prevents excessive loss of fluid to the formation being drilled. The hydrostatic pressure combined with the weight and density of the mud slurry keeps the hole open. This allows the drill rods to be removed from the

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borehole and geophysical logs (electric and radiation) to be run in the open borehole.

In reverse hydraulic rotary drilling, the drilling fluid moves downward through annular space and then upward inside the drill pipe. If the drilling fluid does not contain mud, then sufficient water flow is required as make-up water because the borehole wall is not sealed; therefore, significant water loss can occur to the formation being drilled. The borehole is held open by hydrostatic pressure only. A serious obstacle to this drilling method occurs when the static water level is less than 15 feet below land surface because of insufficient hydrostatic head difference between the borehole and the water table. However, the problems of excessive water loss and shallow depths to water may be overcome by using mud as the drilling fluid.

In mud-rotary drilling, the drilling fluid (mud or polymer) moves downward through the drill pipe and then upward through the annular space. Therefore, the borehole is held open by hydrostatic pressure and the mud cake lining the wall of the borehole. The mud-rotary method can be used to construct moderate to deep wells in unconsolidated (and consolidated material), while the reverse rotary technique can be used to construct moderate to deep wells in unconsolidated materials. The principal disadvantage may be the difficulty in removing mud cake from the formation at the screened zone. Extensive well development may be required to remove the mud cake.

3.5 Cased-Hole Rotary - Several rotary drilling techniques have been developed in which a steel casing is advanced with an air-rotary or mud-rotary drill. This technique is highly desirable for use in exploratory drilling at monitoring sites because water and soil samples may be collected under conditions which preclude contamination from shallower depths. Furthermore, this technique is extremely effective in boulder or cavernous zones which would inhibit or preclude drilling using other techniques. Drilling results are comparable to cable-tool drilling but with greatly enhanced speeds. In all the cased-hole techniques, the main benefit is that the only portion of the borehole which is open, is at the bottom of the drill casing; thus, no soil or water from shallower depths can move down and impact the depth drilled and/or sampled. Electrical geophysical logs cannot be run through the steel-cased borehole, however, radiation logs (e.g., gamma, neutron, etc.) can be run.

Presently, there are three cased-hole rotary techniques which include:

a. The drill-thru casing hammer technique in which the casing is advanced by percussion with a casing hammer or vibratory driver similar to the method used in a borehole drilled by the air-rotary method. The casing hammer can also pull out the casing (air drilling only).

b. The Odex™ Drilling System (European system) which “pulls” the casing using a fixture attached to an air-hammer type drill bit (air drilling only).

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c. The Barber™ Drilling System in which drilling is done with a top-head drive and a rotary table that spins casing into the ground. Casing can be fitted with a carbide "shoe" to cut boulders and an air hammer can be used above the bit. Air or mud rotary can be used to lift cuttings.

Two potential problems may be encountered using the cased-hole rotary technique which include: 1) "sand heave" when drilling stops (which can be quickly drilled or bailed out) and 2) possible aeration of water in the cased borehole if volatiles are being tested (which can be overcome by pumping or bailing the standing water out before sampling). The minimum drill casing diameter is 6 inches and depth is limited to approximately 450 feet.

3.6 Air Rotary - This drilling method uses a rotating bit to drill, and high-velocity compressed air to remove cuttings from the borehole. A pneumatic down-hole hammer is often used to add percussion to the rotary drilling action. This drilling method is very fast and, although it is most suitable for penetrating hard bedrock, it can be used in unconsolidated formations. The borehole may be cased or uncased depending on geologic conditions. If an open borehole is drilled, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If a cased borehole is drilled, then only radiation geophysical logs can be run.

Four potential problems may be encountered when using the air-rotary technique:

a. When a prolific aquifer is tapped, the compressed air may not be able to lift the water to the surface.

b. Aeration of water in the borehole (and finished well) immediately prior to sampling can interfere with a number of inorganic and organic water-quality parameters.

c. Low yield water entry zones may not be identified because the air pressure prevents water from entering the borehole. Care should be taken to prevent overdrilling of the borehole.

d. Air rotary drilling can induce the migration of volatile organics to the surface or adjacent structures causing potential aesthetic or health and safety concerns.

If the air-rotary technique is used then the following special procedures will be implemented:

a. The type of air compressor and lubricating oil will be documented on an appropriate field form and in the field notebook and a 1-pint sample of the oil will be retained for characterization in the event organic compounds are detected in a well sample.

b. An air line oil filter will be required and changed per manufacturer's recommendations during operation with documentation of this

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maintenance on an appropriate field form and in the field notebook. More frequent oil filter changes will be made if oil is visibly detected in the filtered air.

c. The use of any additive will be prohibited, except approved water (e.g., potable water) for dust control and cuttings removal.

3.7 Sonic - This drilling method uses a rotating bit to drill, and high-frequency resonant vibrations created by a Sonic drill head. The drill head contains the mechanism necessary for rotary motion as well as an oscillator, which causes a high frequency force to be superimposed on the drill string. The frequency can be varied to suit operating conditions and is generally between 50 and 120 hertz (cycles per second). The vibrations are sent down the drill string to the drill bit, magnifying the amplitude of the drill bit, which (in overburden) fluidizes the soil particles at the bit face. The drill bit is physically vibrating up and down in addition to being pushed down and rotated. These three combined forces allow for relatively fast and easy penetration through most geological formations. The oscillator is driven by a hydraulic motor and uses out of balance weights to generate high sinusoidal forces that are transmitted to the drill bit. An internal spring system isolates these vibrational forces from the rest of the drill rig. Typically, Sonic drilling uses a drilling fluid (i.e., potable water) to facilitate the advancement of the drill bit. The amount of drilling fluid used should be limited during soil collection as to minimize wash-out of the sample.

## 4.0 DECONTAMINATION

Drilling equipment decontamination procedures are outlined in the field equipment decontamination SOP. Proper decontamination in accordance with regulatory guidelines must be clearly documented in the field notebook.

## 5.0 PROCEDURE FOR DRILLING

5.1 Safety first. Obtain the appropriate work permit, Job Safety Analysis (JSA) and personal protection equipment (PPE), as specified in the site Health and Safety Plan (HASP).

5.2 Document all drilling-related activities (e.g., starting, stopping, footage, problems, decontamination, etc.) on the daily log form and in the field notebook. Record dates and times of activities, and names of Roux Associates personnel providing oversight.

5.3 Monitor and record drill fluid mix, speed of rotation, pressure on the drill fluid, rate of drilling, and length of drill rods or casing in the borehole, as applicable.

5.4 Confirm that the drill rods and core barrel are straight, or discontinue drilling.

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5.5 Pay particular attention to the advancement of the boring because differences in the rate of drilling may be indicative of differences in subsurface geologic conditions (e.g., sand and gravel versus clay).

5.6 Maintain a continuous dialogue with the driller to track and keep informed of all drilling activities (e.g., the speed of the drill and drilling pressure, difficult and easy drilling conditions, etc.).

5.7 Collect formation samples as described in accordance with the work plan. Sample jars must be labeled appropriately (e.g., project number and name, site location, boring number, date, sample interval, blow counts, and initials of Roux Associates personnel collecting sample).

5.8 Record geologic information in the soil boring log form and in the field notebook.

5.9 Handle and ship split-spoon sample jars carefully to avoid breakage and handle and ship tubes or cores carefully to prevent disturbance.

## 6.0 PROCEDURE FOR FORMATION SAMPLING

6.1 Safety first. Obtain the appropriate JSA and PPE, as specified in the site HASP.

6.2 Intact formation sampling will be implemented using continuous core or split-spoon samplers (which are driven), Shelby-tube samplers (which are pushed), or Denison-core samplers (which are rotated) depending on the drilling technique employed. Formation samples will be retained in core barrel liners/tubes or suitable size jars for physical descriptions and potential physical and chemical analysis. The appropriately labeled jars and tubes will be stored in a safe place to avoid breakage, agitation, and over-heating/freezing. Intact formation samples will be collected at specified intervals as described in the work plan. Geologic information will be recorded on a geologic log form on the appropriate field form. Detailed descriptions of the type(s) of intact sample(s) collected, sampling intervals and conditions, and objective(s) of the sample collection will be provided in the work plan.

6.3 Soil cores from the wells drilled at the Site are used for lithologic identification and physical property analysis. Soil core samples will be collected using a direct push continuous core (acetate/PVC liners) or split-spoon sampler (6-inch stainless steel sample containers). The soil core sample intervals will be specified in the work plan.

6.4 Sampling equipment will be decontaminated by steam cleaning and/or a non-phosphate, laboratory-grade and distilled/deionized wash followed by a distilled/deionized water rinse. (Refer to the field equipment decontamination SOP for a detailed description of minimum and special decontamination procedures.) Decontamination of sediment sampling equipment will take place prior to the collection of the first sample and following the collection of each subsequent sample.

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## 7.0 BOREHOLE ABANDONMENT OR CLOSURE

7.1 Safety first. Obtain the appropriate JSA and PPE, as specified in the site HASP.

7.2 Upon the completion of the investigation, boreholes will be abandoned as specified in the workplan.

7.3 For each abandoned borehole, the procedure will be documented in the field notebook.

END OF PROCEDURE

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Date: May 5, 2000

## 1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to describe the considerations and procedures for constructing ground-water monitoring or observation wells in unconsolidated (e.g., gravel, sand, silt, and clay) formations. Well development and well abandonment (closure) procedures will also be addressed in this SOP. The United States Environmental Protection Agency (USEPA), the United States Geological Survey (USGS), and state regulatory agency procedures will be reviewed and considered in conjunction with the extensive experience of Roux Associates, Inc. (Roux Associates) to determine appropriate well construction and abandonment procedures. Discussions will be held with appropriate agencies to resolve conflicting procedures and finalize well construction or abandonment methods. The well construction plan and, if necessary, abandonment will be detailed in the work plan.

Monitoring wells will be completed in unconsolidated formations for the purposes of measuring ground-water levels and collecting ground-water samples. Ground-water level data will be used to calculate ground-water elevations which will be used, to construct water-level elevation and ground-water flow direction maps to illustrate head and flow relationships. Ground-water samples will be used to quantify water-quality conditions.

Observations wells will be completed in unconsolidated formations for the purpose of collecting water-level data from aquifer tests. Slug tests, step-drawdown tests, and constant-rate pumping tests (refer to the respective SOPs) may be conducted to qualitatively or quantitatively characterize flow system hydraulic parameters and/or intra-aquifer and inter-aquifer hydraulic connection.

## 2.0 PROCEDURE FOR WELL CONSTRUCTION

The installation of each unconsolidated well will begin immediately after borehole completion (and geophysical logging, if implemented). Once well installation has begun, no breaks in the process will be made until the well has been completed and secured against unauthorized access. In cases of unscheduled delays, such as personal injury, equipment breakdowns or sudden inclement weather, installation will be resumed as soon as practical.

2.1 The well will be constructed of appropriate type and diameter casing and screen (stainless steel and/or PVC) and will be at least 2 inches in diameter to accommodate most water-sampling and water-level measuring devices. However, if the well's purpose is multiple (pumping tests, remote sensing, water-level recorder station, etc.), a larger diameter monitoring well (4 inches, 6 inches, or greater) may be needed to accommodate pumps, floats, or sensors. The preferred minimum diameter for a well is 4 inches because larger diameter wells (greater

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than 2 inches) facilitate well purging and sampling procedures (e.g., they can accommodate pumps which 2-inch diameter wells may not).

2.2 Fittings (couplings) will not restrict the inside well diameter, as stainless steel casing will be welded and/or flush-joint threaded, and PVC joints will be internally threaded. Glues, solvents, or chemical cleaners will not be used in the construction of the wells. All casings, fittings, and screens will be new material. The well screens will be fabricated and have an inside diameter equal to the well casing. The lengths of casing and screen will be measured and recorded on an appropriate field form and in the field notebook by the field hydrogeologist prior to installation.

2.3 Wells in unconsolidated formations will be installed as described below unless depth to water or total depth require modifying the thickness of emplaced materials.

a. The screen and casing will be lowered into the borehole to the appropriate depth. Screen and casing materials may be either stainless steel or PVC. A bottom plug, well cap, and flush-joint sections will be used.

b. A gravel pack (quartz sand or pea gravel) will be filled in around the screen from a few feet below the bottom of the screen to several feet (approximately 5) above the screen to avoid applying the weight of the casing on the screen. The size of the uniformly graded gravel pack will be selected based on the grain size of the formation material in the screened interval. The placement of the gravel pack may require the use of a tremie pipe.

c. A 1-foot to 3-foot layer of clean, fine-grained silica sand may be placed above the selected gravel pack to isolate the coarse-grained gravel pack (below) from the fine-grained bentonite seal (above). Again, a tremie pipe may be used in the placement of the sand layer.

d. Several feet (approximately 1-3) of bentonite (powder or pellets) will be placed on top of the sand layer to seal the top of the gravel-packed screen zone.

e. The remainder of the annulus will be grouted to within a few feet of land surface. If PVC casing is used for the construction of deep wells, then extreme care must be taken in grouting the annular space in lifts (specified lengths) to avoid deformation of the PVC casing by the heat of curing and/or the weight of the grout. This is especially important if there are large voids which will serve as reservoirs for the grout.

f. A locking steel protective casing or curb box will be set over the well and cemented in place or welded to the steel casing to prevent water from

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ponding at the top of the well or directly entering the well, and safeguard the well from accidental damage or vandalism.

2.4 Each well will be properly identified with the appropriate information (e.g., local well number, state permit number [if applicable], etc.). The top of the well casing will serve as the measuring point (MP) for ground-water level measurements. The measuring point will be surveyed to the nearest 0.01 foot relative to a common datum (e.g., mean sea level) by trained Roux Associates personnel or a professional, state-licensed surveyor as defined in the work plan.

2.5 If required, well clusters will be constructed. A well cluster is defined as a group of two or more wells, located adjacent to or very near each other, which penetrate different depths of the aquifer or formation. Each well is screened at a different depth to obtain data defining the vertical distribution of water levels and quality in the aquifer or formation. In the event that a well cluster is drilled, then one large-diameter (e.g., 6-inch, 8-inch, 10-inch, etc.) borehole may be drilled and each well in the cluster will be individually cased within that one borehole; however, the preferred method is to drill individual boreholes for each well in the cluster.

2.6 Each well will have a location sketch, a well construction log, and a geologic log showing the casing placement and materials used to fill the annular space between the well casing and borehole. The appropriate log will show the depths of each casing material and discuss the geologic variability at the site. A description of the surface soils and unsaturated zone materials down to and including the water table is required.

The following information, if applicable, will be included on the well log:

a. Project number.

b. Date and initials of scientist documenting the well information.

c. Date and time of construction.

d. Well location.

e. Well and permit numbers.

f. Borehole diameter.

g. Well depth.

h. Casing material.

i. Screen material.

j. Screen slot size and length.

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k. Gravel pack type and size (depths from _____ to _____).

l. Sand pack (depths from _____ to _____).

m. Bentonite pellets (depths from _____ to _____).

n. Bentonite grout (depths from _____ to _____).

o. Cement grout (depths from _____ to _____).

p. Ground-surface elevation.

q. Measuring point elevation.

r. Well height above or depth below land surface.

s. Depth where ground water was encountered.

## 3.0 DESCRIPTION OF WELL DEVELOPMENT

3.1 Before a newly constructed well can be used for water-quality sampling, measuring water levels, or aquifer testing, it must be developed. Well development refers to the procedure used to clear the well and formation around the screen of fine-grained materials (sands, silts, and clays) produced during drilling or naturally occurring in the formation. Well development continues until the well responds to water-level changes in the formation (i.e, a good hydraulic connection is established between the well and formation) and the well produces clear, sediment-free water to the extent practical.

3.2 Depending on the drilling technique used, composition of the formation screened, and well diameter and construction materials, well development may include one or more of the following techniques.

a. Bailing.

b. Pumping (centrifugal, submersible, or air).

c. Backwashing.

d. Surging (mechanical).

e. Jetting.

f. A combination of the above.

3.3 A 1-pint sample of the last water removed during development will be obtained and inspected by the field hydrogeologist for relative clarity to determine whether development is complete. A turbidimeter may be used to evaluate the clarity of

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the water removed from the well during development (and its use may also be stipulated by a regulatory agency). Well development procedures will be recorded on the well construction log form and in the field notebook.

3.4 Dispersing agents, acids, disinfectants, or other additives will not be used during development nor will they be introduced into the well at any other time unless specifically stipulated in the work plan. During development, water will be removed from the entire column of water standing in the well by periodically lowering and raising the pump intake. Well development will include the rinsing of the interior well casing above the water column in the well using only water from that well.

## 4.0 WELL ABANDONMENT OR CLOSURE

4.1 Upon the completion of the investigation, a determination will be made whether to maintain the well or to close it (i.e., abandon and seal it). If the client and Roux Associates agree to abandon the well, then the state will be notified and a request will be presented for well abandonment. Upon state approval to seal the well, appropriate state well abandonment forms will be completed. Following state approval, the abandonment of any well will be in accordance with local, state and/or Federal regulations.

4.2 For each abandoned well, the procedure will be documented on an appropriate field form and in the field notebook. Documentation may include, where appropriate, the following:

a. Well designation.

b. Location with respect to the replacement well, if replaced (e.g., 30 ft north and 40 ft west of Monitoring Well MW-1). A location sketch should be prepared.

c. Open depth prior to grouting and any other relevant circumstances (e.g., formation collapse).

d. Well casing left in the borehole by depth, size, and composition.

e. A copy of the geologic log.

f. A revised diagram of the abandoned well using the well construction log form.

g. Additional items left in hole by depth, description, and composition (e.g., lost tools, bailers, etc.).

h. A description and daily quantities of grout used to compensate for settlement.

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i The date of grouting.

j. The level of water prior to grouting and the date and time measured.

k. The remaining casing, size, and composition above or below ground surface reported in depths or heights from ground surface.

l. Any other state or local well abandonment reporting requirements.

END OF PROCEDURE

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## 1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide guidance for the installation of temporary soil gas probes for the collection of shallow soil gas samples. This SOP should be used where its application is consistent with the project's data quality objectives (DQOs) and in conjunction with the SOP for soil gas collection.

## 2.0 MATERIALS

- 1/8 to 1/4 inch sampling tubing – metal, nylon, PEEK, Teflon
- Appropriate Fittings
- Bentonite Chips
- Water
- Drilling Apparatus

Note: It is necessary to coordinate the hardware (i.e. size of tubing, fittings, sampling interface assembly, etc.) for the soil gas probe sampling line with the sampling system (i.e. Tedlar bags, Summa canisters, etc.). This step is critical to achieve a leak free system.

## 3.0 PROCEDURE

Temporary soil gas probe installation procedures are described below to ensure that a quality sample is able to be obtained and to minimize ambient air migrating into the sample. Soil gas wells may be installed using various types of drilling methods, however, some drilling methods can disrupt the surrounding soil gas and will require a longer equilibration time prior to sampling. The steps to installing the temporary point are:

1) Drill a borehole to the required depth as shown on the sample plan or scope of work.

2) Install a 6-12 inches sand pack at the bottom and install the probe tip (with attached tubing) approximately 3-4 inches into the sand pack. Use extra tubing so that sufficient amount (1-2 feet) will be left above ground. Plug the exposed end of the tubing.

3) Install 12 inches of dry granular bentonite on top of the sand pack.

4) Fill the remaining annular space with hydrated bentonite in 6" lifts.

   - If multiple probes depths are to be installed at the same location, the hydrated bentonite shall be installed to the top the next testing interval. Sand pack and the dry bentonite will then be installed as normal.

5) Repair the ground surface to original condition.

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6) Secure and mark the tubing at the surface with the location ID and depth.

END OF PROCEDURE

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# ATTACHMENT 4

Laboratory's Standard Operating Procedures

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| | | |
|---|---|---|
| eurofins | Always check on-line for validity.<br>**EPA Methods TO-15 and TO-3, Determinations of VOCs in Ambient Air** | Level:<br>**Standard Operating Procedure** |
| Document number:<br>**AIR-SOP48257** | | |
| Old Reference:<br>**BR-AT-004** | | |
| Version:<br>**16** | | Organisation level:<br>**4-Business Unit** |
| Approved by: **J8TG, YE6O**<br>Effective Date: **13-FEB-2024** | Document users:<br>**6_EUUS80_BUR_Organic Inst_GCMS VOA_Air** | Responsible:<br>**5_EUUS80_BUR_GCMS VOA and Air Supervisor** |

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### Revision Log

| **Revision**: 16.0 | **Effective Date** | This version |
|---|---|---|
| **Section** | **Justification** | **Changes** |
| Throughout | Added | Cross-reference links to related documents in D4 |
| Section 5 | Updated | Current standard Safety language |
| Sections 6 & 7 | Added | Catalog # disclaimer and storage conditions |
| Section 10.2.2.1 | Added | Percent Error acceptance criteria for individual points in the calibration |

| **Revision**: 15.0 | **Effective Date** | 21 April 2023 |
|---|---|---|
| **Section** | **Justification** | **Changes** |
| Entire Document | Format | Update to D4 format |
| Section 10.2.4 | Updated | Removed reference to DoD specific QA requirements. |
| Section 10.3.4 | Added | Client specific QA requirements |

Previous revisions maintained by QA Department

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### References


- EPA Compendium Method TO-15, "Determination of Volatile Organic Compounds in Ambient Air using Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry", US EPA, January, 1999.
- USEPA Compendium Method TO-3 “Method for the Determination of Volatile Organic Compounds In Ambient Air Using Cryogenic Pre Concentration Techniques and Gas Chromatography with Flame Ionization and Electron Capture Detection”, USEPA, April 1984
- New Jersey Department of Environmental Protection Site Remediation Program Vapor Intrusion Technical Guidance, Version 3.1, March 2013.


### Cross References

- *SOP52862 Quality Assurance Manual*
- *SOP48255 Canister Cleaning, Certification and Sampling Kit Preparation*
- *QP46060 NDSC HSE Manual*
- *SOP49961 Burlington Corporate Safety Manual Addendum*
- *SOP52272 Traceability, Handling and Storage of Standards and Reagents*
- *SOP49959 Sample Management*
- *SOP49967 Nonconformance and Corrective Action Procedures*
- *SOP43862: Manual Integrations*
- *SOP49966 Management, Retention Storage and Archive of Data Records*
- *SOP52264 Employee Training and Analyst Demonstration of Proficiency*
- *SOP47863 Tracking and Collecting of Hazardous Waste*
- *SOP48269 Procedure for Acceptance and Handling of USDA Regulated Domestic and Foreign Soil*

### 1) Scope and Application

This SOP describes the laboratory procedure for the analysis of polar and non-polar volatile organic compounds (VOCs) in ambient and non-ambient air. The procedure is applicable to those VOCs that have been evaluated by the laboratory for their consistent performance in meeting the control criteria put forth in Compendium Method TO-15.

While the compendium method is specifically written for the analysis of ambient air samples collected in leak-free passivated stainless-steel canisters, it may be applied to the analysis of samples that have employed the use of other collection devices such as Tedlar bags and are from sources other than ambient air such as indoor air, vapor intrusion impacted air, soil gas, landfill gas, gas cleaning apparatuses and stack emissions.

This procedure may also be used to report a variety of carbon ranges, constituent groups like TVOC (total volatile organic compounds), or as unresolved complex mixtures (e.g. Total Hydrocarbons).

### 1.1) Analytes, Matrix(s), and Reporting Limits

The target compound list and reporting limits for each compound are provided in the Appendix.

## 2) Summary of Method

An aliquot of sample is pulled from the canister through a solid multi sorbent bed trap which reduces the water content of the sample. The sample is thermally desorbed, and the VOCs are carried onto a GC column coupled to a mass spectrometer. Compounds are identified by comparison of the mass spectra for individual peaks in the total ion chromatogram to the fragmentation patterns of ions corresponding to VOCs including the intensity of primary and secondary ions as well as the patterns of stored spectra acquired under similar conditions.

The concentration of the target compound is calculated by internal standard technique using the average response factor or slope and intercept of that compound as determined by the initial calibration.

If the laboratory has modified the method, a list of these adjustments may be found in the Method Modifications section of this SOP.

## 3) Definitions

A list of terms and definitions are provided in the Appendix. Refer to the Laboratory *SOP52862 Quality Assurance Manual* (QAM) for additional Glossary of Terms, Definitions, and Acronyms.

## 4) Interferences

Contamination may occur if canisters or other equipment is not properly cleaned before use. The laboratory procedures for canister and flow controller cleaning are provided in *SOP48255 Canister Cleaning, Certification and Sampling Kit Preparation*.

## 5) Safety

Employees must abide by the policies and procedures in the Eurofins NDSC-US EHS-*QP46060 NDSC HSE Manual*, the *SOP49961 Burlington Corporate Safety Manual Addendum* and this document. This procedure may involve hazardous material, operations and equipment.

This SOP does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of the method to follow appropriate safety, waste disposal and health practices under the assumption that all samples and reagents are potentially hazardous. Safety glasses, gloves, lab coats and closed-toe, nonabsorbent shoes are a minimum.

A complete list of materials used in the method can be found in the reagents and materials section. Employees must review the information in the SDS for each material before using it for the first time or when there are major changes to the SDS.

### 5.1) Specific Safety Concerns or Requirements

The analytical system contains zones with elevated or depressed temperatures that are capable of causing injury upon direct contact. The analyst needs to be aware of the locations of those zones and allow them to return to room temperature prior to maintenance activities or take measures to avoid contact with hot and/or cold surfaces. There are areas of high voltage in the analytical system. Depending on the type of work involved, either turn the power to the instrument off, or disconnect it from its source of power.

Liquid nitrogen (LN2) is used for cryogenic purposes. In addition to avoiding contact with LN2 cooled surfaces, analysts must be aware of the potential for oxygen depletion in a confined space in the event of an unexpected large release of the product. Users should evacuate a confined space in which large amounts of LN2 have been released.

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Sample canisters are occasionally pressurized for cleaning or sample dilution purposes. Lab systems are designed to ensure that the cans are not pressurized above 40 psi. Eye protection must be worn when cans are pressurized in the event of a canister failure.

### 5.2) Primary Materials Used

There are no materials used in this method which have a serious or significant hazard rating.
**NOTE: This section does not include all materials used in the method**. A complete list of materials used in the method can be found in the reagents and materials section. Employees must review the information in the SDS for each material before using it for the first time or when there are major changes to the SDS.

## 6) Equipment and Supplies

Catalog numbers listed in this SOP are subject to change at the discretion of the vendor. Analysts are cautioned to be sure equipment meets the specification of this SOP.

### 6.1) Sampling Equipment

- 6L and 1L SUMMA® Canisters: Leak-Free, Passivated Stainless Steel, with Swagelok DSS4 Valves, or equivalent. Maximum rated pressure 40 psig.
- 6L SUMMA® Canisters: Silicon Lined-Leak-Free, Passivated Stainless Steel, with Swagelok DSS4 valves or equivalent. Maximum rated pressure 40 psig.
- Flow Controllers: Restek Catalog #24239 or equivalent.
- Flow Controller Orifice: Various sizes ranging from 0.008” to 0.060”, Restek or equivalent.
- Flow Controller Vacuum Gauges: Capable of measuring vacuum to an absolute vacuum of -30” Hg, and pressure up to 30 psi, Grainger Catalog #5WZ37 or equivalent
- Rain Guard: Stainless Steel Tubing ¼”, 10ft. Grainger or Equivalent. Cut 8” and bend into a J shape using a pipe bender.
- Stainless Steel Pre-Filter (7 um): Swagelok Catalog# SS-4F-T7-7 or equivalent
- Teflon Tape: Home Depot Brand or equivalent.

### 6.2) Analytical System

- Mass Spectrometer: Agilent 5973, 5975, 5975B, 5977C MSD or equivalent.
- Gas Chromatograph: Agilent 6890, 7890, 8890 or equivalent.
- VOC Autosampler: Entech 7016CA or equivalent.
- Cryogenic Concentrator: Equipped with an electronic mass flow controller that maintains a constant flow for carrier gas and sample over a range of 0-200 cc/min. Entech 7100A, 7200, 7200A or equivalent.
- Low Pressure Liquid Nitrogen: Air Gas or equivalent.
- Glass Bead Cryotrap: Capable of effectively removing water while trapping polar and non-polar compounds. Entech catalog# 01-04-11320.
- TENAX Sorbent Trap: Capable of removing CO2 and trapping the polar and non-polar compounds. Entech catalog # 01-04-11330.Primary Column: Fused silica capillary column (60 m x 0.32 mm x 1.8 µm), Restek RTX-624 or equivalent.
- Data System: PC software for Entech instrumentation. Hewlett-Packard ChemStation data acquisition software, Environment Testing Chrom and Environment Testing LIMS (TALS).
- NIST Mass Spectral Library and Search Program, 2020 release or newer

### 6.3) Cleaning System

- Canister Cleaner Module and Software: Capable of filling canisters with humidified air and evacuating canisters to 50 mtorr, Entech Model 3100A or equivalent.
- Vacuum Pump: Capable of evacuating sample canisters to full vacuum. Vacuubrand or equivalent.
- Cleaning Manifold: Equipped with stainless steel and Teflon transfer lines and connections for cleaning up to twelve canisters simultaneously.
- Heating Belts: Individual thermal-stated heating belts used to heat canisters to 100ºC during the manifolds cleaning cycles. Entech or equivalent.
- Cleaning oven: Capable of cleaning 6 Summa Cans simultaneously at a temperature of 100ºC. Entech or equivalent.
- Flow Controller Cleaning Manifold: Capable of flushing hot Nitrogen through 24 flow controllers simultaneously for cleaning.

### 6.4) Miscellaneous Supplies

- Mass Flow Controller, NIST Traceable: Capable of flow rate of 70 mL/min, Alicat MC5005CCM or equivalent. Use for the preparation of calibration and working standards.
- Syringes: Gas tight with a Luer-Lok tip, assorted sizes ranging from 1.0 mL to 1.0 L, SGE or equivalent.
- Digital Pressure Gauges, NIST Traceable: Capable of measuring pressure in the range of -30" Hg to 100 psi, Dwyer Models DPGA-12 and 67100 or equivalent
- Digital Flow Meter, NIST Traceable: Alltech or equivalent.

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- Nitrogen Gas
- Digital Stop watch, NIST traceable, Thomas Scientific or equivalent

## 7) Reagents and Standards

Catalog numbers listed in this SOP are subject to change at the discretion of the vendor. Analysts may use equivalent-quality materials based on factors including availability. Permanent changes will be noted in future SOP revisions. All reagent and standards must be labeled with their Name and/or ID #; the Expiration Date; and the Date Prepared.

All reagents and standards are stored at room temperature in the Air Lab work area, unless noted otherwise.

For additional information refer to the *SOP52272 Traceability, Handling and Storage of Standards and Reagents*

### 7.1) Reagents

- Argon - Gas off bulk Liquid Argon tank. UHP Air Gas or equivalent vendor
- Nitrogen- Gas off bulk Liquid Nitrogen tank. UHP Air Gas or equivalent vendor
- Helium- UHP from Airgas or equivalent
- VOA free water

### 7.2) Standards

Certified stock standard solutions are purchased from approved commercial vendors. From these, intermediate and working standard solutions are prepared by diluting a known volume of standard in an appropriate solvent to the desired final concentration.

Formulations for the preparation of intermediate and working standard solutions are provided in the Appendix. Unless otherwise specified, assign an expiration date of 12 months from date of preparation, unless the parent component expires earlier in which case use the earliest expiration date.

There are small variations in analyte concentrations in the preparation of air standards. For simplicity, the nominal concentrations are referenced in this SOP.

***Note:*** *When entering the concentrations of source standards in TALS, use the nominal concentration and not the actual concentration. Unless the actual has a > 15% difference from the nominal value. In these cases, use the actual value.*

Purchase the following stock standard mixtures from commercial vendors:

- Mixed Gas Stock Standard: - Commercially prepared standard that includes internal standard and tune standard compounds: Bromofluorobenzene, Bromochloromethane, 1,4-Difluorobenzene, and Chlorobenzene-d5, at a concentration of 100 ppbv each. Linde or equivalent.
- Calibration Stock Standard: - Commercially prepared custom gaseous stock standard that includes all target analytes except ethanol at a concentration of 1.0 ppmv. Linde or equivalent.
- Calibration Ethanol Neat Material. >99.5%
- ICV / LCS Stock Standard: - Custom made gaseous stock standard prepared from a different lot(s) of the source material(s) used to manufacture the calibration stock standard. The ICV/LCS stock standard includes all target analytes at a concentration of 1.0 ppmv. Linde.
- ICV/LCS Ethanol Neat material. >99.5% from a source other than the calibration source.

Prepare calibration and working standards mixtures by diluting a known volume of the stock standard with nitrogen to a specified volume into a humidified summa canister. The summa canister is humidified by adding 100ul of VOA free reagent water. The volume of the standard added to the canister is calculated using the set flow rate of 70mL/min using a mass flow meter multiplied by the time of the standard addition, plus the inclusion of the 25ml volume for the tubing connecting the mass flow meter to the summa canister. The formulations for standard preparation are provided in the Appendix along with recommended expiration dates and storage conditions.

Each stock standard is assigned a 1-year expiration date from manufacture and recertified annually. See *SOP52272 Traceability, Handling, and Storage of Standards and Reagents* for details on the recertification process. The ethanol neat material is assigned the expiration date given by the manufacturer.

If a new standard cannot be received prior to the expiration of the standard presently in use, the lab will notify the QA manager. The QA manager will perform a control chart review (see *SOP49965 Control Charts*). If the standard is determined to be acceptable, the lab may assign a new expiration date of not more than 30 days from the date of the last data point in the control chart review. When the new standard ID is created in TALS, the COA and the Control Chart verifying the standards stability will be attached to the reagent ID.

## 8) Sample Collection, Preservation, Shipment and Storage

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The laboratory does not perform sample collection, so these procedures are not included in this SOP. Sampling requirements may be found in the published reference method.

| Matrix | Sample Container | Minimum Sample Size | Preservation | Holding Time | Reference |
|---|---|---|---|---|---|
| Air | 1L or 6L Passivated Summa Canister | 1L | NA | 30 days from collection | EPA TO-15 |

1-liter Tedlar bags are only provided upon client request; however, clients are discouraged from using Tedlar bags due to the shortened holding time of 72 hours from collection.

All samples should be collected in passivated stainless-steel canisters that have been certified clean prior to sampling. The laboratory will provide certified clean canisters to the client upon request. The procedures for clean canister certification are provided in Laboratory SOP 48255: Canister Cleaning, Certification and Sampling Kit Preparation.

The laboratory can also provide flow controllers set to the appropriate flow rate for the sampling time required by the client.

The laboratory ships air canisters in custom made boxes. The boxes are equipped with custom-made foam inserts to hold the pre-set flow-controllers. The shipping materials are designed to prevent damage of equipment to and from the sampling site. The laboratory checks the equipment to ensure it is in proper working order before shipment to the client and additional checks are performed on return of the equipment to the laboratory. Sampling instructions are provided with each sampling kit. The sampling crew is advised to handle the sampling equipment using the instructions provided by the laboratory to ensure optimum performance.

The laboratory's sample acceptance policy for air samples in canisters requires that the sampling crew record the ID of the flow controller used for sample collection on the tag attached to each canister, but the association may also be recorded on the Field Test Data Sheet or a COC. With this information the laboratory can review the history of use of the FC as needed to troubleshoot potential equipment problems. Without the association, the history of use of the FC is unknown. The laboratory strongly recommends that field samplers be instructed to provide this information for each sampling event.

The return pressure of each canister should be between -10" Hg to -1"Hg, except for "grab" samples or samples with a collection rate of 100 or 200 mL/min, which must have a pressure greater than or equal to -10" Hg. The residual vacuum criteria ensure that the sample was collected over the time period the flow controller was calibrated for.

## 9) Quality Control

### 9.1) Sample QC

The following quality control samples are prepared with each batch of samples.

| QC Item | Frequency | Acceptance Criteria |
|---|---|---|
| Method Blank (MB) | 1 in 20 or fewer samples | See QC Summary Table |
| Laboratory Control Sample (LCS) | 1 in 20 or fewer samples | See QC Summary Table |
| Internal Standard (ISTD) | Every Sample | See QC Summary Table |
| Laboratory Control Sample Duplicate (LCSD) | Client request or if insufficient sample for Sample Duplicate | See QC Summary Table |
| Sample Duplicate (SD) | 1 in 20 or fewer samples if sample volume allows | See QC Summary Table |
| Trip Blank (TB) | Client Request | See QC Summary Table |

***NOTE:*** *The compendium reference method does not require the analysis of a laboratory control sample (LCS) or provide criteria for the evaluation of an LCS. The laboratory performs an LCS at the above-mentioned frequency as an evaluation of percent recovery in a blank matrix. The laboratory uses statistically derived control limits for the LCS.*

Unless otherwise specified by the client during project initiation, the LCSD will be used to measure precision only. The LCS will be used for evaluations for percent recovery and to determine if corrective action is necessary.

### 9.2) Instrument QC

The following instrument QC is performed:

| QC Item | Frequency | Acceptance Criteria |
|---|---|---|
| Tune Standard (BFB) | Each Analytical Window | See Appendices |
| Initial Calibration (ICAL) | Initially; when ICV or CCV fail | See Appendices |
| Initial Calibration Verification (ICV) | Once, after each ICAL | See Appendices |
| RT Window Establishment | Once per ICAL | See Appendices |

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| | | |
|---|---|---|
| Relative Retention Time (RRT) | With each sample | See Appendices |
| Continuing Calibration Verification (CCV) | Daily, after each BFB | See Appendices |

## 10) Procedure

### 10.1) Support Equipment Calibration

Verify the calibration is valid for the following;

- Mass flow controller used to prepare standards.
- Digital flow meter used to set and check the flow rates of the FC(s) used for sample collection.
- Digital pressure gauges used to check return canister pressure.
- Stopwatch used to measure standard addition time is current to the year.

Immediately notify the QA department if the calibration is not current and wait for further instruction. Equipment whose calibration has expired may not be used without documented approval from the QA department.

***NOTE:*** *The QA department schedules the annual calibrations of the support equipment and maintains all Certificates of Calibration. The flow controllers are checked against a NIST traceable standard. This check is performed by the manufacturer of the equipment, when possible, or by an approved vendor that provides certification service.*

### 10.2) Instrument Calibration

All Calibration Standards and Quality Control samples have the same concentration of Internal Standards and Surrogates that are added for field sample analysis. Refer to the Analytical Sequence section for additional information.

#### 10.2.1) Tune Standard

Analyze a tune standard (BFB) prior at the beginning of each analytical window. The tune standard is a commercially prepared mixed gas stock standard that includes Bromofluorobenzene (BFB) at a concentration of 100 ppbv.

To analyze the tune standard:

1. Establish the instrument operating conditions specified in the Sample Analysis section of this SOP. Once established these settings must be maintained for the analysis of all quality control and environmental samples.
2. Attach the mixed gas stock standard to the Entech concentrator by attaching the cylinder to the line dedicated for introduction of the internal standard (ISTD). The concentrator directly injects 20 mL of the 100 ppbv stock standard onto the instrument to yield an on-column concentration of 10 ppbv.
3. Acquire the data and evaluate the results against the acceptance criteria in the Tune Standard Criteria table in the appendix.
4. Criteria must be met prior to further analysis.
5. The official start time of the 24-hour analytical window is the injection time of a passing tune standard. All samples must be injected within 24 hours of that time.

***NOTE:*** *The data processing system averages three scans (apex scan, scan prior, and scan following) and performs background subtraction of the single scan prior to the elution of BFB.*

#### 10.2.2) Initial Calibration (ICAL)

The instrument must be calibrated with a minimum of five calibration standards for each target analyte at concentrations that span the working range of the method.

The laboratory routinely analyzes 8 standards at the recommended concentrations of 0.035, 0.20, 0.50, 5.0, 10.0, 15.0, 20 and 40 ppbv, except for Ethanol. For Ethanol, a 6-point curve is analyzed at the following concentrations: 5, 10, 15, 20, 40, and 100 ppbv.

***Note:*** *These are nominal concentrations, dependent on parent can stock concentrations. The nominal 0.035 ppbv concentration is prepared to ensure the actual low calibration standard is below the reporting limit (RL).*

Even though eight calibration standards are routinely analyzed not every calibration standard is used for each analyte. Each analyte has been assigned to an analyte group that includes a calibration range of at least five standards. The analyte group associations for each target analyte are provided in Tables in the appendix. The calibration range for each analyte group is as follows:

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- Group A: This analyte group is associated with a seven-point calibration curve. The calibration range is 0.20 to 40 ppbv with the 0.035 ppbv standard excluded. The limit of quantitation (LOQ) for this group of analytes is 0.20 ppbv

- Group B: This analyte group is associated with a six-point calibration curve. The calibration range is 0.50 to 40 ppbv with the 0.04 and 0.20ppbv standards excluded. The limit of quantitation (LOQ) for this group of analytes is 0.50 ppbv.

- Group C: This analyte group is associated with a five-point calibration curve. The calibration range is 5.0 to 40 ppbv with the 0.04, 0.20, and 0.50ppbv standards excluded. The limit of quantitation (LOQ) for this group of analytes is 5.0 ppbv.

- Group D: This analyte group is an eight-point calibration curve. The calibration range is 0.035 to 40 ppbv. The limit of quantitation (LOQ) for this group of analytes is 0.035 ppbv.

- Group E: (Ethanol): This analyte has a six-point calibration curve. The calibration range is 5 to 100 ppbv. The limit of quantitation (LOQ) for this analyte is 5 ppbv.

Prepare the calibration standards using the formulations provided in Appendix B.

Analyze the standards in a sequence from lowest to highest concentration using the instructions provided in the Sample Analysis section.

#### 10.2.2.1) Initial Calibration Acceptance Criteria

The data processing system calculates a relative response factor (RRF), for each analyte and isomer pair using the assigned internal standard. The internal standard associations for each target analyte are provided in tables in the Appendix. The data processing system also calculates a mean relative response factor, relative standard deviation (RSD), relative retention time (RRT) and the mean RRT.

The following criteria must be met for a calibration to be considered acceptable:

- The RSD for each target analyte must be <30% with at most 2 exceptions up to a limit of 40%. If linear regression is used the R2 must be greater than 0.996

- The area response for the primary quantitation ion for the internal standard for each ICAL standard must be within 40% of the mean area response over the calibration range for each internal standard.

    - The RRT for each target compound at each calibration level must be within 0.06 RRT units of the mean RRT for the compound. The retention time shift for each of the internal standards at each calibration level must be within 20 seconds of the mean retention time over the initial calibration range for each internal standard.

If these criteria are not met inspect the system for problems and perform corrective action. See the corrective action section and the QC Summary Table in the appendix for guidance.

Whichever calibration model is selected, it must be subjected to an additional check to establish the representativeness of the data that were used to produce it. This check is the refitting of each calibration point response back to the calibration model, or the comparison of the calculated amount of the standard against the expected amount.

Calculate the concentration of each calibration standard from the final calibration curve. Calculate the %Error for each point. All points must have an absolute %Error of < 30%, except the low point % Error must be < 50%.

If these conditions are not met, perform corrective action and recalibrate the instrument.

The laboratory CHROM software provides an Initial Calibration %Drift report which shows the % Error for each calibration point. This report must be reviewed in addition to the %RSD / Linear Response Factor.
%Error is the absolute value of the difference between the calculated concentration and the true concentration divided by the true concentration x100%.

- For example, if the 0.20mg/L standard reads back as 0.17mg/L:
  [(0.20 – 0.17)/0.20] x 100% = 15%

Repeat initial calibration whenever instrument operating conditions are changed, a new column is installed, when significant instrument maintenance has been performed, and when the result of the CCV indicate the calibration is no longer valid.

#### 10.2.3) Second Source Calibration Verification (ICV)

Immediately following an acceptable initial calibration verify the accuracy of the calibration by the analysis of the second source calibration verification standard (ICV).

Prepare the ICV following the formulation provided in the Appendix.

Analyze the ICV following the instructions provided in Sample Analysis section.

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The percent recovery (%R) for each target analyte must be within 70-130%. If criteria are not met, perform corrective action. Recommended corrective actions are provided in QC Summary Table. If corrective action is not successful, remake your standards and recalibrate.

If after successful analysis of the ICV, time remains in the 24-hour analytical window, QC and field samples may be analyzed without analysis of a continuing calibration verification check standard. If time does not remain in the analytical window, a new analytical sequence must be initiated with a Tune Standard followed by daily calibration (CCV).

#### 10.2.4) Continuing Calibration Verification (CCV)

Analyze the CCV immediately after the tune standard unless the analytical window includes ICAL, in which case, a CCV is not required.

Prepare the CCV standard using the formulation given in the Appendix. The recommended concentration of the CCV for each target analyte is 10.0 ppbv.

Analyze the CCV following the instructions provided in Sample Analysis section. The data system calculates a response factor for each analyte and calculates the percent difference (%D) of the RRF relative to the mean RRF in the most recent initial calibration.

- The %D for each target analyte must be within ±30%. If the above criteria are not met, repeat the analysis of the CCV once. If the second CCV meets criteria, continue with the analytical sequence. If it fails, evaluate the data to determine if one of the following conditions is met. If these conditions are not met corrective action must be taken. Guidance for troubleshooting is provided in the Troubleshooting and Corrective Action sections. After corrective action the analytical sequence may be continued only if two immediate, consecutive CCVs at different concentrations are within acceptance criteria. If these two CCVs do not meet the criteria, recalibration is required prior to further analysis.

- If the CCV criteria are exceeded high, indicating a high bias, and the associated samples have non-detects for those analytes, the analytical data may be considered usable. In the absence of instructions otherwise, proceed with analysis.

- If the CCV criteria are exceeded low, indicating a low bias, analytical results may be reported if those results exceed the project's regulatory decision level. In other words, if the analytical results are sufficiently high to counter the low bias, results may be reported. Consult with the project manager to determine if the exception is allowable for each project.

#### 10.2.5) Troubleshooting

Check the following items in case of calibration failures:

- Loss of sensitivity or unstable ISTD recoveries are usually the result of a leak. Check the union between the GC column and Entech transfer line.
- Loss of sensitivity for individual compounds may be a result of either an active site in a transfer line or a bad trap. Troubleshoot and perform maintenance as necessary.
- Poor chromatography usually requires GC column maintenance, perform as necessary.
- Carryover is usually caused by excessive amounts of analyte introduced to the system. Analyze blanks until the system is cleaned or replace the traps and transfer lines if necessary.

### 10.3) Sample Preparation

#### 10.3.1) Post Sampling Canister Pressure Check Procedure

The post-sampling canister pressure check is performed at the time of sample login by sample management staff so that any problems found are quickly identified and communicated to the client.

Refer to the current version of *SOP49959 Sample Management* for the procedure to take and record the post sampling canister pressure check.

#### 10.3.2) Sample Screening

At the laboratory's discretion unknown samples may be screened prior to initial analysis to determine if the sample requires dilution. Unless otherwise requested by the client the laboratory does not provide screen data with the data package report even when primary dilutions are performed based on the results of the screen analysis.

To prepare a sample for screen analysis, connect the sample canister to the autosampler connected to screening instrument and analyze 20 mL of sample. Acquire and evaluate the results. If the results of screen analysis indicate that a target compound is above its upper range of calibration, calculate a recommended dilution factor (DF) by dividing the concentration of analyte found by 30. Record the recommended DF on the screen worksheet.

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***NOTE:*** *Samples are screened on a GC/MS instrument that is programmed with the operating conditions referenced in this SOP. The calibration is checked weekly with a single point calibration standard at a concentration of 10 ppbv for all target analytes. The calibration is checked more frequently when the results of instrument analysis do not correlate well with the results of the screen analysis.*

#### 10.3.3) Sample Dilutions & Pressure Adjustment

Field samples should be diluted prior to initial analysis when the screen results indicate that the concentrations are above calibration range or when the laboratory has sufficient knowledge of the sample (history) to know that the sample will require dilution. Field samples must be reanalyzed at a dilution when the concentration of target compounds in initial analysis exceed of the upper range of calibration.

When the return negative pressure of a canister is greater than -10” Hg, make-up gas may be added to provide sufficient volume of make-up gas in order to have an adequate sample volume for analysis. The addition of make-up gas is considered a canister dilution. Some concentrators are able to pull full sample volume even if the residual vacuum is lower than -10” Hg so make-up air may not be necessary.

For samples analyzed for constituent groups (e.g., TVOC as Toluene), ranges, and or unresolved complex mixtures (Total Hydrocarbons), samples must be diluted such that the maximum peak height of any sample constituent under consideration does not exceed the equivalent peak height generated by highest calibration level standard. For evaluation it may be useful to graphically overlay sample chromatograms with that of the high point calibration standard.
To dilute the sample:

1) Attach the sample canister to the nitrogen gas line equipped with a pressure gauge that reads negative pressure in (“Hg) and positive pressure in (psig).

2) Ensure the valve of the nitrogen gas line is closed then open the valve of the sample canister. Record the negative pressure reading in the Canister Dilution Worksheet or on the canister’s tag.

3) Slowly open the valve of the nitrogen gas line and fill the canister until canister pressure gauge reads -10” Hg. Do not open the valve to such an extent that the nitrogen gas line pressure drops below 15 psig and do not allow the nitrogen gas line to reach equilibrium otherwise you will contaminate the nitrogen gas line.

4) When the desired pressure is achieved, close the canister valve and the valve on the nitrogen gas line; wait 15 seconds. The pressure should not exceed 40 psig.

5) Open the canister valve and record the final pressure reading in psig.

6) Close the canister valve and remove the valve from the zero air-line.

7) Record the initial and final pressure readings in the TALS canister dilution tracking module. If the final pressure is below ambient, the pressure will be in “Hg. Be sure to change the units in the TALS dilution tracking module.

When the return pressure of a canister is positive, the pressure must be adjusted to near ambient (0” Hg) prior to analysis. To adjust the pressure to ambient, vent the canister to ambient in a fume hood by opening the canister value for ~4-5 seconds, close the valve. For higher pressure canisters, open the valve and listen for a release of air then close the valve when the sound recedes.

If a trip blank is provided under vacuum, pressurize the trip blank canister to 10 psig. The pressurization of the trip blank is not considered a dilution.

#### 10.3.4) QC Sample Preparation

To prepare the method blank (MB): Fill a clean canister that has never been used to collect environmental samples and has never left the laboratory to 20 psig with nitrogen gas. Continue to use this canister as the MB until the pressure of the canister reaches 0 psig, at which time, recharge with nitrogen gas to 20 psig and reuse.

To prepare the LCS: Follow the instructions provided in the Appendix for preparation of the working ICV/LCS standard. If an LCSD is requested, analyze the LCSD from the same canister as the LCS, unless client makes a specific request for an independent LCSD can.

### 10.4) Sample Analysis

#### 10.4.1) Instrument Operating Conditions

Optimize the GC and MS conditions for compound separation and sensitivity.

The recommended operating conditions are as follows:

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| | |
|---|---|
| Thermal Desorb: | Initial Trap #1 Temperature: -110ºC.<br>Desorb Temperature from Trap #1 to #2: 0 ºC.<br>Total Volume Transfer by Mass Flow Controller: 40 mL<br>Initial Trap #2 Temperature: -15 ºC<br>Desorb Temperature from Trap #2 to #3: 200ºC.<br>Transfer time 3.5 minutes<br>Initial Trap #3 Temperature: -165 ºC<br>Injection Trap #3 Temperature: 70ºC<br>Injection Time: 1.5 minutes<br>Trap #3 Temperature after Injection: -165 ºC |
| Carrier Gas: | Helium, Ultra High Purity |
| Cryogenic Focusing Gas: | Liquid Nitrogen |
| Flow Rate: | ~1.5 mL/min |
| Temperature Program: | Initial Temperature: 40ºC<br>Initial Hold Time: 4 minutes<br>Ramp1 Rate: 20ºC/min. to 200ºC.<br>Ramp 2 Rate: 40ºC/min. to 220ºC<br>Final Temperature: 220ºC<br>Final Hold Time: 6.5 minutes |
| Electron Energy: | 70 electron volts |
| Mass Range: | 35-265 amu |
| Scan Time: | ≥1 scan per second. |

These operating conditions may be changed but once the operating conditions are established for initial calibration the same conditions must be used until a new calibration is performed.

The mass spec tune profile may be changed to optimize the BFB tune analysis but once set, it cannot be changed until another BFB tune is analyzed.

**10.4.2) Daily Instrument Maintenance**

Prior to analysis initiate the flushing sequence using the Entech software. Then initiate the bake program using the Entech software.

**10.4.3) Bi-Weekly Instrument Maintenance**

At a minimum frequency of once every two weeks, perform an autosampler leak check. Cap all autosampler ports and initiate the leak check program using the Entech software. Record this check in the instrument maintenance log.

**10.4.4) Analytical Sequence**

All Calibration Standards, batch QA and field samples, except for the BFB analysis, have 20mls of the Mixed Gas Stock Standard added in conjunction with any other additions. This addition adds the internal standards and surrogates.

An example analytical sequence that includes initial calibration (ICAL) is provided below. When ICAL is not performed, the sequence begins with the tune standard and is followed by the CCV, LCS, LCSD, and method blank. If sufficient time remains in the 24 hours analytical window after initial calibration, QC and field samples may be analyzed without the CCV and the ICV will serve as the LCS for the sequence. The MB, LCS and LSCD must be analyzed at a frequency of every 20 samples or with each analytical sequence whichever is more frequent.

1. Tune Standard (BFB)
2. ICAL
3. ICV
4. CCV
5. LCS (repeat every 20 samples)
6. LCSD (when requested)
7. MB (repeat every 20 samples)
8. Field Samples (including trip blanks)

Attach the canisters to the autosampler inlet in the order of the analytical sequence then initiate the analytical sequence. The autosampler introduces 200 mL of sample volume from each canister to the instrument system and adds 20 mL of the mixed gas

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standard to each sample.

Acquire the data and evaluate the results to confirm qualitative identification and quantification.

#### 10.5) Corrective Action

An out-of-control situation may occur that is not adequately addressed in the corrective action table or troubleshooting section. The analyst must use their best analytical judgment and available resources to determine the corrective action to be taken. The analyst should seek the assistance of their immediate supervisor, QA manager or other experienced staff if they are uncertain of the cause of the out-of-control situation.

The analysis must not be resumed until the source of the problem and an in-control status is re-established. All samples associated with the out-of-control situation must be reanalyzed after in-control status has been re-established.

If authorization is received from the Supervisor or QA Manager for release with data qualification, a Non-Conformance Memo (NCM) must be created to notify the project manager, who then notifies the client of the out-of-control situation. Also, the situation may be significant enough that the Supervisor or QA Manager would create a Corrective Action Report (CAR). Refer to the *SOP49967 Nonconformance and Corrective Action Procedures* for further guidance.

## 11) Calculations/Data Reduction

### 11.1) Qualitative Identification

The data processing system tentatively identifies target analytes by comparing the retention time of the peaks to the window set around the continuing calibration standard, and searches in that area for the primary ion and up to two secondary ions characteristic of the target analyte.

All tentative identifications made by the computer are reviewed and either accepted or rejected by the primary analyst. The identification made by the system is accepted when the following criteria are met:

- The target analyte is identified by comparison of its background subtracted mass spectrum to a reference spectrum in the NIST14 database. In general, all ions that are present above 10% relative abundance in the mass spectrum of the standard should be present in the mass spectrum of the sample component and their relative abundances should agree within 20%. For example, if an ion has a relative abundance of 30% in the standard spectrum, its abundance in the sample spectrum should be in the range of 10-50%. Some ions, particularly the molecular ion, are of special importance if a tentative identification is to be made and should be evaluated even if they are below 10% relative abundance.
- The GC retention time for the target analyte should be within 0.06 RRT units of the daily standard.

Identification requires expert judgment when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When GC peaks obviously represent more than one sample component (i.e., broadened peak with shoulder(s) or valley between two or more maxima), appropriate analyte spectra and background spectra can be selected by examining plots of characteristic ions for tentatively identified components.

When analytes coelute (i.e., only one GC peak is apparent), the identification criteria can be met but each analyte spectrum will contain extraneous ions contributed by the coeluting compound. If the data system does not properly integrate a peak, perform manual integration. All manual integration must be performed and documented in accordance with corporate *SOP43862 Manual Integrations*.

### 11.2) Quantification of Target Analytes

After a compound has been identified, the data system quantifies the on-column concentration of the target compound based on the integrated abundance of the characteristic ion from the EICP. If there is matrix interference with the primary ion, a secondary ion may be used for quantification by calculating a mean RF factor for that ion and using that ion to quantify the analyte in the sample. When secondary ion calculations are required, include this information in the non-conformance report and project narrative.

Samples analyzed for constituent groups, ranges, and or unresolved complex mixtures are quantified as follows;

#### 11.2.1) TVOC as Toluene

An internal standard type of quantification response factor is generated using the RIC peak response measured for Toluene and its associated internal standard (as detailed in the calculation section). That response factor is used to quantify all RIC chromatographic sample response with the exception of those peak responses associated with internal standards. The results are reported as 'TVOC (as Toluene)'.

Retention Time Range: Propene to Naphthalene

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**11.2.2) GRO as Octane**

An internal standard type of quantification response factor is generated using the RIC peak response measured for Octane and its associated internal standard (as detailed in the calculation section). That response factor is used to quantify all RIC chromatographic sample response with the exception of those peak responses associated with internal standards that eluted within the retention time range as defined by the elution of 2-Methyl-Butane through Decane (C5-C10). The results are reported as 'GRO (as Octane).

Retention Time Range: 2-Methyl-Butane to n-Decane

**11.2.3) Unresolved Complex mixtures**

An internal standard type of quantification response factor is generated using the RIC peak response measured for the un-resolved complex mixture (i.e. the gasoline envelope) and its associated internal standard (as detailed in the calculation section). That response factor is used to quantify all similarly chromatographing RIC sample response with the exception of those peak responses associated with internal standards. The results are reported using the name of the unresolved complex mixture used in the calibration (e.g. Total Hydrocarbons).

Retention Time Range: Propene to Naphthalene

Final results are calculated in TALS

**11.3) Calculations**

Analytical results are calculated as follows:

Dilution Factor

DF = (V2/V1) x (V4/V3)

Where:
V1 = Pre-Dilution Canister Volume
V2 = Post-Dilution Canister Volume
V4 = Base Sample Amount (200 mL)

Relative Response Factor (RRF)

RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
Ax = Area of the quantitation ion of the analyte
Ais = Area of the quantitation ion of the internal standard
Cx = Concentration of analyte in concentration units (ppbv)
Cis = Concentration of internal standard in concentration units (ppbv)

Sample Concentration

Cx = [(Ax)(Cis)/(Ais)(Mean RRF)] x (DF)

Where:
Cx = Compound concentration (ppbv)
Cis = Concentration of associated internal standard (ppbv)
Ais = Area of quantitation ion for associated internal standard
Ax = Area of quantitation ion for compound
DF = Dilution Factor
Mean RRF = Average Relative Response Factor from initial calibration.

Unit Conversion from ppbv to ugm3

Analytical Result(ug/m3) = Result(ppbv) x (MW/24.45)

Where:
MW = molecular Weight

Example:
Benzene Result = 56 ppbv
Benzene mw = 78.108

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Analytical Result(ug/m3) = 56ppbv x (78.108/24.45)

Result(ug/m3) = 178.9 ug/m3 reported as 180 ug/m3

Percent Recovery (%R)

%R = (Cs/Cn) x 100

Where:
Cs = Concentration of the spiked sample (ppbv)
Cn = Nominal concentration of spike added (ppbv)

Precision (%RPD)

%RPD = [(|C1-C2|)/((C1+C2)/2) x 100

Where:
C1 = Measured concentration of the first sample aliquot
C2 = Measured concentration of the second sample aliquot

Formula of Standard Addition:

Volume (mL) = (FR x T) + 25 mL

Where:
FR = flow rate in mL/min
T= time in minutes

Example:
FR = 70ml/min
Time = 10.69 minutes
Volume = 25+ (70 x 10.69) = 773 mL

Total Volume of diluted standard

Volume (mL) = CV x P

Where:
CV = canister volume in mL
P = pressure in Bar (14.7psi per Bar)

Example:
CV = 6185 mL
P= 2.5 Bar
Volume = 15462 mL

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**11.4) Data Review**

**11.4.1) Primary Review (Performed by Primary Analyst)**

Upload the data files to TALS. Enter batch editor information and add the standards and reagents to the TALS batch. Review the results against acceptance criteria. If acceptance criteria are not met, make arrangements to perform corrective action.

Check the results of samples analyzed immediately after high concentration samples for signs of carry-over. Reanalyze the sample if carry over is suspected.

Dilute and reanalyze samples whose results exceed the calibration range. The diluted analysis should result in a determination within the upper half of the calibration curve.

If samples are run at dilution, there should be a target peak that is at least 20% of the calibrated range but preferably in the upper half of the range or there should be an abundance of TICs which preclude a more concentrated analysis, or the sample should show matrix effects which preclude a more concentrated analysis. If a sample is diluted due to TICs or matrix, an NCM should be written explaining the reason for dilution.

Set results to primary, secondary, acceptable or rejected as appropriate.

Verify corrective action was taken for all results not within acceptance criteria. If corrective action is not taken or was unsuccessful, record all instances where criteria are not met with a nonconformance memo (NCM). Be sure to provide

explanation of your decision making in the internal comment section of the NCM. The internal comment section should list the reason the NCM is suspected, which action (if any) was taken and why, and the outcome of the action taken. Refer to the *SOP49967 Nonconformance and Corrective Action Procedures* for further guidance.

Review project documents such as the Project Plan (PP), Project Memo or any other document/process used to communicate project requirements to ensure those project requirements were met. If project requirements were not met, immediately notify the project manager (PM) to determine an appropriate course of action.

Review that QC links have been properly made and run the data review checker (DRC) and address any anomalies.

Set the batch to 1st level review and record your review on the data review checklist.

### 11.4.2) Secondary Review (Performed by Peer Reviewer)

Review the project documents such as the Project Plan (PP), Project Memo or any other document/process used to communicate project requirements and verify project requirements were met. If project requirements were not met, immediately notify the project manager (PM) to determine an appropriate course of action.

Review records (these records include but are not limited to the Pre-Shipment Clean Canister Certification Report, Flow Controller Set Flow Rate and Leak Check Record, Field Test Data Sheets, and the Air Canister Return Pressure Check Record) associated with release and return of air sampling equipment to ensure all anomalies are properly recorded. Compare any problems noted in these documents with the analytical results and record any findings in the narrative note program or otherwise communicate your findings to the PM for inclusion in the project narrative.

Review the TALS batch editor to verify information is complete. Review the batch to verify that the procedures in this SOP were followed. If discrepancy is found, resolve the discrepancy and verify any modifications to the SOP were approved and properly documented.

Spot-check 15% of samples in the batch to verify quantitative and qualitative identification. If the samples are being analyzed under DoD methods 100% of data must be checked during secondary review.

If manual integrations were performed:

- Review all integrations to verify that the integration meets the requirements for manual integration as specified in corporate SOP CA-Q-S-002. If an error is suspected or found, consult with the analyst that performed the integration and request correction or notify the Department Manager or QA Manager. Do not “fix” the integration. Reintegration by a secondary data reviewer must not be performed except in limited circumstances as approved by the department supervisor or other laboratory management. If those instances where the secondary reviewer performs the integration, this person is now considered the primary analyst and each integration performed by the secondary reviewer must be subsequently reviewed by a peer analyst or the department supervisor to verify the integration is consistent and compliant with the requirements specified in corporate SOP CA-Q-S-002.
- Check to ensure an appropriate technical reason code is provided for all manual integrations.

Verify that the performance criteria for the QC items listed in TO15 QC Summary & Recommended Corrective Action table in Appendix were met. If the results do not fall within the established limits, verify that corrective actions were performed. If corrective action was not performed; verify the reason is provided and that the situation is properly documented with an NCM. Set samples to 2nd level review. Record second level review on the data review checklist.

Run and review the deliverable. Fix any problems found. When complete set the method chain to lab complete and forward any paperwork to report/project management.

### 11.5) TO15 Poor Performing Analytes

***NOTE:*** *Statistically derived limits will be no wider than 50-150%R for poor performing compounds.*

Compounds with a high boiling point which is beyond the range of typical gas compounds.

- Dodecane
- 1,2,4-Trichlorobenzene
- Hexachlorobutadiene
- Naphthalene
- 1,2,3-Trichlorobenzene

The following compounds change how they act on the traps depending on the humidity of the standard.

- 3-chloro-1-propene
- Bromoform

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The following compounds are very polar and are linked to the water in the standard. Since we remove most of the water during the trapping process, a little change can produce a big result. For example removing 95% of the water instead of 94% of the water will have a negligible affect on non-polar compounds, but a 20% difference for polar compounds.

- Ethanol (made from neat material and is not part of the standard TO-15 calibration gas mix due to high reactivity
- Ethyl ether
- Acrolein
- Acetone
- Isopropyl alcohol
- 2-butanone
- Tetrahydrofuran
- 2-hexanone

### 11.6) Data Reporting

Report analytical results above the reporting limit (RL) as the value found. Report analytical results less than the RL, to the adjusted RL with a "U" data qualifier. If the data is to be reported to the method detection limit (MDL) the analytical results between the RL and the MDL are reported with an "estimated" footnote. Adjust the RL and MDL for sample dilution/concentration. The unadjusted RL for each target analyte is provided in Routine Compound List and TO-3 Analyte List tables. For Method TO3 the laboratory does not report values below the reporting limit.

Data reporting and creation of the data deliverable is performed by TALS using the formatters set by the project manager during project initiation.

Electronic and hardcopy data are maintained as described in laboratory *SOP49966 Management, Retention Storage and Archive of Data Records*.

## 12) Method Performance

### 12.1) Method Detection Limit Study (MDL)

Perform a method detection limit (MDL) study at initial method set-up following the procedures specified in laboratory SOP BR-QA-005,

### 12.2) Training Requirements and Demonstration of Capabilities

The Group Leader is responsible for ensuring that this procedure is performed by an associate who has been properly trained in its use and has the required experience. The Group Leader is also responsible for the documentation of this training.

All personnel are required to perform an initial demonstration of proficiency (IDOC) on the portion of the method they will be performing prior to working independently. Annually thereafter, the analyst must document continuing demonstration of capability (CDOC). See requirements for demonstration of analyst proficiency in *SOP52264 Employee Training and Analyst Demonstration of Proficiency*.

## 13) Pollution Control

It is Eurofins Burlington's policy to evaluate each method and look for opportunities to minimize waste generated (i.e., examine recycling options, ordering chemicals based on quantity needed, preparation of reagents based on anticipated usage and reagent stability). Employees must abide by the policies in NDSC-USEHS-*QP46060 NDSC HSE Manual*.

## 14) Waste Management

Waste management practices are conducted consistent with all applicable rules and regulations. Excess reagents, samples and method process wastes are disposed of in an accepted manner. Waste description rules and land disposal restrictions are followed. Waste disposal procedures are incorporated by reference to *SOP47863 Tracking and Collecting of Hazardous Waste* and *SOP48269 Procedure for Acceptance and Handling of USDA Regulated Domestic and Foreign Soil*.

The following waste streams are produced when this method is carried out:

- None

## 15) Method Modifications

- This SOP utilizes and alternative detector (mass spectrometer) vs that of a FID and/or ECD as listed in the published method. (TO3)

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- This SOP describes a method where an aliquot of a whole air sample collected in a passivated stainless-steel canister is cryogenically trapped and concentrated prior to injection into the MS detector equipped GC. (TO3)
- This Method SOP utilizes an RTX-624 capillary column (60M x 0.32 mm ID x 0.18um). (TO3, TO15)
- Additional quality control aspects are employed in the use of this method based on the alternative detector type, specifically, the detector tune is verified at the beginning of each period of analysis prior to the acquisition on any standard, blank, QC sample or field sample. (TO3)
- This Method SOP does not utilize sub ambient column oven temperature programming. (TO3, TO15)
- Sample traps consist of a multi bed system employing Tenax and glass beads (see manufactures system description: Entech Model 7100 Sample Pre-Concentrator). (TO15)
- Sampling apparatus consists of passivated stainless-steel canister specifically design for the collection of ambient air samples for volatile analysis (TO3)
- Nafion dryers are not used. The analytical pre-concentration system employs a moisture control system consisting of multi sorbent bed traps. (TO15)
- System calibration is verified every 24 hours within which samples are analyzed. System linearity is not verified every 4-6 hours as described. (TO3)
- Published Method requires weekly multi-point calibration be performed. Laboratory performs multi-point calibrations as necessary see section 10.2 (TO3)
- System linearity is determined through multi point calibration utilizing average response factors and internal standard technique quantification (see Section 10).(TO3)
- This SOP is applied to more than just the ambient air listed as a matrix by the method (TO15)

## 16) Appendices

### 16.1) Routine Compound List, Reporting Limit, Internal Standard and Ion Assignments

| Analyte | CAS # | 6L RL (ppbv) | 1L RL (ppbv) | Quantifier Mass | Qualifier Mass | Qualifier Mass | ISTD Group | Analyte Group |
|---|---|---|---|---|---|---|---|---|
| Dichlorodifluoromethane | 75-71-8 | 0.5 | 5 | 85 | 87 | | 1 | B |
| Chlorodifluoromethane | 75-45-6 | 0.5 | 5 | 51 | 67 | 69 | 1 | B |
| 1,2-Dichlorotetrafluoroethane | 76-14-2 | 0.2 | 2 | 85 | 135 | 87 | 1 | A |
| Chloromethane | 74-87-3 | 0.5 | 5 | 50 | 52 | | 1 | B |
| n-Butane | 106-97-8 | 0.5 | 5 | 43 | 41 | 58 | 1 | B |
| Vinyl Chloride | 75-01-4 | 0.035 | 0.35 | 62 | 64 | | 1 | D |
| 1,3-Butadiene | 106-99-0 | 0.035 | 0.35 | 54 | | | 1 | D |
| Bromomethane | 74-83-9 | 0.2 | 2 | 94 | 96 | | 1 | A |
| Chloroethane | 75-00-3 | 0.5 | 5 | 64 | 66 | | 1 | B |
| Isopentane | 78-78-4 | 0.2 | 2 | 43 | 57 | 56 | 1 | A |
| Bromoethene (Vinyl Bromide) | 593-60-2 | 0.2 | 2 | 106 | 108 | 81 | 1 | A |
| Trichlorofluoromethane | 75-69-4 | 0.2 | 2 | 101 | 103 | | 1 | A |
| Pentane | 109-66-0 | 0.5 | 5 | 43 | 57 | 56 | 1 | B |
| EthylEther | 60-29-7 | 0.2 | 2 | 59 | 45 | 74 | 1 | A |
| Acrolein | 107-02-8 | 5 | 50 | 56 | 55 | 37 | 1 | C |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 76-13-1 | 0.2 | 2 | 101 | 151 | 103 | 1 | A |
| 1,1-Dichloroethene | 75-35-4 | 0.035 | 0.35 | 96 | 161 | 63 | 1 | A |
| Acetone | 67-64-1 | 5 | 50 | 43 | 58 | | 1 | C |
| Isopropyl Alcohol | 67-63-0 | 5 | 50 | 45 | 43 | | 1 | C |
| Carbon Disulfide | 75-15-0 | 0.5 | 5 | 76 | | | 1 | B |
| 3-Chloropropene (Allyl Chloride) | 107-05-1 | 0.5 | 5 | 41 | 76 | | 1 | B |
| Acetonitrile | 75-05-8 | 5 | 50 | 41 | 40 | 39 | 1 | C |
| Methylene Chloride | 75-09-2 | 0.5 | 5 | 49 | 84 | 86 | 1 | B |
| tert-Butyl Alcohol | 75-65-0 | 5 | 50 | 59 | 41 | 43 | 1 | C |
| Methyl tert-Butyl Ether | 1634-04-4 | 0.5 | 5 | 73 | 43 | | 1 | B |
| trans-1,2-Dichloroethene | 156-60-5 | 0.2 | 2 | 61 | 96 | | 1 | A |
| n-Hexane | 110-54-3 | 0.2 | 2 | 57 | 86 | | 1 | B |
| 1,1-Dichloroethane | 75-34-3 | 0.035 | 0.35 | 63 | 65 | 83 | 1 | A |
| Methyl Ethyl Ketone | 78-93-3 | 0.5 | 5 | 72 | 43 | | 1 | B |
| cis-1,2-Dichloroethene | 156-59-2 | 0.035 | 0.35 | 96 | 98 | 83 | 1 | A |
| Tetrahydrofuran | 109-99-9 | 5 | 50 | 42 | 72 | | 2 | C |
| Chloroform | 67-66-3 | 0.2 | 2 | 83 | 85 | | 1 | A |

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|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 71-55-6 | 0.2 | 2 | 97 | 99 | 61 | 2 | A |
| Cyclohexane | 110-82-7 | 0.2 | 2 | 84 | 56 | | 2 | A |
| Carbon Tetrachloride | 56-23-5 | 0.035 | 0.35 | 117 | 119 | | 2 | D |
| 2,2,4-Trimethylpentane | 540-84-1 | 0.2 | 2 | 57 | 41 | 43 | 2 | A |
| 1,2-Dichloroethene (total) | 540-59-0 | 0.2 | 2 | 61 | 96 | | 1 | A |
| Benzene | 71-43-2 | 0.2 | 2 | 78 | 77 | | 2 | A |
| 1,2-Dichloroethane | 107-06-2 | 0.2 | 2 | 62 | 98 | | 2 | A |
| n-Heptane | 142-82-5 | 0.2 | 2 | 43 | 71 | | 2 | A |
| Trichloroethene | 79-01-6 | 0.035 | 0.35 | 95 | 130 | 132 | 2 | D |
| Methyl Methacrylate | 80-62-6 | 0.5 | 56 | 69 | 41 | 39 | 2 | B |
| 1,2-Dichloropropane | 78-87-5 | 0.2 | 2 | 63 | 41 | | 2 | A |
| 1,4-Dioxane | 123-91-1 | 5 | 50 | 88 | 58 | | 2 | C |
| Dibromomethane | 74-95-3 | 0.2 | 2 | 174 | 93 | 172 | 2 | A |
| Bromodichloromethane | 75-27-4 | 0.2 | 2 | 83 | 85 | | 2 | A |
| cis-1,3-Dichloropropene | 10061-01-5 | 0.2 | 2 | 75 | 110 | | 2 | A |
| Methyl Isobutyl Ketone | 108-10-1 | 0.5 | 5 | 43 | 58 | | 2 | B |
| n-Octane | 111-65-9 | 0.2 | 2 | 43 | 57 | 114 | 2 | A |
| Toluene | 108-88-3 | 0.2 | 2 | 92 | 91 | | 3 | A |
| trans-1,3-Dichloropropene | 10061-02-6 | 0.2 | 2 | 75 | 110 | | 2 | A |
| 1,1,2-Trichloroethane | 79-00-5 | 0.2 | 2 | 83 | 97 | 85 | 3 | A |
| Tetrachloroethene | 127-18-4 | 0.035 | 0.35 | 166 | 168 | 129 | 3 | D |
| Methyl Butyl Ketone | 591-78-6 | 0.5 | 5 | 43 | 58 | | 3 | B |
| Dibromochloromethane | 124-48-1 | 0.2 | 2 | 129 | 127 | | 3 | A |
| 1,2-Dibromoethane | 106-93-4 | 0.2 | 2 | 107 | 109 | | 3 | A |
| Nonane | 111-84-2 | 0.2 | 2 | 57 | 71 | 128 | 3 | A |
| Chlorobenzene | 108-90-7 | 0.2 | 2 | 112 | 77 | 114 | 3 | A |
| Ethylbenzene | 100-41-4 | 0.2 | 2 | 91 | 106 | | 3 | A |
| Xylene (m,p) | 1330-20-7 | 0.5 | 5 | 106 | 91 | | 3 | A |
| Xylene (o) | 95-47-6 | 0.2 | 2 | 106 | 91 | | 3 | A |
| Styrene | 100-42-5 | 0.2 | 2 | 104 | 78 | | 3 | A |
| Bromoform | 75-25-2 | 0.2 | 2 | 173 | 175 | 171 | 3 | A |
| Cumene | 98-82-8 | 0.2 | 2 | 105 | 120 | 77 | 3 | A |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 0.2 | 2 | 83 | 131 | 85 | 3 | A |
| Xylene (total) | 1330-20-7 | 0.2 | 2 | 106 | 91 | | 3 | A |
| n-Decane | 124-18-5 | 0.5 | 5 | 57 | 71 | 142 | 3 | B |
| n-Propylbenzene | 103-65-1 | 0.2 | 2 | 91 | 120 | 92 | 3 | A |
| 1,2,3-Trichoropropane | 96-18-4 | 0.5 | 5 | 75 | 110 | 112 | 3 | B |
| 4-Ethyltoluene | 622-96-8 | 0.2 | 2 | 105 | 120 | | 3 | A |
| 1,3,5-Trimethylbenzene | 108-67-8 | 0.2 | 2 | 105 | 120 | | 3 | A |
| 2-Chlorotoluene | 95-49-8 | 0.2 | 2 | 91 | 63 | | 3 | A |
| tert-Butylbenzene | 98-06-6 | 0.2 | 2 | 119 | 91 | 134 | 3 | A |
| 1,2,4-Trimethylbenzene | 95-63-6 | 0.2 | 2 | 105 | 120 | | 3 | A |
| sec-Butylbenzene | 135-98-8 | 0.2 | 2 | 105 | 134 | 91 | 3 | A |
| 4-Isopropyltoluene | 99-87-6 | 0.2 | 2 | 119 | 134 | 91 | 3 | A |
| 1,3-Dichlorobenzene | 541-73-1 | 0.2 | 2 | 146 | 111 | 148 | 3 | A |
| 1,4-Dichlorobenzene | 106-46-7 | 0.2 | 2 | 146 | 111 | 148 | 3 | A |
| n-Undecane | 1120-21-4 | 5 | 50 | 57 | 71 | 156 | 3 | C |
| Benzyl Chloride | 100-44-7 | 0.2 | 2 | 91 | 126 | 65 | 3 | A |
| n-Butylbenzene | 104-51-8 | 0.2 | 2 | 91 | 134 | 92 | 3 | A |
| 1,2-Dichlorobenzene | 95-50-1 | 0.2 | 2 | 146 | 111 | 148 | 3 | A |
| n-Dodecane | 112-40-3 | 5 | 50 | 57 | 71 | 170 | 3 | C |
| 1,2,4-Trichlorobenzene | 120-82-1 | 0.5 | 5 | 180 | 182 | | 3 | B |
| 1,3-Hexachlorobutadiene | 87-68-3 | 0.2 | 2 | 225 | 223 | | 3 | A |
| Naphthalene | 91-20-3 | 0.5 | 5 | 128 | | | 3 | B |
| 1,2,3-Trichlorobenzene | 87-61-6 | 0.2 | 2 | 180 | 182 | 145 | 3 | A |
| Propylene | 115-07-1 | 5 | 50 | 41 | 42 | 39 | 1 | C |

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|---|---|---|---|---|---|---|---|---|
| Vinyl Acetate | 108-05-4 | 5 | 50 | 43 | 86 | | 1 | C |
| Ethyl Acetate | 141-78-6 | 5 | 50 | 43 | 74 | | 1 | C |
| Ethanol | 64-17-5 | 5 | 50 | 46 | 45 | | 1 | E |
| Bromochloromethane | 74-97-5 | NA | NA | 128 | 49 | 130 | 1 | NA |
| 1,4-Difluorobenzene | 540-36-3 | NA | NA | 114 | | | 2 | NA |
| Chlorobenzene-d5 | 3114-55-4 | NA | NA | 117 | | | 3 | NA |

**16.2) TO-3 Analyte List, Reporting Limit, Internal Standard and Ion Assignments**

| Analyte | CAS No. | RL (ppbv) | Qualifier Ion | Qualifier Ion | Qualifier Ion | ISTD Group |
|---|---|---|---|---|---|---|
| n-Octane | 111-65-9 | 0.2 | 43 | 57 | 114 | 2 |
| Toluene | 108-88-3 | 0.2 | 92 | 91 | | 3 |
| | | | | | | |
| TVOC as Toluene | NA | 11 | | | | NA |
| GRO as Octane | NA | 14 | | | | NA |
| Total Hydrocarbons | NA | 76 ug/m3 | | | | NA |
| | | | | | | |
| Internal Standards | | | | | | |
| Bromochloromethane | 74-97-5 | NA | 128 | 49 | 130 | 1 |
| 1,4-Difluorobenzene | 540-36-3 | NA | 114 | | | 2 |
| Chlorobenzene-d5 | 3114-55-4 | NA | 117 | | | 3 |

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**16.3) Tune Standard Criteria**

| Mass | Ion Abundance Criteria |
|---|---|
| 50 | 8.0 to 40.0 percent of mass 95 |
| 75 | 30.0 to 66.0 percent of mass 95 |
| 95 | Base Peak, 100 percent relative abundance |
| 96 | 5.0 to 9.0 percent of mass 95 |
| 173 | Less than 2.0 percent of mass 174 |
| 174 | 50.0 to 120.0 percent of mass 95 |
| 175 | 4.0 to 9.0 percent of mass 174 |
| 176 | 93.0 to 101.0 percent of mass 174 |
| 177 | 5.0 to 9.0 percent of mass 176 |

**16.4) QC Summary & Recommended Corrective Action (Routine and DoD)**

| QC Check | Frequency | Acceptance Criteria | Recommended Corrective Action |
|---|---|---|---|
| Tune Standard | Prior to calibration and every 24 hours | See Tune Standard Criteria table | Correct Problem. Reanalyze. No samples may be analyzed without a valid tune. |
| Initial Calibration | Prior to sample analysis and when CCV fails | RSD for each analyte ≤ 30% with 2 exceptions up to 40% (if allowed). Individual Calibration points: < 30% Error, except < 50% for the lowest calibration point | Correct problem and repeat calibration |

| | | | |
|---|---|---|---|
| RRT | With each calibration | RRT of each target analyte in each calibration standard within ± 0.006 RRT units | Correct Problem. Repeat ICAL |
| ICV | Once after each ICAL | %R 70-130 for all analytes | Correct Problem. Reanalyze, re-make, re-verify & re-analyze. If that fails, re-make all standards and repeat calibration |
| CCV | Daily before sample analysis after tune standard | %Difference ≤ 30 | Correct Problem. Reanalyze once. If that fails, see Section 10.3.9 for instruction. |
| LCS | Each batch or every 20 samples, whichever is sooner. | %Recovery 70-130% | Reanalyze LCS, re-prep and reanalyze LCS, and all associated samples if sufficient sample volume is available. If corrective action not successful, initiate nonconformance report and qualify sample results. |
| LCSD | Each batch or every 20 samples, only if there is no Sample Duplicate, or per client request | Relative Percent Difference (RPD) ≤ 25% | Reanalyze LCSD, re-prep and reanalyze LCS, LCSD and all associated samples if sufficient sample volume is available. If corrective action not successful, initiate nonconformance report and qualify sample results. |
| Method Blank | Each batch or every 20 samples, whichever is sooner. | < Reporting Limit | Reanalyze along with associated samples, unless detects for same compounds found in blank are greater than 10X the concentration found in the blank. |
| Internal Standards | All standards, field and QC samples | +/- 40% area response from last acceptable calibration.<br>RT +/- 0.33 min (20 seconds) from last acceptable calibration. | Inspect system for malfunction. Reanalyze samples. Qualify data. |
| Sample Duplicate | Each batch or every 20 samples, if volume allows | Relative Percent Difference (RPD) ≤ 25% | Consult with PM. Reanalyze or qualify data. |

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**16.5) In-house LCS limits**

| Analyte | CAS # | In-House Lower Limit (%R) | In-House Upper Limit (%R) | Relative Percent Difference (%) |
|---|---|---|---|---|
| Dichlorodifluoromethane | 75-71-8 | 61 | 142 | 25 |
| Chlorodifluoromethane | 75-45-6 | 60 | 147 | 25 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | 76-14-2 | 71 | 141 | 25 |
| Chloromethane | 74-87-3 | 56 | 141 | 25 |
| n-Butane | 106-97-8 | 53 | 151 | 25 |
| Vinyl Chloride | 75-01-4 | 61 | 135 | 25 |
| 1,3-Butadiene | 106-99-0 | 58 | 139 | 25 |
| Bromomethane | 74-83-9 | 72 | 124 | 25 |
| Chloroethane | 75-00-3 | 68 | 130 | 25 |
| Isopentane | 78-78-4 | 56 | 150 | 25 |
| Bromoethene (Vinyl Bromide) | 593-60-2 | 75 | 125 | 25 |
| Trichlorofluoromethane | 75-69-4 | 70 | 129 | 25 |
| Pentane | 109-66-0 | 59 | 152 | 25 |
| EthylEther | 60-29-7 | 71 | 143 | 25 |
| Acrolein | 107-02-8 | 50* | 150* | 25 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 76-13-1 | 70 | 121 | 25 |
| 1,1-Dichloroethene | 75-35-4 | 68 | 120 | 25 |
| Acetone | 67-64-1 | 54 | 154 | 25 |
| Isopropyl Alcohol | 67-63-0 | 53 | 142 | 25 |
| Carbon Disulfide | 75-15-0 | 71 | 138 | 25 |
| 3-Chloropropene (Allyl Chloride) | 107-05-1 | 50* | 150* | 25 |

| | | | | |
|---|---|---|---|---|
| Acetonitrile | 75-05-8 | 60 | 154 | 25 |
| Methylene Chloride | 75-09-2 | 59 | 137 | 25 |
| tert-Butyl Alcohol | 75-65-0 | 66 | 132 | 25 |
| Methyl tert-Butyl Ether | 1634-04-4 | 70 | 127 | 25 |
| trans-1,2-Dichloroethene | 156-60-5 | 69 | 137 | 25 |
| n-Hexane | 110-54-3 | 63 | 138 | 25 |
| 1,1-Dichloroethane | 75-34-3 | 66 | 130 | 25 |
| Methyl Ethyl Ketone | 78-93-3 | 72 | 124 | 25 |
| cis-1,2-Dichloroethene | 156-59-2 | 72 | 121 | 25 |
| Tetrahydrofuran | 109-99-9 | 60 | 149 | 25 |
| Chloroform | 67-66-3 | 73 | 124 | 25 |
| 1,1,1-Trichloroethane | 71-55-6 | 72 | 127 | 25 |
| Cyclohexane | 110-82-7 | 76 | 124 | 25 |
| Carbon Tetrachloride | 56-23-5 | 71 | 133 | 25 |
| 2,2,4-Trimethylpentane | 540-84-1 | 68 | 131 | 25 |
| 1,2-Dichloroethene (total) | 540-59-0 | 73 | 126 | 25 |
| Benzene | 71-43-2 | 73 | 119 | 25 |
| 1,2-Dichloroethane | 107-06-2 | 68 | 135 | 25 |
| n-Heptane | 142-82-5 | 60 | 142 | 25 |
| Trichloroethene | 79-01-6 | 73 | 122 | 25 |
| Methyl Methacrylate | 80-62-6 | 73 | 129 | 25 |
| 1,2-Dichloropropane | 78-87-5 | 69 | 128 | 25 |
| 1,4-Dioxane | 123-91-1 | 66 | 129 | 25 |
| Dibromomethane | 74-95-3 | 68 | 126 | 25 |
| Bromodichloromethane | 75-27-4 | 75 | 127 | 25 |
| cis-1,3-Dichloropropene | 10061-01-5 | 74 | 125 | 25 |
| Methyl Isobutyl Ketone | 108-10-1 | 58 | 144 | 25 |
| n-Octane | 111-65-9 | 62 | 144 | 25 |
| Toluene | 108-88-3 | 75 | 122 | 25 |
| trans-1,3-Dichloropropene | 10061-02-6 | 74 | 128 | 25 |
| 1,1,2-Trichloroethane | 79-00-5 | 75 | 126 | 25 |
| Tetrachloroethene | 127-18-4 | 70 | 125 | 25 |
| Methyl Butyl Ketone | 591-78-6 | 57 | 143 | 25 |
| Dibromochloromethane | 124-48-1 | 73 | 125 | 25 |
| 1,2-Dibromoethane | 106-93-4 | 78 | 122 | 25 |
| Nonane | 111-84-2 | 70 | 131 | 25 |
| Chlorobenzene | 108-90-7 | 76 | 119 | 25 |
| Ethylbenzene | 100-41-4 | 74 | 122 | 25 |
| Xylene (m,p) | 1330-20-7 | 76 | 121 | 25 |
| Xylene (o) | 95-47-6 | 73 | 123 | 25 |
| Styrene | 100-42-5 | 74 | 125 | 25 |
| Bromoform | 75-25-2 | 53 | 149 | 25 |
| Cumene | 98-82-8 | 73 | 123 | 25 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 74 | 126 | 25 |
| Xylene (total) | 1330-20-7 | 75 | 122 | 25 |
| n-Decane | 124-18-5 | 68 | 134 | 25 |
| n-Propylbenzene | 103-65-1 | 73 | 127 | 25 |
| 1,2,3-Trichoropropane | 96-18-4 | 71 | 125 | 25 |
| 4-Ethyltoluene | 622-96-8 | 75 | 129 | 25 |
| 1,3,5-Trimethylbenzene | 108-67-8 | 72 | 126 | 25 |
| 2-Chlorotoluene | 95-49-8 | 74 | 126 | 25 |
| tert-Butylbenzene | 98-06-6 | 71 | 125 | 25 |
| 1,2,4-Trimethylbenzene | 95-63-6 | 71 | 129 | 25 |
| sec-Butylbenzene | 135-98-8 | 70 | 128 | 25 |
| 4-Isopropyltoluene | 99-87-6 | 68 | 130 | 25 |
| 1,3-Dichlorobenzene | 541-73-1 | 69 | 131 | 25 |
| 1,4-Dichlorobenzene | 106-46-7 | 67 | 132 | 25 |
| n-Undecane | 1120-21-4 | 62 | 136 | 25 |
| Benzyl Chloride | 100-44-7 | 60 | 136 | 25 |
| n-Butylbenzene | 104-51-8 | 65 | 137 | 25 |

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|---|---|---|---|---|
| 1,2-Dichlorobenzene | 95-50-1 | 68 | 129 | 25 |
| n-Dodecane | 112-40-3 | 50* | 150* | 25 |
| 1,2,4-Trichlorobenzene | 120-82-1 | 50* | 150* | 25 |
| 1,3-Hexachlorobutadiene | 87-68-3 | 58 | 130 | 25 |
| Naphthalene | 91-20-3 | 50* | 150* | 25 |
| 1,2,3-Trichlorobenzene | 87-61-6 | 50* | 150* | 25 |
| Propylene | 115-07-1 | 50* | 150* | 25 |
| Vinyl Acetate | 108-05-4 | 59 | 149 | 25 |
| Ethyl Acetate | 141-78-6 | 70 | 131 | 25 |
| Ethanol | 64-17-5 | 50* | 150* | 25 |

*These are poor performing compounds. Limits for poor performing compounds will be no wider than 50-150%.
**The limits in this table are those in effect as of the published date of this SOP. These limits are based on historical data and are subject to change. Current in-house limits are populated in the LIMS database. Contact a laboratory representative for the most current set of limits. Limit Ref: 2019CCTO15

### 16.6) Appendix A: Terms and Definitions

**Acceptance Criteria:** Specified limits placed on characteristics of an item, process or service defined in requirement documents.
**Accuracy:** The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator.
**Analyte:** The specific chemicals or components for which a sample is analyzed. (EPA Risk Assessment Guide for Superfund, OSHA Glossary).
**Batch:** Environmental samples that are prepared and/or analyzed together with the same process, using the same lot(s) of reagents. A preparation/digestion batch is composed of one to 20 environmental samples of similar matrix, meeting the above criteria. An analytical batch is composed of prepared environmental samples (extracts, digestates and concentrates), which are analyzed together as a group.
**Calibration:** a set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material and the corresponding values realized by the standards.
**Calibration Curve:** the graphical relationship between the known values or a series of calibration standards and their instrument response.
**Calibration Standard:** A substance or reference used to calibrate an instrument.
**Continuing Calibration Verification (CCV):** An analytical standard gas mixture containing all target analytes and internal standard compounds that is used to evaluate the performance of the instrument system with respect to a defined set of method criteria.
**Corrective Action:** the action taken to eliminate the cause of an existing nonconformity, defect or other undesirable occurrence in order to prevent recurrence.
**Cryogen:** A refrigerant used to obtain very low temperatures in the cryogenic trap of the analytical system. A typical cryogen is liquid nitrogen (bp -195.8°C) or liquid argon (bp -185.7°C).
**Demonstration of Capability (DOC):** procedure to establish the ability to generate acceptable accuracy and precision.
**Holding Time:** the maximum time that a sample may be held before preparation and/or analysis as promulgated by regulation or as specified in a test method.
**Initial Calibration:** Analysis of analytical standards for a series of different specified concentrations used to define the quantitative response, linearity and dynamic range of the instrument to target analytes.
**Initial Calibration Verification (ICV):** An analytical standard mixture containing all target analytes and internal standard compounds that are prepared from a source independent of the source of the initial calibration standards. The purpose of the ICV is to verify that the initial calibration is in control.
**Intermediate Standard:** a solution made from one or more stock standards at a concentration between the stock and working standard. Intermediate standards may be certified stock standard solutions purchased from a vendor and are also known as secondary standards.
**Internal Standards (IS):** Non-target analytes that are similar to the target analytes but are not expected to be found in environmental media (generally, isotopically labeled target analytes are used for this purpose). IS are added to every standard, quality control sample, and field sample at a known concentration prior to analysis. IS responses are used as the basis for quantitation of target analytes.
**Laboratory Control Sample (LCS):** A QC sample of known composition spiked with analytes of interest. The LCS evaluates method performance and ability to successfully recover target analytes from a clean matrix. LCS recovery is typically expressed as percent recovery and provides a measure of accuracy. A LCSD is a duplicate LCS prepared and analyzed from a separate canister to provide a measure of replicate precision.
**Method Blank (MB):** A canister of humidified ultra pure zero air that is treated exactly as a sample. The MBLK is used to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.
**Method Detection Limit (MDL):** the minimum amount of a substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific measurement system. The MDL is a statistical estimation at a specified confidence interval of the concentration at which relative uncertainty is ±100%. The MDL represents a range where qualitative detection occurs. Quantitative results are not produced in this range.
**Non-conformance:** an indication, judgment, or state of not having met the requirements of the relevant specification, contract or regulation.

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**Precision:** the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves.
**Quality Control Sample (QC):** a sample used to assess the performance of all or a portion of the measurement system.
**Reporting Limit (RL):** the level to which data is reported for a specific test method and/or sample.
**Stock Gas Mixture:** A Commercially purchased concentrated gas mixture containing one or more method analytes

### 16.7) Appendix B: Standard Preparation Tables

The standard formulations contained in this appendix are recommended and are subject to change. If the concentration or volume of any of the stock standard changes, the standard preparation instructions must be adjusted accordingly. See laboratory *SOP52272 Traceability, Handling, and Storage of Standards and Reagents* for further guidance on the preparation of standard solutions.

Prepare all standards using the McMillan Company 80SD mass flow controller. Prepare the standard in zero air, demonstrated to be analyte free. Store the standard at ambient temperature. Unless otherwise specified, assign an expiration date of 30 days from date of preparation unless the parent standard expires earlier, in which case, use the earliest expiration date.

**Intermediate Calibration Standard**

| Parent Standard | Vendor | Stock Standard Concentration (ppmv) | Volume Added (mL) | Final Volume (L) | Final Concentration (ppbv) |
|---|---|---|---|---|---|
| Custom Calibration Stock Standard | Spectra Gases Custom Made | 1.0 | 7500 | 37.5 | 200 |

Prepare in 15 L Summa Canister. Expiration Period 3months
This standard contains all the target analytes listed in the Routine Compound Table.

**Working Calibration Standards**

| Parent Standard | Calibration Standard | Parent Standard Concentration (ppbv) | Volume Added (mL) | Final Volume (L) | Final Concentration (ppbv) |
|---|---|---|---|---|---|
| Cal Standard 20 ppbv | Cal Standard 0.2 ppbv | 20 | 155 | 15.46 | 0.2 |
| Cal Standard 20 ppbv | Cal Standard 0.5 ppbv | 20 | 386 | 15.46 | 0.5 |
| Intermediate Calibration Standard | Cal Standard 5 ppbv | 200 | 386 | 15.46 | 5 |
| Intermediate Calibration Standard | Cal Standard 10 ppbv | 200 | 773 | 15.46 | 10 |
| Intermediate Calibration Standard | Cal Standard 15 ppbv | 200 | 1160 | 15.46 | 15 |
| Intermediate Calibration Standard | Cal Standard 20 ppbv | 200 | 1546 | 15.46 | 20 |
| Intermediate Calibration Standard | Cal Standard 40 ppbv | 200 | 3092 | 15.46 | 40 |

Prepare in 6 L Summa Canister Expiration Period 3 months
Each calibration standard contains all the analytes listed in the Routine Compound Table at the above concentrations.

**Intermediate ICV/LCS Standard**

| Parent Standard | Vendor | Stock Standard Concentration (ppmv) | Volume Added (mL) | Final Volume (L) | Final Concentration (ppbv) |
|---|---|---|---|---|---|
| ICV Stock Standard | Spectra Gases Custom Made | 1.0 | 7500 | 37.5 | 200 |

Prepare in 15L Summa Canister Expiration period 3 months
This standard contains all target analytes listed in Routine Compound Table.

**Working ICV/LCS Standard**

| Parent Standard | Calibration Standard | Stock Standard Concentration (ppbv) | Volume Added (mL) | Final Volume (L) | Final Concentration (ppbv) |
|---|---|---|---|---|---|
| Intermediate ICV/LCS Standard | ICV Standard 10 ppbv | 200 | 773 | 15.46 | 10 |

Prepare in 6L Summa Canister Expiration period 3 months
This standard contains all target analytes listed in Routine Compound Table.

| Calibration Level | Working Calibration Standard | Volume Analyzed (mL) | Concentration on Column (ppbv) |
|---|---|---|---|
| Calibration Level 1 | Cal Standard 0.2 ppbv | 40 | 0.04 |
| Calibration Level 2 | Cal Standard 0.2 ppbv | 200 | 0.2 |

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| | | | |
|---|---|---|---|
| Calibration Level 3 | Cal Standard 0.5 ppbv | 200 | 0.5 |
| Calibration Level 4 | Cal Standard 5 ppbv | 200 | 5 |
| Calibration Level 5 | Cal Standard 10 ppbv | 200 | 10 |
| Calibration Level 6 | Cal Standard 15 ppbv | 200 | 15 |
| Calibration Level 7 | Cal Standard 20 ppbv | 200 | 20 |
| Calibration Level 8 | Cal Standard 40 ppbv | 200 | 40 |
| ICV | Intermediate ICV 10ppb | 200 | 10 |

Prepare in 6L Summa Canister

Intermediate Ethanol Calibration Standard at 500ppbv/v

1. Fill a 44 ml VOA vial with VOA free water. Remove 197ul of water from the vial.
2. Add 197 ul of >99.5% Ethanol neat material
3. Cap and shake/roll vial for 1 minute
4. Inject 10ul of the prepared water/ethanol mix into a fully evacuated 15 liter summa canister
5. Pump the syringe plunger 5 times to insure complete transfer of material
6. Immediately fill the canister to 22 psig with zero air.

| Calibration Level | Working Calibration Standard | Volume added (mL) | Concentration on Column (ppbv) |
|---|---|---|---|
| Calibration Level 1 | Cal Standard 0.5 ppbv | 124 | 5 |
| Calibration Level 2 | Cal Standard 5.0 ppbv | 309 | 10 |
| Calibration Level 3 | Cal Standard 10ppbv | 464 | 15 |
| Calibration Level 4 | Cal Standard 15 ppbv | 618 | 20 |
| Calibration Level 5 | Cal Standard 20 ppbv | 1237 | 40 |
| Calibration Level 6 | Cal Standard 40 ppbv | 3092 | 100 |

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DC-SOP49966 Management, Retention, Storage and Archive of Data Records
EHS-SOP47863 Tracking and Collecting of Hazardous Waste
EHS-SOP48269 Procedure for Acceptance and Handling of USDA Regulated Domestic and Foreign Soil
EHS-SOP49961 Burlington Laboratory Corporate Safety Manual Addendum and Contingency Plan
EQ-SOP48255 Canister Cleaning, Certification and Sampling Kit Preparation
EQ-SOP52272 Traceability, Handling, & Storage of Standards & Reagents
ML-SOP49965 Procedures for Control Charts, Trend Analysis and In-House Limits
NC-SOP49967 Nonconformance and Corrective Action Procedures
QA-QM52862 Quality Assurance Manual
SM-SOP49959 Sample Management
TR-SOP52264 Employee Training and Analyst Demonstration of Competence
NDSC-ETHC-SOP43862 Manual Integrations
NDSC-US-EHS-QP46060 NDSC HSE Manual

End of document

**Version history**

| Version | Approval | Revision information | |
|---|---|---|---|
| 14 | 03.FEB.2022 | | |
| 15 | 21.APR.2023 | Conversion to HTML format and full review | |
| 16 | 29.JAN.2024 | SOP Review & Update. Due to database migration, some review by analysts and approval by supervisors are documented outside of D4 in QA SOP directory. | |

| | | |
|---|---|---|
| eurofins | Always check on-line for validity.<br>**Aqueous PFAS Prep by SPE and Analysis by LC-MS-MS by EPA 1633 and EPA 1633A** | Level:<br>**Work Instruction** |
| Document number:<br>**T-PFAS-WI69608** | | |
| Old Reference: | | |
| Version:<br>**5** | | Organisation level:<br>**5-Sub-BU** |
| Approved by: **TYZ8**<br>Effective Date: **11-MAR-2025** | Document users:<br>**5_EUUSLA_PFAS_Manager, 6_EUUSLA_PFAS_Analyst, 6_EUUSLA_PFAS_BKK_Data_Reviewers, 6_EUUSLA_PFAS_Data_Reviewers, 6_EUUSLA_PFAS_Management_Team, 6_EUUSLA_PFAS_Sample_Prep** | Responsible:<br>**5_EUUSLA_PFAS_Manager** |

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## Revision Log

| | **Revision:** 05 | **Effective date:** This version |
|---|---|---|
| **Section** | **Justification** | **Changes** |
| Revision Log | Formatting requirement | Removed revision logs up to the previous version |
| References | Enhancement | Added Revision A |
| Cross Reference | Enhancement | Added Prescreen SOP QC Rotation form |
| Reagents and Standards | Enhancement | Added sand |
| Procedure | Enhancement | Added 5% solids visual standard prep instructions. Added reconstitution standard prep instructions. Added pre-prep dilution instruction section. Added data types. Clarified Manual SPE steps. Added requirement for to rotate QC. |

| | **Revision:** 04 | **Effective date:** 31.OCT.2024 |
|---|---|---|
| **Section** | **Justification** | **Changes** |
| Revision Log | Formatting requirement | Removed revision logs up to the previous version |
| Apparatus and Equipment | Enhancement | Added missing vendors. Standards are stored in the dark. |
| Calibration | Enhancement | CCVs are run every 10 injections of field sample extracts |
| Reagents and Standards | Enhancement | Added missing vendors. |
| Procedure A, B, C | Clarification | Clarified prep procedure |
| Procedure D | Clarification | removed references to Cal0. Added additional ICB in sequence. Rearranged section. |
| Procedure E | Enhancement | Added section to address dilutions |
| QA/QC | Clarification | IAR ratio is based off the mid-point CCV standard |
| Attachments | Clarification | Updates to Att 01, 02, 11,12, 16 |

## Reference


1. USEPA Method 1633, Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS, January 2024.

2. USEPA Method 1633 Revision A, Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS, December 2024.

3. Chemical Hygiene Plan, current version.


## Cross Reference

| Document | Document Title |
|---|---|
| *T-PEST-WI9847* | Common Equations Used During Chromatographic Analyses |
| *QA-SOP11178* | Demonstrations of Capability |
| *QA-SOP11892* | Determining Method Detection Limits and Limits of Quantitation |
| *G-DC-FRM23907* | Redacted SOPs |
| *T-PFAS-WI21568* | Environmental Monitoring in the PFAS Lab |
| *T-PFAS-WI23588* | Preventative and Corrective Maintenance for the AB Sciex Liquid Chromatograph Mass Spectrometers (LC/MS/MS) |
| *T-PFAS-WI50447* | PFAS Prescreen Method in Water Samples Requesting PFAS by Isotope Dilution |
| *T-PFAS-FRM80101* | D4033 - QC Rotation Tracking |

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## Scope

This method is applicable for the determination of selected per- and polyfluorinated alkyl substances (PFAS) in aqueous samples to include non-potable waters and non-regulatory potable water when directed by the client. The compounds analyzed in this method are listed in the table below. The most current MDLs and LOQs are listed in the LIMS. Compounds other than those listed may be analyzed by client request.

| Analyte | Acronym | CAS# |
|---|---|---|
| Perfluorobutanoic acid | PFBA | 375-22-4 |
| Perfluoropentanoic acid | PFPeA | 2706-90-3 |
| Perfluorohexanoic acid | PFHxA | 307-24-4 |
| Perfluoroheptanoic acid | PFHpA | 375-85-9 |
| Perfluorooctanoic acid | PFOA | 335-67-1 |
| Perfluorononanoic acid | PFNA | 375-95-1 |
| Perfluorodecanoic acid | PFDA | 335-76-2 |
| Perfluoroundecanoic acid | PFUnA | 2058-94-8 |
| Perfluorododecanoic acid | PFDoA | 307-55-1 |
| Perfluorotridecanoic acid | PFTrDA | 72629-94-8 |
| Perfluorotetradecanoic acid | PFTeDA | 376-06-7 |
| Perfluorobutanesulfonic acid | PFBS | 375-73-5 |
| Perfluoropentanesulfonic acid | PFPeS | 2706-91-4 |
| Perfluorohexanesulfonic acid | PFHxS | 355-46-4 |
| Perfluoroheptanesulfonic acid | PFHpS | 375-92-8 |
| Perfluorooctanesulfonic acid | PFOS | 1763-23-1 |
| Perfluorononanesulfonic acid | PFNS | 68259-12-1 |
| Perfluorodecanesulfonic acid | PFDS | 335-77-3 |
| Perfluorododecanesulfonic acid | PFDoS | 79780-39-5 |
| 1H,1H,2H,2H-Perfluorohexane sulfonic acid | 4:2 FTS | 757124-72-4 |
| 1H,1H,2H,2H-Perfluorooctane sulfonic acid | 6:2 FTS | 27619-97-2 |
| 1H,1H,2H,2H-Perfluorodecane sulfonic acid | 8:2 FTS | 39108-34-4 |
| Perfluorooctanesulfonamide | PFOSA | 754-91-6 |
| N-methylperfluorooctane sulfonamide | NMeFOSA, N-MePFOSA | 31506-32-8 |
| N-ethylperfluorooctane sulfonamide | NEtFOSA, N-EtPFOSA | 4151-50-2 |
| N-methylperfluorooctanesulfonamidoacetic acid | NMeFOSAA | 2355-31-9 |
| N-ethylperfluorooctanesulfonamidoacetic acid | NEtFOSAA | 2991-50-6 |
| N-methylperfluorooctane sulfonamidoethanol | NMeFOSE, NMePFOSAE | 24448-09-7 |
| N-ethylperfluorooctane sulfonamidoethanol | NEtFOSE, NEtFOSAE | 1691-99-2 |

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| Analyte | Acronym | CAS# |
|---|---|---|
| Hexafluoropropylene Oxide Dimer Acid | HFPO-DA, GenX | 13252-13-6 |
| 4,8-Dioxa-3H-perfluorononanoic acid | ADONA | 919005-14-4 * |
| Perfluoro-3-methoxypropanoic acid | PFMPA, PFECA F | 377-73-1 |
| Perfluoro-4-methoxybutanoic acid | PFMBA, PFECA A | 863090-89-5 |
| Nonafluoro-3,6-dioxaheptanoic acid | NFDHA, PFECA B | 151772-58-6 |
| 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 9Cl-PF3ONS | 756426-58-1 |
| 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 11Cl-PF3OUdS | 763051-92-9 |
| 3-Perfluoropropylpropanoic acid | 3:3 FTCA | 356-02-5 |
| 3-Perfluoropentylpropanoic acid | 5:3 FTCA | 914637-49-3 |
| 3-Perfluoroheptylpropanoic acid | 7:3 FTCA | 812-70-4 |
| Perfluoro (2-ethoxyethane) sulfonic acid | PFEESA, PES | 113507-82-7 |
| Perfluoro-4-ethylcyclohexanesulfonic acid | PFECHS | 133201-07-7 |
| Perfluorobutylsulfonamide | FBSA | 30334-69-1 |
| Perfluorohexanesulfonamide | FHxSA | 41997-13-1 |

*CAS# for the free acid form of the analyte

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## Basic Principles

An aqueous sample is fortified with isotopically-labeled extraction standards and is passed through a solid phase extraction (SPE) cartridge to extract the analytes. The compounds are eluted from the solid phase with a combination of solvents. Carbon cleanup is performed during SPE. The extract is fortified with Isotopically-labeled injection internal standards. It is then analyzed by LC/MS/MS operated in negative electrospray ionization (ESI) mode for detection and quantification of the analytes. Quantitative analysis is performed using isotope dilution.

## Reference Modifications

This method is "performance-based," which means that modifications may be made without additional EPA review to improve performance (e.g., overcome interferences, or improve the sensitivity, accuracy, or precision of the results) provided that all performance criteria in this method are met. These options include alternative extraction, concentration, and cleanup procedures, and changes in sample volumes, columns, and detectors. Changes in performance, sensitivity, selectivity, precision, recovery, etc., that result from modifications must be documented, as well as how these modifications compare to the specifications in this method.

## Interferences

Compounds which have similar structures to the compounds of interest and similar molecular weights would potentially interfere. Method interferences may be caused by contaminants in solvents, reagents (including reagent water), sample bottles and caps, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. The analytes in this method can also be found in many common laboratory supplies and equipment, such as PTFE (polytetrafluoroethylene) products, LC solvent lines, methanol, aluminum foil, etc. A laboratory blank is performed with each batch of samples to demonstrate that the extraction system is free of contaminants.

## Precaution to Minimize Method Interference

1. LC system components contain many of the target analytes. To minimize the background PFAS peaks, PTFE solvent frits and tubing are replaced by PEEK™ solvent frits and tubing where

possible.

2. A precolumn, Proprietary Content, is installed before the injection valve to separate PFAS in standards/samples from those from the LC system and mobile phases.

3. All part of the SPE manifold must be cleaned as per *T-PFAS-WI21568*.

## Safety Precautions and Waste Handling

See *Chemical Hygiene Plan* for general information regarding employee safety, waste management, and pollution prevention.

The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined. PFOA has been described as "likely to be carcinogenic to humans". Each chemical should be treated as a potential health hazard and exposure to these chemicals should be minimized.

Exposure to these chemicals must be reduced to the lowest possible level by whatever means available, such as fume hoods, lab coats, safety glasses, and gloves. Gloves, lab coats, and safety glasses should be worn when preparing standards and handling samples. Avoid inhaling solvents and chemicals and getting them on the skin. Wear gloves when handling neat materials. When working with acids and bases, take care not to come in contact and to wipe any spills. Always add acid to water when preparing reagents containing concentrated acids.

All laboratory waste is accumulated, managed, and disposed of in accordance with all Federal, State, and local laws and regulations. All solvent waste and extracts are collected in approved solvent waste containers in the laboratory and subsequently emptied by personnel trained in hazardous waste disposal into the lab-wide disposal facility. HPLC vials are disposed of in the lab container for waste vials, and subsequently lab packed. Any solid waste material (disposable pipettes and broken glassware, etc.) may be disposed of in the normal solid waste collection containers.

## Personnel Training and Qualifications

All personnel performing this procedure must have documentation of reading, understanding, and agreeing to follow the current version of this SOP and an annual documented Demonstration of Capability (DOC).

Each chemist performing the extraction must work with an experienced employee for a period of time until they can independently perform the extraction. Also, several batches of sample extractions must be performed under the direct observation of another experienced chemist to assure the trainee is capable of independent preparation. Proficiency is measured through a documented Initial Demonstration of Capability (IDOC).

Each LC/MS/MS analyst must work with an experienced employee for a period of time until they can independently calibrate the LC/MS/MS, review and process data, and perform maintenance procedures. Proficiency is measured through a documented Initial Demonstration of Capability (IDOC).

The IPR (IDOC) and the DOC consist of 4 laboratory control samples (or alternatively, one blind sample for the DOC) that are spiked at the LCS level and carried through all steps of the extraction and analysis. Using results of the set of four analyses, compute the average percent recovery and the relative standard deviation (RSD) of the concentration for each analyte.

- For each target, the RSD and percent recovery must meet the criteria in Table 5. If any individual RSD exceeds the precision limit or any individual percent recovery falls outside the range for recovery for a target, system performance is unacceptable for that compound. Correct the problem and repeat the test.

- For each EIS and NIS, the percent recovery must meet the criteria defined in Table 6. There are is no RSD criteria for the EIS or NIS. If any individual percent recovery falls outside the range for an EIS or NIS, system performance is unacceptable for that compound. Correct the problem and repeat the test.

See *QA-SOP11178* for additional information on IDOC and DOC.

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## Sample Collection, Preservation, and Handling

A. Sample Collection

The samples are collected in 125-mL HDPE containers. All sample containers must have linerless HDPE or polypropylene caps. Keep the sample sealed from time of collection until extraction. The entire aqueous sample that is collected must be prepared and analyzed, and subsampling must be avoided whenever possible.

**NOTE:** PFAS contamination during sampling can occur from a number of common sources, such as food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will aid in minimizing this type of accidental contamination of the samples.

B. Sample Storage and Shipment

1. Samples must be chilled during shipment and must not exceed 6°C during the first 48 hours after collection. Sample temperature must be confirmed to be at 0° to 6°C when the samples are received at the laboratory.

2. Samples stored in the lab must be held at a temperature of 0° to 6°C, not frozen, and protected from light until extraction. Alternatively, to meet project requirements, samples may be stored at less than or equal to -20°C and protected from light until extraction.

3. Water samples must be extracted within 28 days when stored at a temperature of 0° to 6°C, not frozen, and protected from light. Water samples must be extracted within 90 days when stored at a temperature less than or equal to -20°C and protected from light.

4. Extracts must be analyzed within 28 days after extraction when stored at a temperature of 0° to 6°C, not frozen, and protected from light. Extracts must be analyzed within 90 days after extraction when stored at a temperature less than or equal to -20°C and protected from light.

## Apparatus and Equipment

A. Apparatus

1. 125-mL HDPE bottles. CapSure Leak-Proof bottles, Catalog No. 0125-1060-QC or equivalent.

   Note: One bottle per lot must be tested and demonstrated to be PFAS-free at or below the laboratory's MDLs for all target analytes. See *T-PFAS-WI21568* for additional details.

2. Centrifuge tubes, 15-mL conical polypropylene with polypropylene screw caps. Fisher Scientific, Catalog No. 05-539-5 or equivalent.

3. HDPE bottles for extraction fluid storage, 1L. Environmental Sampling Supply, Catalog No. 1000-1902-PC or equivalent.

4. Analytical Balance – Capable of weighing to 0.0001 g

5. Top-Loading Balance – Capable of weighing to 0.01 g

6. Solid phase extraction (SPE) Proprietary Content.

7. GCB filter cartridge, Proprietary Content

8. Large-volume SPE Reservoir, 25-mL. Millipore-Sigma, Product No. 54258-U or equivalent.

9. SPE Tube Adapter. Millipore-Sigma, Catalog No. 57020-U or equivalent.

10. SPE vacuum extraction manifold – "Resprep" 24-port manifold. Restek, Catalog No. 26080 or equivalent.

11. Polypropylene SPE delivery needles. Agilent, Catalog No. 12234511 or equivalent.

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12. Centrifuge, capable of a minimum rotational force of 3500 rcf, rotor radius 19.5 cm. Sorvall ST4 Plus-MD; Fisher Scientific, Catalog No. 75009510 or equivalent.

13. Auto Pipettes, Eppendorf Repeater, capable of accurately dispensing 10- to 1000-µL. Fisher Scientific, Catalog No. 14-287-150 or equivalent.

14. Polypropylene pipette tips, 0.1-200 µL. Fisher Scientific, Catalog No. 02-681-135 or equivalent.

15. Polypropylene pipette tips, 100-1000 µL. Fisher Scientific, Catalog No. 02-707-507 or equivalent.

16. Polypropylene pipette tips, 1 – 10 mL. Eppendorf, Catalog No. 022492098 or equivalent.

17. Pipettes, disposable transfer. Fisher Scientific, Catalog No. 13-711-7M or equivalent.

18. Vortex mixer, variable speed. Fisher Scientific or equivalent.

19. N-Evap sample extract concentrator with $N_2$ supply and water bath for temperature control. Organomation, Inc., Catalog No. 11250 or equivalent.

20. Reagent Water Purification System: Capable of producing ultrapure "Type 1/Milli-Q"-grade water from in-house deionized water system. Millipore SAS, Catalog No. FTPF08831.

21. SureStart Polyspring inserts. Fisher Scientific, Catalog No. 03452340 or equivalent.

22. Short-Cap Vial with Grad Marking Spot, 9-425 Screw-Thread, 2.0 mL, 9 mm, Clear. Restek, Catalog No. 21141 or equivalent.

23. Short Screw Caps, Polypropylene, Screw-Thread, PTFE/Silicone Septa, Blue, Preassembled, 2.0 mL, 9 mm. Restek, Catalog No. 24485 or equivalent.

24. Centrifuge tubes, 50-mL conical polypropylene with polypropylene screw caps. Fisher Scientific, Catalog No. 06-443-21 or equivalent.

25. Polypropylene bottles for standard storage, 4-mL. Fisher Scientific, Catalog No. 02-923-11E or equivalent.

26. Stainless steel spatula/scoop set. Bel-Art SP Scienceware, Product No. 11-865-130 or equivalent.

27. pH paper, Hydrion, range 5.5-8.0. Fisher Scientific, Catalog No. 14-853-275 or equivalent.

28. Disposable syringe filter, 25-mm, 0.2µm Nylon membrane, PALL/Acrodisc or equivalent.

29. Wheaton Bottle, 15-mL, narrow mouth, HDPE, Leak resistant; DWK Life Sciences, Catalog No. 209044SP or equivalent.

30. Graduated Medicine Cups, Plastic, 30-mL. Medline Industries, Catalog No. DYND8000 or equivalent.

31. Mobile phase bottles, 5 L. Fisher Scientific, Catalog No. 064141F or equivalent.

B. Equipment

1. AB Sciex Triple Quad 5500/5500+ Turbo V Ion Source or equivalent.

   ExionLC Controller
   ExionLC AC Pump
   ExionLC AC Autosampler
   Exion AC Column Oven
   Data system – Analyst 1.6.3

2. AB Sciex Triple Quad 7500 QTRAP Ready or equivalent.

   Shimadzu DGU-405 Degasser
   Shimadzu LC-40D XR Pump A
   Shimadzu LC-40D XR Pump B
   Shimadzu SIL-40C XR Autosampler

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Shimadzu CBM-40 Controller
Shimadzu CTO-40C Column Oven
Data system – Sciex OS (Version 3.1.6.44)

3. Automated extractor, Proprietary Content or equivalent

4. HPLC columns

   a. Analytical column: Proprietary Content Catalog No. 00B-4439-Y0 or equivalent.
   b. Pre-column: Proprietary Content Catalog No. 00D-4435-Y0 or equivalent.

## Reagents and Standards

All solvents, acids, and bases are stored in glass bottles in flammable proof cabinets or pressure resistant steel drums. Solvents, acids, and bases are stored at ambient temperature for up to 1 year. All non-solvents are stored according to manufacturer's storage conditions.

A. Reagents

1. Methanol (MeOH), "Chromasolv LC-MS" grade. Honeywell, Catalog No. 34966-4X4L or equivalent.

2. Acetonitrile (ACN). J.T. Baker, Catalog No. 9012-03 or equivalent.

3. Ammonium acetate. Sigma Aldrich, Catalog No. 431311-250G or equivalent. Store at 0-6°C.

4. Proprietary Content.

   a. Proprietary Content.

   b. Proprietary content.

   c. Proprietary Content.

5. 30:70 (v/v) Methanol:Water – Add methanol (300 mL) to water (700 mL). Store at room temperature. Replace after 1 month.

6. Methanol with 5% water - Add reagent water (50 mL) to methanol (950 mL). Store at room temperature. Replace after 1 month.

7. Formic Acid, ACS-grade. Sigma, Catalog No. 33015-1L or equivalent.

   a. Formic acid (aqueous, 0.1 M) - Dissolve formic acid (4.6 g or 3.8 mL) in reagent water (1 L). Store at room temperature. Replace after 2 years.

   b. Formic acid (aqueous, 0.3 M) - Dissolve formic acid (13.8 g or 11.3 mL) in reagent water (1 L). Store at room temperature. Replace after 2 years.

   c. Formic acid (aqueous, 5% v/v) - Mix 5 mL formic acid with 95 mL reagent water. store at room temperature. Replace after 2 years.

   d. Formic acid (aqueous, 50% v/v) - Mix 50 mL formic acid with 50 mL reagent water. Store at room temperature. Replace after 2 years.

8. Mobile Phase A: Proprietary Content. Store at room temperature for up to 2 months. Different volumes can be prepared as long as final concentrations are equivalent.

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9. Mobile Phase B: Proprietary Content into a 2-L glass mobile phase bottle. Store at room temperature for up to 2 months.

10. Sand - Sigma-Aldrich, Part No. 274739-5Kg or equivalent.

B. Standards

Standards are prepared using calibrated pipettes, polypropylene microcentrifuge tubes, and polypropylene bottles to create solutions at desired concentrations. The concentrated solution is injected below the surface of the diluting solvent. After preparation is completed, standards should be vortexed to ensure complete mixing. Measurement of volumes less than 5 µl should be avoided in routine production operations.

All stock, intermediate and spiking solutions are prepared using methanol. All initial calibration, initial calibration verification, and linear branched working standard solutions are prepared using Proprietary Content.

All diluted solutions must be stored in HDPE containers that have been thoroughly rinsed with methanol.

Stock standard and intermediate standard solutions are stored in the dark in the refrigerator in labeled polypropylene screw-top vials, polypropylene bottles, or polypropylene centrifuge tubes.

Expiration dates are managed through LIMS Reagent module. Solutions transferred from sealed glass ampules to screw-capped vials are given expiration dates of 1 year from the date opened or the expiration date provided by the vendor, whichever occurs sooner. Intermediate solutions are given an expiration date of 6 months from the preparation date, or the expiration date from the ampule provided by the vendor, whichever occurs sooner. The ampules and transferred solutions are stored in the refrigerator in the dark.

Working native and labeled (extraction surrogate and internal standard) compound spiking solutions are given an expiration date of 6 months, or the expiration date of the solutions used to prepare the working solution, whichever occurs sooner. The solutions are stored in labeled polypropylene screw-top vials in the refrigerator in the dark. When these solutions are prepared they must be tested prior to use in the PFAS extraction lab and verified monthly until they are consumed by operations or expire. Records of the standard verification are maintained by the laboratory. Prior to use, the working spiking solution should be evaluated against recovery windows of 85-115% for all compounds that will be analyzed using that solution. Should a standard fail to meet these criteria, the data must be reviewed by departmental management for acceptability and/or corrective action.

Working initial calibration solutions are given an expiration date of 6 months, or the expiration date of the solutions used to prepare the working initial calibration solution, whichever occurs sooner.

The primary/preferred standard vendor is Wellington Laboratories, Inc. Ontario, Canada. Listed catalog numbers are taken from Wellington product lists. Equivalent standards may be substituted, if the listed standards are unavailable.

The solution concentration listed is as presented on the certificate of analysis and includes adjustment for purity and the salt form of the compound used.

The concentrations referenced for the sulfonate salts, (for example PFBS, PFHxS and PFOS) have already been corrected to the acid form by the standards supplier as noted in the example Certificate of analysis (CofA). See *Attachment 04*. If the compound purity is assayed to be 98% or greater, weight can be used without correction to calculate concentrations.

Log purchased standards into LIMS Reagent. Select the solution category SOURCE for purchased mixes and/or single-compound ampules. LIMS Reagent system will assign formatted names to the purchased standard solutions. The automatically-generated name can be overwritten with a manually created name if desired. Use labels printed through the LIMS Reagent to identify and track standard solutions after transfer from original ampule to storage vial. The CofA for the ampulated stock standard is attached in LIMS Reagent for reference.

Standards are prepared by transferring a known quantity of Standard to a final volume of solvent. Standard Preparation is documented in LIMS Reagent. Solutions are stored by Type in LIMS Reagent,

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i.e., INTERMEDIATE=working solutions and intermediate standards and SOURCE=stocks (ampulated solutions). Each Standard is given a unique name.

The following attachments provide examples of standard preparation and purchasing information. Refer to the documentation in LIMS Reagent for standards preparation information.

*Attachment 05* - 1633 Native PFAS Intermediate A
*Attachment 06* - 1633 Native PFAS Intermediate B
*Attachment 07* - 1633 Native PFAS CAL8 Intermediate
*Attachment 08* - 1633 Extracted Internal Standard Intermediate
*Attachment 09* - 1633 Non-Extracted Internal Standard Intermediate
*Attachment 10* - 1633 TOP Surrogate Intermediate
*Attachment 11* - 1633 ICAL Standard Preparation Scheme
*Attachment 12* - 1633 Initial Calibration Standard Concentrations
*Attachment 13* - Bile Salts Stock Solution
*Attachment 14* - Bile Salts Intermediate
*Attachment 15* - Bile Salts Working Solution
*Attachment 16* - 1633 WDM Standard
*Attachment 17* - 1633 Native Mid-Level Spike
*Attachment 18* - 1633 Native Low-Level Spike
*Attachment 19* - 1633 ICV Working Standard
*Attachment 20* - 1633 Purchased/Ampulated Standards

## Calibration

A. Mass Calibration

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| Calibration - at least annually or as recommended by the instrument manufacturer, whichever is more frequent, to maintain instrument sensitivity and stability. | Per manufacturer recommendations. Optimize the precursor and product ions in *Attachment 01* | Repeat as needed. |
| Verification - on an as-needed basis (e.g., QC failures, ion masses fall outside of the required mass window, major instrument maintenance, or if the instrument is moved) prior to the analysis of any standards and samples and after each subsequent mass calibration. | Resolution must meet manufacturer recommendations.<br><br>The mass assignments must be within ±0.2 amu of the values shown in *Attachment 01*. | Recalibrate as needed. Otherwise, proceed to ICAL. |

B. Chromatographic conditions

The mass spectral acquisition rate must include a minimum of 10 spectra scans across each chromatographic peak. See the AB Sciex (5500/5500 Plus/7500) Acquisition, Quantitation, Gradient, and Detector Condition files for the most up to date chromatographic conditions. An example acquisition method and chromatographic conditions are shown in *Proprietary* Content. Modifications to these conditions can be made at the discretion of the analyst to improve resolution or the chromatographic process. All injections must use the same parameters as used in the ICAL.

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C. Retention Time Calibration

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| once per ICAL and at the beginning of the analytical sequence | The position of all target, EIS, and NIS peaks shall be set using the midpoint standard of the ICAL curve when ICAL is performed. When an ICAL is not performed, the initial CV retention times or the midpoint standard of the ICAL curve can be used to establish the RT window position.<br><br>The RTs for the target analytes, EIS, and NIS compounds must fall within 0.4 minutes of the predicted retention times from the midpoint standard of the ICAL or initial CV, whichever was used to establish the RT window position for the analytical batch. All branched isomer peaks identified in either the calibration standard or the qualitative (technical grade) standard also must fall within 0.4 minutes of the predicted retention times from the midpoint standard of the ICAL or initial CV.<br><br>For all target analytes with exact corresponding isotopically labeled analogs, target analytes must elute within 0.1 minutes of the associated EIS compound. | Recalibrate |

D. Initial Calibration

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| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| Prior to the analysis of samples, and after the mass calibration verification has met all criteria<br><br>whenever the laboratory takes an action that changes the chromatographic conditions or might change or affect the initial calibration criteria<br><br>when either the CV or Instrument Sensitivity Check (ISC) acceptance criteria have not been met. | A minimum of six calibration standards are required when using an average or linear curve fit. A minimum of seven calibration standards are required for a second-order curve fit (quadratic). The lowest standard must be at or below the RL. In general, Cal1 (at the RL), Cal2, Cal3, Cal4, Cal5, Cal6, Cal7, and Cal8 are included in the initial calibration.<br><br>S/N ratio for the lowest standard within the quantitation range must be greater than or equal to 3:1 for quantification ions and the confirmation ions, or greater than or equal to 10:1 if the analyte only has a quantification ion.<br><br>To use Average Response Factor:<br>• %RSD for the response factors is less than or equal to 20%<br>• if greater than 20%, try a Linear Regression.<br><br>To use Linear Regression with a concentration weighing factor of 1/x:<br>• The %RSE for all method analytes must be less than or equal to 20%.<br>• if greater than 20%, try a Quadratic fit.<br><br>To use Quadratic fit with a concentration weighing factor of $1/x^2$:<br>• The %RSE for all method analytes must be less than or equal to 20%.<br><br>For all curve fits, each calibration point is calculated back against the curve. The back calculated concentration for each calibration point must be within ±30% of its true value. | If the criteria are not met, the source of the problem must be determined and corrected.<br><br>Situations may exist where the initial calibration can be used. In those cases, the data will be reported with a qualifying comment. |

E. Initial Calibration Verification (ICV)

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| After ICAL prior to analyzing samples | ICV must be prepared from a second source. If a second source is not available, a separate preparation from the same stock (including intermediates) by a second analyst may be used.<br><br>The calculated amount for each analyte must be within ±30% of the true value. | If this criteria is not met, re-inject or remake the standard. If the criteria is still not met, recalibration is necessary. Instrument maintenance may be needed prior to recalibrating. |

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F. Calibration Verification (CV)

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| Once the calibration curve has been established, the continuing accuracy must be verified by analysis of a continuing calibration verification (CCV) standard at the beginning of each analytical sequence, every ten injections of a field sample extract, and at the end of the analytical sequence. | The calculated amount for each native in the CCV standard must be within ±30% of the true value.<br><br>The absolute areas of the injection internal standard must be greater than 30% of the average areas measured during the initial calibration. | Samples that are not bracketed by acceptable CCV analyses must be reanalyzed. The exception to this would be if the CCV recoveries are high, indicating increased sensitivity, and there are no positive detections in the associated samples, the data may be reported with a qualifying comment. The source of the problem must be determined and the system recalibrated before continuing sample analysis. |

## Procedure

Data Types are included in brackets. If a Data Type is not needed (for example, no reagents were needed for pH adjustment), "NA" may be used.

## A) Sample Preparation and Prescreen

1. Bring all samples to room temperature and vortex prior to starting. Thaw frozen samples in room temperature water. Weigh sample container with contents on a calibrated top loading balance to 0.1g and record the first reading in the automated prep entry system [*Gross Weight*].

2. Sample Volume:

    a. For all samples, the full bottle must be extracted. The sample must remain in the original sample container until after spiking solutions have been added.

    b. If a limited sample volume is submitted, spike sample in original container, then add Milli-Q water to bring to final volume of 125 mL prior to SPE extraction (see Procedure A.7 for spiking details).

    c. All water samples should be evaluated for Total Suspended Solids (TSS) by visual inspection. Although the full container volume of sample should be extracted, this method is applicable to aqueous samples containing up to 50 mg of suspended solids. For samples containing > 50 mg of suspended solids, or when unavoidable due to high levels of PFAS, smaller samples volumes may be analyzed. However, ultimately, visual inspection and analyst experience are all used to determine the volume to be used to extract the sample.

    d. TSS above 400 mg/L will likely require sample manipulation to effectively mitigate impacts on the solid phase extraction process and there may be impacts on data quality objectives. Every effort should be made in the field to properly collect samples with less than 50 mg of suspended solids. If sample dilution is required, this will result in elevated final reporting limits.

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In most cases a dilution factor less than 5X is sufficient which would result in RLs being elevated by up to 5X. Eurofins analyst will conduct a visual inspection of the sample and use professional judgement to determine the necessary dilution. If sample dilution is not acceptable for the project DQOs or significantly high TSS is anticipated e.g. >2,000 mg/L in a 125mL sample, the laboratory will centrifuge the sample according to the following procedure. This approach must be agreed to as part of the project DQOs up front and the analyst will proceed accordingly without further client consultation. Centrifugation can only be performed if the solids have high enough density to form a pellet or mass at the bottom of the bottle. Please note, not all samples will form such a mass, and the solids will not be extracted as a separate sample. With the use of isotope dilution, once labeled surrogates (EIS) are added to the sample, they distribute between all phases of the sample system (solid fraction, aqueous fraction, air/water interface, and water/container interface). These surrogates (EIS) are then used for recovery correction and the total PFAS concentration can be accurately reported for the whole sample, provided surrogate (EIS) recoveries are acceptable. A potential outcome of this approach is poor recoveries of the labeled surrogates (EIS) that will preferentially sorb to the particulates leading to qualified QC in the final results.

Note: Fill a 125-mL HDPE bottle with 125 mL of Milli-Q water. Using a calibrated balance, add 6.25 g of sand to the bottle to create a 5% (w/v) standard. Record the preparation of this standard in the reagent prep logbook and replace annually.

e. All attempts will be made to use the full volume of sample. If multiple bottles sizes were sent from the field, the appropriate sample volume will be processed. In cases where this is not possible, the sample is first gently swirled and then subsampled for pre-dilution. The sample aliquot is placed into a clean 125-mL HDPE container, brought up to 125 mL with Milli-Q water, and vortexed for 30 seconds to mix. Continue the extraction process with Procedure A.4. Clients will be notified, and the laboratory will proceed with the pre-dilution as necessary.

3. Use a 125-mL HDPE bottle [*QCBottleLotID*] for the Method Blank (MB), the Laboratory Control Sample (LCS), and the Low-level Laboratory Control Sample (LLCS). If the client has not requested an MS/MSD, an LCSD must be prepared as well. Fill each bottle with 125 mL of Milli-Q water. Record "150.0 g" as the gross weight and "25.0 g" as the tare weight for the batch QC samples.

4. Check that the pH is 6.0 ± 0.5. If necessary, adjust the pH with 50% formic acid or 30% ammonium hydroxide (or with 5% formic acid or 3% aqueous ammonium hydroxide). **NOTE: Never put pH test strips into the sample.** Record the acid or base lot number [*RgtID*] and amount used [*Amt*]. Use a disposable pipette [*TranferPipID*] to place a few drops of sample onto the pH paper [*pHIndID*].

5. If a client requests centrifugation, see T-PFAS-FRM74046.

6. Bring all spike solutions to room temperature and vortex for 30 seconds prior to use.

7. Spike QC and all samples with 25 µL of 1633_125 EIS Intermediate (1633_125_SS_#####). Spike LCS/LCSD/MS/MSD with 50 µL of 1633_125 Native Spike Mid (1633_125_MS_M_#####). Spike LLCS with 40 µL of 1633_125 Native Spike Low (1633_125_MS_L_#####). Vortex/Shake containers to mix thoroughly. Let samples equilibrate for 30 minutes after spiking. Document the technician who spike the sample [*Analyst ID - Reagent Drop*] as well as the spike witness [*Analyst ID - Reagent Drop Witness*].

8. Continue to either Manual SPE (Procedure B) or Automated SPE (Procedure C.)

## B) Manual Solid Phase Extraction (SPE)

1. Before use, rinse each port of the SPE manifold [*ManifoldID*] with several milliliters of the following solvents in order:

- Proprietary
- Proprietary
- Proprietary
- Proprietary

2. Label each SPE cartridge [*SPECartType*] and *SPECartLot#*] to correspond with each associated sample/QC piece and attach to a rinsed SPE port. Record the SPE port number for each sample/QC piece on the batchlog.

3. Condition each SPE cartridge with the following reagents in the following order without allowing the cartridges to go dry. Do not use vacuum during this step.

   a. Proprietary Content
   b. Proprietary Content
   c. Proprietary Content
   d. Proprietary Content

4. Label each sample bottle, cap, 15-mL centrifuge tube, and reservoir with the same number to ensure samples are not inadvertently switched during the extraction procedure (i.e.; 1,1,1; 2,2,2; 3,3,3; etc.).

5. Attach the labeled 25-mL SPE reservoir to each cartridge. Load the QC and samples to their respective cartridges. Allow sample to pass through. The drip rate should be approximately 3-5 drops per second.

6. After sample/QC has passed through, rinse the walls of the sample bottle with 5 mL reagent water. Add to cartridge and allow to pass through using vacuum. Then repeat.

7. After Milli-Q water has passed through, rinse the walls of the sample/QC bottle with 5 mL 30:70 (v/v) methanol:water [*RinseSolventName* and *RinseSolventLot*]. Add to cartridge and allow to pass through using vacuum. Then repeat.

8. Apply full vacuum to dry the cartridges until visibly dry (at least 10 minutes). Discard the rinse solution.

   NOTE: If a given sample is too problematic to extract using one cartridge with full vacuum, a second cartridge is created following Procedure B.2-4 above.

9. Place each empty sample bottle on the top-loading balance and weigh. Record the second reading in the automated prep entry system. The prep entry system will calculate the sample weight to 0.1g. Record the calculated weight as the sample volume on the batchlog.

10. Proprietary Content to the bottom of each SPE cartridge.

11. Place labeled 15-mL polypropylene centrifuge collection tubes [*CentrifugeTube*]under each respective SPE cartridge ensuring the delivery needles to do not touch the sides of the tubes.

12. Rinse the inside of each empty sample/QC bottle with Proprietary Content. Add to reservoir and cartridge.

13. Apply a slight vacuum to the manifold in order to reclaim as much solvent as possible from the SPE cartridges.

14. Disconnect the cartridge/adapter from the manifold. Remove the collection tubes.

    Note: If a second cartridge was required, the eluent from the second cartridge is added to the first cartridge eluent with a methanol rinse and then blown down to 5 mL on an N-EVAP prior to step 16 below.

15. Bring each sample extract to final volume 5 mL using methanol with Proprietary Content. Cap and vortex for 30 seconds to mix.

16. Proceed to Procedure D - Vialing and Addition of Internal Standard

## C) Automated Solid Phase Extraction (SPE) by Proprietary

This procedure can be used in place of the manual extraction described in Procedure B.

Note: all samples must be prescreened prior to use of the Proprietary to avoid carryover and contamination.

1. Label each SPE cartridge [*SPECartType* and *SPECartLot#*] to correspond with each associated sample/QC piece and attach to a rinsed SPE port. Record the SPE port number for each sample/QC piece on the batchlog.

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2. Check to make sure all reagent bottles are filled and that reagents are not expired. Record Proprietary ID and reagent lot numbers. [*ManifoldID*, *SPE_Cond#1ID*, *SPE_Cond#2ID*, *RinseSolventName*, *RinseSolventLot*, *SolventName*, and *SolventLot*]

3. Label each sample bottle, cap, and Proprietary cartridge with the same number to ensure samples are not inadvertently switched during the extraction procedure (i.e.; 1,1,1; 2,2,2; 3,3,3; etc.).

4. Select "Proprietary" from the drop down menu to start the cleaning cycle prior to SPE. Make sure the "Clean" cartridges and bottles are attached for this cycle.

5. Remove "Clean" cartridges and attach the labeled cartridges that will be used when running the samples when the system cleaning is complete. Disconnect the "Clean" bottles. Attach the labeled sample bottles by twisting the bottles and not the cap. Attach a filter [*FilterEXPID*] to each cap. Place sample bottles upside down in corresponding numbered location on shaker. Poke two holes into the lip of each bottle. Load labeled centrifuge tubes [*CentrifugeTube*] in the moving tray beneath the cartridges.

6. Select "Proprietary" from the drop down menu and press the green check mark to start the procedure. The Proprietary program is described in *Proprietary*.

7. When the cycle pauses after cartridge drying, attach Proprietary to the bottom of each SPE cartridge and uncapped tubes in the moving tray.

8. Once the cycle is complete, remove centrifuge tubes and discard the used cartridges and bottles. Reattach "Clean" bottles and cartridges, select "Proprietary" from menu, select "start". This must be done between each batch and at the beginning and the end of the day. At the end of the day, run the "Proprietary" clean cycle.

9. Place each empty sample bottle on the top-loading balance and weigh. Record the second reading in the automated prep entry system [*TareWeight*]. The prep entry system will calculate the sample weight to 0.1g. Record the calculated weight as the sample volume on the batchlog.

10. The batch QC must be rotated among the Proprietary ports so that all the ports are covered over the course of a quarter. Use form *T-PFAS-FRM80101* for tracking.

11. Bring each sample extract to final volume 5 mL using methanol with Proprietary. Cap and vortex for 30 seconds to mix.

12. Proceed to Procedure D - Vialing and Addition of Internal Standard

## D) Vialing and Addition of Internal Standard

**Note: The instrument lab chemist performs these steps.**

1. Determine the sample aliquot to use for analysis. Add Internal Standard Spike Solution (1633_125_IS_V_#####) to the corresponding labeled autosampler vial [*VialLot#*].

    - 10 µL IS into a 190 µL aliquot of sample (final volume = 200 µL)
    - 25 µL IS into a 475 µL aliquot of sample (final volume = 500 µL)
    - 50 µL IS into a 950 µL aliquot of sample (final volume = 1000 µL)

2. Transfer an aliquot of the final extract (as determined in Step 1 above) to the corresponding labeled auto-sampler vial.

3. Cap the auto-sampler vial [*Caps*] and vortex for 30 seconds. Samples are now ready for analysis.

4. Cap the centrifuge tube. The remaining centrifuged extracts are stored in the refrigerator for dilution or reinjection if needed.

## E) LC/MS/MS Analysis

1. Load sample vials containing calibration standards, quality control samples, and sample extracts into the autosampler tray. Allow the instrument adequate time to equilibrate to ensure the mass

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spec and LC have reached operating conditions (approximately 5 minutes) before the first injection. Analyze several solvent blanks to clean the instrument prior to sample acquisition.

2. Bring standards to room temperature and vortex before calibrating. To eliminate the need for a qualitative identification standard, the calibration standards contain the branched isomers for PFHxS, PFOS, NMeFOSAA, NEtFOSAA, PFNA, PFOA, PFOSA, NEtFOSE, NMeFOSE, NEtFOSA, and NMeFOSA. Mass Transitions are defined in *Attachment 01*.

Example Initial Calibration Sequence (LIMS ID):

Instrument Blank to clean instrument (at least 3)
1. CAL 1 (IC)
2. CAL 2 (IC)
3. CAL 3 (IC)
4. CAL 4 (IC)
5. CAL 5 (ICISAV)
6. CAL 6 (IC)
7. CAL 7 (IC)
8. CAL 8 (IC)
9. Instrument Blank (ICB)
10. Initial Calibration Verification (ICV)
11. Bile Salts Standard (WDM)

3. Isotopically-labeled compounds are not available for some compounds. See below for compounds without labeled isotopes and their referenced extraction standards. See *Attachment 02* shows the full list of analytes and their EIS and NIS.

**Note**: For better accuracy, PFTrDA is quantitated using the average of the areas of labeled compounds 13C2-PFTeDA and 13C2-PFDoA.

| Native | Extracted Internal Standard |
|---|---|
| 3:3FTCA | 13C5-PFPeA |
| PFMPA | |
| PFMBA | |
| NFDHA | 13C5-PFHxA |
| 5:3FTCA | |
| 7:3FTCA | |
| PFEESA | |
| DONA | 13C3-HFPO-DA |
| 9Cl-PF3ONS | |
| 11Cl-PF3OUdS | |
| PFTrDA | Avg 13C2-PFTeDA and 13C2-PFDoA |
| PFHpS | 13C8-PFOS |
| PFNS | |
| PFDS | |
| PFDoS | |
| PFPeS | 13C3-PFHxS |
| TFSI | |
| FHxSA | |
| PFECHS | |
| PFODA | 13C2-PFTeDA |

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| Native | Extracted Internal Standard |
|---|---|
| FBSA | 13C3-PFBS |

Example Sample Sequence (LIMS ID):

Instrument Blanks to clean instrument if needed (at least 3)
1. Instrument Sensitivity Check at CAL1 (CCVO)
2. Calibration Verification at CAL4 (CCV)
3. Instrument Blank (CCB)
4. Bile Salts marker (WDM)
5. Method Blank (MB)
6. On-going Precision and Recovery (LCS)
7. Low-level OPR (LLCS)
8. On-going Precision and Recovery Duplicate (LCSD)
9. Samples (10 or less)
10. Calibration Verification at CAL4 (CCV)
11. Instrument Blank (CCB)

4. Instrument Blank (ICB, CCB) - Instrument Blanks need to be analyzed immediately following the highest standard analyzed and daily at the start of a sequence. The concentration of all analytes must be less than the MDL. If acceptance criteria are not met, the calibration must be performed using a lower concentration standard for the high standard until the criteria are met.

5. Instrument Sensitivity Check (CCVO) - Prior to sample analysis, an Instrument Sensitivity Check (ISC) must be performed. The ISC standard concentration must be at the LOQ. The CAL1 standard's concentration is at the LOQ, so the CAL1 standard will be analyzed. All analyte concentrations must be within ±30% of their true values. The signal-to-noise ratio must be greater than or equal to 3:1 for the quantitation ions and confirmation ions, and 10:1 for quantitation ions that have no confirmation ion. If the criteria are not met, correct problem and rerun ISC. If a target analyte (or EIS) reads back high with no detection (or in-spec recoveries) in the samples, data may be reported. If problem persists, repeat the ICAL. No samples can be analyzed until the ISC meets acceptance criteria.

6. Bile Salt Interference Check (WDM) - Analyze a Window-Defining Matrix (WDM) standard containing 100 ppb of Taurodeoxycholic Acid (TDCA), Taurochenodeoxycholic Acid (TCDCA), and Tauroursodeoxycholic Acid (TUDCA). The laboratory must establish chromatographic conditions to ensure the bile salt (TDCA) does not cause interference during the analysis of samples. To demonstrate successful separation the retention time of TDCA must be at least 1 minute outside the retention time window of PFOS. This is demonstrated as a comparison of the RT of TDCA (measured at the apex of the TCDA peak) separated by at least 1.4 minutes from the RT of the linear isomer of PFOS (measured at the apex of the peak of the linear isomer of PFOS). If the mobile phase does not contain acetonitrile, this check must include all three bile salts (TDCA, TCDCA, and TUDCA). If adequate separation is not achieved, adjust the chromatographic conditions and reevaluate the separation of TDCA from PFOS.

7. After injections are completed, check all CCV recoveries and absolute areas to make sure they are within method control limits. See Calibration F for acceptance criteria. Process each chromatogram and closely evaluate all integrations, baseline anomalies, and retention time differences. If manual integrations are performed, they must be documented and a reason given for the change in integrations. The manual integrations are documented during data processing and all original integrations are reported at the end of the sample PDF file with the reason for manual integration clearly listed.

8. Quantitate results for the Method Blank (MB). Calculate the recoveries of spiked analytes for the LCS and its duplicate (LCSD, if needed), Low-Level LCS, Matrix Spike and Matrix Spike Duplicate (MS/MSD) by comparing concentrations observed to the true values. Calculate the relative percent difference (RPD) between the duplicates.

9. Isotopically-labeled Extraction Standards (EIS) are added to all samples, MB, LLCS, LCS/LCSD, and MS/MSD prior to extraction. Isotopically-labeled Injection Standards (NIS) are added to each QC and field sample extract prior to analysis. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to EIS recoveries being outside of the acceptance limits as long as the signal-to-noise ratio is greater than 10:1.

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10. To identify a target or EIS:

    a. Peak responses of quantitation and confirmation ions must have S/N of at least 3:1. If there is no confirmation ion, the quantitation ion must have S/N of at least 10:1. If the S/N ratio is not met, the analyte is considered to be ND.

    b. The retention times should not vary by more than 0.4 minutes from the expected retention time from the midpoint of the ICAL or initial CV. Furthermore, native compounds with an exact isotopically-labeled analogue must elute within 0.1 minutes from their associated analog. If the retention time is outside of the criteria, the compound is considered a false positive unless it is a compound with branched isomers. Compounds with branched isomers can vary in intensity of the individual isomers that are used for reporting and must be reviewed and compared to the preceding CCV to determine if it should be reported.

    c. For concentrations at or above the LOQ, the Ion Abundance Ratio (IAR) must fall within ±50% of the IAR observed in the mid-point initial calibration standard. The total response of all isomers (branched and linear) in the quantitative standards must be used to define the IAR. In samples, the total response should include only the branched isomer peaks that have been identified in either the quantitative or qualitative standard.

11. Two ion transitions and the ion transition ratio per analyte shall be monitored and documented with the exception of PFBA, PFECA F (PFMPA), PFECA A (PFMBA), NMeFOSE, NEtFOSE, FBSA, and FHxSA. The expected ion ratio for each compound is calculated by using the average of ion ratios of each compound from initial calibration standards. When an ion ratio for a compound differs from the expected ion ratio by more than 50%, see QA/QC section for Corrective Action.

## F) Dilutions

Aqueous samples are prescreened prior to extraction to ensure concentrations do not exceed the range of the method and will not contaminate the laboratory or instrumentation. Samples with high concentrations of target PFAS which have the potential to contaminate the laboratory or the instrument will be extracted at a lower volume to mitigate those risks. Samples determined to be at or above 100x the level of the high standard will be diluted to mitigate the need for dilutions of the sample extract above 10x. For example, prescreen results at 125x the high standard would require that the sample prior to extraction be diluted by a factor of 12.5x (125/10 = 12.5). This would be done by using a 10mL portion of the sample (125/12.5 = 10) and bringing to a final volume of 125mL for extraction.

All attempts will be made to use the full volume of sample if multiple bottles sizes were sent from the field. In cases where this is not possible, the sample is first shaken, then subsampled for pre-dilution. Clients will be notified, and the laboratory will proceed with the pre-dilution as necessary. Samples requiring dilution due to high concentrations will be noted in the case narrative. Note that results based solely off the pre-dilution of a sample DO NOT have a dilution factor as dilution factors are only applied to extract dilutions.

When the area of the primary transition of a target analyte is above the area of the highest calibration point a sample dilution is required. Dilute the extract as follows:

1. Remove extracts from storage and allow to come to room temperature for approximately 60-90 minutes.
2. Vortex the extract for one minute.
3. Using a pipette or syringe, remove an aliquot of the extract, this extract should target a dilution equivalent to the mid-level concentration of the calibration curve to avoid over diluting the extract.
4. Dilute the aliquot to volume using Proprietary Content.
5. Fortify with additional NIS to achieve the same concentration of NIS in the original extract.
6. Vortex an aliquot for analysis.

If the S/N of EIS associated with the analyte requiring dilution in the extract meets the S/N requirement for EIS and the recovery of the associated EIS meet the method criteria, the results from the dilution can be reported. If these criteria are not met and additional sample is available, a smaller volume/mass of sample should be extracted.

## Calculations

1. Peak Area Ratio

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$$\text{Peak Area Ratio} = \frac{\text{Analyte Response}}{\text{Labeled Analyte Response}}$$

2. On-Column Analyte Concentration using average RRF

   On-column Concentration = peak area ratio ÷ AVE RRF

3. On-Column Analyte Concentration using linear curve

   On-column Concentration = (peak area ratio - intercept) ÷ slope

4. Sample Concentration

   Sample concentration (ng/l) = (On-column concentration x Final Sample Volume x DF) ÷ Initial Sample Volume

5. Ion Abundance Ratio (IAR)

   Ion Abundance Ratio (IAR) = (peak area or height of quantifier)/(peak area or height of qualifier)

6. See *T-PEST-WI9847* for additional calculations used to evaluate the calibrations and quality control samples.

## Statistical Information/Method Performance

Historical data for LCS/Ds, LLCSs, MS/Ds, and EIS is reviewed at least annually. However, all samples are reported using the limits in EPA 1633 Tables 5 and 6. When target analytes not on these tables are requested, statistical limits are used for LCS/MS. (Preliminary limits of 70-130% Recovery and <20% RPD can be used until enough data points are generated.) Reporting limits including method detection limits (MDLs) and limits of quantitation (LOQs) are set according to EPA method requirements and are evaluated annually. Refer to *QA-SOP11892* for specific guidelines and procedures. Updates to the LIMS are made as needed by the QA Department and only as directed by the supervisor.

As MDL studies are run on clean laboratory matrices, statistically derived MDL values could be artificially lower than achievable limits in real world samples. Nominal MDL values, set at no lower than 1/4 the calculated and verified Reporting Limit (or Limit of Quantitation) will be used as a method to avoid artificially low bias in MDL studies.

## Quality Assurance/Quality Control

For each batch of samples extracted, a method blank, an LCS, and an LLCS must be extracted and analyzed. An MS/MSD are extracted only if requested and submitted by the client. If no MS/MSD is provided, an LCS/LCSD must be extracted and analyzed instead. A batch is defined as the samples to be extracted on any given day, but not to exceed 20 field samples. If more than 20 samples are prepared in a day, an additional batch must be prepared. If any client, state, or agency has more stringent QC or batching requirements, these must be followed.

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| QC Item | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|
| Method Blank (MB) | One per extraction batch of no more than 20 field samples | No target analytes greater than RL, or greater than 1/10 the amount measured in any sample, or 1/10 the regulatory limit (whichever is greater). | Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank. |
| Low-Level On-going Precision and Recovery (LLCS) | One per extraction batch of no more than 20 field samples | Acceptance criteria defined in *Attachment 22* (Tables 5 and 6 of Method 1633) | Reanalyze LLCS once. If acceptable, report. Evaluate samples for detections, and LLCS for high bias. If LLCS has high bias, and samples non-detect, report and narrate. If LLCS has low bias, or if there are detections for critical chemicals of concern, evaluate and reprep and reanalyze the LLCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available. |
| On-going Precision and Recovery and its Duplicate (LCS) | One per extraction batch of no more than 20 field samples | Acceptance criteria defined in *Attachment 22* (Tables 5 and 6 of Method 1633) | Reanalyze LCS once. If acceptable, report. Evaluate samples for detections, and LCS for high bias. If LCS has high bias, and samples non-detect, report and narrate. If LCS has low bias, or if there are detections for critical chemicals of concern, evaluate and re-prep and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available. |
| Matrix Spike/Matrix Spike Duplicate (MS/MSD) | *at client request*, one per extraction batch of no more than 20 field samples | Acceptance criteria defined in *Attachment 22* (Tables 5 and 6 of Method 1633)<br><br>RPD less than 30% | If outside the acceptance windows, consult a supervisor to determine the appropriate course of action based on batch and sample results. |

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| QC Item | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|
| Extracted Internal Standards (EIS) or Isotope Dilution Analyte (IDA), added prior to extraction | per sample (including MB, LCS, LCSD, LLCS, MS, MSD) during preparation | Acceptance criteria defined in *Attachment 22* (Table 6 of Method 1633) | 1. If EIS outside windows, check for errors and correct. Re-analyze sample, if needed.<br>2. If EIS out high and samples are non-detect, report and narrate. If EIS out high with detections, but EIS <200% (FTS <350%), report and narrate. If EIS out high with detections and EIS >200% (FTS >350%), dilute 10X, re-analyze, report, and narrate.<br>3. If EIS low but > 5% and S/N > 10:1, narrate and report. If EIS <5% then contact client to re-extract at smaller aliquot. |
| Non-extracted Internal Standards (NIS) added following extraction and prior to analysis | per sample (including MB, LCS, LCSD, LLCS, MS, MSD) during preparation | NIS areas 50-200% of the mean area of the most recent ICAL in undiluted sample extracts and sample extracts that require NIS to be added. | If fails high, check for errors and report. If fails low, re-analyze fresh aliquot of sample. If in control, report. If the failure confirms report the initial analysis and narrate. |
| Ion Abundance Ratio (IAR) | Each detected analyte (except PFBA, PFPeA, NMeFOSE, NEtFOSE, PFMPA, PFMBA, FBSA, FHxSA) | Acceptance window of 50-150% of the ratio in the mid-point CCV standard. | Check for error, if none found report as outlined below.<br>1. If outside limits and value is less than the RL, report as ND at RL.<br>2. If outside limits, but within 2X rule* flag, report and narrate.<br>3. If ratio outside 2X rule* then report as ND at elevated RL, apply G flag and narrate.<br>4. If ratio out due to branched isomer contribution, report as positive with narration.<br>5. If outside limits (and RT window) due to matrix, report as ND at elevated RL, apply G flag and narrate. |
| E-flagged data | NA | NA | Dilute sample extract. If still E-flagged after dilution, consult the client for course of action. |

*2X Rule: If the ion ratio <0.5X the lower control limit or >2X the upper control limit, then do not report the analyte. It should be either Non-Detect at the RL or elevate the RL as needed (G flag). As an example if the target ion ratio is 4.00. The Chrom-determined limits are 2.00-6.00. If the ratio is <1.00 (2.00 X 0.5) or >12.00 (6.00 X 2) follow the specifications above.

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Attachment:
Attachment 01 - Mass Transitions (.pdf)
Attachment 02 - Standard Relationships (.pdf)
Attachment 03 – Proprietary Content
Attachment 04 - Example CoA (.pdf)
Attachment 05 - Native PFAS Intermediate A (.pdf)
Attachment 06 - Native PFAS Intermediate B (.pdf)
Attachment 07 - Native PFAS CAL8 Intermediate (.pdf)
Attachment 08 - 1633 EIS Intermediate (.pdf)
Attachment 09 - 1633 NIS Intermediate (.pdf)
Attachment 10 - 1633 TOP SS Intermediate (.pdf)
Attachment 11 - Initial Calibration Standards Preparation (.pdf)
Attachment 12 - ICAL Standard Concentration (.pdf)
Attachment 13 - Bile Salts Stock Solutions (.pdf)
Attachment 14 - Bile Salts Intermediate (.pdf)
Attachment 15 - Bile Salts Working Solution (.pdf)
Attachment 16 - 1633 WDM (.pdf)
Attachment 17 - Native Mid Level Spike (.pdf)
Attachment 18 - Native Low Level Spike (.pdf)
Attachment 19 - ICV Working Standard (.pdf)
Attachment 20 - Purchased Standards (.pdf)
Attachment 21 – Proprietary Content
Attachment 22 - Tables 5-6 (EPA 1633) (.docx)

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G-DC-FRM23907 Redacted SOPs
QA-SOP11178 Demonstrations of Capability
QA-SOP11892 Determining Method Detection Limits and Limits of Quantitation
T-PEST-WI9847 Common Equations Used During Chromatographic Analyses
T-PFAS-FRM80101 D4033 - QC Rotation Tracking Form
T-PFAS-WI21568 Environmental Monitoring in the PFAS Lab
T-PFAS-WI23588 Preventative and Corrective Maintenance for the AB Sciex Liquid Chromatograph Mass Spectrometers (LC/MS/MS)
T-PFAS-WI50447 PFAS Prescreen Method in Water Samples Requesting PFAS by Isotope Dilution
T-WC-WI53304 Total Suspended Solids (TSS Gravimetric) Prescreen for PFAS by EPA Draft Methods in Aqueous Samples
Attachment: Attachment 01 - Mass Transitions (pdf)
Attachment: Attachment 02 - Standard Relationships (pdf)
Attachment: Attachment 03 – Proprietary Content  Attachment:
Attachment 04 - Example CoA (pdf)
Attachment: Attachment 05 - Native PFAS Intermediate A (pdf)
Attachment: Attachment 06 - Native PFAS Intermediate B (pdf)
Attachment: Attachment 07 - Native PFAS CAL8 Intermediate (pdf)
Attachment: Attachment 08 - 1633 EIS Intermediate (pdf)
Attachment: Attachment 09 - 1633 NIS Intermediate (pdf)
Attachment: Attachment 10 - 1633 TOP SS Intermediate (pdf)
Attachment: Attachment 11 - Initial Calibration Standards Preparation (pdf)
Attachment: Attachment 12 - ICAL Standard Concentration (pdf)
Attachment: Attachment 13 - Bile Salts Stock Solutions (pdf)
Attachment: Attachment 14 - Bile Salts Intermediate (pdf)
Attachment: Attachment 15 - Bile Salts Working Solution (pdf)
Attachment: Attachment 16 - 1633 WDM (pdf)
Attachment: Attachment 17 - Native Mid Level Spike (pdf)
Attachment: Attachment 18 - Native Low Level Spike (pdf)
Attachment: Attachment 19 - ICV Working Standard (pdf)
Attachment: Attachment 20 - Purchased Standards (pdf)
Attachment: Attachment 21 – Proprietary Content
Attachment: Attachment 22 - Tables 5-6 (EPA 1633) (docx)

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End of document

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**Version history**

| Version | Approval | Revision information | |
|---|---|---|---|
| 3.1 | 27.AUG.2024 | | |
| 4 | 31.OCT.2024 | | |
| 5 | 11.MAR.2025 | | |

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# Attachment 1 – Mass Transitions

| CAS# | Compound | Parent Ion | Daughter Ion |
|---|---|---|---|
| 422-64-0 | PFPrA | 163.00 | 119.00 |
| STL03194 | 13C3-PFPrA | 166.00 | 121.00 |
| STL02680 | 13C3-PFBA | 216.00 | 172.00 |
| STL00992 | 13C4-PFBA | 216.80 | 171.90 |
| 375-22-4 | PFBA | 212.80 | 168.90 |
| 377-73-1 | PFECA F (PFMPA) | 229.00 | 84.90 |
| 356-02-5 | 3:3 FTCA | 241.00 | 177.00 |
| | 3:3 FTCA (2) | 241.00 | 117.00 |
| 2706-90-3 | PFPeA | 263.00 | 219.00 |
| STL01893 | 13C5-PFPeA | 268.30 | 223.00 |
| 863090-89-5 | PFECA A (PFMBA) | 279.00 | 85.10 |
| 82113-65-3 | TFSI | 280.00 | 147.00 |
| | TFSI (2) | 280.00 | 78.00 |
| 13252-13-6 | HFPODA | 284.90 | 168.90 |
| | HFPODA (2) | 284.90 | 184.90 |
| STL02255 | 13C3-HFPODA | 286.90 | 168.90 |
| | 13C3-HFPODA (2) | 286.90 | 184.90 |
| 151772-58-6 | PFECA B (NFDHA) | 295.00 | 201.00 |
| | PFECA B (NFDHA) (2) | 295.00 | 84.90 |
| | | | |
| 375-73-5 | PFBS | 298.70 | 79.90 |
| | PFBS (2) | 298.70 | 98.80 |
| | | | |
| STL02337 | 13C3-PFBS | 302.10 | 79.90 |
| | | | |
| 307-24-4 | PFHxA | 313.00 | 269.00 |
| | PFHxA (2) | 313.00 | 118.90 |
| 113507-82-7 | PFEESA (PES) | 314.80 | 134.90 |
| | PFEESA (PES) (2) | 314.80 | 82.90 |
| STL00993 | 13C2-PFHxA | 315.10 | 270.00 |
| STL02577 | 13C5-PFHxA | 318.00 | 273.00 |
| 757124-72-4 | 4:2-FTS | 327.10 | 307.00 |
| | 4:2-FTS (2) | 327.10 | 80.90 |
| 914637-49-3 | 5:3 FTCA | 341.00 | 237.10 |
| | 5:3 FTCA (2) | 341.00 | 217.00 |
| 2706-91-4 | PFPeS | 349.10 | 79.90 |
| | PFPeS (2) | 349.10 | 98.90 |
| 375-85-9 | PFHpA | 363.10 | 319.00 |
| | PFHpA (2) | 363.10 | 169.00 |
| STL01892 | 13C4-PFHpA | 367.10 | 322.00 |
| 919005-14-4 | DONA | 376.90 | 250.90 |
| | DONA (2) | 376.90 | 84.80 |
| 41997-13-1 | FHxSA | 397.90 | 78.00 |

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# Attachment 1 – Mass Transitions

| CAS# | Compound | Parent Ion | Daughter Ion |
|---|---|---|---|
| 355-46-4 | PFHxS | 398.70 | 79.90 |
| | PFHxS (2) | 398.70 | 98.90 |
| STL02581 | 13C3-PFHxS | 402.10 | 79.90 |
| STL00994 | 18O2-PFHxS | 403.00 | 83.90 |
| 335-67-1 | PFOA | 413.00 | 369.00 |
| | PFOA (2) | 413.00 | 169.00 |
| STL00623 | 13C2-PFOA | 415.00 | 370.00 |
| STL00990 | 13C4-PFOA | 417.10 | 372.00 |
| STL01054 | 13C8-PFOA | 421.10 | 376.00 |
| 27619-97-2 | 6:2-FTS | 427.10 | 407.00 |
| | 6:2-FTS (2) | 427.10 | 80.90 |
| STL02279 | 13C2-6:2-FTS | 429.10 | 80.90 |
| 812-70-4 | 7:3 FTCA | 441.00 | 316.90 |
| | 7:3 FTCA (2) | 441.00 | 336.90 |
| 375-92-8 | PFHpS | 449.00 | 79.90 |
| | PFHpS (2) | 449.00 | 98.80 |
| 133201-07-7 | PFECHS | 461.00 | 381.00 |
| | PFECHS (2) | 461.00 | 99.00 |
| 375-95-1 | PFNA | 463.00 | 419.00 |
| | PFNA (2) | 463.00 | 219.00 |
| STL00995 | 13C5-PFNA | 468.00 | 423.00 |
| STL02578 | 13C9-PFNA | 472.10 | 427.00 |
| 516-50-7 | TDCA | 498.00 | 80.00 |
| 754-91-6 | PFOSA | 498.10 | 77.90 |
| | PFOSA (2) | 498.10 | 478.00 |
| 516-35-8 | TCDCA | 498.10 | 80.00 |
| 14605-22-2 | TUDCA | 498.20 | 80.00 |
| 1763-23-1 | PFOS | 498.90 | 79.90 |
| | PFOS (2) | 498.90 | 98.80 |
| STL00991 | 13C4-PFOS | 502.80 | 79.90 |
| STL01056 | 13C8-PFOSA | 506.10 | 77.80 |
| STL01054 | 13C8-PFOS | 507.10 | 79.90 |
| 31506-32-8 | NMeFOSA | 511.90 | 219.00 |
| | NMeFOSA (2) | 511.90 | 169.00 |
| 335-76-2 | PFDA | 512.90 | 469.00 |
| | PFDA (2) | 512.90 | 219.00 |
| STL02705 | d3-NMeFOSA | 515.00 | 219.00 |
| STL00996 | 13C2-PFDA | 515.10 | 470.10 |
| STL02579 | 13C6-PFDA | 519.10 | 474.10 |
| 4151-50-2 | NEtFOSA | 526.00 | 219.00 |
| | NEtFOSA (2) | 526.00 | 169.00 |
| 39108-34-4 | 8:2-FTS | 527.10 | 507.00 |
| | 8:2-FTS (2) | 527.10 | 80.80 |

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# Attachment 1 – Mass Transitions

| CAS# | Compound | Parent Ion | Daughter Ion |
|---|---|---|---|
| STL02280 | 13C2-8:2-FTS | 529.10 | 80.90 |
| 756426-58-1 | 9Cl-PF3ONS | 530.80 | 351.00 |
| | 9Cl-PF3ONS (2) | 532.80 | 353.00 |
| STL02704 | d5-NEtFOSA | 531.10 | 219.00 |
| 68259-12-1 | PFNS | 548.80 | 79.90 |
| | PFNS (2) | 548.80 | 98.80 |
| 2058-94-8 | PFUnA | 563.10 | 519.00 |
| | PFUnA (2) | 563.10 | 269.10 |
| STL00997 | 13C2-PFUnA | 565.00 | 520.00 |
| STL02580 | 13C7-PFUnA | 570.00 | 525.10 |
| 2355-31-9 | NMeFOSAA | 570.10 | 419.00 |
| | NMeFOSAA (2) | 570.10 | 483.00 |
| STL02118 | d3-NMeFOSAA | 573.20 | 419.00 |
| 2991-50-6 | NEtFOSAA | 584.20 | 419.10 |
| | NEtFOSAA (2) | 584.20 | 526.00 |
| STL02117 | d5-NEtFOSAA | 589.20 | 419.00 |
| 335-77-3 | PFDS | 599.00 | 79.90 |
| | PFDS (2) | 599.00 | 98.80 |
| 307-55-1 | PFDoDA | 613.10 | 569.00 |
| | PFDoDA (2) | 613.10 | 319.00 |
| STL00998 | 13C2-PFDoDA | 615.10 | 570.00 |
| 24448-09-7 | NMeFOSE | 616.10 | 58.90 |
| STL02277 | d7-NMeFOSE | 623.20 | 58.90 |
| 1691-99-2 | NEtFOSE | 630.00 | 58.90 |
| 763051-92-9 | 11Cl-PF3OUdS | 630.90 | 450.90 |
| | 11Cl-PF3OUdS (2) | 632.90 | 452.90 |
| STL02278 | d9-NEtFOSE | 639.20 | 58.90 |
| 72629-94-8 | PFTrDA | 663.00 | 619.00 |
| | PFTrDA (2) | 663.00 | 168.90 |
| 79780-39-5 | PFDoS | 699.10 | 79.90 |
| | PFDoS (2) | 699.10 | 98.80 |
| 376-06-7 | PFTeDA | 713.10 | 168.90 |
| | PFTeDA (2) | 713.10 | 219.00 |
| STL02116 | 13C2-PFTeDA | 715.20 | 670.00 |
| 16517-11-6 | PFODA | 913.00 | 869.00 |
| | PFODA (2) | 913.00 | 169.00 |

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# Attachment 2 - PFAS Injection Standards/Extraction Standards/Native Compounds

| Native | Extraction Standard | Internal Standard |
|---|---|---|
| PFBA | 13C4-PFBA | 13C3-PFBA |
| PFPrA | 13C3-PFPrA | |
| PFPeA | 13C5-PFPeA | 13C2-PFHxA |
| 3:3FTCA | | |
| PFMPA | | |
| PFMBA | | |
| PFHxA | 13C5-PFHxA | |
| NFDHA | | |
| 5:3FTCA | | |
| 7:3FTCA | | |
| PFEESA | | |
| PFHpA | 13C4-PFHpA | |
| HFPO-DA | 13C3-HFPO-DA | |
| ADONA | | |
| 9Cl-PF3ONS | | |
| 11Cl-PF3OUdS | | |
| PFOA | 13C8-PFOA | 13C4-PFOA |
| PFNA | 13C9-PFNA | 13C5-PFNA |
| PFDA | 13C6-PFDA | 13C2-PFDA |
| PFUnA | 13C7-PFUnA | |
| PFDoA | 13C2-PFDoA | |
| PFTeDA | 13C2-PFTeDA | |
| PFODA | | |
| PFTrDA | Avg 13C2-PFTeDA and 13C2-PFDoA | |
| PFBS | 13C3-PFBS | 18O2-PFHxS |
| FBSA | | |
| PFPeS | 13C3-PFHxS | |
| PFHxS | | |
| FHxSA | | |
| PFECHS | | |
| TFSI | | |
| 4:2-FTS | 13C2-4:2-FTS | |
| 6:2-FTS | 13C2-6:2-FTS | |
| 8:2-FTS | 13C2-8:2-FTS | |
| PFHpS | 13C8-PFOS | 13C4-PFOS |
| PFOS | | |

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# Attachment 2 - PFAS Injection Standards/Extraction Standards/Native Compounds

| Native | Extraction Standard | Internal Standard |
|---|---|---|
| PFNS | | |
| PFDS | | |
| PFDoS | | |
| PFOSA | 13C8-PFOSA | |
| NMeFOSA | d3-NMeFOSA | |
| NEtFOSA | d5-NEtFOSA | |
| NMeFOSAA | d3-NMeFOSAA | |
| NEtFOSAA | d5-NEtFOSAA | |
| NMeFOSE | d7-N-MeFOSE-M | |
| NEtFOSE | d9-N-EtFOSE-M | |

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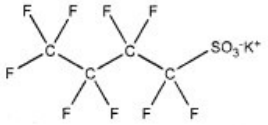
# Attachment 4 – Example CoA

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

| | | | |
|---|---|---|---|
| **PRODUCT CODE:** | L-PFBS | **LOT NUMBER:** | LPFBS1022 |
| **COMPOUND:** | Potassium perfluoro-1-butanesulfonate | | |
| **STRUCTURE:** | | **CAS #:** | 29420-49-3 |



| | | | |
|---|---|---|---|
| **MOLECULAR FORMULA:** | $C_4F_9SO_3K$ | **MOLECULAR WEIGHT:** | 338.19 |
| **CONCENTRATION:** | 50.0 ± 2.5 µg/mL (K salt)<br>44.4 ± 2.2 µg/mL (PFBS acid)<br>44.2 ± 2.2 µg/mL (PFBS anion) | **SOLVENT(S):** | Methanol |
| **CHEMICAL PURITY:** | >98% | | |
| **LAST TESTED:** (mm/dd/yyyy) | 10/04/2022 | | |
| **EXPIRY DATE:** (mm/dd/yyyy) | 10/04/2027 | | |
| **RECOMMENDED STORAGE:** | Store ampoule in a cool, dark place | | |

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**DOCUMENTATION/ DATA ATTACHED:**

Figure 1: LC/MS Data (Full Scan and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

- See page 2 for further details.

***FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE***

**Certified By:** _____ **Date:** 10/14/2022 (mm/dd/yyyy)
B.G. Chittim, General Manager

*Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA*
*519-822-2436 • Fax: 519-822-2849 • info@well-labs.com*

*Form#:27, Issued 2004-11-10*
*Revision#:9, Revised 2020-12-23*

# Attachment 4 – Example CoA

**INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

**HANDLING:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

**SYNTHESIS / CHARACTERIZATION:**

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

**HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

**UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value $y$ and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

**TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

**EXPIRY DATE / PERIOD OF VALIDITY:**

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

**LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

**QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A1226), and ISO 17034 by ANSI National Accreditation Board (ANAB; AR-1523).

CALA Testing Accreditation No. A1226

ANAB ANSI National Accreditation Board ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

**For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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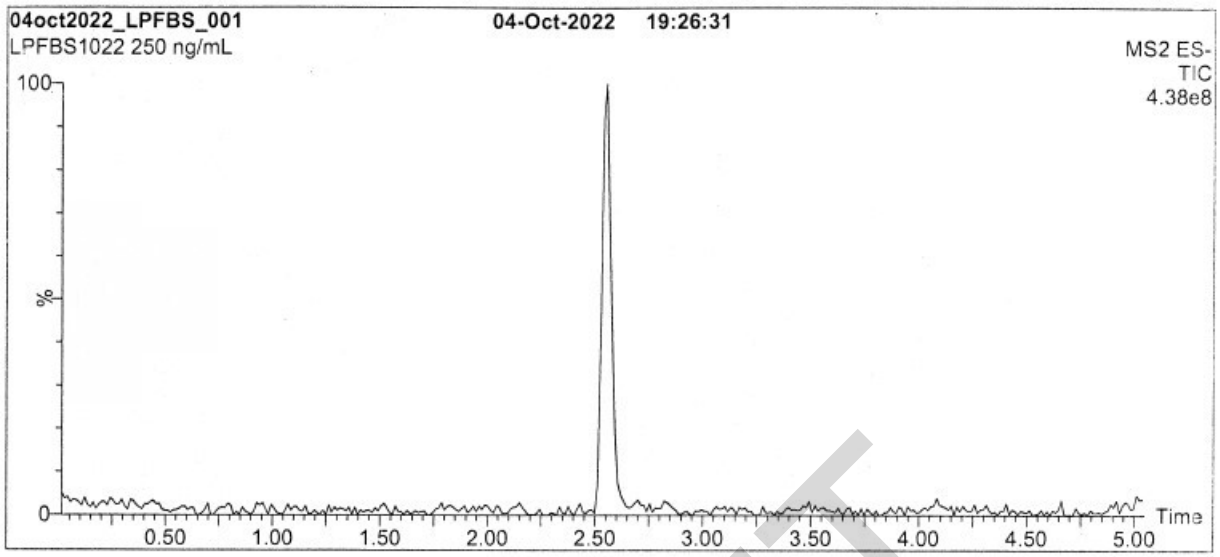
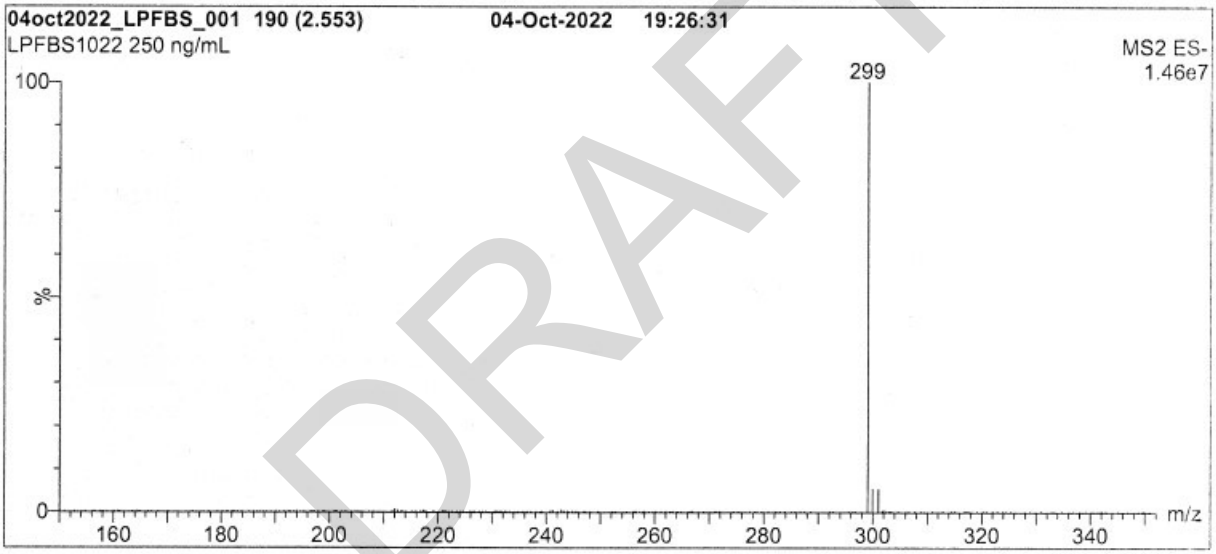
# Attachment 4 – Example CoA

**Figure 1:** **L-PFBS; LC/MS Data (Full Scan and Mass Spectrum)**

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**Conditions for Figure 1:**

Waters Acquity Ultra Performance LC
Waters Xevo TQ-S micro MS

**Chromatographic Conditions:**

Column: Acquity UPLC BEH Shield $RP_{18}$
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% $H_2O$ / 40% (80:20 MeOH:ACN)
(both with 10 mM $NH_4OAc$ buffer)
Ramp to 90% organic over 8 min and hold for 2 min
before returning to initial conditions over 0.75 min.
Time: 12 min

Flow: 300 µL/min

**MS Parameters:**

Experiment: Full Scan (150 - 850 amu)

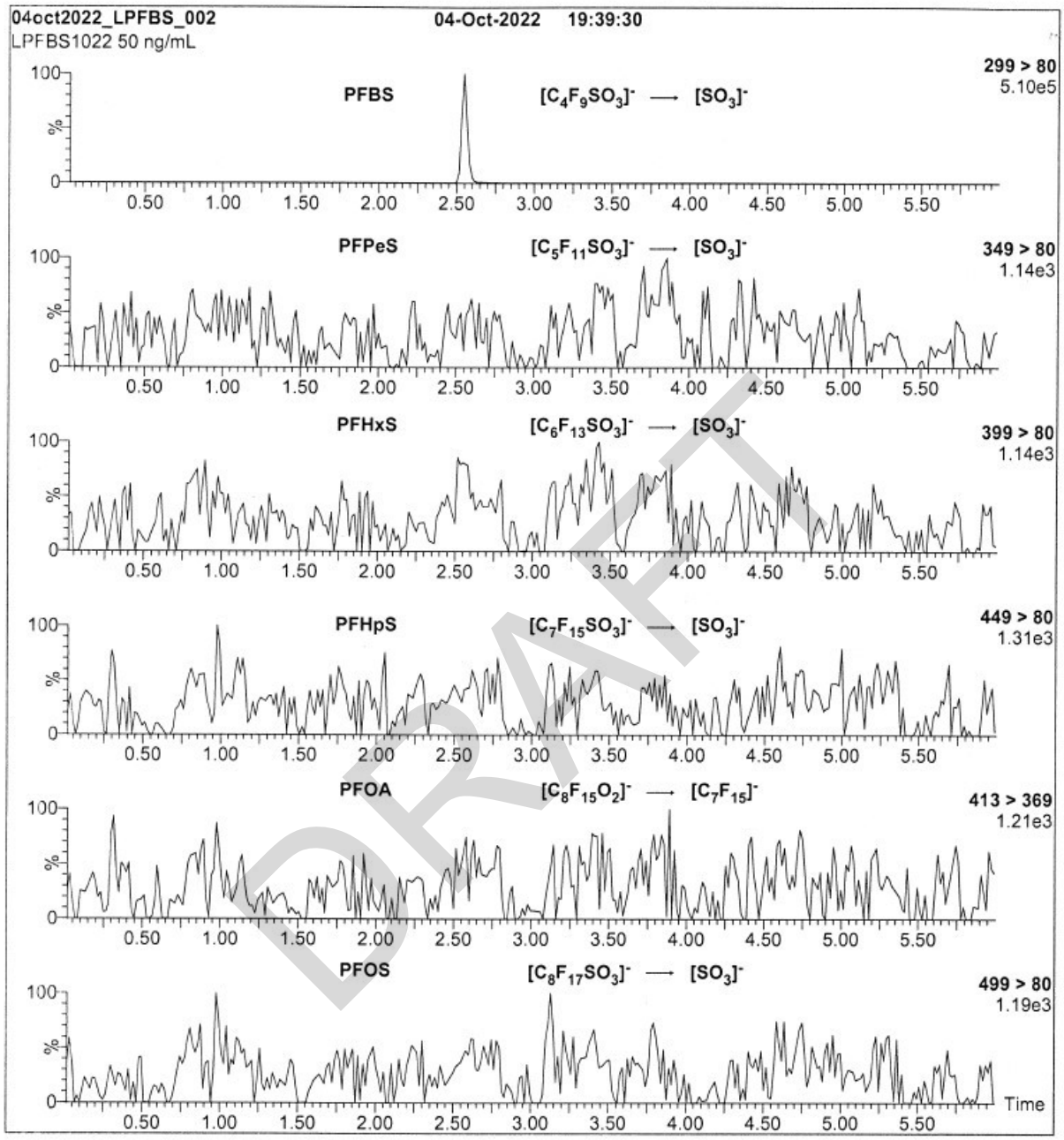
Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 10.00
Desolvation Temperature (°C) = 500
Desolvation Gas Flow (L/hr) = 1000

*Form#:27, Issued 2004-11-10*
*Revision#:9, Revised 2020-12-23*

LPFBS1022 (3 of 4)
rev0

# Attachment 4 – Example CoA

**Figure 2:** **L-PFBS; LC/MS/MS Data (Selected MRM Transitions)**

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**Conditions for Figure 2:**

| | |
|---|---|
| Injection: | On-column (L-PFBS) |
| Mobile phase: | Same as Figure 1 |
| Flow: | 300 µL/min |

**MS Parameters:**

Collision Gas (mbar) = 3.29e-3
Collision Energy (eV) = 30

*Form#:27, Issued 2004-11-10*
*Revision#:9, Revised 2020-12-23*

LPFBS1022 (4 of 4)
rev0

| Attachment 05 - Native PFAS Intermediate A | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vendor | Catalog Number | Analyte | CAS# | Acronym | Conc. (ng/mL) | Aliquot (mL) | Final Volume (mL) in MeOH | Final Conc. (ng/mL) |
| Wellington | PFBA | Perfluorobutanoic acid | 375-22-4 | PFBA | 50000 | 0.100 | 10 | 500 |
| Wellington | PFPeA | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 50000 | 0.050 | | 250 |
| Wellington | PFHxA | Perfluorohexanoic acid | 307-24-4 | PFHxA | 50000 | 0.050 | | 250 |
| Wellington | PFHpA | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 50000 | 0.050 | | 250 |
| Wellington | br-PFOA | Perfluorooctanoic acid | 335-67-1 | PFOA | 50000 | 0.050 | | 250 |
| Wellington | br-PFNA | Perfluorononanoic acid | 375-95-1 | PFNA | 50000 | 0.050 | | 250 |
| Wellington | PFDA | Perfluorodecanoic acid | 335-76-2 | PFDA | 50000 | 0.050 | | 250 |
| Wellington | PFUdA | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 50000 | 0.050 | | 250 |
| Wellington | MPFDOA | Perfluorododecanoic acid | 307-55-1 | PFDoA | 50000 | 0.050 | | 250 |
| Wellington | PFTrDA | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 50000 | 0.050 | | 250 |
| Wellington | PFTeDA | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 50000 | 0.050 | | 250 |
| Wellington | L-PFBS | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 44200 | 0.050 | | 221 |
| Wellington | L-PFPeS | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 46900 | 0.050 | | 235 |
| Wellington | br-PFHxSK | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 45500 | 0.050 | | 228 |
| Wellington | L-PFHpS | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 47600 | 0.050 | | 238 |
| Wellington | br-PFOSK | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 46600 | 0.050 | | 233 |
| Wellington | L-PFNS | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 48000 | 0.050 | | 240 |
| Wellington | L-PFDS | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 48200 | 0.050 | | 241 |
| Wellington | L-PFDoS | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 48400 | 0.050 | | 242 |
| Wellington | 4;2 FTS | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 46700 | 0.100 | | 467 |
| Wellington | 6;2 FTS | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 47400 | 0.100 | | 474 |
| Wellington | 8;2 FTS | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 47900 | 0.100 | | 479 |
| Wellington | br-FOSA | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 50000 | 0.050 | | 250 |
| Wellington | br-NMeFOSA | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 50000 | 0.050 | | 250 |
| Wellington | br-NEtFOSA | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 50000 | 0.050 | | 250 |
| Wellington | br-NMeFOSAA | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 50000 | 0.050 | | 250 |
| Wellington | br-NEtFOSAA | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 50000 | 0.050 | | 250 |
| Wellington | br-NMeFOSE | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 50000 | 0.250 | | 1250 |
| Wellington | br-NMeFOSE | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 50000 | 0.250 | | 1250 |
| Wellington | HFPO-DA | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 50000 | 0.0375 | | 187.5 |
| Wellington | NaDONA | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 47100 | 0.050 | | 236 |
| Wellington | PFEESA | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 44500 | 0.050 | | 223 |
| Wellington | PF4OPeA | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 50000 | 0.050 | | 250 |
| Wellington | PF5OHxA | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 50000 | 0.050 | | 250 |
| Wellington | 3,6-OPFHpA | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 50000 | 0.050 | | 250 |
| Wellington | 9Cl-PF3ONS | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 46600 | 0.050 | | 233 |
| Wellington | 11Cl-PF3OUdS | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 47100 | 0.050 | | 236 |
| Wellington | FPrPA | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 50000 | 0.100 | | 500 |
| Wellington | FPePA | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 50000 | 0.250 | | 1250 |
| Wellington | FHpPA | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 50000 | 0.250 | | 1250 |
| Wellington | PFECHS | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 46100 | 0.050 | | 231 |
| Wellington | FBSA-I | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 50000 | 0.050 | | 250 |
| Wellington | FHxSA-I | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 50000 | 0.050 | | 250 |
| Wellington | PFPrA | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 50000 | 0.250 | | 1250 |
| Wellington | PFODA | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 50000 | 0.050 | | 250 |
| AccuStandard | PFOS-030S | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 97900 | 0.0250 | | 245 |

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| Attachment 06 - Native PFAS Intermediate B | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL) in MeOH** | **Final Conc. (ng/mL)** |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 0.1 | 10 | 5 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 2.5 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 2.5 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 2.5 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 2.5 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 2.5 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 2.5 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 2.5 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 2.5 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 2.5 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 2.5 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 2.21 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 2.35 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 2.28 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 2.38 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 2.33 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 2.4 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 2.41 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 2.42 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 4.67 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 4.74 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 4.79 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 2.5 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 2.5 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 2.5 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 2.5 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 2.5 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 12.5 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 12.5 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 1.875 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 236 | | | 2.36 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 2.23 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 2.5 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 2.5 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 2.5 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 2.33 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 236 | | | 2.36 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 5 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 12.5 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 12.5 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 231 | | | 2.31 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 2.5 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 2.5 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 12.5 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 2.5 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 245 | | | 2.45 |

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| Attachment 07 - Native PFAS CAL8 Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL) in MeOH** | **Final Conc. (ng/mL)** |
| Wellington | PFBA | Perfluorobutanoic acid | 375-22-4 | PFBA | 50000 | 0.100 | 10 | 500 |
| Wellington | PFPeA | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 50000 | 0.050 | | 250 |
| Wellington | PFHxA | Perfluorohexanoic acid | 307-24-4 | PFHxA | 50000 | 0.050 | | 250 |
| Wellington | PFHpA | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 50000 | 0.050 | | 250 |
| Wellington | br-PFOA | Perfluorooctanoic acid | 335-67-1 | PFOA | 50000 | 0.050 | | 250 |
| Wellington | br-PFNA | Perfluorononanoic acid | 375-95-1 | PFNA | 50000 | 0.050 | | 250 |
| Wellington | L-PFBS | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 44200 | 0.050 | | 221 |
| Wellington | L-PFPeS | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 46900 | 0.050 | | 235 |
| Wellington | br-PFHxSK | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 45500 | 0.050 | | 228 |
| Wellington | L-PFHpS | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 47600 | 0.050 | | 238 |
| Wellington | br-PFOSK | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 46600 | 0.050 | | 233 |
| Wellington | HFPO-DA | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 50000 | 0.0375 | | 187.5 |

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| Attachment 08 - 1633 EIS Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL in MeOH)** | **Final Conc. (ng/mL)** |
| Wellington | MPFBA | Perfluoro-n-[13C4]butanoic acid | STL00992 | $^{13}C_4$-PFBA | 50000 | 0.08 | 10 | 400 |
| Wellington | M5PFPeA | Perfluoro-n-[13C5]pentanoic acid | STL01893 | $^{13}C_5$-PFPeA | 50000 | 0.08 | | 400 |
| Wellington | M5PFHxA | Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid | STL02577 | $^{13}C_5$-PFHxA | 50000 | 0.08 | | 400 |
| Wellington | M4PFHpA | Perfluoro-n-[1,2,3,4-13C4]heptanoic acid | STL01892 | $^{13}C_4$-PFHpA | 50000 | 0.08 | | 400 |
| Wellington | M8PFOA | Perfluoro-n-[13C8]octanoic acid | STL01052 | $^{13}C_8$-PFOA | 50000 | 0.08 | | 400 |
| Wellington | M9PFNA | Perfluoro-n-[13C9]nonanoic acid | STL02578 | $^{13}C_9$-PFNA | 50000 | 0.08 | | 400 |
| Wellington | M6PFDA | Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid | STL02579 | $^{13}C_6$-PFDA | 50000 | 0.08 | | 400 |
| Wellington | M7PFUdA | Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid | STL02580 | $^{13}C_7$-PFUnA | 50000 | 0.08 | | 400 |
| Wellington | MPFDoA | Perfluoro-n-[1,2-13C2]dodecanoic acid | STL00998 | $^{13}C_2$-PFDoA | 50000 | 0.08 | | 400 |
| Wellington | M2PFTeDA | Perfluoro-n-[1,2-13C2]tetradecanoic acid | STL02116 | $^{13}C_2$-PFTeDA | 50000 | 0.08 | | 400 |
| Wellington | M3PFBS | Perfluoro-1-[2,3,4-13C3]butanesulfonic acid | STL02337 | $^{13}C_3$-PFBS | 46500 | 0.08 | | 372 |
| Wellington | M3PFHxS | Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid | STL02581 | $^{13}C_3$-PFHxS | 47300 | 0.08 | | 378 |
| Wellington | M8PFOS | Perfluoro-1-[13C8]octanesulfonic acid | STL01054 | $^{13}C_8$-PFOS | 47800 | 0.08 | | 382 |
| Wellington | M8FOSA-I | Perfluoro-1-[13C8]octanesulfonamide | STL01056 | $^{13}C_8$-PFOSA | 50000 | 0.08 | | 400 |
| Wellington | d3-N-MeFOSAA | N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid | STL02118 | $d_3$-NMeFOSAA | 50000 | 0.2 | | 1000 |
| Wellington | d5-N-EtFOSAA | N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid | STL02117 | $d_5$-NEtFOSAA | 50000 | 0.2 | | 1000 |
| Wellington | M2-4;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]hexane sulfonic acid | STL02395 | $^{13}C_2$-4:2FTS | 46700 | 0.2 | | 934 |
| Wellington | M2-6;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]octane sulfonic acid | STL02279 | $^{13}C_2$-6:2FTS | 47500 | 0.2 | | 950 |
| Wellington | M2-8;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]decane sulfonic acid | STL02280 | $^{13}C_2$-8:2FTS | 47900 | 0.2 | | 958 |
| Wellington | M3HFPO-DA | Tetrafluoro-2-heptafluoropropoxy-13C3-propanoic acid | STL02255 | $^{13}C_3$-HFPO-DA | 50000 | 0.08 | | 400 |
| Wellington | d7-N-MeFOSE-M | N-methyl-d7-perfluorooctanesulfonamidoethanol | STL02277 | $d_7$-N-MeFOSE-M | 50000 | 0.2 | | 1000 |
| Wellington | d9-N-EtFOSE-M | N-ethyl-d9-perfluorooctanesulfonamidoethanol | STL02278 | $d_9$-N-EtFOSE-M | 50000 | 0.2 | | 1000 |
| Wellington | d-N-MeFOSA-M | N-ethyl-d5-perfluoro-1-octanesulfonamide | STL02704 | $d_5$-NEtPFOSA | 50000 | 0.08 | | 400 |
| Wellington | d-N-EtFOSA-M | N-methyl-d3-perfluoro-1-octanesulfonamide | STL02705 | $d_3$-NMePFOSA | 50000 | 0.08 | | 400 |
| Cambridge Isotope | CLM-11324-A-1.2 | Perfluoropropanoic acid (PFPrA) ($^{13}C_3$) | STL03194 | $^{13}C_3$-PFPrA | 50000 | 0.08 | | 400 |

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| Attachment 09 - 1633 NIS Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL) in MeOH** | **Final Conc. (ng/mL)** |
| Wellington | M3PFBA | Perfluoro-n-[2,3,4-13C3]butanoic acid | STL02680 | $^{13}C_3$-PFBA | 50000 | 0.08 | 10 | 400 |
| Wellington | MPFOA | Perfluoro-n-[1,2,3,4-13C4]octanoic acid | STL00990 | $^{13}C_4$-PFOA | 50000 | 0.2 | | 1000 |
| Wellington | MPFDA | Perfluoro-n-[1,2-13C2]decanoic acid | STL00996 | $^{13}C_2$-PFDA | 50000 | 0.08 | | 400 |
| Wellington | MPFOS | Perfluoro-n-[1,2,3,4-13C4]octanesulfonic acid | STL00991 | $^{13}C_4$-PFOS | 47800 | 0.08 | | 382.4 |
| Wellington | MPFNA | Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid | STL00995 | $^{13}C_5$-PFNA | 50000 | 0.08 | | 400 |
| Wellington | MPFHxA | Perfluoro-n-[1,2-13C2]hexanoic acid | STL00993 | $^{13}C_2$-PFHxA | 50000 | 0.2 | | 1000 |
| Wellington | MPFHxS | Perfluoro-1-hexane[18O2]sulfonic acid | STL00994 | $^{18}O_2$-PFHxS | 47300 | 0.08 | | 378.4 |

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| Attachment 10 - 1633 TOP SS Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL in MeOH)** | **Final Conc. (ng/mL)** |
| Wellington | M2PFOA | Perfluoro-n-(1,2-13C2)octanoic acid | STL00623 | $^{13}C_2$-PFOA | 50000 | 0.025 | 10 | 125 |
| Wellington | MPFUdA | Perfluoro-n-(1,2-13C2)undecanoic acid | STL00997 | $^{13}C_2$-PFUnA | 50000 | 0.025 | | 125 |
| Wellington | M3PFPeA | Perfluoro-n-(3,4,5-13C3)pentanoic acid | STL03269 | $^{13}C_3$-PFPeA | 50000 | 0.025 | | 125 |

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| Attachment 11 - 1633 Initial Calibration Standards Preparation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Solution Name** | **CAL1** | **CAL2** | **CAL3** | **CAL4** | **CAL5** | **CAL6** | **CAL7** | **CAL8** |
| Native PFAS CAL8 Intermediate (mL) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.0 |
| Native PFAS Intermediate A (mL) | N/A | N/A | 0.02 | 0.04 | 0.1 | 0.2 | 0.4 | N/A |
| Native PFAS Intermediate B (mL) | 0.2 | 0.5 | N/A | N/A | N/A | N/A | N/A | N/A |
| 1633 TOP SS Intermediate (mL) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1633 EIS Intermediate (mL) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1633 NIS Intermediate (mL) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Final Volume (mL) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

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| Attachment 12 - 1633 Initial Calibration Standard Concentrations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CAL1 | CAL2 | CAL3 | CAL4 | CAL5 | CAL6 | CAL7 | CAL8 |
| Analyte Name | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) |
| PFBA | 0.100 | 0.250 | 1.00 | 2.00 | 5.00 | 10.0 | 20.0 | 100 |
| PFPeA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFHxA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFHpA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFOA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFNA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFDA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFUnA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFDoA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFTrDA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFTeDA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFBS | 0.044 | 0.111 | 0.442 | 0.884 | 2.21 | 4.42 | 8.84 | 44.2 |
| PFPeS | 0.047 | 0.117 | 0.469 | 0.938 | 2.35 | 4.69 | 9.38 | 46.9 |
| PFHxS | 0.046 | 0.114 | 0.455 | 0.910 | 2.28 | 4.55 | 9.10 | 45.5 |
| PFHpS | 0.048 | 0.119 | 0.476 | 0.952 | 2.38 | 4.76 | 9.52 | 47.6 |
| PFOS | 0.047 | 0.117 | 0.466 | 0.932 | 2.33 | 4.66 | 9.32 | 46.6 |
| PFNS | 0.048 | 0.120 | 0.480 | 0.960 | 2.40 | 4.80 | 9.60 | N/A |
| PFDS | 0.048 | 0.121 | 0.482 | 0.964 | 2.41 | 4.82 | 9.64 | N/A |
| PFDoS | 0.048 | 0.121 | 0.484 | 0.968 | 2.42 | 4.84 | 9.68 | N/A |
| 4:2-FTS | 0.093 | 0.234 | 0.934 | 1.87 | 4.67 | 9.34 | 18.7 | N/A |
| 6:2-FTS | 0.095 | 0.237 | 0.948 | 1.90 | 4.74 | 9.48 | 19.0 | N/A |
| 8:2-FTS | 0.096 | 0.240 | 0.958 | 1.92 | 4.79 | 9.58 | 19.2 | N/A |
| PFOSA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NMeFOSA / N-MePFOSA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NEtFOSA / N-EtPFOSA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NMeFOSAA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NEtFOSAA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NMePFOSAE / NMeFOSE | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| NEtPFOSAE / NEtFOSE | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| HFPO-DA / GenX | 0.038 | 0.094 | 0.38 | 0.750 | 1.88 | 3.75 | 7.50 | 37.5 |
| ADONA | 0.047 | 0.118 | 0.471 | 0.942 | 2.36 | 4.71 | 9.42 | N/A |
| PFEESA / PES | 0.045 | 0.111 | 0.445 | 0.890 | 2.23 | 4.45 | 8.90 | N/A |
| PFMPA / PFECA F | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFMBA / PFECA A | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NFDHA / PFECA B | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| 9Cl-PF3ONS | 0.047 | 0.117 | 0.466 | 0.93 | 2.33 | 4.66 | 9.32 | N/A |
| 11Cl-PF3OUdS | 0.047 | 0.118 | 0.471 | 0.94 | 2.36 | 4.71 | 9.42 | N/A |
| 3:3 FTCA | 0.100 | 0.250 | 1.00 | 2.00 | 5.00 | 10.0 | 20.0 | N/A |
| 5:3 FTCA | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| 7:3 FTCA | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| PFECHS | 0.046 | 0.116 | 0.462 | 0.92 | 2.31 | 4.62 | 9.24 | N/A |
| FBSA | 0.050 | 0.125 | 0.500 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| FHxSA | 0.050 | 0.125 | 0.500 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFPrA / PPF Acid | 0.250 | 0.625 | 2.500 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| PFODA | 0.050 | 0.125 | 0.500 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| TFSI | 0.049 | 0.122 | 0.490 | 0.98 | 2.45 | 4.90 | 9.79 | N/A |
| $^{13}C_3$-PFPrA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFBA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_5$-PFPeA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_5$-PFHxA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFHpA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_8$-PFOA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_9$-PFNA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_6$-PFDA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_7$-PFUnA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFDoA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFTeDA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_3$-PFBS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_3$-PFHxS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_8$-PFOS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_8$-PFOSA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $d_3$-NMeFOSAA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $d_5$-NEtFOSAA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-4:2FTS | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-6:2FTS | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-8:2FTS | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_3$-HFPO-DA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $d_7$-N-MeFOSE-M | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $d_9$-N-EtFOSE-M | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $d_5$-NEtPFOSA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $d_3$-NMePFOSA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_3$-PFBA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFOA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-PFDA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFOS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_5$-PFNA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFHxA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{18}O_2$-PFHxS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFOA | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 |
| $^{13}C_2$-PFUnA | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 |
| $^{13}C_3$-PFPeA | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 |

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| Attachment 13 - Bile Salts Stock Solution | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Aliquot (g)** | **Final Volume (mL of MeOH)** | **Final Conc. (ng/mL)** |
| Sigma Aldrich | T0557-500MG | Taurodeoxycholic acid | 516-50-7 | TDCA | 0.05 | 50 | 1000000 |
| Sigma Aldrich | T6260-1G | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 0.05 | | 950000 |
| Calbiochem | 580549-1GM | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 0.05 | | 1000000 |

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| Attachment 14 - Bile Salts Intermediate | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL of MeOH)** | **Final Conc. (ng/mL)** |
| Bile Salts Stock Solution | Taurodeoxycholic acid | 516-50-7 | TDCA | 1000000 | 1 | 4 | 250000 |
| | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 950000 | | | 237500 |
| | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 1000000 | | | 250000 |

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| Attachment 15 - Bile Salts Working Solution | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL of MeOH)** | **Final Conc. (ng/mL)** |
| Bile Salts Intermediate | Taurodeoxycholic acid | 516-50-7 | TDCA | 250000 | 0.1 | 5 | 5000 |
| | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 237500 | | | 4750 |
| | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 250000 | | | 5000 |

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| Attachment 16 - 1633 Window-Defining Matrix Standard | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt. Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume* (mL)** | **Final Conc. (ng/mL)** |
| Bile Salts Working Solution | Taurodeoxycholic acid | 516-50-7 | TDCA | 5000 | 0.05 | 10 | 25 |
| | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 4750 | | | 23.8 |
| | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 5000 | | | 25 |

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| Attachment 17 - Native 1633 Mid-Level Spike | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Rgt. Name | Analyte | CAS# | Acronym | Conc. (ng/mL) | Aliquot (mL) | Final Volume (mL in MeOH) | Final Conc. (ng/mL) |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 4 | 10 | 200 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 100 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 100 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 100 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 100 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 100 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 100 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 100 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 100 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 100 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 100 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 88.4 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 93.8 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 91.0 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 95.2 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 93.2 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 96.0 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 96.4 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 96.8 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 187 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 190 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 192 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 100 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 100 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 100 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 100 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 100 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 500 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 500 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 75.0 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 236 | | | 94.2 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 89.0 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 100 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 100 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 100 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 93.2 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 236 | | | 94.2 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 200 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 500 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 500 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 231 | | | 92.2 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 100 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 100 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 500 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 100 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 245 | | | 97.9 |

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| Attachment 18 - Native 1633 Low-Level Spike | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt. Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL in MeOH)** | **Final Conc. (ng/mL)** |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 0.5 | 10 | 25.00 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 12.50 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 12.50 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 12.50 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 12.50 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 12.50 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 12.50 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 12.50 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 12.50 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 12.50 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 12.50 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 11.05 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 11.73 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 11.38 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 11.90 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 11.65 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 12.00 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 12.05 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 12.10 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 23.35 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 23.70 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 23.95 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 12.50 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 12.50 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 12.50 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 12.50 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 12.50 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 62.50 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 62.50 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 9.38 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 235.5 | | | 11.78 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 11.13 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 12.50 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 12.50 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 12.50 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 11.65 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 235.5 | | | 11.78 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 25.00 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 62.50 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 62.50 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 230.5 | | | 11.53 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 12.50 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 12.50 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 62.50 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 12.50 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 244.75 | | | 12.24 |

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| Attachment 19 - 1633 ICV Working Standard | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Rgt. Name | Analyte | CAS# | Acronym | Conc. (ng/mL) | Aliquot (mL) | Final Volume (mL | Final Conc. (ng/mL) |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 0.050 | 10 | 2.50 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 1.25 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 1.25 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 1.25 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 1.25 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 1.25 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 1.25 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 1.25 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 1.25 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 1.25 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 1.25 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 1.105 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 1.173 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 1.138 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 1.190 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 1.165 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 1.200 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 1.205 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 1.210 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 2.34 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 2.37 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 2.40 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 1.25 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 1.25 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 1.25 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 1.25 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 1.25 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 6.25 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 6.25 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 0.938 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 236 | | | 1.178 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 1.113 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 1.25 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 1.25 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 1.25 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 1.165 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 236 | | | 1.178 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 2.50 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 6.25 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 6.25 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 231 | | | 1.153 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 1.25 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 1.25 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 6.25 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 1.25 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 245 | | | 1.224 |
| 1633 TOP SS Intermediate | Perfluoro-n-(1,2-13C2)octanoic acid | STL00623 | $^{13}C_2$-PFOA | 125 | 0.050 | | 0.625 |
| | Perfluoro-n-(1,2-13C2)undecanoic acid | STL00997 | $^{13}C_2$-PFUnA | 125 | | | 0.625 |
| | Perfluoro-n-(3,4,5-13C3)pentanoic acid | STL03269 | $^{13}C_3$-PFPeA | 125 | | | 0.625 |
| 1633 EIS Intermediate | Perfluoro-n-[13C4]butanoic acid | STL00992 | $^{13}C_4$-PFBA | 400 | 0.050 | | 2.00 |
| | Perfluoro-n-[13C5]pentanoic acid | STL01893 | $^{13}C_5$-PFPeA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid | STL02577 | $^{13}C_5$-PFHxA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4-13C4]heptanoic acid | STL01892 | $^{13}C_4$-PFHpA | 400 | | | 2.00 |
| | Perfluoro-n-[13C8]octanoic acid | STL01052 | $^{13}C_8$-PFOA | 400 | | | 2.00 |
| | Perfluoro-n-[13C9]nonanoic acid | STL02578 | $^{13}C_9$-PFNA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid | STL02579 | $^{13}C_6$-PFDA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid | STL02580 | $^{13}C_7$-PFUnA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2-13C2]dodecanoic acid | STL00998 | $^{13}C_2$-PFDoA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2-13C2]tetradecanoic acid | STL02116 | $^{13}C_2$-PFTeDA | 400 | | | 2.00 |
| | Perfluoro-1-[2,3,4-13C3]butanesulfonic acid | STL02337 | $^{13}C_3$-PFBS | 372 | | | 1.86 |
| | Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid | STL02581 | $^{13}C_3$-PFHxS | 378 | | | 1.89 |
| | Perfluoro-1-[13C8]octanesulfonic acid | STL01054 | $^{13}C_8$-PFOS | 382 | | | 1.91 |
| | Perfluoro-1-[13C8]octanesulfonamide | STL01056 | $^{13}C_8$-PFOSA | 400 | | | 2.00 |
| | N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid | STL02118 | $d_3$-NMeFOSAA | 1000 | | | 5.00 |
| | N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid | STL02117 | $d_5$-NEtFOSAA | 1000 | | | 5.00 |
| | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]hexane sulfonic acid | STL02395 | $^{13}C_2$-4:2FTS | 934 | | | 4.67 |
| | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]octane sulfonic acid | STL02279 | $^{13}C_2$-6:2FTS | 950 | | | 4.75 |
| | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]decane sulfonic acid | STL02280 | $^{13}C_2$-8:2FTS | 958 | | | 4.79 |
| | Tetrafluoro-2-heptafluoropropoxy-13C3-propanoic acid | STL02255 | $^{13}C_3$-HFPO-DA | 400 | | | 2.00 |
| | N-methyl-d7-perfluorooctanesulfonamidoethanol | STL02277 | $d_7$-N-MeFOSE-M | 1000 | | | 5.00 |
| | N-ethyl-d9-perfluorooctanesulfonamidoethanol | STL02278 | $d_9$-N-EtFOSE-M | 1000 | | | 5.00 |
| | N-ethyl-d5-perfluoro-1-octanesulfonamide | STL02704 | $d_5$-NEtPFOSA | 400 | | | 2.00 |
| | N-methyl-d3-perfluoro-1-octanesulfonamide | STL02705 | $d_3$-NMePFOSA | 400 | | | 2.00 |
| | Perfluoropropanoic acid (PFPrA) ($^{13}C_3$) | STL03194 | $^{13}C_3$-PFPrA | 400 | | | 2.00 |
| 1633 NIS Intermediate | Perfluoro-n-[2,3,4-13C3]butanoic acid | STL02680 | $^{13}C_3$-PFBA | 400 | 0.050 | | 2.00 |
| | Perfluoro-n-[1,2,3,4-13C4]octanoic acid | STL00990 | $^{13}C_4$-PFOA | 1000 | | | 5.00 |
| | Perfluoro-n-[1,2-13C2]decanoic acid | STL00996 | $^{13}C_2$-PFDA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4-13C4]octanesulfonic acid | STL00991 | $^{13}C_4$-PFOS | 382 | | | 1.91 |
| | Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid | STL00995 | $^{13}C_5$-PFNA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2-13C2]hexanoic acid | STL00993 | $^{13}C_2$-PFHxA | 1000 | | | 5.00 |
| | Perfluoro-1-hexane[18O2]sulfonic acid | STL00994 | $^{18}O_2$-PFHxS | 378 | | | 1.89 |

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| Attachment 20 - Purchased Standards | | | | | |
|---|---|---|---|---|---|
| Vendor | Cat. No. | Analyte | CAS# | Acronym | Conc. (ng/ml) |
| Wellington | PFBA | Perfluorobutanoic acid | 375-22-4 | PFBA | 50000 |
| Wellington | PFPeA | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 50000 |
| Wellington | PFHxA | Perfluorohexanoic acid | 307-24-4 | PFHxA | 50000 |
| Wellington | PFHpA | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 50000 |
| Wellington | br-PFOA | Perfluorooctanoic acid | 335-67-1 | PFOA | 50000 |
| Wellington | br-PFNA | Perfluorononanoic acid | 375-95-1 | PFNA | 50000 |
| Wellington | PFDA | Perfluorodecanoic acid | 335-76-2 | PFDA | 50000 |
| Wellington | PFUdA | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 50000 |
| Wellington | MPFDOA | Perfluorododecanoic acid | 307-55-1 | PFDoA | 50000 |
| Wellington | PFTrDA | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 50000 |
| Wellington | PFTeDA | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 50000 |
| Wellington | L-PFBS | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 44200 |
| Wellington | L-PFPeS | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 46900 |
| Wellington | br-PFHxSK | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 45500 |
| Wellington | L-PFHpS | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 47600 |
| Wellington | br-PFOSK | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 46600 |
| Wellington | L-PFNS | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 48000 |
| Wellington | L-PFDS | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 48200 |
| Wellington | L-PFDoS | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 48400 |
| Wellington | 4;2 FTS | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 46700 |
| Wellington | 6;2 FTS | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 47400 |
| Wellington | 8;2 FTS | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 47900 |
| Wellington | br-FOSA | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 50000 |
| Wellington | br-NMeFOSA | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 50000 |
| Wellington | br-NEtFOSA | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 50000 |
| Wellington | br-NMeFOSAA | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 50000 |
| Wellington | br-NEtFOSAA | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 50000 |
| Wellington | br-NMeFOSE | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 50000 |
| Wellington | br-NEtFOSE | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 50000 |
| Wellington | HFPO-DA | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 50000 |
| Wellington | NaDONA | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 47100 |
| Wellington | PFEESA | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 44500 |
| Wellington | PF4OPeA | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 50000 |
| Wellington | PF5OHxA | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 50000 |
| Wellington | 3,6-OPFHpA | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 50000 |
| Wellington | 9Cl-PF3ONS | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 46600 |
| Wellington | 11Cl-PF3OUdS | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 47100 |
| Wellington | FPrPA | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 50000 |
| Wellington | FPePA | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 50000 |
| Wellington | FHpPA | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 50000 |
| Wellington | PFECHS | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 46100 |
| Wellington | FBSA-I | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 50000 |
| Wellington | FHxSA-I | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 50000 |
| Wellington | PFPrA | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 50000 |
| Wellington | PFODA | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 50000 |
| AccuStandard | PFOS-030S | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 97900 |
| Wellington | MPFBA | Perfluoro-n-[13C4]butanoic acid | STL00992 | $^{13}C_4$-PFBA | 50000 |
| Wellington | M5PFPeA | Perfluoro-n-[13C5]pentanoic acid | STL01893 | $^{13}C_5$-PFPeA | 50000 |
| Wellington | M5PFHxA | Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid | STL02577 | $^{13}C_5$-PFHxA | 50000 |
| Wellington | M4PFHpA | Perfluoro-n-[1,2,3,4-13C4]heptanoic acid | STL01892 | $^{13}C_4$-PFHpA | 50000 |
| Wellington | M8PFOA | Perfluoro-n-[13C8]octanoic acid | STL01052 | $^{13}C_8$-PFOA | 50000 |
| Wellington | M9PFNA | Perfluoro-n-[13C9]nonanoic acid | STL02578 | $^{13}C_9$-PFNA | 50000 |
| Wellington | M6PFDA | Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid | STL02579 | $^{13}C_6$-PFDA | 50000 |
| Wellington | M7PFUdA | Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid | STL02580 | $^{13}C_7$-PFUnA | 50000 |
| Wellington | MPFDoA | Perfluoro-n-[1,2-13C2]dodecanoic acid | STL00998 | $^{13}C_2$-PFDoA | 50000 |
| Wellington | M2PFTeDA | Perfluoro-n-[1,2-13C2]tetradecanoic acid | STL02116 | $^{13}C_2$-PFTeDA | 50000 |
| Wellington | M3PFBS | Perfluoro-1-[2,3,4-13C3]butanesulfonic acid | STL02337 | $^{13}C_3$-PFBS | 46500 |
| Wellington | M3PFHxS | Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid | STL02581 | $^{13}C_3$-PFHxS | 47300 |
| Wellington | M8PFOS | Perfluoro-1-[13C8]octanesulfonic acid | STL01054 | $^{13}C_8$-PFOS | 47800 |
| Wellington | M8FOSA-I | Perfluoro-1-[13C8]octanesulfonamide | STL01056 | $^{13}C_8$-PFOSA | 50000 |
| Wellington | d3-N-MeFOSAA | N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid | STL02118 | $d_3$-NMeFOSAA | 50000 |
| Wellington | d5-N-EtFOSAA | N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid | STL02117 | $d_5$-NEtFOSAA | 50000 |
| Wellington | M2-4;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]hexane sulfonic acid | STL02395 | $^{13}C_2$-4:2FTS | 46700 |
| Wellington | M2-6;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]octane sulfonic acid | STL02279 | $^{13}C_2$-6:2FTS | 47500 |
| Wellington | M2-8;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]decane sulfonic acid | STL02280 | $^{13}C_2$-8:2FTS | 47900 |
| Wellington | M3HFPO-DA | Tetrafluoro-2-heptafluoropropoxy-13C3-propanoic acid | STL02255 | $^{13}C_3$-HFPO-DA | 50000 |
| Wellington | d7-N-MeFOSE-M | N-methyl-d7-perfluorooctanesulfonamidoethanol | STL02277 | $d_7$-N-MeFOSE-M | 50000 |
| Wellington | d9-N-EtFOSE-M | N-ethyl-d9-perfluorooctanesulfonamidoethanol | STL02278 | $d_9$-N-EtFOSE-M | 50000 |
| Wellington | d-N-MeFOSA-M | N-ethyl-d5-perfluoro-1-octanesulfonamide | STL02704 | $d_5$-NEtPFOSA | 50000 |
| Wellington | d-N-EtFOSA-M | N-methyl-d3-perfluoro-1-octanesulfonamide | STL02705 | $d_3$-NMePFOSA | 50000 |
| Cambridge Isotope | CLM-11324-A-1.2 | Perfluoropropanoic acid (PFPrA) ($^{13}C_3$) | STL03194 | $^{13}C_3$-PFPrA | 50000 |
| Wellington | M3PFBA | Perfluoro-n-[2,3,4-13C3]butanoic acid | STL02680 | $^{13}C_3$-PFBA | 50000 |
| Wellington | MPFOA | Perfluoro-n-[1,2,3,4-13C4]octanoic acid | STL00990 | $^{13}C_4$-PFOA | 50000 |
| Wellington | MPFDA | Perfluoro-n-[1,2-13C2]decanoic acid | STL00996 | $^{13}C_2$-PFDA | 50000 |
| Wellington | MPFOS | Perfluoro-n-[1,2,3,4-13C4]octanesulfonic acid | STL00991 | $^{13}C_4$-PFOS | 47800 |
| Wellington | MPFNA | Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid | STL00995 | $^{13}C_5$-PFNA | 50000 |
| Wellington | MPFHxA | Perfluoro-n-[1,2-13C2]hexanoic acid | STL00993 | $^{13}C_2$-PFHxA | 50000 |
| Wellington | MPFHxS | Perfluoro-1-hexane[18O2]sulfonic acid | STL00994 | $^{18}O_2$-PFHxS | 47300 |
| Wellington | M2PFOA | Perfluoro-n-(1,2-13C2)octanoic acid | STL00623 | $^{13}C_2$-PFOA | 50000 |
| Wellington | MPFUdA | Perfluoro-n-(1,2-13C2)undecanoic acid | STL00997 | $^{13}C_2$-PFUnA | 50000 |
| Wellington | M3PFPeA | Perfluoro-n-(3,4,5-13C3)pentanoic acid | STL03269 | $^{13}C_3$-PFPeA | 50000 |
| Sigma Aldrich | T0557-500MG | Taurodeoxycholic acid | 516-50-7 | TDCA | neat |
| Sigma Aldrich | T6260-1G | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | neat |
| Calbiochem | 580549-1GM | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | neat |

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**ATTACHMENT 22**

Table 5. IPR/OPR/LLOPR Acceptance Limits for Target Analytes in Aqueous Matrices[1]

| Target Analyte | IPR[2] | | OPR/LLOPR Recovery (%)[2] |
|---|---|---|---|
| | Mean Recovery (%) | RSD (%) | |
| PFBA | 70 - 135 | 21 | 70 - 140 |
| PFPeA | 70 - 135 | 23 | 65 - 135 |
| PFHxA | 70 - 135 | 24 | 70 - 145 |
| PFHpA | 70 - 135 | 28 | 70 - 150 |
| PFOA | 65 - 155 | 27 | 70 - 150 |
| PFNA | 70 - 140 | 28 | 70 - 150 |
| PFDA | 65 - 140 | 26 | 70 - 140 |
| PFUnA | 70 - 135 | 29 | 70 - 145 |
| PFDoA | 70 - 130 | 21 | 70 - 140 |
| PFTrDA | 60 - 145 | 29 | 65 - 140 |
| PFTeDA | 70 - 145 | 27 | 60 - 140 |
| PFBS | 70 - 140 | 23 | 60 - 145 |
| PFPeS | 70 - 135 | 25 | 65 - 140 |
| PFHxS | 70 - 135 | 27 | 65 - 145 |
| PFHpS | 70 - 140 | 30 | 70 - 150 |
| PFOS | 70 - 140 | 29 | 55 - 150 |
| PFNS | 70 - 135 | 29 | 65 - 145 |
| PFDS | 70 - 135 | 30 | 60 - 145 |
| PFDoS | 45 - 135 | 35 | 50 - 145 |
| 4:2FTS | 70 - 135 | 27 | 70 - 145 |
| 6:2FTS | 70 - 135 | 32 | 65 - 155 |
| 8:2FTS | 70 - 140 | 33 | 60 - 150 |
| PFOSA | 70 - 135 | 22 | 70 - 145 |
| NMeFOSA | 70 - 135 | 30 | 60 - 150 |
| NEtFOSA | 70 - 130 | 26 | 65 - 145 |
| NMeFOSAA | 65 - 140 | 32 | 50 - 140 |
| NEtFOSAA | 70 - 135 | 28 | 70 - 145 |
| NMeFOSE | 70 - 135 | 29 | 70 - 145 |
| NEtFOSE | 70 - 130 | 21 | 70 - 135 |
| HFPO-DA | 70 - 135 | 23 | 70 - 140 |
| ADONA | 70 - 135 | 23 | 65 - 145 |
| PFMPA | 60 - 140 | 23 | 55 - 140 |
| PFMBA | 65 - 145 | 27 | 60 - 150 |
| NFDHA | 65 - 140 | 37 | 50 - 150 |
| 9Cl-PF3ONS | 70 - 145 | 30 | 70 - 155 |
| 11Cl-PF3OUdS | 50 - 150 | 35 | 55 - 160 |
| PFEESA | 70 - 135 | 25 | 70 - 140 |
| 3:3FTCA | 70 - 130 | 23 | 65 - 130 |
| 5:3FTCA | 70 - 130 | 24 | 70 - 135 |
| 7:3FTCA | 55 - 130 | 34 | 50 - 145 |

[1] Limits apply to the IPR, OPR, and LLOPR analyses associated with all aqueous matrices, including wastewater, surface water, groundwater, and landfill leachates.

[2] The recovery and RSD limits apply to the target analyte results for IPR, OPR, and LLOPR samples associated with all aqueous matrices. Data were derived from the multi-laboratory validation study and are therefore the limits required for this method.

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| Table 6. Acceptance Limits for EIS and NIS Compounds in All Aqueous Matrices and Associated QC Samples | | |
|---|---|---|
| | Aqueous Matrices Other Than Leachates[2] | Landfill Leachates[3] |
| EIS Compound[1] | Recovery (%) | Recovery (%) |
| $^{13}C_4$-PFBA | 5[4] - 130 | 5[4] - 130 |
| $^{13}C_5$-PFPeA | 40 - 130 | 40 - 130 |
| $^{13}C_5$-PFHxA | 40 - 130 | 40 - 130 |
| $^{13}C_4$-PFHpA | 40 - 130 | 40 - 130 |
| $^{13}C_8$-PFOA | 40 - 130 | 40 - 130 |
| $^{13}C_9$-PFNA | 40 - 130 | 40 - 130 |
| $^{13}C_6$-PFDA | 40 - 130 | 40 - 130 |
| $^{13}C_7$-PFUnA | 30 - 130 | 40 - 130 |
| $^{13}C_2$-PFDoA | 10 - 130 | 35 – 130 |
| $^{13}C_2$-PFTeDA | 10 - 130 | 25 – 130 |
| $^{13}C_3$-PFBS | 40 - 135 | 40 - 130 |
| $^{13}C_3$-PFHxS | 40 - 130 | 40 - 130 |
| $^{13}C_8$-PFOS | 40 - 130 | 40 - 130 |
| $^{13}C_2$-4:2FTS | 40 - 200 | 40 – 220 |
| $^{13}C_2$-6:2FTS | 40 - 200 | 40 – 170 |
| $^{13}C_2$-8:2FTS | 40 - 300 | 40 – 145 |
| $^{13}C_8$-PFOSA | 40 - 130 | 40 – 130 |
| $D_3$-NMeFOSA | 10 - 130 | 40 – 130 |
| $D_5$-NEtFOSA | 10 - 130 | 35 - 130 |
| $D_3$-NMeFOSAA | 40 - 170 | 35 - 130 |
| $D_5$-NEtFOSAA | 25 - 135 | 30 - 130 |
| $D_7$-NMeFOSE | 10 - 130 | 20 - 130 |
| $D_9$-NEtFOSE | 10 - 130 | 20 - 130 |
| $^{13}C_3$-HFPO-DA | 40 - 130 | 40 - 130 |
| $^{13}C_3$-PFBA | 50 - 200 | 50 - 200 |
| $^{13}C_2$-PFHxA | | |
| $^{13}C_4$-PFOA | | |
| $^{13}C_5$-PFNA | | |
| $^{13}C_2$-PFDA | | |
| $^{18}O_2$-PFHxS | | |
| $^{13}C_4$-PFOS | | |

[1] The recovery limits for the EIS compounds were derived by EPA from the data from multi-laboratory validation study. To simplify laboratory operations, EPA has applied the same EIS recovery limits used for field sample analyses to the EIS recoveries in the method blank, IPR, OPR, and LLOPR samples. There are no IPR mean or RSD criteria for the EIS compounds.

[2] Limits apply to the EIS and NIS recoveries from samples of aqueous matrices, including wastewater, surface water, and groundwater, but **not** landfill leachates.

[3] Limits apply to the EIS and NIS recoveries from samples of landfill leachates, **not** other aqueous matrices.

[4] Recovery of $^{13}C_4$-PFBA can be problematic in some field samples. Although the lower limit for recovery for this EIS is set below 10%, laboratories should routinely track recovery of this EIS and take reasonable steps to ensure that recovery is at least 10% in the majority of samples.

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|---|---|---|
| eurofins | Always check on-line for validity.<br>**Solid PFAS Prep by Sonication and Analysis by LC-MS-MS by EPA 1633 and EPA 1633A** | Level:<br>**Work Instruction** |
| Document number:<br>**T-PFAS-WI72213** | | |
| Old Reference: | | |
| Version:<br>**5** | | Organisation level:<br>**5-Sub-BU** |
| Approved by: **TYZ8**<br>Effective Date: **11-MAR-2025** | Document users:<br>**5_EUUSLA_PFAS_Manager, 6_EUUSLA_PFAS_Analyst, 6_EUUSLA_PFAS_BKK_Data_Reviewers, 6_EUUSLA_PFAS_Data_Reviewers, 6_EUUSLA_PFAS_Management_Team, 6_EUUSLA_PFAS_Sample_Prep** | Responsible:<br>**5_EUUSLA_PFAS_Manager** |


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## Revision Log

| | **Revision:** 05 | **Effective date:** This version |
|---|---|---|
| **Section** | **Justification** | **Changes** |
| Revision Log | Formatting requirement | Removed revision logs up to the previous version |
| Cross Reference | Enhancement | Added Moisture form, QC rotation form |
| Sample Collection, Preservation, and Handling | Clarification | Clarified sample container |
| Reagents and Standards | Enhancement | Added sand |
| Procedure A | Enhancement | Added an additional centrifugation step. Added Data Types. Added uncertainty to biosolid weights. Added requirement to check sonicator water level. Added solvents to clean manifold ports. Added drip rate. |

| | **Revision:** 04 | **Effective date:** 31.OCT.2024 |
|---|---|---|
| **Section** | **Justification** | **Changes** |
| Revision Log | Formatting requirement | Removed revision logs up to the previous version |
| Apparatus and Equipment | Enhancement | Added missing vendors. Standards are stored in the dark. |
| Calibration | Enhancement | CCVs are run every 10 injections of field sample extracts |
| Reagents and Standards | Enhancement | Added missing vendors. |
| Procedure A, B, C | Clarification | Clarified prep procedure |
| Procedure D | Clarification | removed references to Cal0. Added additional ICB in sequence. Rearranged section. |
| Procedure E | Enhancement | Added section to address dilutions |
| QA/QC | Clarification | IAR ratio is based off the mid-point CCV standard |
| Attachments | Clarification | Updates to Att 01, 02, 11,12, 16 |

## Reference

1. USEPA Method 1633, Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS, January 2024.

2. USEPA Method 1633 Revision A, Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS, December 2024.

3. Chemical Hygiene Plan, current version.

## Cross Reference

| Document | Document Title |
|---|---|
| *T-PFAS-WI21568* | Environmental Monitoring in the PFAS Lab |
| *T-PEST-WI9847* | Common Equations Used During Chromatographic Analyses |
| *QA-SOP11178* | Demonstrations of Capability |
| *QA-SOP11892* | Determining Method Detection Limits and Limits of Quantitation |
| *T-PFAS-WI23588* | Preventative and Corrective Maintenance for the AB Sciex Liquid Chromatograph Mass Spectrometers (LC-MS/MS) |
| *G-DC-FRM23907* | Redacted SOPs |
| *T-PFAS-FRM74731* | D4033 - Moisture Calculation |

## Scope

This method is applicable for the determination of selected per- and polyfluorinated alkyl substances (PFAS) in solid samples to include solids and biosolids. The compounds analyzed in this method are

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listed in the table below. The most current MDLs and LOQs are listed in the LIMS. Compounds other than those listed may be analyzed by client request.

| Analyte | Acronym | CAS# |
|---|---|---|
| Perfluorobutanoic acid | PFBA | 375-22-4 |
| Perfluoropentanoic acid | PFPeA | 2706-90-3 |
| Perfluorohexanoic acid | PFHxA | 307-24-4 |
| Perfluoroheptanoic acid | PFHpA | 375-85-9 |
| Perfluorooctanoic acid | PFOA | 335-67-1 |
| Perfluorononanoic acid | PFNA | 375-95-1 |
| Perfluorodecanoic acid | PFDA | 335-76-2 |
| Perfluoroundecanoic acid | PFUnA | 2058-94-8 |
| Perfluorododecanoic acid | PFDoA | 307-55-1 |
| Perfluorotridecanoic acid | PFTrDA | 72629-94-8 |
| Perfluorotetradecanoic acid | PFTeDA | 376-06-7 |
| Perfluorobutanesulfonic acid | PFBS | 375-73-5 |
| Perfluoropentanesulfonic acid | PFPeS | 2706-91-4 |
| Perfluorohexanesulfonic acid | PFHxS | 355-46-4 |
| Perfluoroheptanesulfonic acid | PFHpS | 375-92-8 |
| Perfluorooctanesulfonic acid | PFOS | 1763-23-1 |
| Perfluorononanesulfonic acid | PFNS | 68259-12-1 |
| Perfluorodecanesulfonic acid | PFDS | 335-77-3 |
| Perfluorododecanesulfonic acid | PFDoS | 79780-39-5 |
| 1H,1H,2H,2H-Perfluorohexane sulfonic acid | 4:2 FTS | 757124-72-4 |
| 1H,1H,2H,2H-Perfluorooctane sulfonic acid | 6:2 FTS | 27619-97-2 |
| 1H,1H,2H,2H-Perfluorodecane sulfonic acid | 8:2 FTS | 39108-34-4 |
| Perfluorooctanesulfonamide | PFOSA | 754-91-6 |
| N-methylperfluorooctane sulfonamide | NMeFOSA, N-MePFOSA | 31506-32-8 |
| N-ethylperfluorooctane sulfonamide | NEtFOSA, N-EtPFOSA | 4151-50-2 |
| N-methylperfluorooctanesulfonamidoacetic acid | NMeFOSAA | 2355-31-9 |
| N-ethylperfluorooctanesulfonamidoacetic acid | NEtFOSAA | 2991-50-6 |
| N-methylperfluorooctane sulfonamidoethanol | NMeFOSE, NMePFOSAE | 24448-09-7 |
| N-ethylperfluorooctane sulfonamidoethanol | NEtFOSE, NEtFOSAE | 1691-99-2 |
| Hexafluoropropylene Oxide Dimer Acid | HFPO-DA, GenX | 13252-13-6 |
| 4,8-Dioxa-3H-perfluorononanoic acid | ADONA | 919005-14-4 * |
| Perfluoro-3-methoxypropanoic acid | PFMPA, PFECA F | 377-73-1 |

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| Analyte | Acronym | CAS# |
|---|---|---|
| Perfluoro-4-methoxybutanoic acid | PFMBA, PFECA A | 863090-89-5 |
| Nonafluoro-3,6-dioxaheptanoic acid | NFDHA, PFECA B | 151772-58-6 |
| 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 9Cl-PF3ONS | 756426-58-1 |
| 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 11Cl-PF3OUdS | 763051-92-9 |
| 3-Perfluoropropylpropanoic acid | 3:3 FTCA | 356-02-5 |
| 3-Perfluoropentylpropanoic acid | 5:3 FTCA | 914637-49-3 |
| 3-Perfluoroheptylpropanoic acid | 7:3 FTCA | 812-70-4 |
| Perfluoro (2-ethoxyethane) sulfonic acid | PFEESA, PES | 113507-82-7 |
| Perfluoro-4-ethylcyclohexanesulfonic acid | PFECHS | 133201-07-7 |
| Perfluorobutylsulfonamide | FBSA | 30334-69-1 |
| Perfluorohexanesulfonamide | FHxSA | 41997-13-1 |

*CAS# for the free acid form of the analyte

## Basic Principles

A solid sample is fortified with isotopically-labeled extraction standards. The sample is sonicated, centrifuged, and the supernatant decanted. Carbon cleanup is performed on each sample extract. Sample extract is diluted to volume and then concentrated. The sample is then passed through a solid phase extraction (SPE) cartridge to extract the analytes. The compounds are eluted from the solid phase with a combination of solvents. The extract is fortified with Isotopically-labeled injection internal standards. It is then analyzed by LC/MS/MS operated in negative electrospray ionization (ESI) mode for detection and quantification of the analytes. Quantitative analysis is performed using isotope dilution.

## Interferences

Compounds which have similar structures to the compounds of interest and similar molecular weights would potentially interfere. Method interferences may be caused by contaminants in solvents, reagents (including reagent water), sample bottles and caps, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. The analytes in this method can also be found in many common laboratory supplies and equipment, such as PTFE (polytetrafluoroethylene) products, LC solvent lines, methanol, aluminum foil, etc. A laboratory blank is performed with each batch of samples to demonstrate that the extraction system is free of contaminants.

## Precaution to Minimize Method Interference

1. LC system components contain many of the target analytes. To minimize the background PFAS peaks, PTFE solvent frits and tubing are replaced by PEEK™ solvent frits and tubing where possible.

2. A precolumn, Proprietary Content, is installed before the injection valve to separate PFAS in standards/samples from those from the LC system and mobile phases.

3. All parts of the SPE manifold must be cleaned as per *T-PFAS-WI21568*.

## Safety Precautions and Waste Handling

See *Chemical Hygiene Plan* for general information regarding employee safety, waste management, and pollution prevention.

The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined. PFOA has been described as "likely to be carcinogenic to humans". Each chemical should be treated as a potential health hazard and exposure to these chemicals should be minimized.

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Exposure to these chemicals must be reduced to the lowest possible level by whatever means available, such as fume hoods, lab coats, safety glasses, and gloves. Gloves, lab coats, and safety glasses should be worn when preparing standards and handling samples. Avoid inhaling solvents and chemicals and getting them on the skin. Wear gloves when handling neat materials. When working with acids and bases, take care not to come in contact and to wipe any spills. Always add acid to water when preparing reagents containing concentrated acids.

All laboratory waste is accumulated, managed, and disposed of in accordance with all Federal, State, and local laws and regulations. All solvent waste and extracts are collected in approved solvent waste containers in the laboratory and subsequently emptied by personnel trained in hazardous waste disposal into the lab-wide disposal facility. HPLC vials are disposed of in the lab container for waste vials, and subsequently lab packed. Any solid waste material (disposable pipettes and broken glassware, etc.) may be disposed of in the normal solid waste collection containers.

## Personnel Training and Qualifications

All personnel performing this procedure must have documentation of reading, understanding, and agreeing to follow the current version of this SOP and an annual documented Demonstration of Capability (DOC).

Each chemist performing the extraction must work with an experienced employee for a period of time until they can independently perform the extraction. Also, several batches of sample extractions must be performed under the direct observation of another experienced chemist to assure the trainee is capable of independent preparation. Proficiency is measured through a documented Initial Demonstration of Capability (IDOC).

Each LC/MS/MS analyst must work with an experienced employee for a period of time until they can independently calibrate the LC/MS/MS, review and process data, and perform maintenance procedures. Proficiency is measured through a documented Initial Demonstration of Capability (IDOC).

The IPR (IDOC) and the DOC consist of 4 laboratory control samples (or alternatively, one blind sample for the DOC) that are spiked at the LCS level and carried through all steps of the extraction and analysis. Using results of the set of four analyses, compute the average percent recovery and the relative standard deviation (RSD) of the concentration for each analyte.

- For each target, the RSD and percent recovery must meet the criteria in Table 7. If any individual RSD exceeds the precision limit or any individual percent recovery falls outside the range for recovery for a target, system performance is unacceptable for that compound. Correct the problem and repeat the test.

- For each EIS and NIS, the percent recovery must meet the criteria defined in Table 8. There are is no RSD criteria for the EIS or NIS. If any individual percent recovery falls outside the range for an EIS or NIS, system performance is unacceptable for that compound. Correct the problem and repeat the test.

See *QA-SOP11178* for additional information on IDOC and DOC.

## Sample Collection, Preservation, and Handling

A. Sample Collection

The samples are collected in 4-oz HDPE specimen containers with polyethylene screw caps. Keep the sample sealed from time of collection until extraction.

**NOTE:** PFAS contamination during sampling can occur from a number of common sources, such as food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will aid in minimizing this type of accidental contamination of the samples.

B. Sample Storage and Shipment

1. Solid and Biosolid samples must be chilled during shipment and must not exceed 6°C during the first 48 hours after collection. Sample temperature must be confirmed to be at 0° to 6°C when the samples are received at the laboratory.

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2. Solid and Biosolid samples stored in the lab must be protected from light and held at a temperature of 0° to 6°C, or less than or equal to -20°C, until extraction.

3. Solid and Biosolid samples must be extracted within 90 days.

**NOTE:** Biosolid samples stored under refrigeration may produce gases that may cause sample to be expelled from the container when opened. This may produce noxious odors. It is recommended to store frozen if extraction will not occur for a few days.

4. Extracts must be analyzed within 28 days after extraction when stored at a temperature of 0° to 6°C, not frozen, and protected from light. Extracts must be analyzed within 90 days after extraction when stored at a temperature less than or equal to -20°C and protected from light.

## Apparatus and Equipment

A. Apparatus

1. Specimen container; PP; natural; graduated; non-sterile; separate 1/4-turn red screwcap; 4 oz. Greenwood Products, Inc., Part No. HP30011 or equivalent

Note: One bottle per lot must be tested and demonstrated to be PFAS-free at or below the laboratory's MDLs for all target analytes. See *T-PFAS-WI21568* for additional details.

2. Centrifuge tubes, 15-mL conical polypropylene with polypropylene screw caps. Fisher Scientific, Catalog No. 05-539-5 or equivalent.

3. HDPE bottles for extraction fluid storage, 1L. Environmental Sampling Supply, Catalog No. 1000-1902-PC or equivalent.

4. Analytical Balance – Capable of weighing to 0.0001 g

5. Top-Loading Balance – Capable of weighing to 0.01 g

6. Solid phase extraction (SPE) Cartridge; Proprietary Content or equivalent.

7. GCB filter cartridge, Proprietary Content or equivalent.

8. Large-volume SPE Reservoir, 25-mL. Millipore-Sigma, Product No. 54258-U or equivalent.

9. SPE Tube Adapter. Millipore-Sigma, Catalog No. 57020-U or equivalent.

10. SPE vacuum extraction manifold – "Resprep" 24-port manifold. Restek, Catalog No. 26080 or equivalent.

11. Polypropylene SPE delivery needles. Agilent, Catalog No. 12234511 or equivalent.

12. Centrifuge, capable of a minimum rotational force of 3500 rcf, rotor radius 19.5 cm. Sorvall ST4 Plus-MD; Fisher Scientific, Catalog No. 75009510 or equivalent.

13. Auto Pipettes, Eppendorf Repeater, capable of accurately dispensing 10- to 1000-µL. Fisher Scientific, Catalog No. 14-287-150 or equivalent.

14. Polypropylene pipette tips, 0.1-200 µL. Fisher Scientific, Catalog No. 02-681-135 or equivalent.

15. Polypropylene pipette tips, 101-1000 µL. Fisher Scientific, Catalog No. 02-707-507 or equivalent.

16. Polypropylene pipette tips, 1 – 10 mL. Eppendorf, Catalog No. 022492098 or equivalent.

17. Pipettes, disposable transfer. Fisher Scientific, Catalog No. 13-711-7M or equivalent.

18. Vortex mixer, variable speed, Fisher Scientific or equivalent.

19. N-Evap sample extract concentrator with $N_2$ supply and water bath for temperature control. Organomation, Inc., Catalog No. 11250, or equivalent.

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20. Reagent Water Purification System: Capable of producing ultrapure "Type 1/Milli-Q"-grade water from in-house deionized water system. Millipore SAS, Catalog No. FTPF08831.

21. SureStart Polyspring inserts. Fisher Scientific, Catalog No. 03452340 or equivalent.

22. Short-Cap Vial with Grad Marking Spot, 9-425 Screw-Thread, 2.0 mL, 9 mm, Clear. Restek, Catalog No. 21141 or equivalent.

23. Short Screw Caps, Polypropylene, Screw-Thread, PTFE/Silicone Septa, Blue, Preassembled, 2.0 mL, 9 mm. Restek, Catalog No. 24485 or equivalent.

24. Centrifuge tubes, 50-mL conical polypropylene with polypropylene screw caps. Fisher Scientific, Catalog No. 06-443-21 or equivalent.

25. Polypropylene bottles for standard storage, 4 mL. Fisher Scientific, Catalog No. 2006-9125 or equivalent.

26. Stainless steel spatula/scoop set. Bel-Art SP Scienceware, Product No. 11-865-130 or equivalent.

27. pH paper, Hydrion, range 5.5-8.0. Fisher Scientific, Catalog No. 14-853-275 or equivalent.

28. Syringe filter, 25 mm Syringe Filter, 0.22 um, 100-pk. Restek, Catalog No. 26148 or equivalent.

29. Sonicator bath - Branson 3800 or equivalent.

30. Wooden Tongue Depressors. Fisher Scientific, Catalog No. 11-700-555 or equivalent.

31. Mobile phase bottles, 5 L. Fisher Scientific, Catalog No. 064141F or equivalent.

B. Equipment

1. AB Sciex Triple Quad 5500/5500+ Turbo V Ion Source or equivalent.

   ExionLC Controller
   ExionLC AC Pump
   ExionLC AC Autosampler
   Exion AC Column Oven
   Data system – Analyst 1.6.3

2. AB Sciex Triple Quad 7500 QTRAP Ready or equivalent.

   Shimadzu DGU-405 Degasser
   Shimadzu LC-40D XR Pump A
   Shimadzu LC-40D XR Pump B
   Shimadzu SIL-40C XR Autosampler
   Shimadzu CBM-40 Controller
   Shimadzu CTO-40C Column Oven
   Data system – Sciex OS (Version 3.1.6.44)

3. Automated extractor, Proprietary Content or equivalent

4. HPLC columns

   a. Analytical column: Proprietary Content or equivalent.
   b. Pre-column: Proprietary Content or equivalent.

## Reagents and Standards

All solvents, acids, and bases are stored in glass bottles in flammable proof cabinets or pressure resistant steel drums. Solvents, acids, and bases are stored at ambient temperature for up to 1 year. All non-solvents are stored according to manufacturer's storage conditions.

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A. Reagents

1. Methanol (MeOH), "Chromasolv LC-MS" grade. Honeywell, Catalog No. 34966-4X4L or equivalent.
2. Acetonitrile (ACN). J.T. Baker, Catalog No. 9012-03 or equivalent.
3. Ammonium acetate. Sigma Aldrich, Catalog No. 431311-250G or equivalent. Store at 0-6°C.
4. Proprietary Content or equivalent. Store at room temperature.
    a. Proprietary Content Store at room temperature. Replace after 3 months.
    b. Proprietary Content Store at room temperature. Replace after 1 month.
    c. Proprietary Content. Store at room temperature. Replace after 1 month.
5. 30:70 (v/v) Methanol:Water – Add methanol (300 mL) to water (700 mL). Store at room temperature. Replace after 1 month.
6. Methanol with 5% water - Add reagent water (50 mL) to methanol (950 mL). Store at room temperature. Replace after 1 month.
7. Acetic Acid, ACS grade. Sigma Aldrich, Catalog No. 695092-100mL or equivalent. Store at room temperature.
    a. Acetic Acid (0.1% v/v) – Dissolve acetic acid (1 mL) in reagent water (1 L). Store at room temperature. Replace after 3 months.
8. Formic Acid, ACS-grade. Sigma, Catalog No. 33015-1L or equivalent.
    a. Formic acid (aqueous, 0.1 M) - Dissolve formic acid (4.6 g or 3.8 mL) in reagent water (1 L). Store at room temperature. Replace after 2 years
    b. Formic acid (aqueous, 0.3 M) - Dissolve formic acid (13.8 g or 11.3 mL) in reagent water (1 L). Store at room temperature. Replace after 2 years
    c. Formic acid (aqueous, 5% v/v) - Mix 5 mL formic acid with 95 mL reagent water. store at room temperature. Replace after 2 years
    d. Formic acid (aqueous, 50% v/v) - Mix 50 mL formic acid with 50 mL reagent water. Store at room temperature. Replace after 2 years.
9. Proprietary Content or equivalent. Store at room temperature. Replace 1 year after opening.
    a. Proprietary Content. Store at room temperature. Expires 1 month after preparation.
10. Sand - Sigma-Aldrich, Part No. 274739-5Kg or equivalent.
11. Mobile Phase A: Proprietary Content. Store at room temperature for up to 2 months. Different volumes can be prepared as long as final concentrations are equivalent.
12. Mobile Phase B: 100% acetonitrile into a 2-L glass mobile phase bottle. Store at room temperature for up to 2 months.

B. Standards

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Standards are prepared using calibrated pipettes, polypropylene microcentrifuge tubes, and polypropylene bottles to create solutions at desired concentrations. The concentrated solution is injected below the surface of the diluting solvent. After preparation is completed, standards should be vortexed to ensure complete mixing. Measurement of volumes less than 5 µl should be avoided in routine production operations.

All stock, intermediate and spiking solutions are prepared using methanol. All initial calibration, initial calibration verification, and linear branched working standard solutions are prepared using Proprietary Content.

All diluted solutions must be stored in HDPE containers that have been thoroughly rinsed with methanol.

Stock standard and intermediate standard solutions are stored in the dark in the refrigerator in labeled polypropylene screw-top vials, polypropylene bottles, or polypropylene centrifuge tubes.

Expiration dates are managed through LIMS Reagent module. Solutions transferred from sealed glass ampules to screw-capped vials are given expiration dates of 1 year from the date opened or the expiration date provided by the vendor, whichever occurs sooner. Intermediate solutions are given an expiration date of 6 months from the preparation date, or the expiration date from the ampule provided by the vendor, whichever occurs sooner. The ampules and transferred solutions are stored in the refrigerator in the dark.

Working native and labeled (extraction surrogate and internal standard) compound spiking solutions are given an expiration date of 6 months, or the expiration date of the solutions used to prepare the working solution, whichever occurs sooner. The solutions are stored in labeled polypropylene screw-top vials in the refrigerator in the dark. When these solutions are prepared they must be tested prior to use in the PFAS extraction lab and verified monthly until they are consumed by operations or expire. Records of the standard verification are maintained by the laboratory. Prior to use, the working spiking solution should be evaluated against recovery windows of 85-115% for all compounds that will be analyzed using that solution. Should a standard fail to meet these criteria, the data must be reviewed by departmental management for acceptability and/or corrective action.

Working initial calibration solutions are given an expiration date of 6 months, or the expiration date of the solutions used to prepare the working initial calibration solution, whichever occurs sooner.

The primary/preferred standard vendor is Wellington Laboratories, Inc. Ontario, Canada. Listed catalog numbers are taken from Wellington product lists. Equivalent standards may be substituted, if the listed standards are unavailable.

The solution concentration listed is as presented on the certificate of analysis and includes adjustment for purity and the salt form of the compound used.

The concentrations referenced for the sulfonate salts, (for example PFBS, PFHxS and PFOS) have already been corrected to the acid form by the standards supplier as noted in the example Certificate of analysis (CofA). See Attachment 4. If the compound purity is assayed to be 98% or greater, weight can be used without correction to calculate concentrations.

Log purchased standards into LIMS Reagent. Select the solution category SOURCE for purchased mixes and/or single-compound ampules. LIMS Reagent system will assign formatted names to the purchased standard solutions. The automatically-generated name can be overwritten with a manually created name if desired. Use labels printed through the LIMS Reagent to identify and track standard solutions after transfer from original ampule to storage vial. The CofA for the ampulated stock standard is attached in LIMS Reagent for reference.

Standards are prepared by transferring a known quantity of Standard to a final volume of solvent. Standard Preparation is documented in LIMS Reagent. Solutions are stored by Type in LIMS Reagent, i.e., INTERMEDIATE=working solutions and intermediate standards and SOURCE=stocks (ampulated solutions). Each Standard is given a unique name.

The following attachments provide examples of standard preparation and purchasing information. Refer to the documentation in LIMS Reagent for standards preparation information.

*Attachment 05* - 1633 Native PFAS Intermediate A
*Attachment 06* - 1633 Native PFAS Intermediate B
*Attachment 07* - 1633 Native PFAS CAL8 Intermediate
*Attachment 08* - 1633 Extracted Internal Standard Intermediate

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*Attachment 09* - 1633 Non-Extracted Internal Standard Intermediate
*Attachment 10* - 1633 TOP Surrogate Intermediate
*Attachment 11* - 1633 ICAL Standard Preparation Scheme
*Attachment 12* - 1633 Initial Calibration Standard Concentrations
*Attachment 13* - Bile Salts Stock Solution
*Attachment 14* - Bile Salts Intermediate
*Attachment 15* - Bile Salts Working Solution
*Attachment 16* - 1633 WDM Standard
*Attachment 17* - 1633 Native Mid-Level Spike
*Attachment 18* - 1633 Native Low-Level Spike
*Attachment 19* - 1633 ICV Working Standard
*Attachment 20* - 1633 Purchased/Ampulated Standards

## Calibration

A. Mass Calibration

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| Calibration - at least annually or as recommended by the instrument manufacturer, whichever is more frequent, to maintain instrument sensitivity and stability. | Per manufacturer recommendations. Optimize the precursor and product ions in *Attachment 01* | Repeat as needed. |
| Verification - on an as-needed basis (e.g., QC failures, ion masses fall outside of the required mass window, major instrument maintenance, or if the instrument is moved) prior to the analysis of any standards and samples and after each subsequent mass calibration. | Resolution must meet manufacturer recommendations.<br><br>The mass assignments must be within ±0.2 amu of the values shown in *Attachment 01*. | Recalibrate as needed. Otherwise, proceed to ICAL. |

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B. Chromatographic conditions

The mass spectral acquisition rate must include a minimum of 10 spectra scans across each chromatographic peak. See the AB Sciex (5500/5500 Plus/7500) Acquisition, Quantitation, Gradient, and Detector Condition files for the most up to date chromatographic conditions. An example acquisition method and chromatographic conditions are shown in *Proprietary* . Modifications to these conditions can be made at the discretion of the analyst to improve resolution or the chromatographic process. All injections must use the same parameters as used in the ICAL.

C. Retention Time Calibration

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| once per ICAL and at the beginning of the analytical sequence | EIS, and NIS peaks shall be set using the midpoint standard of the ICAL curve when ICAL is performed. When an ICAL is not performed, the initial CV retention times or the midpoint standard of the ICAL curve can be used to establish the RT window position.<br><br>The RTs for the target analytes, EIS, and NIS compounds must fall within 0.4 minutes of the predicted retention times from the midpoint standard of the ICAL or initial CV, whichever was used to establish the RT window position for the analytical batch. All branched isomer peaks identified in either the calibration standard or the qualitative (technical grade) standard also must fall within 0.4 minutes of the predicted retention times from the midpoint standard of the ICAL or initial CV.<br><br>For all target analytes with exact corresponding isotopically labeled analogs, target analytes must elute within 0.1 minutes of the associated EIS compound. | Recalibrate. |

D. Initial Calibration

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| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| Prior to the analysis of samples, and after the mass calibration verification has met all criteria<br><br>whenever the laboratory takes an action that changes the chromatographic conditions or might change or affect the initial calibration criteria<br><br>when either the CV or Instrument Sensitivity Check (ISC) acceptance criteria have not been met. | A minimum of six calibration standards are required when using an average or linear curve fit. A minimum of seven calibration standards are required for a second-order curve fit (quadratic). The lowest standard must be at or below the RL. In general, Cal1 (at the RL), Cal2, Cal3, Cal4, Cal5, Cal6, Cal7, and Cal8 are included in the initial calibration.<br><br>S/N ratio for the lowest standard within the quantitation range must be greater than or equal to 3:1 for quantification ions and the confirmation ions, or greater than or equal to 10:1 if the analyte only has a quantification ion.<br><br>To use Average Response Factor:<br>• %RSD for the response factors is less than or equal to 20%<br>• if greater than 20%, try a Linear Regression.<br><br>To use Linear Regression with a concentration weighing factor of 1/x:<br>• The %RSE for all method analytes must be less than or equal to 20%.<br>• if greater than 20%, try a Quadratic fit.<br><br>To use Quadratic fit with a concentration weighing factor of $1/x^2$:<br>• The %RSE for all method analytes must be less than or equal to 20%.<br><br>For all curve fits, each calibration point is calculated back against the curve. The back calculated concentration for each calibration point must be within ±30% of its true value. | If the criteria are not met, the source of the problem must be determined and corrected.<br><br>Situations may exist where the initial calibration can be used. In those cases, the data will be reported with a qualifying comment. |

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E. Initial Calibration Verification (ICV)

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| After ICAL prior to analyzing samples | ICV must be prepared from a second source. If a second source is not available, a separate preparation from the same stock (including intermediates) by a second analyst may be used.<br><br>The calculated amount for each analyte must be within ±30% of the true value. | If this criteria is not met, re-inject or remake the standard. If the criteria is still not met, recalibration is necessary. Instrument maintenance may be needed prior to recalibrating. |

F. Calibration Verification (CV)

| Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|
| Once the calibration curve has been established, the continuing accuracy must be verified by analysis of a continuing calibration verification (CCV) standard at the beginning of each analytical sequence, every ten injections of a field sample extract, and at the end of the analytical sequence. | The calculated amount for each native in the CCV standard must be within ±30% of the true value.<br><br>The absolute areas of the injection internal standard must be greater than 30% of the average areas measured during the initial calibration. | Samples that are not bracketed by acceptable CCV analyses must be reanalyzed. The exception to this would be if the CCV recoveries are high, indicating increased sensitivity, and there are no positive detections in the associated samples, the data may be reported with a qualifying comment. The source of the problem must be determined and the system recalibrated before continuing sample analysis. |

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## Procedure

Data Types are included in brackets. If a Data Type is not needed (for example, no reagents were needed for pH adjustment), "NA" may be used.

## A) Solid Sample Preparation

NOTE: Prior to weighing out samples, thoroughly mix each sample using a separate wooden tongue depressor or stainless steel spoon to ensure a homogeneous sample matrix. Stir from the bottom to the top in a circular motion along the sides of the jar, breaking particles to less than 1 mm by pressing against the side of the container. Remove rocks, invertebrates, and foreign objects. Vegetation can either be removed or cut into smaller pieces based on project requirements.

1. On a calibrated, top-loading balance [*BalanceID*], accurately weigh:

    - 2.0 ± 0.10g for solids (dry weight; note: maximum 4.0g sample aliquot)
    - 0.5 ± 0.025g for biosolids (dry weight; note: maximum 1.0g sample aliquot)

    into a tared, labeled 50-mL centrifuge tube [*TubeLotID*] using a disposable polypropylene spatula [*SpatulaID*]. Record sample weight in the prep entry system to 2 decimal places [*InitialAmount*]. These weights are based on dry weights. Use T-PFAS-FRM74731 to calculate dry weight based on the percent moisture.

2. For each batch of no more than 20 field samples include the following quality control samples:

    a. Method Blank, LCS, LCSD, and LLCS: Weigh 2.0 ± 0.10g (0.5 ± 0.025g for biosolids) of sand [*BlankMtrxID, BlkMatLot, QCBottleLotID*] wetted with 1.0g (0.25g for biosolids) of reagent water. Record "2.00g" as the Initial Amount.

    b. Matrix Spike/Matrix Spike Duplicate (MS/MSD): Weigh 2.0g ± 0.10g (dry weight; note: maximum 2.5g sample aliquot) (0.5g for biosolids (dry weight; note: maximum 1g sample

aliquot)) of sample as specified in sample preparation log. **Note**: if not enough sample to prepare an MS/MSD, an LCS/LCSD must be prepared instead.

3. Bring all spike solutions to room temperature and vortex for 30 seconds prior to use.

4. Spike QC and all samples with 25 µL of 1633_125 EIS (1633_125_SS_#####). Spike LCS/LCSD/MS/MSD with 50 µL of 1633_125 Native Spike Mid (1633_125_MS_M_#####). Spike LLCS with 40 µL of 1633_125 Native Spike Low (1633_125_MS_L_#####). Vortex/Shake containers to mix thoroughly. Let samples equilibrate for 30 minutes after spiking. Document the technician who spike the sample [*Analyst ID - Reagent Drop*] as well as the spike witness [*Analyst ID - Reagent Drop Witness*].

5. Cap and vortex for 30 seconds.

6. Allow samples/QC to equilibrate for at least 30 minutes.

7. Add 10 mL of Proprietary Content to each centrifuge tube.

8. Cap and vortex for 30 seconds.

9. Sonicate in an ultrasonic bath [*SonicatorID*] for 1 hour. Record start and stop times. [S*onicationStart* and *SonicationStop]* Ensure the bath is filled with water to the optimal water level mark inside the tank.

10. Centrifuge [*CentrifugeID*] at 3500 rcf for 5 minutes and transfer supernatant to a clean 50-mL centrifuge tube.

11. Add 4 mL of 0.4% (w/v) methanolic potassium hydroxide to the remaining solid sample in each centrifuge tube. Cap and vortex for 30 seconds.

12. Centrifuge at 3500 rcf for 5 minutes and decant the supernatant from the second extraction into the 50-mL centrifuge tube with the supernatant from the first extraction.

13. Centrifuge the combined extracts at 3500 rcf for 5 minutes and decant the supernatant from the 50-mL centrifuge tube to a clean 125-mL HDPE bottle.

14. Bring the 125-mL HDPE container up to 125 mL with Milli-Q water.

15. Check that the pH is 6.0 ± 0.5 and adjust as necessary with 50% formic acid or 30% ammonium hydroxide (or with 5% formic acid and 3% aqueous ammonium hydroxide). **NOTE: Never put pH test strips into the sample.** Record the acid or base lot number [*RgtID*] and amount used [*Amt*]. Use a disposable pipette [*TranferPipID*] to place a few drops of sample onto the pH paper [*pHIndID*].

16. Invert container to thoroughly mix.

17. Continue to either Manual SPE (Procedure B) or Automated SPE (Procedure C.)

## B) Manual Sample Phase Extraction

1. Before use, rinse each port of the SPE manifold [*ManifoldID*] with several milliliters of the following solvents in order:

   Proprietary
   Proprietary
   Proprietary
   Proprietary

2. Label each SPE cartridge [*SPECartType*] and *SPECartLot#*] to correspond with each associated sample/QC piece and attach to a rinsed SPE port. Record the SPE port number for each sample/QC piece on the batchlog.

3. Condition each SPE cartridge with the following reagents in the following order:

   a. Proprietary Content
   b. Proprietary Content
   c. Proprietary Content

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d. Proprietary Content

4. Label each sample bottle, cap, 15-mL centrifuge tube, and reservoir with the same number to ensure samples are not inadvertently switched during the extraction procedure (i.e.; 1,1,1; 2,2,2; 3,3,3; etc.).

5. Attach the labeled 25-mL SPE reservoir [*SPEResID*] to each cartridge. Load the QC and samples to their respective cartridges. Allow full volume to pass through each cartridge by gravity, if possible. Allow sample to pass through. The drip rate should be approximately 3-5 drops per second.

6. After sample/QC has passed through, rinse the walls of the sample/QC bottle with 5 mL reagent water. Add to cartridge and allow to pass through using vacuum. Then repeat.

7. After Milli-Q water has passed through, rinse the walls of the sample/QC bottle with 5 mL 30:70 (v/v) methanol:water [*RinseSolventName* and *RinseSolventLot*]. Add to cartridge and allow to pass through using vacuum. Then repeat.

8. Apply full vacuum to dry the cartridges until they are visually similar to an unused cartridge. This may take up to 10 minutes for some cartridges.

9. Discard the waste and rinse the waste reservoir with isopropyl alcohol. Wipe each needle with a Kim-wipe/methanol.

10. Attach Proprietary Content to the bottom of each SPE cartridge.

11. Place labeled 15-mL polypropylene centrifuge collection tubes [*CentrifugeTube*] under each respective SPE cartridge.

12. Rinse the inside of each empty sample/QC bottle with 5 mL of Proprietary Content. Add to reservoir and cartridge.

13. Apply a slight vacuum to the manifold in order to reclaim as much solvent as possible from the SPE cartridges.

14. Disconnect the cartridge/adapter from the manifold. Remove the collection tubes.

15. Bring each sample extract to final volume 5 mL using methanol with Proprietary Content. Cap and vortex for 30 seconds to mix.

16. Proceed to Procedure D - Vialing and Addition of Internal Standard

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## C) Automated Solid Phase Extraction (SPE) by Proprietary

This procedure can be used in place of the manual extraction described above.

1. Label each SPE cartridge [*SPECartType* and *SPECartLot#*] to correspond with each associated sample/QC piece and attach to a rinsed SPE port. Record the SPE port number for each sample/QC piece on the batchlog.

2. Check to make sure all reagent bottles are filled and that reagents are not expired. Record Proprietary Content ID and reagent lot numbers. [*ManifoldID*, *SPE_Cond#1ID*, *SPE_Cond#2ID*, *RinseSolventName*, *RinseSolventLot*, *SolventName*, and *SolventLot*]

3. Label each sample bottle, cap, and Proprietary Content cartridge with the same number to ensure samples are not inadvertently switched during the extraction procedure (i.e.; 1,1,1; 2,2,2; 3,3,3; etc.).

4. Select "Proprietary Content" from the drop down menu to start the cleaning cycle prior to SPE. Make sure the "Clean" cartridges and bottles are attached for this cycle.

5. Remove "Clean" cartridges and attach the labeled cartridges that will be used when running the samples. Disconnect the "Clean" bottles. Attach the sample bottle by twisting the bottle and not the cap. Place sample bottle upside down in corresponding numbered location on shaker. Attach a filter [*FilterEXPID*] to each cap. Poke two holes into the lip of each bottle. Load labeled centrifuge tubes [*CentrifugeTube*] in the moving tray beneath the cartridges.

6. Select “Proprietary Content” from the drop down menu and press the green check mark to start the procedure. The Proprietary Content program is described in *Proprietary* .

7. When the cycle pauses after cartridge drying, attach Proprietary Content to the bottom of each SPE cartridge and uncapped tubes in the moving tray.

8. Once the cycle is complete, remove centrifuge tubes and discard the used cartridges and bottles. Reattach “Clean” bottles and cartridges, select "Proprietary Content" from menu, select “start”. This must be done between each batch and at the beginning and the end of the day. At the end of the day, run the "Proprietary Content" clean cycle.

9. The batch QC must be rotated among the Proprietary Content ports so that all the ports are covered over the course of a quarter. Use form T-PFAS-FRM80101 for tracking.

10. Bring each sample extract to final volume 5 mL using Proprietary Content. Cap and vortex for 30 seconds to mix.

11. Proceed to Procedure D - Vialing and Addition of Internal Standard

## D) Vialing and Addition of Internal standard

**Note: The instrument lab chemist performs these steps.**

1. Determine the sample aliquot to use for analysis. Add Internal Standard Spike Solution (1633_125_IS_V_#####) to the corresponding labeled autosampler vial [*VialLot#*].

    - 10 µL IS into a 190 µL aliquot of sample (final volume = 200 µL)
    - 25 µL IS into a 475 µL aliquot of sample (final volume = 500 µL)
    - 50 µL IS into a 950 µL aliquot of sample (final volume = 1000 µL)

2. Transfer an aliquot of the final extract (as determined in Step 1 above) to the corresponding labeled auto-sampler vial.

3. Cap the auto-sampler vial [*Caps*] and vortex for 30 seconds. Samples are now ready for analysis.

4. Cap the centrifuge tube. The remaining centrifuged extracts are stored in the refrigerator for dilution or reinjection if needed.

## E) LC/MS/MS Analysis

1. Load sample vials containing calibration standards, quality control samples, and sample extracts into the autosampler tray. Allow the instrument adequate time to equilibrate to ensure the mass spec and LC have reached operating conditions (approximately 5 minutes) before the first injection. Analyze several solvent blanks to clean the instrument prior to sample acquisition.

2. Bring standards to room temperature and vortex before calibrating. To eliminate the need for a qualitative identification standard, the calibration standards contain the branched isomers for PFHxS, PFOS, NMeFOSAA, NEtFOSAA, PFNA, PFOA, PFOSA, NEtFOSE, NMeFOSE, NEtFOSA, and NMeFOSA. Mass Transitions are defined in *Attachment 01*.

Example Initial Calibration Sequence (LIMS ID) (Example instrument method is in *Attachment 03*.):

Instrument Blank to clean instrument (at least 3)

1. CAL 1 (IC)
2. CAL 2 (IC)
3. CAL 3 (IC)
4. CAL 4 (IC)
5. CAL 5 (ICISAV)
6. CAL 6 (IC)
7. CAL 7 (IC)
8. CAL 8 (IC)
9. Instrument Blank (ICB)
10. Initial Calibration Verification (ICV)
11. Bile Salts Standard (WDM)

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3. Isotopically-labeled compounds are not available for some compounds. See below for compounds without labeled isotopes and their referenced extraction standards. See *Attachment 02* shows the full list of analytes and their EIS and NIS.

**Note**: For better accuracy, PFTrDA is quantitated using the average of the areas of labeled compounds 13C2-PFTeDA and 13C2-PFDoA.

| Native | Extracted Internal Standard |
|---|---|
| 3:3FTCA | 13C5-PFPeA |
| PFMPA | |
| PFMBA | |
| NFDHA | 13C5-PFHxA |
| 5:3FTCA | |
| 7:3FTCA | |
| PFEESA | |
| DONA | 13C3-HFPO-DA |
| 9Cl-PF3ONS | |
| 11Cl-PF3OUdS | |
| PFTrDA | Avg 13C2-PFTeDA and 13C2-PFDoA |
| PFHpS | 13C8-PFOS |
| PFNS | |
| PFDS | |
| PFDoS | |
| PFPeS | 13C3-PFHxS |
| TFSI | |
| FHxSA | |
| PFECHS | |
| PFODA | 13C2-PFTeDA |
| FBSA | 13C3-PFBS |

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Example Sample Sequence (LIMS ID):

Instrument Blanks to clean instrument if needed (at least 3)
1. Instrument Sensitivity Check at CAL1 (CCVO)
2. Calibration Verification at CAL4 (CCV)
3. Instrument Blank (CCB)
4. Bile Salts marker (WDM)
5. Method Blank (MB)
6. On-going Precision and Recovery (LCS)
7. Low-level OPR (LLCS)
8. On-going Precision and Recovery Duplicate (LCSD)
9. Samples (10 or less)
10. Calibration Verification at CAL4 (CCV)
11. Instrument Blank (CCB)

4. Instrument Blank (ICB, CCB) - Instrument Blanks need to be analyzed immediately following the highest standard analyzed and daily at the start of a sequence. The concentration of all analytes

must be less than the MDL. If acceptance criteria are not met, the calibration must be performed using a lower concentration standard for the high standard until the criteria are met.

5. Instrument Sensitivity Check (CCVO) - Prior to sample analysis, an Instrument Sensitivity Check (ISC) must be performed. The ISC standard concentration must be at the LOQ. The CAL1 standard's concentration is at the LOQ, so the CAL1 standard will be analyzed. All analyte concentrations must be within ±30% of their true values. The signal-to-noise ratio must be greater than or equal to 3:1 for the quantitation ions and confirmation ions, and 10:1 for quantitation ions that have no confirmation ion. If the criteria are not met, correct problem and rerun ISC. If a target analyte (or EIS) reads back high with no detection (or in-spec recoveries) in the samples, data may be reported. If problem persists, repeat the ICAL. No samples can be analyzed until the ISC meets acceptance criteria.

6. Bile Salt Interference Check (WDM) - Analyze a Window-Defining Matrix (WDM) standard containing 100 ppb of Taurodeoxycholic Acid (TDCA), Taurochenodeoxycholic Acid (TCDCA), and Tauroursodeoxycholic Acid (TUDCA). The laboratory must establish chromatographic conditions to ensure the bile salt (TDCA) does not cause interference during the analysis of samples. To demonstrate successful separation the retention time of TDCA must be at least 1 minute outside the retention time window of PFOS. This is demonstrated as a comparison of the RT of TDCA (measured at the apex of the TCDA peak) separated by at least 1.4 minutes from the RT of the linear isomer of PFOS (measured at the apex of the peak of the linear isomer of PFOS). If the mobile phase does not contain acetonitrile, this check must include all three bile salts (TDCA, TCDCA, and TUDCA). If adequate separation is not achieved, adjust the chromatographic conditions and reevaluate the separation of TDCA from PFOS.

7. After injections are completed, check all CCV recoveries and absolute areas to make sure they are within method control limits. See Calibration F for acceptance criteria. Process each chromatogram and closely evaluate all integrations, baseline anomalies, and retention time differences. If manual integrations are performed, they must be documented and a reason given for the change in integrations. The manual integrations are documented during data processing and all original integrations are reported at the end of the sample PDF file with the reason for manual integration clearly listed.

8. Quantitate results for the Method Blank (MB). Calculate the recoveries of spiked analytes for the LCS and its duplicate (LCSD, if needed), Low-Level LCS, Matrix Spike and Matrix Spike Duplicate (MS/MSD) by comparing concentrations observed to the true values. Calculate the relative percent difference (RPD) between the duplicates.

9. Isotopically-labeled Extraction Standards (EIS) are added to all samples, MB, LLCS, LCS/LCSD, and MS/MSD prior to extraction. Isotopically-labeled Injection Standards (NIS) are added to each QC and field sample extract prior to analysis. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to EIS recoveries being outside of the acceptance limits as long as the signal-to-noise ratio is greater than 10:1.

10. To identify a target or EIS:

    a. Peak responses of quantitation and confirmation ions must have S/N of at least 3:1. If there is no confirmation ion, the quantitation ion must have S/N of at least 10:1. If the S/N ratio is not met, the analyte is considered to be ND.

    b. The retention times should not vary by more than 0.4 minutes from the expected retention time from the midpoint of the ICAL or initial CV. Furthermore, native compounds with an exact isotopically-labeled analogue must elute within 0.1 minutes from their associated analog. If the retention time is outside of the criteria, the compound is considered a false positive unless it is a compound with branched isomers. Compounds with branched isomers can vary in intensity of the individual isomers that are used for reporting and must be reviewed and compared to the preceding CCV to determine if it should be reported.

    c. For concentrations at or above the LOQ, the Ion Abundance Ratio (IAR) must fall within ±50% of the IAR observed in the mid-point initial calibration standard. The total response of all isomers (branched and linear) in the quantitative standards must be used to define the IAR. In samples, the total response should include only the branched isomer peaks that have been identified in either the quantitative or qualitative standard.

11. Two ion transitions and the ion transition ratio per analyte shall be monitored and documented with the exception of PFBA, PFECA F (PFMPA), PFECA A (PFMBA), NMeFOSE, NEtFOSE, FBSA, and FHxSA. The expected ion ratio for each compound is calculated by using the average of ion ratios

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of each compound from initial calibration standards. When an ion ratio for a compound differs from the expected ion ratio by more than 50%, see QA/QC section for Corrective Action.

## F) Dilution

When the area of the primary transition of a target analyte is above the area of the highest calibration point a sample dilution is required. Dilute the extract as follows:

1. Remove extracts from storage and allow to come to room temperature for approximately 60-90 minutes.
2. Vortex the extract for one minute.
3. Using a pipette or syringe, remove an aliquot of the extract, this extract should target a dilution equivalent to the mid-level concentration of the calibration curve to avoid over diluting the extract.
4. Dilute the aliquot to volume using Proprietary Content.
5. Fortify with additional NIS to achieve the same concentration of NIS in the original extract.
6. Vortex an aliquot for analysis.

If the S/N of EIS associated with the analyte requiring dilution in the extract meets the S/N requirement for EIS and the recovery of the associated EIS meet the method criteria, the results from the dilution can be reported. If these criteria are not met and additional sample is available, a smaller volume/mass of sample should be extracted.

## Calculations

1. Peak Area Ratio

$$\text{Peak Area Ratio} = \frac{\text{Analyte Response}}{\text{Labeled Analyte Response}}$$

2. On-Column Analyte Concentration using average RRF

   On-column Concentration = peak area ratio ÷ AVE RRF

3. On-Column Analyte Concentration using linear curve

   On-column Concentration = (peak area ratio - intercept) ÷ slope

4. Sample Concentration

   Sample concentration (ng/g) = (On-column concentration x Final Sample Volume x DF) ÷ Initial Sample Volume

5. Ion Abundance Ratio (IAR)

   ion abundance ratio = (peak area or height of quantifier)/(peak area or height of qualifier)

6. See *T-PEST-WI9847* for additional calculations used to evaluate the calibrations and quality control samples.

## Statistical Information/Method Performance

Historical data for LCS/Ds, LLCSs, MS/Ds, and EIS is reviewed at least annually. However, all samples are reported using the limits in EPA 1633 Tables 7 and 8. When target analytes not on these tables are requested, statistical limits are used for LCS/MS. (Preliminary limits of 70-130% Recovery and <20%

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RPD can be used until enough data points are generated.) Reporting limits including method detection limits (MDLs) and limits of quantitation (LOQs) are set according to EPA method requirements and are evaluated annually. Refer to *QA-SOP11892* for specific guidelines and procedures. Updates to the LIMS are made as needed by the QA Department and only as directed by the supervisor.

As MDL studies are run on clean laboratory matrices, statistically derived MDL values could be artificially lower than achievable limits in real world samples. Nominal MDL values, set at no lower than 1/4 the calculated and verified Reporting Limit (or Limit of Quantitation) will be used as a method to avoid artificially low bias in MDL studies.

## Quality Assurance/Quality Control

For each batch of samples extracted, a method blank, an LCS, and an LLCS must be extracted and analyzed. An MS/MSD are extracted only if requested and submitted by the client. If no MS/MSD is provided, an LCS/LCSD must be extracted and analyzed instead. A batch is defined as the samples to be extracted on any given day, but not to exceed 20 field samples. If more than 20 samples are prepared in a day, an additional batch must be prepared. If any client, state, or agency has more stringent QC or batching requirements, these must be followed.

| QC Item | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|
| Method Blank (MB) | One per extraction batch of no more than 20 field samples | No target analytes greater than RL, or greater than 1/10 the amount measured in any sample, or 1/10 the regulatory limit (whichever is greater). | Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank. |
| Low-Level On-going Precision and Recovery (LLCS) | One per extraction batch of no more than 20 field samples | Acceptance criteria defined in *Attachment 22* (Tables 7 and 8 of Method 1633) | Reanalyze LLCS once. If acceptable, report. Evaluate samples for detections, and LLCS for high bias. If LLCS has high bias, and samples non-detect, report and narrate. If LLCS has low bias, or if there are detections for critical chemicals of concern, evaluate and reprep and reanalyze the LLCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available. |
| On-going Precision and Recovery and its Duplicate (LCS) | One per extraction batch of no more than 20 field samples | Acceptance criteria defined in *Attachment 22* (Tables 7 and 8 of Method 1633) | Reanalyze LCS once. If acceptable, report. Evaluate samples for detections, and LCS for high bias. If LCS has high bias, and samples non-detect, report and narrate. If LCS has low bias, or if there are detections for critical chemicals of concern, evaluate and re-prep and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available. |

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| QC Item | Frequency | Acceptance Criteria | Corrective Action |
|---|---|---|---|
| Matrix Spike/Matrix Spike Duplicate (MS/MSD) | *at client request*, one per extraction batch of no more than 20 field samples | Acceptance criteria defined in *Attachment 22* (Tables 7 and 8 of Method 1633)<br><br>RPD less than 30% | If outside the acceptance windows, consult a supervisor to determine the appropriate course of action based on batch and sample results. |
| Extracted Internal Standards (EIS) or Isotope Dilution Analyte (IDA), added prior to extraction | per sample (including MB, LCS, LCSD, LLCS, MS, MSD) during preparation | Acceptance criteria defined in *Attachment 22* (Table 8 of Method 1633) | 1. If EIS outside windows, check for errors and correct. Re-analyze sample, if needed.<br>2. If EIS out high and samples are non-detect, report and narrate. If EIS out high with detections, but EIS <200% (FTS <350%), report and narrate. If EIS out high with detections and EIS >200% (FTS >350%), dilute 10X, re-analyze, report, and narrate.<br>3. If EIS low but > 5% and S/N > 10:1, narrate and report. If EIS <5% then contact client to re-extract at smaller aliquot. |
| Non-extracted Internal Standards (NIS) added following extraction and prior to analysis | per sample (including MB, LCS, LCSD, LLCS, MS, MSD) during preparation | NIS areas 50-200% of the mean area of the most recent ICAL in undiluted sample extracts and sample extracts that require NIS to be added. | If fails high, check for errors and report. If fails low, re-analyze fresh aliquot of sample. If in control, report. If the failure confirms report the initial analysis and narrate. |
| Ion Abundance Ratio (IAR) | Each detected analyte (except PFBA, PFPeA, NMeFOSE, NEtFOSE, PFMPA, PFMBA, FBSA, FHxSA) | Acceptance window of 50-150% of the ratio in the mid-point CCV standard. | Check for error, if none found report as outlined below.<br>1. If outside limits and value is less than the RL, report as ND at RL.<br>2. If outside limits, but within 2X rule* flag, report and narrate.<br>3. If ratio outside 2X rule* then report as ND at elevated RL, apply G flag and narrate.<br>4. If ratio out due to branched isomer contribution, report as positive with narration.<br>5. If outside limits (and RT window) due to matrix, report as ND at elevated RL, apply G flag and narrate. |
| E-flagged data | NA | NA | Dilute sample extract. If still E-flagged after dilution, consult the client for course of action. |

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*2X Rule: If the ion ratio <0.5X the lower control limit or >2X the upper control limit, then do not report the analyte. It should be either Non-Detect at the RL or elevate the RL as needed (G flag). As an example if the target ion ratio is 4.00. The Chrom-determined limits are 2.00-6.00. If the ratio is <1.00 (2.00 X 0.5) or >12.00 (6.00 X 2) follow the specifications above.

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Attachment:
Attachment 01 - Mass Transitions (.pdf)
Attachment 02 - Standard Relationships (.pdf)
Attachment 03 – Proprietary Content
Attachment 04 - Example CoA (.pdf)
Attachment 05 - Native PFAS Intermediate A (.pdf)
Attachment 06 - Native PFAS Intermediate B (.pdf)
Attachment 07 - Native PFAS CAL8 Intermediate (.pdf)
Attachment 08 - 1633 EIS Intermediate (.pdf)
Attachment 09 - 1633 NIS Intermediate (.pdf)
Attachment 10 - 1633 TOP SS Intermediate (.pdf)
Attachment 11 - Initial Calibration Standards Preparation (.pdf)
Attachment 12 - Initial Calibration Standard Concentrations (.pdf)
Attachment 13 - Bile Salts Stock Solutions (.pdf)
Attachment 14 - Bile Salts Intermediate (.pdf)
Attachment 15 - Bile Salts Working Solution (.pdf)
Attachment 16 - 1633 WDM (.pdf)
Attachment 17 - Native Mid Level Spike (.pdf)
Attachment 18 - Native Low Level Spike (.pdf)
Attachment 19 - ICV Working Standard (.pdf)
Attachment 20 - Purchased Standards (.pdf)
Attachment 21 – Proprietary Content
Attachment 22 - Tables 7-8 (EPA 1633) (.docx)

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G-DC-FRM23907 Redacted SOPs
QA-SOP11178 Demonstrations of Capability
QA-SOP11892 Determining Method Detection Limits and Limits of Quantitation
T-PEST-WI9847 Common Equations Used During Chromatographic Analyses
T-PFAS-FRM74731 D4033 - Moisture Calculation
T-PFAS-WI21568 Environmental Monitoring in the PFAS Lab
T-PFAS-WI23588 Preventative and Corrective Maintenance for the AB Sciex Liquid Chromatograph Mass Spectrometers (LC/MS/MS)
Attachment: Attachment 01 - Mass Transitions (pdf)
Attachment: Attachment 02 - Standard Relationships (pdf)
Attachment: Attachment 03 – Proprietary Content
Attachment: Attachment 04 - Example CoA (pdf)
Attachment: Attachment 05 - Native PFAS Intermediate A (pdf)
Attachment: Attachment 06 - Native PFAS Intermediate B (pdf)
Attachment: Attachment 07 - Native PFAS CAL8 Intermediate (pdf)
Attachment: Attachment 08 - 1633 EIS Intermediate (pdf)
Attachment: Attachment 09 - 1633 NIS Intermediate (pdf)
Attachment: Attachment 10 - 1633 TOP SS Intermediate (pdf)
Attachment: Attachment 11 - Initial Calibration Standards Preparation (pdf)
Attachment: Attachment 12 - Initial Calibration Standard Concentrations (pdf)
Attachment: Attachment 13 - Bile Salts Stock Solutions (pdf)
Attachment: Attachment 14 - Bile Salts Intermediate (pdf)
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Attachment: Attachment 16 - 1633 WDM (pdf)
Attachment: Attachment 17 - Native Mid Level Spike (pdf)
Attachment: Attachment 18 - Native Low Level Spike (pdf)
Attachment: Attachment 19 - ICV Working Standard (pdf)
Attachment: Attachment 20 - Purchased Standards (pdf)
Attachment: Attachment 21 – Proprietary Content
Attachment: Attachment 22 - Tables 7-8 (EPA 1633) (docx)

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End of document

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**Version history**

| Version | Approval | Revision information | |
|---|---|---|---|
| 3.1 | 27.AUG.2024 | | |
| 4 | 31.OCT.2024 | | |
| 5 | 11.MAR.2025 | | |

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# Attachment 1 – Mass Transitions

| CAS# | Compound | Parent Ion | Daughter Ion |
|---|---|---|---|
| 422-64-0 | PFPrA | 163.00 | 119.00 |
| STL03194 | 13C3-PFPrA | 166.00 | 121.00 |
| STL02680 | 13C3-PFBA | 216.00 | 172.00 |
| STL00992 | 13C4-PFBA | 216.80 | 171.90 |
| 375-22-4 | PFBA | 212.80 | 168.90 |
| 377-73-1 | PFECA F (PFMPA) | 229.00 | 84.90 |
| 356-02-5 | 3:3 FTCA | 241.00 | 177.00 |
| | 3:3 FTCA (2) | 241.00 | 117.00 |
| 2706-90-3 | PFPeA | 263.00 | 219.00 |
| STL01893 | 13C5-PFPeA | 268.30 | 223.00 |
| 863090-89-5 | PFECA A (PFMBA) | 279.00 | 85.10 |
| 82113-65-3 | TFSI | 280.00 | 147.00 |
| | TFSI (2) | 280.00 | 78.00 |
| 13252-13-6 | HFPODA | 284.90 | 168.90 |
| | HFPODA (2) | 284.90 | 184.90 |
| STL02255 | 13C3-HFPODA | 286.90 | 168.90 |
| | 13C3-HFPODA (2) | 286.90 | 184.90 |
| 151772-58-6 | PFECA B (NFDHA) | 295.00 | 201.00 |
| | PFECA B (NFDHA) (2) | 295.00 | 84.90 |
| | | | |
| 375-73-5 | PFBS | 298.70 | 79.90 |
| | PFBS (2) | 298.70 | 98.80 |
| | | | |
| STL02337 | 13C3-PFBS | 302.10 | 79.90 |
| | | | |
| 307-24-4 | PFHxA | 313.00 | 269.00 |
| | PFHxA (2) | 313.00 | 118.90 |
| 113507-82-7 | PFEESA (PES) | 314.80 | 134.90 |
| | PFEESA (PES) (2) | 314.80 | 82.90 |
| STL00993 | 13C2-PFHxA | 315.10 | 270.00 |
| STL02577 | 13C5-PFHxA | 318.00 | 273.00 |
| 757124-72-4 | 4:2-FTS | 327.10 | 307.00 |
| | 4:2-FTS (2) | 327.10 | 80.90 |
| 914637-49-3 | 5:3 FTCA | 341.00 | 237.10 |
| | 5:3 FTCA (2) | 341.00 | 217.00 |
| 2706-91-4 | PFPeS | 349.10 | 79.90 |
| | PFPeS (2) | 349.10 | 98.90 |
| 375-85-9 | PFHpA | 363.10 | 319.00 |
| | PFHpA (2) | 363.10 | 169.00 |
| STL01892 | 13C4-PFHpA | 367.10 | 322.00 |
| 919005-14-4 | DONA | 376.90 | 250.90 |
| | DONA (2) | 376.90 | 84.80 |
| 41997-13-1 | FHxSA | 397.90 | 78.00 |

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# Attachment 1 – Mass Transitions

| CAS# | Compound | Parent Ion | Daughter Ion |
|---|---|---|---|
| 355-46-4 | PFHxS | 398.70 | 79.90 |
| | PFHxS (2) | 398.70 | 98.90 |
| STL02581 | 13C3-PFHxS | 402.10 | 79.90 |
| STL00994 | 18O2-PFHxS | 403.00 | 83.90 |
| 335-67-1 | PFOA | 413.00 | 369.00 |
| | PFOA (2) | 413.00 | 169.00 |
| STL00623 | 13C2-PFOA | 415.00 | 370.00 |
| STL00990 | 13C4-PFOA | 417.10 | 372.00 |
| STL01054 | 13C8-PFOA | 421.10 | 376.00 |
| 27619-97-2 | 6:2-FTS | 427.10 | 407.00 |
| | 6:2-FTS (2) | 427.10 | 80.90 |
| STL02279 | 13C2-6:2-FTS | 429.10 | 80.90 |
| 812-70-4 | 7:3 FTCA | 441.00 | 316.90 |
| | 7:3 FTCA (2) | 441.00 | 336.90 |
| 375-92-8 | PFHpS | 449.00 | 79.90 |
| | PFHpS (2) | 449.00 | 98.80 |
| 133201-07-7 | PFECHS | 461.00 | 381.00 |
| | PFECHS (2) | 461.00 | 99.00 |
| 375-95-1 | PFNA | 463.00 | 419.00 |
| | PFNA (2) | 463.00 | 219.00 |
| STL00995 | 13C5-PFNA | 468.00 | 423.00 |
| STL02578 | 13C9-PFNA | 472.10 | 427.00 |
| 516-50-7 | TDCA | 498.00 | 80.00 |
| 754-91-6 | PFOSA | 498.10 | 77.90 |
| | PFOSA (2) | 498.10 | 478.00 |
| 516-35-8 | TCDCA | 498.10 | 80.00 |
| 14605-22-2 | TUDCA | 498.20 | 80.00 |
| 1763-23-1 | PFOS | 498.90 | 79.90 |
| | PFOS (2) | 498.90 | 98.80 |
| STL00991 | 13C4-PFOS | 502.80 | 79.90 |
| STL01056 | 13C8-PFOSA | 506.10 | 77.80 |
| STL01054 | 13C8-PFOS | 507.10 | 79.90 |
| 31506-32-8 | NMeFOSA | 511.90 | 219.00 |
| | NMeFOSA (2) | 511.90 | 169.00 |
| 335-76-2 | PFDA | 512.90 | 469.00 |
| | PFDA (2) | 512.90 | 219.00 |
| STL02705 | d3-NMeFOSA | 515.00 | 219.00 |
| STL00996 | 13C2-PFDA | 515.10 | 470.10 |
| STL02579 | 13C6-PFDA | 519.10 | 474.10 |
| 4151-50-2 | NEtFOSA | 526.00 | 219.00 |
| | NEtFOSA (2) | 526.00 | 169.00 |
| 39108-34-4 | 8:2-FTS | 527.10 | 507.00 |
| | 8:2-FTS (2) | 527.10 | 80.80 |

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# Attachment 1 – Mass Transitions

| CAS# | Compound | Parent Ion | Daughter Ion |
|---|---|---|---|
| STL02280 | 13C2-8:2-FTS | 529.10 | 80.90 |
| 756426-58-1 | 9Cl-PF3ONS | 530.80 | 351.00 |
| | 9Cl-PF3ONS (2) | 532.80 | 353.00 |
| STL02704 | d5-NEtFOSA | 531.10 | 219.00 |
| 68259-12-1 | PFNS | 548.80 | 79.90 |
| | PFNS (2) | 548.80 | 98.80 |
| 2058-94-8 | PFUnA | 563.10 | 519.00 |
| | PFUnA (2) | 563.10 | 269.10 |
| STL00997 | 13C2-PFUnA | 565.00 | 520.00 |
| STL02580 | 13C7-PFUnA | 570.00 | 525.10 |
| 2355-31-9 | NMeFOSAA | 570.10 | 419.00 |
| | NMeFOSAA (2) | 570.10 | 483.00 |
| STL02118 | d3-NMeFOSAA | 573.20 | 419.00 |
| 2991-50-6 | NEtFOSAA | 584.20 | 419.10 |
| | NEtFOSAA (2) | 584.20 | 526.00 |
| STL02117 | d5-NEtFOSAA | 589.20 | 419.00 |
| 335-77-3 | PFDS | 599.00 | 79.90 |
| | PFDS (2) | 599.00 | 98.80 |
| 307-55-1 | PFDoDA | 613.10 | 569.00 |
| | PFDoDA (2) | 613.10 | 319.00 |
| STL00998 | 13C2-PFDoDA | 615.10 | 570.00 |
| 24448-09-7 | NMeFOSE | 616.10 | 58.90 |
| STL02277 | d7-NMeFOSE | 623.20 | 58.90 |
| 1691-99-2 | NEtFOSE | 630.00 | 58.90 |
| 763051-92-9 | 11Cl-PF3OUdS | 630.90 | 450.90 |
| | 11Cl-PF3OUdS (2) | 632.90 | 452.90 |
| STL02278 | d9-NEtFOSE | 639.20 | 58.90 |
| 72629-94-8 | PFTrDA | 663.00 | 619.00 |
| | PFTrDA (2) | 663.00 | 168.90 |
| 79780-39-5 | PFDoS | 699.10 | 79.90 |
| | PFDoS (2) | 699.10 | 98.80 |
| 376-06-7 | PFTeDA | 713.10 | 168.90 |
| | PFTeDA (2) | 713.10 | 219.00 |
| STL02116 | 13C2-PFTeDA | 715.20 | 670.00 |
| 16517-11-6 | PFODA | 913.00 | 869.00 |
| | PFODA (2) | 913.00 | 169.00 |

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# Attachment 2 - PFAS Injection Standards/Extraction Standards/Native Compounds

| Native | Extraction Standard | Internal Standard |
|---|---|---|
| PFBA | 13C4-PFBA | 13C3-PFBA |
| PFPrA | 13C3-PFPrA | |
| PFPeA | 13C5-PFPeA | 13C2-PFHxA |
| 3:3FTCA | | |
| PFMPA | | |
| PFMBA | | |
| PFHxA | 13C5-PFHxA | |
| NFDHA | | |
| 5:3FTCA | | |
| 7:3FTCA | | |
| PFEESA | | |
| PFHpA | 13C4-PFHpA | |
| HFPO-DA | 13C3-HFPO-DA | |
| ADONA | | |
| 9Cl-PF3ONS | | |
| 11Cl-PF3OUdS | | |
| PFOA | 13C8-PFOA | 13C4-PFOA |
| PFNA | 13C9-PFNA | 13C5-PFNA |
| PFDA | 13C6-PFDA | 13C2-PFDA |
| PFUnA | 13C7-PFUnA | |
| PFDoA | 13C2-PFDoA | |
| PFTeDA | 13C2-PFTeDA | |
| PFODA | | |
| PFTrDA | Avg 13C2-PFTeDA and 13C2-PFDoA | |
| PFBS | 13C3-PFBS | 18O2-PFHxS |
| FBSA | | |
| PFPeS | 13C3-PFHxS | |
| PFHxS | | |
| FHxSA | | |
| PFECHS | | |
| TFSI | | |
| 4:2-FTS | 13C2-4:2-FTS | |
| 6:2-FTS | 13C2-6:2-FTS | |
| 8:2-FTS | 13C2-8:2-FTS | |
| PFHpS | 13C8-PFOS | 13C4-PFOS |
| PFOS | | |

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# Attachment 2 - PFAS Injection Standards/Extraction Standards/Native Compounds

| Native | Extraction Standard | Internal Standard |
|---|---|---|
| PFNS | | |
| PFDS | | |
| PFDoS | | |
| PFOSA | 13C8-PFOSA | |
| NMeFOSA | d3-NMeFOSA | |
| NEtFOSA | d5-NEtFOSA | |
| NMeFOSAA | d3-NMeFOSAA | |
| NEtFOSAA | d5-NEtFOSAA | |
| NMeFOSE | d7-N-MeFOSE-M | |
| NEtFOSE | d9-N-EtFOSE-M | |

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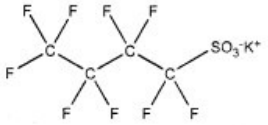
# Attachment 4 – Example CoA

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

| | | | |
|---|---|---|---|
| **PRODUCT CODE:** | L-PFBS | **LOT NUMBER:** | LPFBS1022 |
| **COMPOUND:** | Potassium perfluoro-1-butanesulfonate | | |
| **STRUCTURE:** | | **CAS #:** | 29420-49-3 |



| | | | |
|---|---|---|---|
| **MOLECULAR FORMULA:** | $C_4F_9SO_3K$ | **MOLECULAR WEIGHT:** | 338.19 |
| **CONCENTRATION:** | 50.0 ± 2.5 µg/mL (K salt)<br>44.4 ± 2.2 µg/mL (PFBS acid)<br>44.2 ± 2.2 µg/mL (PFBS anion) | **SOLVENT(S):** | Methanol |
| **CHEMICAL PURITY:** | >98% | | |
| **LAST TESTED:** (mm/dd/yyyy) | 10/04/2022 | | |
| **EXPIRY DATE:** (mm/dd/yyyy) | 10/04/2027 | | |
| **RECOMMENDED STORAGE:** | Store ampoule in a cool, dark place | | |

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**DOCUMENTATION/ DATA ATTACHED:**

Figure 1: LC/MS Data (Full Scan and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

- See page 2 for further details.

***FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE***

**Certified By:** _____ **Date:** 10/14/2022 (mm/dd/yyyy)
B.G. Chittim, General Manager

*Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA*
*519-822-2436 • Fax: 519-822-2849 • info@well-labs.com*

*Form#:27, Issued 2004-11-10*
*Revision#:9, Revised 2020-12-23*

# Attachment 4 – Example CoA

**INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

**HANDLING:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

**SYNTHESIS / CHARACTERIZATION:**

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

**HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

**UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value $y$ and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

**TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

**EXPIRY DATE / PERIOD OF VALIDITY:**

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

**LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

**QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A1226), and ISO 17034 by ANSI National Accreditation Board (ANAB; AR-1523).

CALA Testing Accreditation No. A1226

ANAB ANSI National Accreditation Board ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

**For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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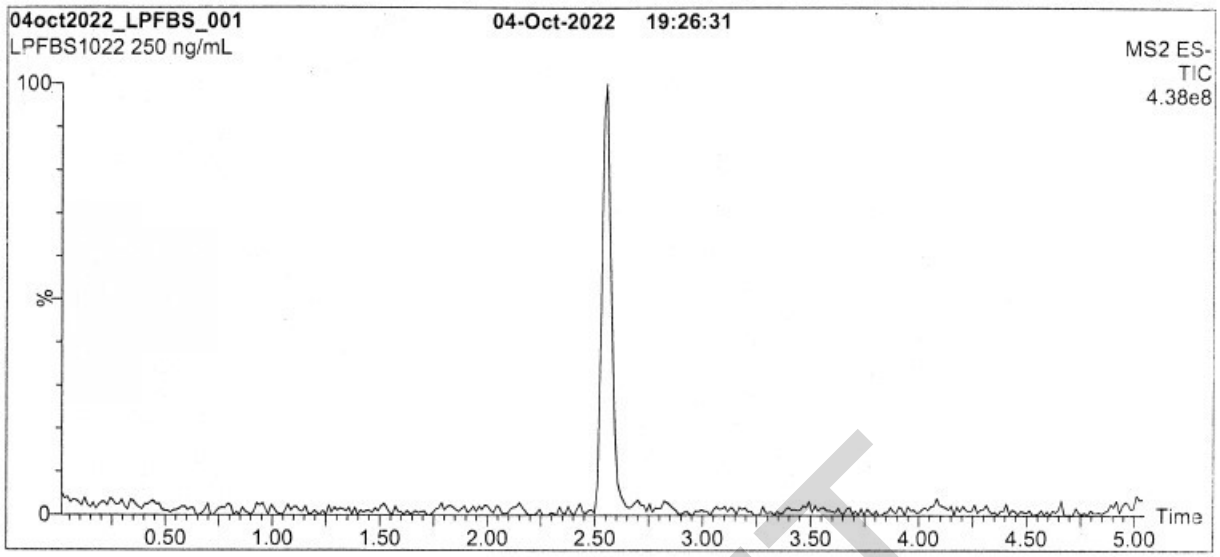
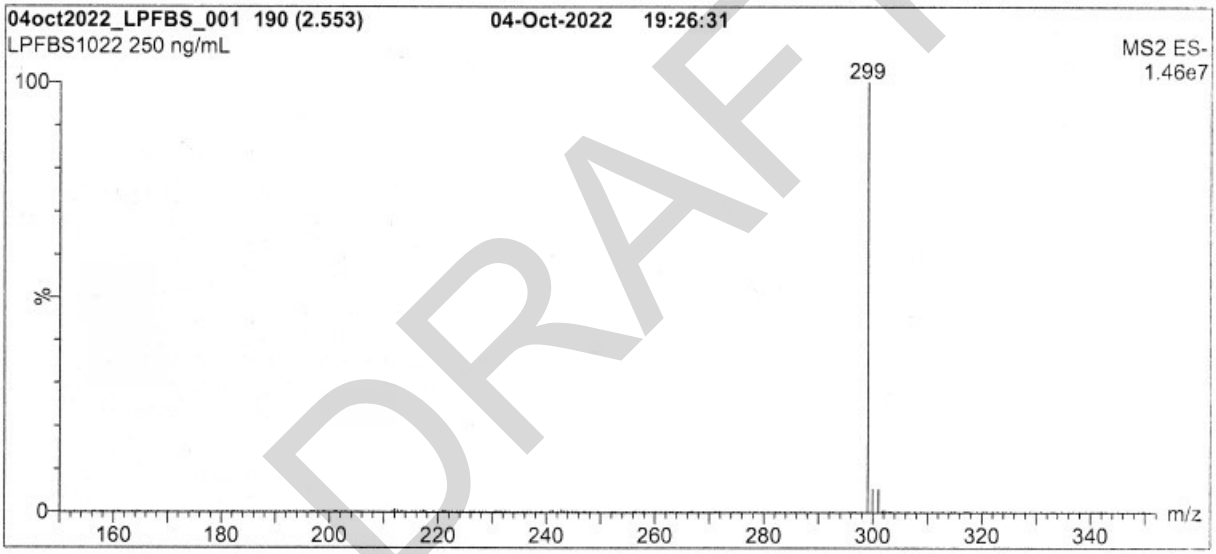
# Attachment 4 – Example CoA

**Figure 1:** **L-PFBS; LC/MS Data (Full Scan and Mass Spectrum)**

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**Conditions for Figure 1:**

Waters Acquity Ultra Performance LC
Waters Xevo TQ-S micro MS

**Chromatographic Conditions:**

Column: Acquity UPLC BEH Shield $RP_{18}$
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% $H_2O$ / 40% (80:20 MeOH:ACN)
(both with 10 mM $NH_4OAc$ buffer)
Ramp to 90% organic over 8 min and hold for 2 min
before returning to initial conditions over 0.75 min.
Time: 12 min

Flow: 300 µL/min

**MS Parameters:**

Experiment: Full Scan (150 - 850 amu)

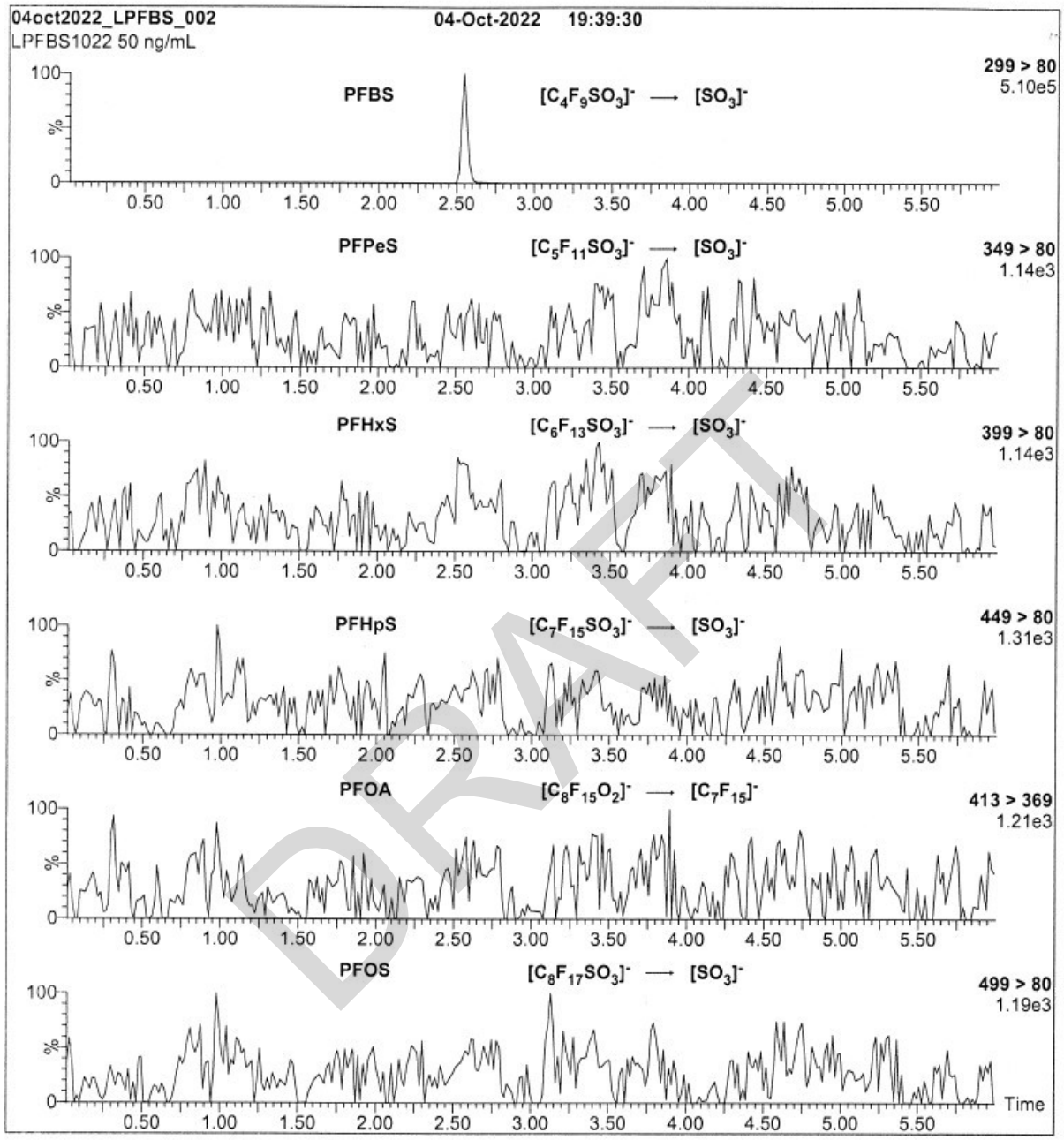
Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 10.00
Desolvation Temperature (°C) = 500
Desolvation Gas Flow (L/hr) = 1000

*Form#:27, Issued 2004-11-10*
*Revision#:9, Revised 2020-12-23*

LPFBS1022 (3 of 4)
rev0

# Attachment 4 – Example CoA

**Figure 2:** **L-PFBS; LC/MS/MS Data (Selected MRM Transitions)**

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**Conditions for Figure 2:**

| | | | |
|---|---|---|---|
| Injection: | On-column (L-PFBS) | **MS Parameters:** | |
| Mobile phase: | Same as Figure 1 | Collision Gas (mbar) = 3.29e-3 | |
| | | Collision Energy (eV) = 30 | |
| Flow: | 300 µL/min | | |

| Attachment 05 - Native PFAS Intermediate A | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL)** | **Final Conc. (ng/mL)** |
| Wellington | PFBA | Perfluorobutanoic acid | 375-22-4 | PFBA | 50000 | 0.100 | 10 | 500 |
| Wellington | PFPeA | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 50000 | 0.050 | | 250 |
| Wellington | PFHxA | Perfluorohexanoic acid | 307-24-4 | PFHxA | 50000 | 0.050 | | 250 |
| Wellington | PFHpA | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 50000 | 0.050 | | 250 |
| Wellington | br-PFOA | Perfluorooctanoic acid | 335-67-1 | PFOA | 50000 | 0.050 | | 250 |
| Wellington | br-PFNA | Perfluorononanoic acid | 375-95-1 | PFNA | 50000 | 0.050 | | 250 |
| Wellington | PFDA | Perfluorodecanoic acid | 335-76-2 | PFDA | 50000 | 0.050 | | 250 |
| Wellington | PFUdA | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 50000 | 0.050 | | 250 |
| Wellington | MPFDOA | Perfluorododecanoic acid | 307-55-1 | PFDoA | 50000 | 0.050 | | 250 |
| Wellington | PFTrDA | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 50000 | 0.050 | | 250 |
| Wellington | PFTeDA | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 50000 | 0.050 | | 250 |
| Wellington | L-PFBS | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 44200 | 0.050 | | 221 |
| Wellington | L-PFPeS | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 46900 | 0.050 | | 235 |
| Wellington | br-PFHxSK | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 45500 | 0.050 | | 228 |
| Wellington | L-PFHpS | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 47600 | 0.050 | | 238 |
| Wellington | br-PFOSK | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 46600 | 0.050 | | 233 |
| Wellington | L-PFNS | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 48000 | 0.050 | | 240 |
| Wellington | L-PFDS | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 48200 | 0.050 | | 241 |
| Wellington | L-PFDoS | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 48400 | 0.050 | | 242 |
| Wellington | 4;2 FTS | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 46700 | 0.100 | | 467 |
| Wellington | 6;2 FTS | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 47400 | 0.100 | | 474 |
| Wellington | 8;2 FTS | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 47900 | 0.100 | | 479 |
| Wellington | br-FOSA | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 50000 | 0.050 | | 250 |
| Wellington | br-NMeFOSA | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 50000 | 0.050 | | 250 |
| Wellington | br-NEtFOSA | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 50000 | 0.050 | | 250 |
| Wellington | br-NMeFOSAA | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 50000 | 0.050 | | 250 |
| Wellington | br-NEtFOSAA | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 50000 | 0.050 | | 250 |
| Wellington | br-NMeFOSE | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 50000 | 0.250 | | 1250 |
| Wellington | br-NMeFOSE | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 50000 | 0.250 | | 1250 |
| Wellington | HFPO-DA | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 50000 | 0.0375 | | 187.5 |
| Wellington | NaDONA | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 47100 | 0.050 | | 236 |
| Wellington | PFEESA | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 44500 | 0.050 | | 223 |
| Wellington | PF4OPeA | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 50000 | 0.050 | | 250 |
| Wellington | PF5OHxA | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 50000 | 0.050 | | 250 |
| Wellington | 3,6-OPFHpA | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 50000 | 0.050 | | 250 |
| Wellington | 9Cl-PF3ONS | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 46600 | 0.050 | | 233 |
| Wellington | 11Cl-PF3OUdS | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 47100 | 0.050 | | 236 |
| Wellington | FPrPA | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 50000 | 0.100 | | 500 |
| Wellington | FPePA | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 50000 | 0.250 | | 1250 |
| Wellington | FHpPA | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 50000 | 0.250 | | 1250 |
| Wellington | PFECHS | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 46100 | 0.050 | | 231 |
| Wellington | FBSA-I | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 50000 | 0.050 | | 250 |
| Wellington | FHxSA-I | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 50000 | 0.050 | | 250 |
| Wellington | PFPrA | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 50000 | 0.250 | | 1250 |
| Wellington | PFODA | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 50000 | 0.050 | | 250 |
| AccuStandard | PFOS-030S | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 97900 | 0.0250 | | 245 |

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| Attachment 06 - Native PFAS Intermediate B | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL** | **Final Conc. (ng/mL)** |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 0.1 | 10 | 5 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 2.5 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 2.5 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 2.5 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 2.5 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 2.5 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 2.5 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 2.5 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 2.5 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 2.5 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 2.5 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 2.21 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 2.35 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 2.28 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 2.38 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 2.33 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 2.4 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 2.41 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 2.42 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 4.67 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 4.74 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 4.79 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 2.5 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 2.5 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 2.5 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 2.5 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 2.5 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 12.5 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 12.5 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 1.875 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 236 | | | 2.36 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 2.23 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 2.5 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 2.5 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 2.5 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 2.33 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 236 | | | 2.36 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 5 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 12.5 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 12.5 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 231 | | | 2.31 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 2.5 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 2.5 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 12.5 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 2.5 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 245 | | | 2.45 |

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| Attachment 07 - Native PFAS CAL8 Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL)** | **Final Conc. (ng/mL)** |
| Wellington | PFBA | Perfluorobutanoic acid | 375-22-4 | PFBA | 50000 | 0.100 | 10 | 500 |
| Wellington | PFPeA | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 50000 | 0.050 | | 250 |
| Wellington | PFHxA | Perfluorohexanoic acid | 307-24-4 | PFHxA | 50000 | 0.050 | | 250 |
| Wellington | PFHpA | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 50000 | 0.050 | | 250 |
| Wellington | br-PFOA | Perfluorooctanoic acid | 335-67-1 | PFOA | 50000 | 0.050 | | 250 |
| Wellington | br-PFNA | Perfluorononanoic acid | 375-95-1 | PFNA | 50000 | 0.050 | | 250 |
| Wellington | L-PFBS | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 44200 | 0.050 | | 221 |
| Wellington | L-PFPeS | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 46900 | 0.050 | | 235 |
| Wellington | br-PFHxSK | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 45500 | 0.050 | | 228 |
| Wellington | L-PFHpS | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 47600 | 0.050 | | 238 |
| Wellington | br-PFOSK | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 46600 | 0.050 | | 233 |
| Wellington | HFPO-DA | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 50000 | 0.0375 | | 187.5 |

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| Attachment 08 - 1633 EIS Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume** | **Final Conc. (ng/mL)** |
| Wellington | MPFBA | Perfluoro-n-[13C4]butanoic acid | STL00992 | $^{13}C_4$-PFBA | 50000 | 0.08 | 10 | 400 |
| Wellington | M5PFPeA | Perfluoro-n-[13C5]pentanoic acid | STL01893 | $^{13}C_5$-PFPeA | 50000 | 0.08 | | 400 |
| Wellington | M5PFHxA | Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid | STL02577 | $^{13}C_5$-PFHxA | 50000 | 0.08 | | 400 |
| Wellington | M4PFHpA | Perfluoro-n-[1,2,3,4-13C4]heptanoic acid | STL01892 | $^{13}C_4$-PFHpA | 50000 | 0.08 | | 400 |
| Wellington | M8PFOA | Perfluoro-n-[13C8]octanoic acid | STL01052 | $^{13}C_8$-PFOA | 50000 | 0.08 | | 400 |
| Wellington | M9PFNA | Perfluoro-n-[13C9]nonanoic acid | STL02578 | $^{13}C_9$-PFNA | 50000 | 0.08 | | 400 |
| Wellington | M6PFDA | Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid | STL02579 | $^{13}C_6$-PFDA | 50000 | 0.08 | | 400 |
| Wellington | M7PFUdA | Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid | STL02580 | $^{13}C_7$-PFUnA | 50000 | 0.08 | | 400 |
| Wellington | MPFDoA | Perfluoro-n-[1,2-13C2]dodecanoic acid | STL00998 | $^{13}C_2$-PFDoA | 50000 | 0.08 | | 400 |
| Wellington | M2PFTeDA | Perfluoro-n-[1,2-13C2]tetradecanoic acid | STL02116 | $^{13}C_2$-PFTeDA | 50000 | 0.08 | | 400 |
| Wellington | M3PFBS | Perfluoro-1-[2,3,4-13C3]butanesulfonic acid | STL02337 | $^{13}C_3$-PFBS | 46500 | 0.08 | | 372 |
| Wellington | M3PFHxS | Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid | STL02581 | $^{13}C_3$-PFHxS | 47300 | 0.08 | | 378 |
| Wellington | M8PFOS | Perfluoro-1-[13C8]octanesulfonic acid | STL01054 | $^{13}C_8$-PFOS | 47800 | 0.08 | | 382 |
| Wellington | M8FOSA-I | Perfluoro-1-[13C8]octanesulfonamide | STL01056 | $^{13}C_8$-PFOSA | 50000 | 0.08 | | 400 |
| Wellington | d3-N-MeFOSAA | N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid | STL02118 | $d_3$-NMeFOSAA | 50000 | 0.2 | | 1000 |
| Wellington | d5-N-EtFOSAA | N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid | STL02117 | $d_5$-NEtFOSAA | 50000 | 0.2 | | 1000 |
| Wellington | M2-4;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]hexane sulfonic acid | STL02395 | $^{13}C_2$-4:2FTS | 46700 | 0.2 | | 934 |
| Wellington | M2-6;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]octane sulfonic acid | STL02279 | $^{13}C_2$-6:2FTS | 47500 | 0.2 | | 950 |
| Wellington | M2-8;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]decane sulfonic acid | STL02280 | $^{13}C_2$-8:2FTS | 47900 | 0.2 | | 958 |
| Wellington | M3HFPO-DA | Tetrafluoro-2-heptafluoropropoxy-13C3-propanoic acid | STL02255 | $^{13}C_3$-HFPO-DA | 50000 | 0.08 | | 400 |
| Wellington | d7-N-MeFOSE-M | N-methyl-d7-perfluorooctanesulfonamidoethanol | STL02277 | $d_7$-N-MeFOSE-M | 50000 | 0.2 | | 1000 |
| Wellington | d9-N-EtFOSE-M | N-ethyl-d9-perfluorooctanesulfonamidoethanol | STL02278 | $d_9$-N-EtFOSE-M | 50000 | 0.2 | | 1000 |
| Wellington | d-N-MeFOSA-M | N-ethyl-d5-perfluoro-1-octanesulfonamide | STL02704 | $d_5$-NEtPFOSA | 50000 | 0.08 | | 400 |
| Wellington | d-N-EtFOSA-M | N-methyl-d3-perfluoro-1-octanesulfonamide | STL02705 | $d_3$-NMePFOSA | 50000 | 0.08 | | 400 |
| Cambridge Isotope | CLM-11324-A-1.2 | Perfluoropropanoic acid (PFPrA) ($^{13}C_3$) | STL03194 | $^{13}C_3$-PFPrA | 50000 | 0.08 | | 400 |

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| Attachment 09 - 1633 NIS Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume (mL)** | **Final Conc. (ng/mL)** |
| Wellington | M3PFBA | Perfluoro-n-[2,3,4-13C3]butanoic acid | STL02680 | $^{13}C_3$-PFBA | 50000 | 0.08 | 10 | 400 |
| Wellington | MPFOA | Perfluoro-n-[1,2,3,4-13C4]octanoic acid | STL00990 | $^{13}C_4$-PFOA | 50000 | 0.2 | | 1000 |
| Wellington | MPFDA | Perfluoro-n-[1,2-13C2]decanoic acid | STL00996 | $^{13}C_2$-PFDA | 50000 | 0.08 | | 400 |
| Wellington | MPFOS | Perfluoro-n-[1,2,3,4-13C4]octanesulfonic acid | STL00991 | $^{13}C_4$-PFOS | 47800 | 0.08 | | 382.4 |
| Wellington | MPFNA | Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid | STL00995 | $^{13}C_5$-PFNA | 50000 | 0.08 | | 400 |
| Wellington | MPFHxA | Perfluoro-n-[1,2-13C2]hexanoic acid | STL00993 | $^{13}C_2$-PFHxA | 50000 | 0.2 | | 1000 |
| Wellington | MPFHxS | Perfluoro-1-hexane[18O2]sulfonic acid | STL00994 | $^{18}O_2$-PFHxS | 47300 | 0.08 | | 378.4 |

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| Attachment 10 - 1633 TOP SS Intermediate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume** | **Final Conc. (ng/mL)** |
| Wellington | M2PFOA | Perfluoro-n-(1,2-13C2)octanoic acid | STL00623 | $^{13}C_2$-PFOA | 50000 | 0.025 | 10 | 125 |
| Wellington | MPFUdA | Perfluoro-n-(1,2-13C2)undecanoic acid | STL00997 | $^{13}C_2$-PFUnA | 50000 | 0.025 | | 125 |
| Wellington | M3PFPeA | Perfluoro-n-(3,4,5-13C3)pentanoic acid | STL03269 | $^{13}C_3$-PFPeA | 50000 | 0.025 | | 125 |

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| Attachment 11 - 1633 Initial Calibration Standards Preparation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Solution Name** | **CAL1** | **CAL2** | **CAL3** | **CAL4** | **CAL5** | **CAL6** | **CAL7** | **CAL8** |
| Native PFAS CAL8 Intermediate (mL) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2.0 |
| Native PFAS Intermediate A (mL) | N/A | N/A | 0.02 | 0.04 | 0.1 | 0.2 | 0.4 | N/A |
| Native PFAS Intermediate B (mL) | 0.2 | 0.5 | N/A | N/A | N/A | N/A | N/A | N/A |
| 1633 TOP SS Intermediate (mL) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1633 EIS Intermediate (mL) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1633 NIS Intermediate (mL) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Final Volume (mL) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

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| Attachment 12 - 1633 Initial Calibration Standard Concentrations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CAL1 | CAL2 | CAL3 | CAL4 | CAL5 | CAL6 | CAL7 | CAL8 |
| Analyte Name | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) | Conc. (ng/ml) |
| PFBA | 0.100 | 0.250 | 1.00 | 2.00 | 5.00 | 10.0 | 20.0 | 100 |
| PFPeA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFHxA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFHpA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFOA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFNA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | 50.0 |
| PFDA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFUnA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFDoA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFTrDA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFTeDA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFBS | 0.044 | 0.111 | 0.442 | 0.884 | 2.21 | 4.42 | 8.84 | 44.2 |
| PFPeS | 0.047 | 0.117 | 0.469 | 0.938 | 2.35 | 4.69 | 9.38 | 46.9 |
| PFHxS | 0.046 | 0.114 | 0.455 | 0.910 | 2.28 | 4.55 | 9.10 | 45.5 |
| PFHpS | 0.048 | 0.119 | 0.476 | 0.952 | 2.38 | 4.76 | 9.52 | 47.6 |
| PFOS | 0.047 | 0.117 | 0.466 | 0.932 | 2.33 | 4.66 | 9.32 | 46.6 |
| PFNS | 0.048 | 0.120 | 0.480 | 0.960 | 2.40 | 4.80 | 9.60 | N/A |
| PFDS | 0.048 | 0.121 | 0.482 | 0.964 | 2.41 | 4.82 | 9.64 | N/A |
| PFDoS | 0.048 | 0.121 | 0.484 | 0.968 | 2.42 | 4.84 | 9.68 | N/A |
| 4:2-FTS | 0.093 | 0.234 | 0.934 | 1.87 | 4.67 | 9.34 | 18.7 | N/A |
| 6:2-FTS | 0.095 | 0.237 | 0.948 | 1.90 | 4.74 | 9.48 | 19.0 | N/A |
| 8:2-FTS | 0.096 | 0.240 | 0.958 | 1.92 | 4.79 | 9.58 | 19.2 | N/A |
| PFOSA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NMeFOSA / N-MePFOSA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NEtFOSA / N-EtPFOSA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NMeFOSAA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NEtFOSAA | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NMePFOSAE / NMeFOSE | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| NEtPFOSAE / NEtFOSE | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| HFPO-DA / GenX | 0.038 | 0.094 | 0.38 | 0.750 | 1.88 | 3.75 | 7.50 | 37.5 |
| ADONA | 0.047 | 0.118 | 0.471 | 0.942 | 2.36 | 4.71 | 9.42 | N/A |
| PFEESA / PES | 0.045 | 0.111 | 0.445 | 0.890 | 2.23 | 4.45 | 8.90 | N/A |
| PFMPA / PFECA F | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFMBA / PFECA A | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| NFDHA / PFECA B | 0.050 | 0.125 | 0.50 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| 9Cl-PF3ONS | 0.047 | 0.117 | 0.466 | 0.93 | 2.33 | 4.66 | 9.32 | N/A |
| 11Cl-PF3OUdS | 0.047 | 0.118 | 0.471 | 0.94 | 2.36 | 4.71 | 9.42 | N/A |
| 3:3 FTCA | 0.100 | 0.250 | 1.00 | 2.00 | 5.00 | 10.0 | 20.0 | N/A |
| 5:3 FTCA | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| 7:3 FTCA | 0.250 | 0.625 | 2.50 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| PFECHS | 0.046 | 0.116 | 0.462 | 0.92 | 2.31 | 4.62 | 9.24 | N/A |
| FBSA | 0.050 | 0.125 | 0.500 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| FHxSA | 0.050 | 0.125 | 0.500 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| PFPrA / PPF Acid | 0.250 | 0.625 | 2.500 | 5.00 | 12.5 | 25.0 | 50.0 | N/A |
| PFODA | 0.050 | 0.125 | 0.500 | 1.00 | 2.50 | 5.00 | 10.0 | N/A |
| TFSI | 0.049 | 0.122 | 0.490 | 0.98 | 2.45 | 4.90 | 9.79 | N/A |
| $^{13}C_3$-PFPrA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFBA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_5$-PFPeA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_5$-PFHxA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFHpA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_8$-PFOA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_9$-PFNA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_6$-PFDA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_7$-PFUnA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFDoA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFTeDA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_3$-PFBS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_3$-PFHxS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_8$-PFOS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_8$-PFOSA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $d_3$-NMeFOSAA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $d_5$-NEtFOSAA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-4:2FTS | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-6:2FTS | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-8:2FTS | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_3$-HFPO-DA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $d_7$-N-MeFOSE-M | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $d_9$-N-EtFOSE-M | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $d_5$-NEtPFOSA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $d_3$-NMePFOSA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_3$-PFBA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFOA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{13}C_2$-PFDA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_4$-PFOS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_5$-PFNA | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFHxA | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| $^{18}O_2$-PFHxS | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $^{13}C_2$-PFOA | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 |
| $^{13}C_2$-PFUnA | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 |
| $^{13}C_3$-PFPeA | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 | 0.625 |

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| Attachment 13 - Bile Salts Stock Solution | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Vendor** | **Catalog Number** | **Analyte** | **CAS#** | **Acronym** | **Aliquot (g)** | **Final Volume** | **Final Conc. (ng/mL)** |
| Sigma Aldrich | T0557-500MG | Taurodeoxycholic acid | 516-50-7 | TDCA | 0.05 | 50 | 1000000 |
| Sigma Aldrich | T6260-1G | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 0.05 | | 950000 |
| Calbiochem | 580549-1GM | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 0.05 | | 1000000 |

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| Attachment 14 - Bile Salts Intermediate | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume** | **Final Conc. (ng/mL)** |
| Bile Salts Stock Solution | Taurodeoxycholic acid | 516-50-7 | TDCA | 1000000 | 1 | 4 | 250000 |
| | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 950000 | | | 237500 |
| | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 1000000 | | | 250000 |

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| Attachment 15 - Bile Salts Working Solution | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume** | **Final Conc. (ng/mL)** |
| Bile Salts Intermediate | Taurodeoxycholic acid | 516-50-7 | TDCA | 250000 | 0.1 | 5 | 5000 |
| | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 237500 | | | 4750 |
| | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 250000 | | | 5000 |

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| Attachment 16 - 1633 Window-Defining Matrix Standard | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt. Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume* (mL)** | **Final Conc. (ng/mL)** |
| Bile Salts Working Solution | Taurodeoxycholic acid | 516-50-7 | TDCA | 5000 | 0.05 | 10 | 25 |
| | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | 4750 | | | 23.8 |
| | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | 5000 | | | 25 |

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| Attachment 17 - Native 1633 Mid-Level Spike | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Rgt. Name | Analyte | CAS# | Acronym | Conc. (ng/mL) | Aliquot (mL) | Final Volume | Final Conc. (ng/mL) |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 4 | 10 | 200 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 100 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 100 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 100 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 100 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 100 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 100 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 100 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 100 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 100 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 100 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 88.4 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 93.8 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 91.0 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 95.2 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 93.2 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 96.0 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 96.4 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 96.8 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 187 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 190 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 192 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 100 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 100 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 100 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 100 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 100 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 500 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 500 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 75.0 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 236 | | | 94.2 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 89.0 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 100 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 100 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 100 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 93.2 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 236 | | | 94.2 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 200 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 500 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 500 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 231 | | | 92.2 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 100 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 100 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 500 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 100 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 245 | | | 97.9 |

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| Attachment 18 - Native 1633 Low-Level Spike | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Rgt. Name** | **Analyte** | **CAS#** | **Acronym** | **Conc. (ng/mL)** | **Aliquot (mL)** | **Final Volume** | **Final Conc. (ng/mL)** |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 0.5 | 10 | 25.00 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 12.50 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 12.50 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 12.50 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 12.50 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 12.50 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 12.50 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 12.50 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 12.50 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 12.50 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 12.50 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 11.05 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 11.73 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 11.38 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 11.90 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 11.65 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 12.00 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 12.05 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 12.10 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 23.35 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 23.70 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 23.95 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 12.50 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 12.50 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 12.50 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 12.50 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 12.50 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 62.50 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 62.50 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 9.38 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 235.5 | | | 11.78 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 11.13 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 12.50 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 12.50 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 12.50 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 11.65 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 235.5 | | | 11.78 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 25.00 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 62.50 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 62.50 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 230.5 | | | 11.53 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 12.50 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 12.50 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 62.50 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 12.50 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 244.75 | | | 12.24 |

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| Attachment 19 - 1633 ICV Working Standard | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Rgt. Name | Analyte | CAS# | Acronym | Conc. (ng/mL) | Aliquot (mL) | Final Volume | Final Conc. (ng/mL) |
| Native PFAS Intermediate A | Perfluorobutanoic acid | 375-22-4 | PFBA | 500 | 0.050 | 10 | 2.50 |
| | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 250 | | | 1.25 |
| | Perfluorohexanoic acid | 307-24-4 | PFHxA | 250 | | | 1.25 |
| | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 250 | | | 1.25 |
| | Perfluorooctanoic acid | 335-67-1 | PFOA | 250 | | | 1.25 |
| | Perfluorononanoic acid | 375-95-1 | PFNA | 250 | | | 1.25 |
| | Perfluorodecanoic acid | 335-76-2 | PFDA | 250 | | | 1.25 |
| | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 250 | | | 1.25 |
| | Perfluorododecanoic acid | 307-55-1 | PFDoA | 250 | | | 1.25 |
| | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 250 | | | 1.25 |
| | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 250 | | | 1.25 |
| | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 221 | | | 1.105 |
| | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 235 | | | 1.173 |
| | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 228 | | | 1.138 |
| | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 238 | | | 1.190 |
| | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 233 | | | 1.165 |
| | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 240 | | | 1.200 |
| | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 241 | | | 1.205 |
| | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 242 | | | 1.210 |
| | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 467 | | | 2.34 |
| | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 474 | | | 2.37 |
| | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 479 | | | 2.40 |
| | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 250 | | | 1.25 |
| | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 250 | | | 1.25 |
| | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 250 | | | 1.25 |
| | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 250 | | | 1.25 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 250 | | | 1.25 |
| | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 1250 | | | 6.25 |
| | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 1250 | | | 6.25 |
| | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 187.5 | | | 0.938 |
| | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 236 | | | 1.178 |
| | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 223 | | | 1.113 |
| | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 250 | | | 1.25 |
| | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 250 | | | 1.25 |
| | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 250 | | | 1.25 |
| | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 233 | | | 1.165 |
| | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 236 | | | 1.178 |
| | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 500 | | | 2.50 |
| | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 1250 | | | 6.25 |
| | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 1250 | | | 6.25 |
| | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 231 | | | 1.153 |
| | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 250 | | | 1.25 |
| | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 250 | | | 1.25 |
| | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 1250 | | | 6.25 |
| | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 250 | | | 1.25 |
| | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 245 | | | 1.224 |
| 1633 TOP SS Intermediate | Perfluoro-n-(1,2-13C2)octanoic acid | STL00623 | $^{13}C_2$-PFOA | 125 | 0.050 | | 0.625 |
| | Perfluoro-n-(1,2-13C2)undecanoic acid | STL00997 | $^{13}C_2$-PFUnA | 125 | | | 0.625 |
| | Perfluoro-n-(3,4,5-13C3)pentanoic acid | STL03269 | $^{13}C_3$-PFPeA | 125 | | | 0.625 |
| 1633 EIS Intermediate | Perfluoro-n-[13C4]butanoic acid | STL00992 | $^{13}C_4$-PFBA | 400 | 0.050 | | 2.00 |
| | Perfluoro-n-[13C5]pentanoic acid | STL01893 | $^{13}C_5$-PFPeA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid | STL02577 | $^{13}C_5$-PFHxA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4-13C4]heptanoic acid | STL01892 | $^{13}C_4$-PFHpA | 400 | | | 2.00 |
| | Perfluoro-n-[13C8]octanoic acid | STL01052 | $^{13}C_8$-PFOA | 400 | | | 2.00 |
| | Perfluoro-n-[13C9]nonanoic acid | STL02578 | $^{13}C_9$-PFNA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid | STL02579 | $^{13}C_6$-PFDA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid | STL02580 | $^{13}C_7$-PFUnA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2-13C2]dodecanoic acid | STL00998 | $^{13}C_2$-PFDoA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2-13C2]tetradecanoic acid | STL02116 | $^{13}C_2$-PFTeDA | 400 | | | 2.00 |
| | Perfluoro-1-[2,3,4-13C3]butanesulfonic acid | STL02337 | $^{13}C_3$-PFBS | 372 | | | 1.86 |
| | Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid | STL02581 | $^{13}C_3$-PFHxS | 378 | | | 1.89 |
| | Perfluoro-1-[13C8]octanesulfonic acid | STL01054 | $^{13}C_8$-PFOS | 382 | | | 1.91 |
| | Perfluoro-1-[13C8]octanesulfonamide | STL01056 | $^{13}C_8$-PFOSA | 400 | | | 2.00 |
| | N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid | STL02118 | $d_3$-NMeFOSAA | 1000 | | | 5.00 |
| | N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid | STL02117 | $d_5$-NEtFOSAA | 1000 | | | 5.00 |
| | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]hexane sulfonic acid | STL02395 | $^{13}C_2$-4:2FTS | 934 | | | 4.67 |
| | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]octane sulfonic acid | STL02279 | $^{13}C_2$-6:2FTS | 950 | | | 4.75 |
| | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]decane sulfonic acid | STL02280 | $^{13}C_2$-8:2FTS | 958 | | | 4.79 |
| | Tetrafluoro-2-heptafluoropropoxy-13C3-propanoic acid | STL02255 | $^{13}C_3$-HFPO-DA | 400 | | | 2.00 |
| | N-methyl-d7-perfluorooctanesulfonamidoethanol | STL02277 | $d_7$-N-MeFOSE-M | 1000 | | | 5.00 |
| | N-ethyl-d9-perfluorooctanesulfonamidoethanol | STL02278 | $d_9$-N-EtFOSE-M | 1000 | | | 5.00 |
| | N-ethyl-d5-perfluoro-1-octanesulfonamide | STL02704 | $d_5$-NEtPFOSA | 400 | | | 2.00 |
| | N-methyl-d3-perfluoro-1-octanesulfonamide | STL02705 | $d_3$-NMePFOSA | 400 | | | 2.00 |
| | Perfluoropropanoic acid (PFPrA) ($^{13}C_3$) | STL03194 | $^{13}C_3$-PFPrA | 400 | | | 2.00 |
| 1633 NIS Intermediate | Perfluoro-n-[2,3,4-13C3]butanoic acid | STL02680 | $^{13}C_3$-PFBA | 400 | 0.050 | | 2.00 |
| | Perfluoro-n-[1,2,3,4-13C4]octanoic acid | STL00990 | $^{13}C_4$-PFOA | 1000 | | | 5.00 |
| | Perfluoro-n-[1,2-13C2]decanoic acid | STL00996 | $^{13}C_2$-PFDA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2,3,4-13C4]octanesulfonic acid | STL00991 | $^{13}C_4$-PFOS | 382 | | | 1.91 |
| | Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid | STL00995 | $^{13}C_5$-PFNA | 400 | | | 2.00 |
| | Perfluoro-n-[1,2-13C2]hexanoic acid | STL00993 | $^{13}C_2$-PFHxA | 1000 | | | 5.00 |
| | Perfluoro-1-hexane[18O2]sulfonic acid | STL00994 | $^{18}O_2$-PFHxS | 378 | | | 1.89 |

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| Attachment 20 - Purchased Standards | | | | | |
|---|---|---|---|---|---|
| Vendor | Cat. No. | Analyte | CAS# | Acronym | Conc. (ng/ml) |
| Wellington | PFBA | Perfluorobutanoic acid | 375-22-4 | PFBA | 50000 |
| Wellington | PFPeA | Perfluoropentanoic acid | 2706-90-3 | PFPeA | 50000 |
| Wellington | PFHxA | Perfluorohexanoic acid | 307-24-4 | PFHxA | 50000 |
| Wellington | PFHpA | Perfluoroheptanoic acid | 375-85-9 | PFHpA | 50000 |
| Wellington | br-PFOA | Perfluorooctanoic acid | 335-67-1 | PFOA | 50000 |
| Wellington | br-PFNA | Perfluorononanoic acid | 375-95-1 | PFNA | 50000 |
| Wellington | PFDA | Perfluorodecanoic acid | 335-76-2 | PFDA | 50000 |
| Wellington | PFUdA | Perfluoroundecanoic acid | 2058-94-8 | PFUnA | 50000 |
| Wellington | MPFDOA | Perfluorododecanoic acid | 307-55-1 | PFDoA | 50000 |
| Wellington | PFTrDA | Perfluorotridecanoic acid | 72629-94-8 | PFTrDA | 50000 |
| Wellington | PFTeDA | Perfluorotetradecanoic acid | 376-06-7 | PFTeDA | 50000 |
| Wellington | L-PFBS | Perfluorobutanesulfonic acid | 375-73-5 | PFBS | 44200 |
| Wellington | L-PFPeS | Perfluoropentansulfonic acid | 2706-91-4 | PFPeS | 46900 |
| Wellington | br-PFHxSK | Perfluorohexanesulfonic acid | 355-46-4 | PFHxS | 45500 |
| Wellington | L-PFHpS | Perfluoroheptanesulfonic acid | 375-92-8 | PFHpS | 47600 |
| Wellington | br-PFOSK | Perfluorooctanesulfonic acid | 1763-23-1 | PFOS | 46600 |
| Wellington | L-PFNS | Perfluorononanesulfonic acid | 68259-12-1 | PFNS | 48000 |
| Wellington | L-PFDS | Perfluorodecanesulfonic acid | 335-77-3 | PFDS | 48200 |
| Wellington | L-PFDoS | Perfluorododecanesulfonic acid | 79780-39-5 | PFDoS | 48400 |
| Wellington | 4;2 FTS | 1H,1H, 2H, 2H-Perfluorohexane sulfonic acid | 757124-72-4 | 4:2-FTS | 46700 |
| Wellington | 6;2 FTS | 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid | 27619-97-2 | 6:2-FTS | 47400 |
| Wellington | 8;2 FTS | 1H,1H, 2H, 2H-Perfluorodecane sulfonic acid | 39108-34-4 | 8:2-FTS | 47900 |
| Wellington | br-FOSA | Perfluorooctanesulfonamide | 754-91-6 | PFOSA | 50000 |
| Wellington | br-NMeFOSA | N-methyl perfluorooctanesulfonamide | 31506-32-8 | NMeFOSA / N-MePFOSA | 50000 |
| Wellington | br-NEtFOSA | N-ethyl perfluorooctanesulfonamide | 4151-50-2 | NEtFOSA / N-EtPFOSA | 50000 |
| Wellington | br-NMeFOSAA | N-methyl perfluorooctanesulfonamidoacetic acid | 2355-31-9 | NMeFOSAA | 50000 |
| Wellington | br-NEtFOSAA | N-ethyl perfluorooctanesulfonamidoacetic acid | 2991-50-6 | NEtFOSAA | 50000 |
| Wellington | br-NMeFOSE | N-methyl perfluorooctanesulfonamidoethanol | 24448-09-7 | NMePFOSAE / NMeFOSE | 50000 |
| Wellington | br-NEtFOSE | N-ethyl perfluorooctanesulfonamidoethanol | 1691-99-2 | NEtPFOSAE / NEtFOSE | 50000 |
| Wellington | HFPO-DA | Hexafluoropropylene oxide dimer acid | 13252-13-6 | HFPO-DA / GenX | 50000 |
| Wellington | NaDONA | 4,8-Dioxa-3H-perfluorononanoic acid | 919005-14-4 | ADONA | 47100 |
| Wellington | PFEESA | Perfluoro(2-ethoxyethane)sulfonic acid | 113507-82-7 | PFEESA / PES | 44500 |
| Wellington | PF4OPeA | Perfluoro-3-methoxypropanoic acid | 377-73-1 | PFMPA / PFECA F | 50000 |
| Wellington | PF5OHxA | Perfluoro-4-methoxybutanoic acid | 863090-89-5 | PFMBA / PFECA A | 50000 |
| Wellington | 3,6-OPFHpA | Nonafluoro-3,6-dioxaheptanoic acid | 151772-58-6 | NFDHA / PFECA B | 50000 |
| Wellington | 9Cl-PF3ONS | 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid | 756426-58-1 | 9Cl-PF3ONS | 46600 |
| Wellington | 11Cl-PF3OUdS | 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid | 763051-92-9 | 11Cl-PF3OUdS | 47100 |
| Wellington | FPrPA | 3-Perfluoropropyl propanoic acid | 356-02-5 | 3:3 FTCA | 50000 |
| Wellington | FPePA | 2H,2H,3H,3H-Perfluorooctanoic acid | 914637-49-3 | 5:3 FTCA | 50000 |
| Wellington | FHpPA | 3-Perfluoroheptyl propanoic acid | 812-70-4 | 7:3 FTCA | 50000 |
| Wellington | PFECHS | Perfluoro-4-ethylcyclohexanesulfonate | 335-24-0 | PFECHS | 46100 |
| Wellington | FBSA-I | Perfluoro-1-butanesulfonamide | 30334-69-1 | FBSA | 50000 |
| Wellington | FHxSA-I | Perlfuoro-1-hexanesulfonamide | 41997-13-1 | FHxSA | 50000 |
| Wellington | PFPrA | Perfluoropropanoic acid | 422-64-0 | PFPrA / PPF Acid | 50000 |
| Wellington | PFODA | Perfluoro-n-octadecanoic acid | 16517-11-6 | PFODA | 50000 |
| AccuStandard | PFOS-030S | Bis(trifluoromethylsulfonyl)amine | 82113-65-3 | TFSI | 97900 |
| Wellington | MPFBA | Perfluoro-n-[13C4]butanoic acid | STL00992 | $^{13}C_4$-PFBA | 50000 |
| Wellington | M5PFPeA | Perfluoro-n-[13C5]pentanoic acid | STL01893 | $^{13}C_5$-PFPeA | 50000 |
| Wellington | M5PFHxA | Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid | STL02577 | $^{13}C_5$-PFHxA | 50000 |
| Wellington | M4PFHpA | Perfluoro-n-[1,2,3,4-13C4]heptanoic acid | STL01892 | $^{13}C_4$-PFHpA | 50000 |
| Wellington | M8PFOA | Perfluoro-n-[13C8]octanoic acid | STL01052 | $^{13}C_8$-PFOA | 50000 |
| Wellington | M9PFNA | Perfluoro-n-[13C9]nonanoic acid | STL02578 | $^{13}C_9$-PFNA | 50000 |
| Wellington | M6PFDA | Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid | STL02579 | $^{13}C_6$-PFDA | 50000 |
| Wellington | M7PFUdA | Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid | STL02580 | $^{13}C_7$-PFUnA | 50000 |
| Wellington | MPFDoA | Perfluoro-n-[1,2-13C2]dodecanoic acid | STL00998 | $^{13}C_2$-PFDoA | 50000 |
| Wellington | M2PFTeDA | Perfluoro-n-[1,2-13C2]tetradecanoic acid | STL02116 | $^{13}C_2$-PFTeDA | 50000 |
| Wellington | M3PFBS | Perfluoro-1-[2,3,4-13C3]butanesulfonic acid | STL02337 | $^{13}C_3$-PFBS | 46500 |
| Wellington | M3PFHxS | Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid | STL02581 | $^{13}C_3$-PFHxS | 47300 |
| Wellington | M8PFOS | Perfluoro-1-[13C8]octanesulfonic acid | STL01054 | $^{13}C_8$-PFOS | 47800 |
| Wellington | M8FOSA-I | Perfluoro-1-[13C8]octanesulfonamide | STL01056 | $^{13}C_8$-PFOSA | 50000 |
| Wellington | d3-N-MeFOSAA | N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid | STL02118 | $d_3$-NMeFOSAA | 50000 |
| Wellington | d5-N-EtFOSAA | N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid | STL02117 | $d_5$-NEtFOSAA | 50000 |
| Wellington | M2-4;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]hexane sulfonic acid | STL02395 | $^{13}C_2$-4:2FTS | 46700 |
| Wellington | M2-6;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]octane sulfonic acid | STL02279 | $^{13}C_2$-6:2FTS | 47500 |
| Wellington | M2-8;2FTS | 1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]decane sulfonic acid | STL02280 | $^{13}C_2$-8:2FTS | 47900 |
| Wellington | M3HFPO-DA | Tetrafluoro-2-heptafluoropropoxy-13C3-propanoic acid | STL02255 | $^{13}C_3$-HFPO-DA | 50000 |
| Wellington | d7-N-MeFOSE-M | N-methyl-d7-perfluorooctanesulfonamidoethanol | STL02277 | $d_7$-N-MeFOSE-M | 50000 |
| Wellington | d9-N-EtFOSE-M | N-ethyl-d9-perfluorooctanesulfonamidoethanol | STL02278 | $d_9$-N-EtFOSE-M | 50000 |
| Wellington | d-N-MeFOSA-M | N-ethyl-d5-perfluoro-1-octanesulfonamide | STL02704 | $d_5$-NEtPFOSA | 50000 |
| Wellington | d-N-EtFOSA-M | N-methyl-d3-perfluoro-1-octanesulfonamide | STL02705 | $d_3$-NMePFOSA | 50000 |
| Cambridge Isotope | CLM-11324-A-1.2 | Perfluoropropanoic acid (PFPrA) ($^{13}C_3$) | STL03194 | $^{13}C_3$-PFPrA | 50000 |
| Wellington | M3PFBA | Perfluoro-n-[2,3,4-13C3]butanoic acid | STL02680 | $^{13}C_3$-PFBA | 50000 |
| Wellington | MPFOA | Perfluoro-n-[1,2,3,4-13C4]octanoic acid | STL00990 | $^{13}C_4$-PFOA | 50000 |
| Wellington | MPFDA | Perfluoro-n-[1,2-13C2]decanoic acid | STL00996 | $^{13}C_2$-PFDA | 50000 |
| Wellington | MPFOS | Perfluoro-n-[1,2,3,4-13C4]octanesulfonic acid | STL00991 | $^{13}C_4$-PFOS | 47800 |
| Wellington | MPFNA | Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid | STL00995 | $^{13}C_5$-PFNA | 50000 |
| Wellington | MPFHxA | Perfluoro-n-[1,2-13C2]hexanoic acid | STL00993 | $^{13}C_2$-PFHxA | 50000 |
| Wellington | MPFHxS | Perfluoro-1-hexane[18O2]sulfonic acid | STL00994 | $^{18}O_2$-PFHxS | 47300 |
| Wellington | M2PFOA | Perfluoro-n-(1,2-13C2)octanoic acid | STL00623 | $^{13}C_2$-PFOA | 50000 |
| Wellington | MPFUdA | Perfluoro-n-(1,2-13C2)undecanoic acid | STL00997 | $^{13}C_2$-PFUnA | 50000 |
| Wellington | M3PFPeA | Perfluoro-n-(3,4,5-13C3)pentanoic acid | STL03269 | $^{13}C_3$-PFPeA | 50000 |
| Sigma Aldrich | T0557-500MG | Taurodeoxycholic acid | 516-50-7 | TDCA | neat |
| Sigma Aldrich | T6260-1G | Taurochenodeoxycholic acid | 516-35-8 | TCDCA | neat |
| Calbiochem | 580549-1GM | Tauroursodeoxycholic acid | 14605-22-2 | TUDCA | neat |

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**Table 7. IPR/OPR/LLOPR Acceptance Limits for Target Analytes in Solid, Biosolid, and Tissue Matrices**

| | Solid and Biosolid Matrices[1] | | | Tissue Matrix[1] | | |
|---|---|---|---|---|---|---|
| | IPR | | | IPR | | |
| Compound | Mean Recovery (%) | RSD (%) | OPR/LLOPR Recovery (%) | Mean Recovery (%) | RSD (%) | OPR/LLOPR Recovery (%) |
| PFBA | 70 - 140 | 17 | 70 - 140 | 70 - 135 | 20 | 60 - 140 |
| PFPeA | 70 - 140 | 26 | 60 - 150 | 70 - 130 | 20 | 60 - 145 |
| PFHxA | 70 - 135 | 23 | 65 - 140 | 70 - 140 | 20 | 60 - 160 |
| PFHpA | 70 - 140 | 21 | 65 - 145 | 70 - 140 | 20 | 60 - 145 |
| PFOA | 70 - 140 | 23 | 70 - 150 | 70 - 130 | 25 | 60 - 150 |
| PFNA | 65 - 145 | 24 | 70 - 155 | 70 - 140 | 20 | 60 - 145 |
| PFDA | 70 - 145 | 26 | 70 - 155 | 70 - 135 | 20 | 60 - 150 |
| PFUnA | 70 - 145 | 26 | 70 - 155 | 70 - 135 | 20 | 60 - 155 |
| PFDoA | 70 - 145 | 25 | 70 - 150 | 70 - 135 | 20 | 60 - 140 |
| PFTrDA | 55 - 160 | 26 | 65 - 150 | 55 - 160 | 20 | 60 - 150 |
| PFTeDA | 70 - 145 | 24 | 65 - 150 | 70 - 140 | 25 | 60 - 140 |
| PFBS | 60 - 145 | 25 | 65 - 145 | 70 - 145 | 20 | 60 - 150 |
| PFPeS | 65 - 140 | 29 | 55 - 160 | 70 - 150 | 20 | 60 - 145 |
| PFHxS | 65 - 145 | 28 | 60 - 150 | 70 - 140 | 25 | 60 - 155 |
| PFHpS | 70 - 140 | 27 | 65 - 155 | 70 - 145 | 20 | 60 - 140 |
| PFOS | 70 - 135 | 27 | 65 - 160 | 70 - 135 | 30 | 60 - 160 |
| PFNS | 70 - 140 | 27 | 55 - 140 | 60 - 130 | 20 | 45 - 140 |
| PFDS | 50 - 150 | 31 | 40 - 155 | 55 - 135 | 20 | 50 - 140 |
| PFDoS | 40 - 140 | 40 | 25 - 160 | 25 - 145 | 45 | 25 - 140 |
| 4:2FTS | 70 - 135 | 27 | 60 - 150 | 65 - 140 | 30 | 55 - 150 |
| 6:2FTS | 60 - 160 | 50 | 55 - 200 | 70 - 140 | 25 | 60 - 150 |
| 8:2FTS | 70 - 140 | 27 | 70 - 150 | 70 - 150 | 25 | 60 - 170 |
| PFOSA | 70 - 140 | 19 | 70 - 140 | 70 - 140 | 20 | 60 - 150 |
| NMeFOSA | 65 - 145 | 26 | 70 - 155 | 70 - 140 | 30 | 60 - 160 |
| NEtFOSA | 70 - 135 | 19 | 70 - 140 | 70 - 140 | 40 | 60 - 150 |
| NMeFOSAA | 65 - 145 | 31 | 65 - 155 | 70 - 140 | 20 | 60 - 145 |
| NEtFOSAA | 60 - 150 | 31 | 65 - 165 | 70 - 140 | 25 | 60 - 145 |
| NMeFOSE | 70 - 140 | 19 | 70 - 140 | 60 - 150 | 20 | 40 - 180 |
| NEtFOSE | 70 - 135 | 17 | 70 - 135 | 70 - 145 | 40 | 60 - 205 |
| HFPO-DA | 70 - 140 | 25 | 70 - 145 | 70 - 140 | 25 | 60 - 145 |
| ADONA | 70 - 155 | 26 | 70 - 160 | 70 - 145 | 20 | 55 - 165 |
| PFMPA | 70 - 140 | 25 | 30 - 140 | 70 - 145 | 40 | 25 - 145 |
| PFMBA | 55 - 145 | 33 | 60 - 150 | 70 - 140 | 20 | 60 - 150 |
| NFDHA | 45 - 145 | 27 | 60 - 155 | 70 - 155 | 30 | 60 - 180 |
| 9Cl-PF3ONS | 65 - 135 | 23 | 70 - 150 | 70 - 140 | 20 | 60 - 170 |
| 11Cl-PF3OUdS | 50 - 135 | 31 | 45 - 160 | 65 - 140 | 20 | 50 - 170 |
| PFEESA | 70 - 140 | 20 | 70 - 140 | 70 - 145 | 25 | 50 - 150 |
| 3:3FTCA | 45 - 155 | 32 | 45 - 130 | 55 - 130 | 25 | 30 - 140 |
| 5:3FTCA | 70 - 135 | 28 | 60 - 130 | 70 - 145 | 20 | 60 - 160 |
| 7:3FTCA | 70 - 145 | 39 | 60 - 150 | 70 - 155 | 20 | 60 - 200 |

[1] The recovery limits apply to the target analyte results for IPR, OPR, and LLOPR samples for solid, biosolids, and tissue matrices. Data were derived from the multi-laboratory validation study and are therefore the limits required for this method.

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**Table 8. Acceptance Limits for EIS and NIS Compounds in Soil-Sediment, Tissue, and Biosolid Matrices and Associated QC Samples**

| EIS Compound[1] | Soil/Sediment Samples[2] Recovery (%) | Tissue Samples[2] Recovery (%) | Biosolid Samples[2] Recovery (%) |
|---|---|---|---|
| $^{13}C_4$-PFBA | 8[3] - 130 | 5[3] - 130 | 5[3] - 130 |
| $^{13}C_5$-PFPeA | 35 - 130 | 10 - 185 | 35 - 130 |
| $^{13}C_5$-PFHxA | 40 - 130 | 25 - 170 | 40 – 130 |
| $^{13}C_4$-PFHpA | 40 - 130 | 25 - 150 | 40 – 130 |
| $^{13}C_8$-PFOA | 40 - 130 | 25 - 150 | 40 – 130 |
| $^{13}C_9$-PFNA | 40 - 130 | 35 - 185 | 40 – 145 |
| $^{13}C_6$-PFDA | 40 - 130 | 30 - 150 | 40 – 130 |
| $^{13}C_7$-PFUnA | 40 - 130 | 30 - 180 | 40 – 130 |
| $^{13}C_2$-PFDoA | 40 - 130 | 35 - 180 | 40 – 130 |
| $^{13}C_2$-PFTeDA | 20 - 130 | 20 - 160 | 10 - 160 |
| $^{13}C_3$-PFBS | 40 - 135 | 25 - 190 | 40 - 150 |
| $^{13}C_3$-PFHxS | 40 - 130 | 35 - 175 | 40 - 140 |
| $^{13}C_8$-PFOS | 40 - 130 | 40 - 160 | 40 - 130 |
| $^{13}C_2$-4:2FTS | 40 - 165 | 30 - 300 | 40 - 300 |
| $^{13}C_2$-6:2FTS | 40 - 215 | 35 - 300 | 40 - 300 |
| $^{13}C_2$-8:2FTS | 40 - 275 | 40 - 365 | 40 - 300 |
| $^{13}C_8$-PFOSA | 40 - 130 | 25 - 180 | 20 - 140 |
| $D_3$-NMeFOSA | 10 - 130 | 5[4] - 130 | 20 - 130 |
| $D_5$-NEtFOSA | 10 - 130 | 5[4]- 130 | 20 - 130 |
| $D_3$-NMeFOSAA | 40 - 135 | 30 - 250 | 30 – 150 |
| $D_5$-NEtFOSAA | 40 - 150 | 30 - 235 | 20 - 140 |
| $D_7$-NMeFOSE | 20 - 130 | 5[4] - 160 | 25 - 130 |
| $D_9$-NEtFOSE | 15 - 130 | 5[4] - 130 | 20 - 130 |
| $^{13}C_3$-HFPO-DA | 40 - 130 | 20 - 185 | 40 - 130 |
| $^{13}C_3$-PFBA | 50 - 200 | 50 - 200 | 50 - 200 |
| $^{13}C_2$-PFHxA | | | |
| $^{13}C_4$-PFOA | | | |
| $^{13}C_5$-PFNA | | | |
| $^{13}C_2$-PFDA | | | |
| $^{18}O_2$-PFHxS | | | |
| $^{13}C_4$-PFOS | | | |

[1] Limits apply to the EIS and NIS recoveries from samples of all solid, biosolid, and tissue matrices.

[2] The recovery limits for the EIS compounds were derived by EPA from the solid, tissue, and biosolids sample data from multi-laboratory validation study. To simplify laboratory operations, EPA has applied the same EIS recovery limits used for field sample analyses to the EIS recoveries in the method blank, IPR, OPR, and LLOPR samples. There are no IPR mean or RSD criteria for the EIS compounds.

[3] Recovery of $^{13}C_4$-PFBA, can be problematic in some soil, tissue, and biosolids samples. Although the lower limits for recovery for these EISs are set below 10%, laboratories should routinely track recoveries of these EISs and take reasonable steps to ensure that recoveries are at least 10% in the majority of samples.

[4] Recoveries of $D_3$-NMeFOSA, $D_5$-NEtFOSA, $D_7$-NMeFOSE, and $D_9$-NEtFOSE can be problematic in tissue samples. The 5% the lower limit for recovery for these EISs may not be achievable for all laboratories in tissue samples. Any result associated with an EIS recovery below 5% should be considered estimated.

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# APPENDIX F

Resumes of Key Personnel

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# PROFESSIONAL PROFILE

## CONTACT INFORMATION

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209 Shafter Street
Islandia, NY 11749


## EDUCATION

BA, Geology, Colgate University, 2003

## PROFESSIONAL LICENSES

New York Licensed Professional Geologist #720
Connecticut Licensed Environmental Professional #610
Accredited AHERA Inspector, 2004
NJ UST Subsurface Evaluator Certification #491925
Waterfront Edge Design Guidelines Professional

# Frank Cherena, PG, LEP, WEDG

## National Director of Real Estate Services

## Vice President | Principal Geologist

### EXPERIENCE SUMMARY

Twenty years of experience: Vice President/Principal Geologist with Roux, Islandia, New York; Staff Geologist with RTP Environmental Associates, Inc., Green Brook, New Jersey.

### TECHNICAL SPECIALTIES

Conducted, managed, or overseen Phase I and Phase II investigations and remediation at contaminated sites, specializing in developing innovative cost-saving solutions that focus on integrating remedies into redevelopment scenarios. Experience working with multiple agencies and stakeholders including negotiation and coordination with lenders, tenants, and community stakeholders to secure funding and approvals.

### REPRESENTATIVE PROJECTS

- Principal-in-charge of large university tech development project in New York City. The project consists of the demolition and decommissioning of a former hospital building, and excavation for redevelopment of four separate buildings for the first phase of campus construction. Environmental considerations on the project included site assessment, remediation design and oversight, SDPES permitting (construction dewatering and geothermal well discharge), soil characterization for reuse and capping of soils. Coordinated with NYCDEP, and other project stakeholders concerning community protection and monitoring concerns.
- Principal-in-charge of redevelopment of a former powerplant into an industrial arts complex. Remediation consisted of removal and containment of TSCA-regulated PCB-impacted soils, groundwater, and building material, and remediation waste. Successfully obtained Certificate of Completion for NYSDEC BCP, clean up and continue to coordinate Site redevelopment activities under a Site Management Plan. Included significant coordination and correspondence with USEPA to negotiate installation of a consent order for bulkhead installation along the Gowanus Canal Superfund Site.
- Principal-in-charge of redevelopment of shopping mall in Staten Island, New York. The Site will consist of the construction of two commercial out parcel buildings, a new parking deck, and an expansion of the existing mall building. Areas of concern include historical fill, site-wide soil contamination (arsenic and pesticides). In addition, also responsible for agency coordination with FDNY, NYSDEC, and NYCOER for mitigation of methane and chlorinated volatile organic compounds vapor issues.
- Principal-in-charge for the redevelopment of a 5-acre live-work-play campus in Hunts Point, Bronx. The residential component of the Project is comprised of 100% affordable housing and is currently enrolled in the NYSDEC BCP. Mr. Cherena has also negotiated/coordinated with lenders, coordinated with multiple disciplines on the design team to create a RAP to comply with NYCOER air/noise requirements, and assisted in remedial design and estimation.
- Principal-in-charge for new development of a large regional mall in Norwalk, Connecticut with underground parking. The proposed redevelopment will result in the construction of retail shops, restaurants, hotel, and entertainment. Previous usage of the property included over 30 different parcels including three establishments, gasoline filling stations, fuel oil terminal storage, hazardous waste disposal areas. The project includes investigation and subsequent remediation of petroleum and hazardous waste releases, filing of the Environmental Conditions Assessment Form (ECAF) associated with the three transfer act parcels, and coordination with the CT DEEP and CT DECD to obtain CT Brownfields Grant funds.

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- Principal-in-charge for two adjoining multifamily NYSDEC BCP redevelopment sites in Mott Haven, Bronx, New York along the Harlem River. Project includes characterization, excavation, and disposal of over 40,000 tons of soil, support for obtaining a SPDES discharge permit for construction water, along with attending public meetings and creating public participation plans. Project tasks include community air monitoring, shoreline permitting, and construction monitoring while minimizing cost impact by sharing resources between both projects.
- Principal-in-charge for the largest redevelopment project in New York City (over $4.5 billion). Project includes Phase I and Phase II ESAs (investigation of soil, groundwater, and soil vapor) at over 75 properties; Construction support for excavation of one million cubic yards of soil including implementing an in situ waste characterization program; Environmental support for demolition, asbestos and lead abatement, site remediation using In Situ Chemical Oxidation, and relocating of an active 9-acre 100-year old railyard; Property acquisition support throughout the project (7 city blocks); and Agency support for NYSDEC, NYCDEP, MTA (LIRR/NYCT), and ESDC. The environmental data was used as an integral component of the New York State Environmental Quality Review Act (SEQRA) final Environmental Impact Statement (EIS). The project encompasses 336,000 sq ft of office space, 6.4 million sq ft of residential space, an 18,000 seat sports and entertainment venue: the Barclays Center (home of the Nets professional basketball team), 247,000 sq ft of retail space, a 165,000 square-foot hotel, and over 8 acres of intricately designed publicly accessible open space.
- Principal-in-charge of redevelopment and rehabilitation of the Nassau Coliseum Event Center in Uniondale, Long Island, New York. Services included Phase I and Phase II ESA to obtain approvals and entitlements, along with providing consulting services for asbestos abatement and operations and maintenance. Also was responsible for diesel generator tank removal and replacement tank design and installation.
- Principal-in-charge for a remedial investigation and real estate transaction negotiation for a contaminated former industrial property in Glen Cove, Long Island, New York. Activities included due diligence including document review and historical research to develop and implement a cost efficient investigation scope that was able to identify presence of contamination that was used to negotiate property transaction. Investigation was also designed to develop red mediation and construction budget to support future mixed use redevelopment of the over 12 acre property.
- Principal-in-charge of numerous due diligence projects for owners, developers, managers, municipalities, and lenders at commercial and industrial properties throughout the Northeast. Activities included performance of UST evaluations and closures, hot spot remediations, Phase I and Phase II Site Assessments, vapor intrusion studies and mitigation, lead based paint, asbestos and hazardous materials surveys, interaction with regulatory agencies on behalf of clients and development of remedial cost estimates for planning and negotiation.
- Principal-in-charge for investigation and review of a former electroplating facility in Bay Shore, New York with chlorinated solvent DNAPL. Activities included historical document review, subsurface investigation, and coordination with outside legal counsel and NYSDEC.
- Project manager for a property transfer support project at a heavily contaminated state-of-the-art distribution facility in the Bronx, New York. The site was a former MGP being handled under the VCP in central office, the site had an open spill under the regional spills group and the site was attempting to apply to the BCP through the regional office. Roux performed a Phase I for the buyer, a Phase II and remedial cost estimate for the owner and negotiated with the buyer's consultant and NYSDEC to limit the scope of the investigation and cleanup.
- Principal-in-charge of NYSDEC BCP redevelopment project in Island Park, Long Island, New York. Property was the location of a former oil terminal with extensive degraded petroleum contamination. Contracted services included, management of contaminated soil, import of recycled soil to bring the site above the flood plain, and negotiation with the NYSDEC. Project remediation schedule was extremely tight, and a COC was achieved before the requisite deadline.
- Served as Environmental Professional on hundreds of Phase I Environmental Site Assessments according to ASTM E1527-00, ASTM E1527-05, and ASTM E1527-13 for due diligence of large retail shopping centers, industrial facilities, and office buildings. Associated activities included agency contact, database management and interpretation, report preparation, and recommendations for additional work.
- Implemented GIS analysis and mapping for a remedial study and alternative analysis report (AAR) for an active petroleum storage terminal in Buffalo, New York under jurisdiction of the NYSDEC. The AAR required spatial analyses in order to categorize and analyze contaminant data from multiple investigations, investigate remedial alternatives, and to help focus ongoing additional investigations.

**PROFESSIONAL TRAININGS**

OSHA 40-Hour Hazardous Materials Training, 2003

OSHA 8-Hour Supervisor Training, 2004

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# PROFESSIONAL PROFILE

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**EDUCATION**
BCE, Civil Engineering,
University of Delaware, 1987
MBA, Management, Adelphi
University, 1992

**PROFESSIONAL LICENSES**
Professional Engineer:
New York, New Jersey, Pennsylvania, Rhode Island, Connecticut, Vermont, Virginia, North Carolina, Ohio, Michigan, and Montana

## Charles J. McGuckin, PE

### Vice President | Principal Engineer

**EXPERIENCE SUMMARY**
Thirty-five years of experience: Principal, Senior and Project Engineer with Roux Associates, Inc.; President of Remedial Engineering, P.C.; and Design Engineer at Dvirka and Bartilucci Consulting Engineers.

**TECHNICAL SPECIALTIES**
Engineering design of soil and groundwater remediation systems. Brownfields clean-up plans, stormwater studies and engineered natural treatment systems.

**REPRESENTATIVE PROJECTS**

- Principal Engineer for remedial investigation scoping, fate and transport analysis, and feasibility study preparation for a 1300+ acre Former Aluminum Smelter USEPA Superfund Site in Montana. Due to the size, complexity, and unique exposure areas of the Site it was broken up into multiple decision units including landfills, percolation ponds, operational areas, river area, soil, and groundwater. The contaminants of concern included metals, PAHs, cyanide, and fluoride. Remedial technologies evaluated in detail included landfill capping, groundwater extraction and treatment, pond and river dredging, soil excavation, slurry wall containment, *in situ* stabilization, and *in situ* groundwater treatment. Detailed effectiveness, implementability, and cost evaluations were prepared to support preferred remedial alternatives for each decision unit.
- Principal Engineer for remedial action implementation for a 2.5-acre former subway transit power station in Brooklyn along the Gowanus Canal. The project remedial action was completed under an extremely tight deadline to obtain the certificate of completion under the NYSDEC BCP program. The project also involves close coordination with USEPA due to the adjacent canal superfund status. The investigation required in depth review of historic facility operations and sampling of subsurface tunnel structures. The remedy included excavation of PCB impacted soils, LNAPL recovery, shoreline stabilization, concrete scarification, sewer cleaning and capping. The project has required close coordination with the development team to ensure management of impacted materials in conformance with the Site Management Plan.
- Principal Engineer for the preparation of field implementation plans, construction monitoring, and Engineers Certification Report for a former manufactured gas Plant (MGP) site in West Chelsea, Manhattan, New York. The site was one of the first projects completed under the NYS Brownfields Clean-up Program. The remedy included soil excavation and offsite thermal treatment, a sheet pile barrier wall, a vapor barrier, and basement ventilation system. A comprehensive air monitoring program was conducted due to the concerns over coal tar residue emissions and odors on the surrounding community. The remedy was incorporated into the design and construction of the headquarters office building of an international media company.
- Principal engineer for the preparation of the feasibility study, IRM plans, and remedial design/remedial action plans for a 40-acre former manufacturing facility in Rensselaer, New York. IRM Soil remediation included excavation of over 10,000 cubic yards of CVOC and metals source material for disposal at multiple facilities based on waste characteristics. Basement cleaning was performed in three large buildings to remove accumulated process sludges. Lagoon closure plans included sediment removal, dewatering, soil washing, and soil capping. The final remedy for the site includes a groundwater perimeter containment trench and 40 gpm treatment system for metals and VOCs and a 9-acre vegetated cap for a former landfill.

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- Principal Engineer for the feasibility studies and remedial action work plans for multiple operable units of a large railyard located in Sunnyside, Queens, New York under the NYSDEC Inactive hazardous waste program. For the former engine house and maintenance area unit, pre-design studies included product plume thickness data collection and modeling, ex situ biopiles treatment, *in situ* enhanced bioremediation, and *in situ* chemical oxidation. The final design consisted of decontamination and removal of structures, excavation of hot spot soils for PCBs and lead, UST closures, a dual phase high vacuum extraction system and *in situ* bioremediation.
- Project Engineer for the design and construction management of a 600 gpm groundwater extraction and treatment system to prevent offsite migration at a petroleum storage and pipeline transfer facility in Providence, Rhode Island. The treatment system was designed to remove iron, BTEX, and naphthalene from the groundwater to below surface water discharge standards for the Providence River. The system processes consisted of equalization, aeration, de-aeration, flocculation, clarification, air stripping, dual media filtration, granular activated carbon adsorption (liquid and vapor phase), and sludge thickening and dewatering. The system included an outfall diffuser designed in accordance with the CORMIX computer model.
- Senior Engineer responsible for the design, construction management, and O&M of a 60,000-gpd constructed wetlands treatment system for a former manufacturing facility in Virginia. The 16-acre treatment system was designed within an existing phragmites wetland to remove zinc and iron from landfill leachate prior to discharge to an adjacent creek. The treatment system consisted of alkalinity producing cells, toxic ponds, compost and limestone berms, anaerobic cells, and aerobic cells. The design included a 400-foot reinforced earthen dike together with hydraulic control structures and piping to maintain cell water levels and flow rates. The system also includes a pump station and force main for both effluent discharge and irrigation purposes. Joint wetlands and local permit approvals were obtained for the project.
- Senior Engineer for the performance of a feasibility study and remedial design for the closure of a concrete oil/water separator filled with refinery sludge and demolition materials impacted with lead at a former refinery in Providence, Rhode Island. Remedial alternatives were developed and evaluated including capping and containment using a perimeter slurry wall, sheet piling or concrete wall sealing; excavation and disposal; and *in situ* solidification. The capping and containment using a slurry wall alternative was selected for implementation of the remedial design. The design consisted of removal and replacement of existing monitoring wells, sealing of separator wall openings, a 2-acre multi-layer cap, a 1200-foot long by 30-foot deep soil-bentonite slurry wall, and a perimeter drainage swale. The multi-layer cap included a 40-mil HDPE geomembrane and a geosynthetic clay liner. The slurry wall was keyed into the existing clay confining layer beneath the separator. The design incorporated disposal of an additional 10,000 cubic yards of petroleum impacted soil under the cap.
- Principal Engineer for environmental consulting support services for a large landfill O&M contract under review by the New York City Department of Investigation. The work entailed reviewing the scope of routine vs. non-routine work performed over a one-year period for compliance with contract requirements. The O&M Work included routine cover maintenance, groundwater and gas monitoring, landfill gas extraction, major system repairs and waste handling. Memos of findings were prepared assessing acceptability of work, compliance with permit regulations and providing recommendations for improvements.
- Principal Engineer for the independent engineering review of change orders for the New York MTA Office of the Inspector General associated with electric utility substations reconstruction damaged during the 2012 Superstorm Sandy. The cost review focused on contracting procedures, waste classification of impacted structures and soils, proper waste management and disposal. Findings were compiled in a report to determine if costs were legitimate and justifiable and providing recommendations for improved specifications for bidding and of management waste handling contracts.
- Principal Engineer for remedial action plan implementation oversight and certification for the CornellTech campus development on Roosevelt Island, New York. The first phase of the campus development included lead paint and ACM abatement and demolition of the former Goldwater Hospital, construction of six main campus buildings, new utilities, roadways, and lawn/landscaped areas. Responsibilities include oversight of soil/subsurface structures excavation handling, disposal, and reuse; community air monitoring; dewatering permit compliance; and SWPPP inspections.
- Senior and Principal Engineer for the decommissioning and decontamination of a pharmaceutical facility covering seven city blocks as a part of a NYSDEC Voluntary Cleanup Agreement in Brooklyn, New York. The former office and laboratory complex would be decontaminated for reuse as a school and small business space. Multiple other buildings were demolished. Responsibilities included preparation of interior abatement plans to address mercury, lead and PCBs in building materials and review of Interim Remedial Measure (IRM) work plans for lead, benzene and mercury-contaminated soil excavation and disposal. Groundwater remediation design

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included air sparge/soil vapor extraction, *in situ* oxidation and a reactive barrier wall using colloidal carbon and ZVI.

- Principal Engineer for the performance of a Brownfields Demonstration Pilot Program in the Hamlet of New Cassel for the Town of North Hempstead, New York. Under an EPA grant, Roux Associates created an inventory of 50 potential commercial/industrial properties within New Cassel and evaluated these properties based on perceived contamination and potential for redevelopment/reuse. Eight sites exhibiting the greatest potential for redevelopment were selected to perform Phase I Environmental Site Assessments. Of these eight sites, four sites were selected for Brownfield Site investigations to identify the nature and extent of contamination in soil and groundwater and provide potential remedial alternatives and cleanup costs to revitalize these properties. The Brownfields Demonstration Pilot Program also included community outreach activities to promote a unified approach to the redevelopment of Brownfields in new Cassel.
- Principal Engineer responsible for engineering certification of all remediation activities related to the seven-city-block Barclay's Arena and Atlantic Yards redevelopment in Brooklyn, New York. This multi-billion-dollar redevelopment includes the Arena, which will be focal point of the largest redevelopment project in Brooklyn, consisting of an urban complex of housing, commercial and retail space, as well as several acres of landscaped public open space. The existing properties being redeveloped are residential, commercial, and industrial properties, including a large railroad yard. Engineering certification included multiple RAWPs under NYSDEC Spills Program, UST removals, soil excavation, *in situ* groundwater treatment and remedy oversight services. The project also includes ACM abatement, building demolition, soil pre-waste-classification, coordination (with the receiving facilities), and oversight of the removal of 1,000,000 cubic yards of soil (~550,000 yards removed to date), representing one of the largest excavation and soil removal projects performed in New York City.
- Principal Engineer responsible for the preparation of the remediation completion report at Captain's Cove former municipal landfill State Superfund Site located in Glen Cove, New York. This work has been performed in accordance with Title 3 of the NYS Environmental Quality Bond Act under contract to the City of Glen Cove. Design elements included excavation plans, radiological waste monitoring, demo debris and waste separation and screening, dewatering water management, waste disposal, and site restoration. Additional work included the delisting of a six acre "clean" portion of the site to allow the development of a ferry terminal and esplanade and development of alternative cleanup standards consistent with future site uses. Site remediation will accommodate site redevelopment as a commercial waterfront and operating ferry service and seaport area.
- Principal Engineer providing program management of interior building materials surveys for 22 residential buildings along the south shore of long island under an Army Corps of Engineers contract for dune reconstruction. Building materials surveys included testing and analysis of suspect contaminants and reporting in support of building abatement and demolition planning. Testing was completed using multiple teams on a tight timeline to meet project schedule requirements.
- Principal Engineer for the remediation of a former Manufactured Gas Plant (MGP) facility in Brooklyn, NY, including oversight of the excavation of both the former gasholders, and adjacent contaminated hotspots requiring offsite thermal desorption of over 30,000 tons of coal tar impacted soil. Directed the Community Air Monitoring Program (CAMP) specific to the MGP impacted soil removal, as required by both New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH). Remedial activity met all substantive requirements of the NYSDEC approved Remedial Action Work Plan for the Site. The remedy included design of a passive subsurface vapor monitoring/recovery system for a 500,000 sq. ft. retail structure in Brooklyn, NY. The system design integrated a perforated piping system complemented by a protective vapor barrier below the structural floor slab to monitor and mitigate volatile organic compound vapors. Multiple vapor barrier options were evaluated to determine the optimum design based on the site conditions.
- Principal Engineer providing expert settlement support services to a county municipality in New York State. The case involved an EPA Order for underground storage tank (UST) compliance for over 50 county operated facilities with over 125 USTs. The project involved the field inventory of the USTs at each facility and development of both Interim and final compliance plans to comply with EPA, NYSDEC and local UST regulations. Detailed cost estimates were prepared for multiple scenarios for upgrading USTs including tightness testing, manway repairs, leak detection and overfill protection monitoring systems, UST removal and replacement, and new piping. The upgrade evaluation and negotiations included incorporation of Supplemental Environmental Project (SEPs) in accordance with EPA requirements. SEPs included centralized monitoring systems for leak detection and inventory control.
- Principal Engineer for preparation of a site management plan for redevelopment of a former watch case factory in Sag Harbor, New York. The primary engineering controls for the former factory conversion to a residential building consisted of a vapor barrier and an active sub slab depressurization system

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(SSDS) to address chlorinated VOCs. The SSDS system was complicated due to the existing 100-year-old structure. A unique raised floor approach was designed to allow for the SSDS installation. The system design, approved by NYSDEC and NYSDOH includes multiple legs, dual blowers, low vacuum alarms and monitoring points.

- Principal Engineer for the Remedial Action Work Plan (RAWP) for redevelopment of a shopping center in the Bronx, New York. The RAWP elements included soil and groundwater management plans, stormwater management, air monitoring and vapor mitigation systems. To address vapor intrusion, active sub slab depressurization systems were designed for two pad buildings. One system for a new retail building construction and one retrofit system for an existing building to be used as a restaurant. Closure reports were prepared and certified documenting all remediation work and approved by NYC Mayor's Office of Environmental Remediation (OER).
- Principal Engineer for the preparation of a preliminary remedial design for the remediation and restoration of a pond and surface water tributaries to Canaan Lake that have been impacted from leachate generated from an upgradient former municipal landfill located in Holtsville, New York. Completed a preliminary remedial design for the construction of a compost-based permeable reactive barrier for the removal and treatment of leachate prior to discharge to the surface water, followed by restoration of the surface water body and surrounding wetlands. The project included development of a long term remedial strategy to reduce rainfall infiltration into the landfill and minimize leachate generation. Current plans to reduce rainfall infiltration include the planting of 3,250 hybrid poplars, regrading and lining of drainage swales, and the resurfacing of low lying areas consistent with recreational facilities.
- Principal Engineer for final capping elements and wetlands restoration work and completion of the Final Engineering Report for an inactive hazardous waste site in Syracuse, New York. The project included onsite consolidation of lead impacted waste; 7-acre landfill cap with vegetated layer, cover soil, and geomembrane; stormwater runoff controls; reconstruction of wastewater ponds; and an 8-acre wetland restoration. An O &M Plan was prepared and implemented consisting of groundwater, surface water and landfill gas monitoring, and annual cap and wetland inspections.
- Principal Engineer for the preparation of the remedial action work plan for an 11-acre former Department of Defense owned Site that manufactured airplane parts along Hempstead Harbor in Manorhaven, New York. The project is regulated under the NYSDEC Voluntary Cleanup Program. The remedial design consisted of both soil vapor extraction/air sparging and *in situ* enhanced bioremediation systems for Site groundwater impacted by chlorinated VOCs. The final remedial design and site management plan are expected to include soil capping, vapor barriers and passive ventilation systems to be incorporated into a residential redevelopment with waterfront access.
- Senior Engineer for the performance of a stormwater runoff evaluation for a manufacturing facility in Watertown, New York. Roux Associates was retained as third party to evaluate the drainage design and construction elements for an industrial landfill cap. The evaluation was performed for the facility owner in support of potential litigation arising from onsite building flooding incidents following a severe snow and rainstorm event. The scope of work included an evaluation of the existing onsite storm sewer system capacity, calculation of runoff flow rates for the 300-acre contributing area, review of landfill cap surface drainage design, review of erosion control measures implemented during construction, and analysis of specific flooding incident causes. The runoff analyses were performed using the TR 55 Method for three conditions: pre-capped, capping under construction prior to establishment of vegetation, and final vegetated cap design. Recommendations were made to improve the site drainage including design of surface drainage swales, temporary berms and sediment traps during construction and modification of snow handling practices.
- Principal Engineer for the management of a soil and ground-water remediation system for a nationwide overnight delivery distribution center in Brooklyn, New York as part of the NYSDEC Voluntary Cleanup Program. A risk-based remedial approach that called for the remediation of "hot spot" source area soils, and mass-reduction of VOCs was successfully utilized for the Site. As a result, the focus of remediation was on reducing the mass of VOCs in on-site groundwater to a level where natural attenuation would be effective in remediation of VOCs. To address the contamination in the source area, a soil vapor extraction (SVE) and air sparge (AS) system consisting of 8 SVE wells and 17 AS wells was designed, constructed, operated and maintained for a period of approximately 3 years. Permanent shutdown of the system was approved by the NYSDEC.
- Senior Engineer for the design and construction management of a soil remediation and stormwater management project at a 16-acre former pesticide warehouse facility in Dayton, New Jersey. The Site was redeveloped for storage and trailer parking. The project consisted of consolidation of pesticide contaminated soils; asphalt capping of the 3.5-acre contaminated soils area; stormwater collection, conveyance, and detention; and site regrading. The evaluation included TR-55 runoff modeling for pre and post capping and development conditions. The storm sewer system consisted of

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multiple catch basins, over 2,000 linear feet of reinforced concrete pipe ranging in size from 15 to 30 inches, and a recharge basin. A Soil Erosion and Sedimentation Control Plan and a NJPDES General Permit were prepared for the project.

- Project Principal for the performance of LNAPL remediation studies at the New Jersey Transit former Lake Street Bus Garage in Newark, New Jersey. The studies involved evaluating remedial alternatives for free product recovery, performance of an LNAPL recovery pilot test and cost estimating. A RAWP and engineering design plans were prepared for both the bus garage and the adjacent park properties. The remedy included excavation of the source area, horizontal recovery wells, a vertical recovery trench, *in situ* oxidation injections and product recovery using vacuum extraction.
- Senior Engineer for the performance of a stormwater management analysis for a 28-acre industrial landfill in Virginia. The principal objective of the study was to identify engineering controls to minimize stormwater runoff to a metals-contaminated sediment impoundment. The study included TR-55 runoff modeling and storage analyses for multiple detention ponds. Three engineering control alternatives were identified including landfill cap regrading, diversion using berms and swales, and diking and weir raising.
- Senior Engineer for the investigation, design, and construction management of the closure of a 2-acre fire-water supply pond and modification of the stormwater conveyance system at a former manufacturing facility in Williamsburg, Virginia. The investigation phase of the project was focused on determining the sources and loading of metals influent to the pond. Field activities included examination of the existing stormwater drainage system, sub watershed delineation, groundwater monitoring, and installation of automatic stormwater sampling devices. The final design included 400 feet of open concrete channels, 250 feet of culvert replacement, slip lining of 370 feet of 36-inch RCP culvert, reconstruction of five catch basins, placement of 10,000 cubic yards of clay fill within the pond and regrading of existing drainage ditches. Erosion control measures and slope stabilization were also included as well as the design of a special outlet structure for minimizing erosion at the outfall.
- Project Principal for the investigation and closure of five USTs at the New Jersey Transit Broad Street Station site in Summit, New Jersey. Tank sizes ranged from 20,000 to 30,000-gallon capacity. UST closure program completed in accordance with the NJDEP Technical Requirements for Site Remediation. Closure report prepared and submitted to the NJDEP and subsequent issuance of a No Further Action letter from the NJDEP.
- Project Engineer of the underground storage tank (UST) program for a major retail chain store in the New York, New Jersey, and Pennsylvania region. Responsibilities included preparation of a UST management plan based on federal, state, and local regulations and costs to prioritize UST maintenance. The tank designs included plans and specifications for the removal and replacement, or upgrading, of USTs to meet regulatory requirements. The engineering design involved fuel requirements for dual heating and back-up generator usage, mechanical pumping equipment and fire wall design.
- Project Engineer for the design and construction management of a 1,000 sq. ft. hazardous and flammable materials storage facility in Syosset, New York. The facility included concrete secondary containment dikes, access ramps, sprinkler system modifications, and lighting. The separate flammable materials area included 2-hour fire rated concrete block walls and doors, ventilation equipment and a fire alarm system. Permitting services were performed for the Nassau County Department of Health, the Nassau County Fire Marshall, and the Building Department.
- Project Engineer for the design of a 2,000 sq. ft. hazardous waste storage facility in Astoria, New York. Prior to construction, demolition of an existing building was required and included removal of asbestos and lead paint. The project included driving treated timber piles and excavation and removal of contaminated soil and groundwater. The structure consisted of a steel frame with a metal standing seam roof system, decorative masonry block walls, and a roll-up door. Temporary and permanent fencing were required along with concrete sidewalk replacement.
- Senior Engineer providing construction management services in support of the BNYCP Cogeneration Facility construction and Brooklyn Navy Yard facility decommissioning. Work included preparation of construction management plans, supervision of soil, concrete, and sediment disposal activities, asbestos surveys, and PCB sampling and analysis work. A NYCDEP wastewater discharge permit was prepared for the million gallon per day stream condensate and wastewater backwash flow rate.
- Project Principal for performing remedial alternative cost estimating for a New Jersey Transit site in Montclair, New Jersey, which is to be redeveloped as a firehouse. A cost estimate prepared by another consultant was reviewed as part of the scope of work. The proposed remedial alternative for the site consisted of excavation and disposal of PAH-impacted fill material and capping. The alternative remedy proposed by Roux Associates was a more risk-based approach, resulting in a cost savings of approximately $100,000 for New Jersey Transit.

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- Project Engineer for the design and construction management of cap repair and drainage improvement measures for an industrial hazardous waste landfill in Tennessee. Components of the design included replacement of the primary clay cover material, temporary and permanent erosion and sedimentation control measures, and a lined drainage channel to minimize the generation of landfill leachate. The project included the performance of a focused feasibility study to characterize the flow, quality, and treatability of the leachate. A feasibility study was also performed in order to evaluate constructed wetlands remedial technology as a method of effective and economical treatment of leachate.
- Senior Engineer for the remedial design and construction management of a 7-acre off-spec asphalt waste pond at a former refinery in New England. The asphalt material exhibited a low load bearing capacity combined with a viscous, tacky surface. An *in situ* solidification mix design was developed consisting of liquification using hot water and a 2-stage lime kiln dust reagent injection and mixing step. Gravel was added to the mix when the existing subgrade material was of insufficient bearing capacity. Solidified material was tested for unconfined compressive strength, durability, and TCLP. The final cover material consisted of a 6-inch vegetated layer.
- Principal Engineer for the performance of LNAPL remediation studies for a former bus maintenance facility and a segment of a Metropolitan Subway System in Newark, New Jersey. The studies involved evaluating groundwater and soil monitoring data, performance of LNAPL recovery pilot tests, evaluation of remedial alternatives and cost estimating. Recommendations included the use of mobile high vacuum extraction methods to collect LNAPL while minimizing capital expenditures and permanent low vacuum extraction methods to minimize odors to subway cars and surrounding communities.

### Litigation Support Experience

- Project Engineer for the evaluation of remedial investigations and remedial cost estimates for a 30-acre former book publishing facility in Poughkeepsie, New York. The evaluation included the review of Phase I and Phase II investigation reports, remedial investigation (RI) and feasibility study (FS) reports, and the remedial investigation work plan. The findings included the presence of chlorinated volatile organic compounds in the soil and groundwater as well as identification of underground storage tanks. Deficiencies were identified in both the RI and FS reports by comparing with the NYSDEC's required criteria and recommendations were proposed for the RI work plan to further delineate source areas. Based on the remedial investigation review, revised costing assumptions were made, and remedial cost estimates were prepared totaling $3.6 million.
- Project Engineer for the evaluation of expected remedial costs for nine hazardous waste sites, two of which are federal superfund sites. The evaluation of both single and multiple PRP sites was performed to identify costs for an insurance claim. The expected remedial costs for nine sites, which include landfills or facility surface impoundments, totalled approximately $65 million. Remedial plans evaluated for multiple site operable units included groundwater pump and treat, alternative water supply systems, soil/sludge *in situ* solidification and treatment, and wetlands restoration. Additional work included evaluating invoices for site work previously performed and allocating expenses into their appropriate operable unit and work type, i.e., defense or indemnity.

### Water Treatment Experience

- Senior Engineer for the engineering design of a 10 gpm groundwater recovery and treatment system at a former tank farm in Rhode Island. The recovery system included a 200-foot slotted HDPE horizontal well, a 400-foot coated concrete swale and curbing, and a series of seepage collection points manifolded to a common receiving structure. The entire system was designed for passive recovery and gravity flow transmission targeting free-product seepage areas. The treatment system consisted of a collection sump retrofitted within an existing separator, a coalescing plate oil/water separator, a surge tank, a bag filter, and carbon adsorption units. The project included a permit modification for discharge to the Providence River.
- Design Engineer for the design and start-up operation of a 2 mgd packed tower aeration system for potable water in Williston Park, New York. The primary contaminants were trichloroethane and tetrachloroethene which were stripped below drinking water standards. The design process included full scale pilot testing to assure proper removal levels.
- Design Engineer for the design, construction, and start-up operation of a 5 mgd industrial cooling water treatment system utilizing mechanical surface aeration. The system consisted of two lined aeration basins operating in series with floating mechanical aerators to remove volatile organic contaminants to levels suitable for recharge into the Long Island groundwater aquifer. The primary contaminants were 1,1-dichloroethene, trichloroethane, tetrachloroethene and vinyl chloride.
- Design Engineer for the design and construction of a 4 mgd granular activated carbon system for potable water in Hempstead, New York. The primary contaminants consisted of more than 8 volatile and semi volatile organic compounds. Responsibilities included site inspection for the installation of the six vessels containing 20,000 lbs. of carbon in each. The

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system was designed for 99.9% removal efficiency with two units operating in series.

### Constructed Wetlands Experience

- Senior engineer for the conceptual design of a constructed wetlands stormwater treatment system for a coal handling freight railroad facility in Norfolk, Virginia. The design consists of treatment of contaminated stormwater runoff generated from maintenance and fuel handling areas onsite. The design treatment performance objective is the reduction of total suspended solids, oil and grease, and selected metals to levels below the SPDES permit discharge standards established for two of the site's outfalls discharging to the Elizabeth River. The 3 acre system consists of a passively operated 200,000 gpd subsurface-type constructed wetlands with a low visual impact and specialized structural design to meet the needs of a busy railyard facility. Additional design components include stormwater bypass structures, jacking beneath tracks, a grit chamber, a lift station, and outfall modifications. A joint wetlands permit will be prepared for the project.
- Senior Engineer for the feasibility study, conceptual design, and construction of four constructed wetlands units and sedimentation basin for a stormwater treatment system along Cedar Swamp Creek for the City of Glen Cove, New York. The project consisted of review of stormwater studies of the 12 square mile contributing watershed, compilation of USGS water quality and flow data, evaluation of stormwater treatment methods and best management practices and optimum site selection along the creek. The constructed wetlands design included a forebay, high and low marsh cells, a micropool, and stormwater bypass structures for removal of sediment, nitrogen, phosphorus, and trace metals during first flush events. Final design for the first 1.8 acre constructed wetlands unit was completed and performance of construction management is ongoing. Design activities include structural and hydraulic design tasks with specific emphasis on storm water bypass. The design has been integrated into an into an intermodal transportation project with the addition of bicycle and walking paths. NYSDEC and Army Corps permits were obtained for the project.
- Project Engineer for the design of a 7,000 gpd subsurface flow-type constructed wetlands treatment system for a refinery site in Rhode Island. The system was designed to treat a surface-water stream impacted by petroleum hydrocarbons. The system's high aesthetic, low visual impact appeal was ideal for its golf course setting. Both phragmites SPP and Typha SPP wetland species were incorporated in the design in order to assess the biodegradation/biotransformation processes effectiveness. A growth and maturation plan and a treatment evaluation plan were developed in order to evaluate the system performance.
- Lead Engineer responsible for technical review of a design for modifications to a constructed wetlands system in Nicholas County, West Virginia. The system was designed to treat the leachate from a solid waste landfill at a maximum capacity of 30 gpm. The complete water-tight treatment system consisted of a sedimentation basin, stabilization basin, a series of three wetland cells and a finishing ditch. The wetland cells consisted of a double liner system with leachate collection piping overlaid with stone fill and a matrix of plant life. The technology combines physical, geochemical, and biological removal mechanisms operating simultaneously.

### Permitting/Compliance Plans

- Project Engineer for the preparation of a Spill Prevention Control and Countermeasure (SPCC) Plan and a Storm Water Pollution Prevention Plan (SWPPP) for an 850-acre petroleum storage terminal in New England. The SPCC Plan involved the inventory of 50 bulk storage tanks and miscellaneous storage vessels and an assessment of barge loading areas, truck loading racks, additive loading areas, pumping stations, and a network of aboveground pipelines. The SWPPP encompassed an inventory and surveying of the existing storm sewer system, an evaluation of oil/water separator performance and identification of storm water management controls and practices.
- Project Engineer for the design of modifications to multiple discharge facilities along the Providence and Runnins Rivers in Rhode Island. Permitting activities were performed with the following agencies: Rhode Island Department of Environmental Management (RIDEM) Pollutant Discharge Elimination System (RPDES), RIDEM Division of Freshwater Wetlands, Coastal Resources Management Council (CRMC), and the Army Corps of Engineers.

### Sanitary Experience

- Design Engineer for the evaluation of a municipal sanitary sewer system consisting of approximately 70 miles of piping ranging in size from 8 inches to 16 inches, in Garden City, New York. The sewer system was evaluated for existing and proposed flow capacity, surcharging, infiltration of groundwater, inflow of storm water, root encroachment, and sewer breaks. Evaluation methods consisted of hydraulic profile analysis, television inspection of piping, field inspection of manholes, and flow measurement. Sewer upgrading methods were evaluated including direct replacement, manhole restoration and pipe slip lining, and a rehabilitation program was implemented.
- Design Engineer for the City of Glen Cove's industrial wastewater pretreatment program which was established to monitor significant industrial users discharging to the city's wastewater treatment plant to minimize upsets to the

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biological treatment mechanisms. The program work included annual facility inspections, wastewater discharge sampling, review and evaluation of quarterly self-monitoring results, calculation of discharge penalty fees, preparation of annual monitoring reports for each facility and development of wastewater discharge permits to comply with City regulations.

- Design Engineer for a heavy metals study for the municipal sanitary sewer system in the City of Glen Cove, New York. The heavy metals study consisted of the development and performance of a city-wide sewer sampling program to identify the sources of heavy metals loadings on the wastewater treatment plant. The evaluation included industrial sources, scavengers, non-industrial sources, the plant operation itself, and review of existing heavy metal studies. Recommendations were provided for minimization of loadings and pretreatment to protect the plant operations.

### Stormwater Experience

- Design Engineer for the evaluation and conceptual design of a water management plan for a 200-acre proposed office complex in Bethpage, New York. The design included inlets, piping and recharge basin sizing for peak storm water runoff flows as well as a system of architectural ponds and level control structures. For dry periods, the design included flow controls connected to an existing cooling water system to maintain pond levels and for utilization as a water supply for an irrigation sprinkler system during the growing season.
- Design Engineer for the design of a municipal storm drainage system for a 200-acre contributing area in Garden City, New York. The purpose of the drainage system was to alleviate severe flooding problems for eight homes located in a local low point of a residential neighborhood. The system included over 4,800 linear feet of reinforced concrete piping ranging in size from 12 to 60 inches. Design considerations included hydraulic gradient analysis, inlet capacity, utility crossings, minimization of removals of established trees, a county road crossing, utilization of existing structures and piping, and a headwall discharge to a recharge basin. Additional design items included pavement restoration, service line relocations, curbs and sidewalks, and maintenance and protection of traffic.

### Site Assessment Experience

- Senior Engineer for coordination and review of Phase I environmental site assessments for five large research and development complexes located throughout the eastern United States for a major chemical company. The site assessments were performed for due diligence prior to engaging in long-term property lease agreements. The site assessments evaluated chemical storage and handling areas and previous site usage.
- Senior Engineer for coordination and review of Phase I environmental site assessments for 12 properties associated with tennis centers acquisition on Long Island, New York. The properties were either active tennis center facilities or vacant parcels available for new construction. All site assessments were conducted in accordance with ASTM standards for commercial real estate transactions. Primary concerns identified were USTs, drum storage areas, and unauthorized dumping.
- Project Manager representing a group of banks investing in a 20 acre commercial property in Westchester, New York. The onsite soil was contaminated with several volatile and semi volatile organics. Performed an evaluation of the remediation plan which included onsite biological treatment of soils and aeration and oil water separation of groundwater.

### Water Main Experience

- Project Engineer for the design of over 6,000 feet of ductile iron water main in sizes from 4 to 16 inches for Town of Hempstead, New York Department of Water and the Nassau County, New York Department of Public Works. The designs included wet and dry connections to existing mains, fittings, valves, copper services and fire hydrants. Restoration work included replacement of asphalt pavement, concrete sidewalk and curbs, and grass areas.
- Design Engineer for the design and construction management of over 10,000 feet of ductile iron water main in sizes from 6 to 12 inches for the Town of Wallkill, New York. The designs included booster pump station upgrades, a stream crossing, a wetlands crossing, jacking of 36-inch casing beneath a state highway, air release chambers, copper service re-connections, fire hydrants, valves, and appurtenances. Restoration work included wetlands restoration, backfilling, and regrading within a NYSDOT right-of-way and grass and pavement replacement.
- Design Engineer for the design and construction management of upgrades to a 3.7 mgd potable water booster pump station for the Town of Wallkill, New York. The design featured the replacement of a hydropneumatic tank and pump system with three larger capacity centrifugal pumps. The upgrades were performed while maintaining the pump station service. The pump station revisions included piping, pump pads, shut-off valves, silent check valves, pressure relief valves, gauges, ventilation equipment and a motor control center.

### Feasibility Study Experience

- Senior Engineer for the performance of a feasibility study and remedial design of a free product containment and recovery system at a former refinery in New England. The areal extent of the free-product plume was approximately 10 acres with a measured thickness of up to eight feet. Pilot testing activities consisted of pump tests, baildown tests, and funnel and gate

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systems with and without sheeting. The selected remedial alternative consisted of re-routing and repair of active storm sewer piping, closure-in place of a former 72-inch storm drain using clay fill material to form a barrier wall, and installation of multiple recovery trenches totaling 450 linear feet. The recovery trenches were installed to a depth of 14 feet using a deep trenching machine and were completed with gravel, horizontal perforated piping, recovery wells, and monitoring wells to accommodate both passive and active product recovery pumping equipment. Product recovery enhancement pilot testing was also performed by using non-ionic surfactants, mechanical reworking of soil and vacuum extraction methods.

- Project Engineer for the performance of a feasibility study for the containment of a free-product plume beneath a refinery site in Rhode Island. The feasibility study included analysis of groundwater modeling, bench and pilot scale treatability studies, groundwater quality characterization, identification and screening of discharge alternatives, and treatment process evaluations. The work also included the evaluation of the discharge of treatment system effluent to several receptors including groundwater, wetlands, sanitary sewers, and storm sewers. Discharge requirements were evaluated for process water, off-gas air, and residual wastes. Several treatment processes were also evaluated including metals precipitation and sludge dewatering, VOC and SVOC removal, and off-gas treatment. Preferred alternatives for each process were selected for remedial design development.
- Project Engineer for the performance of a feasibility study for a hazardous waste landfill located at a Superfund site in Tennessee. The feasibility study focused on the characterization and quantification of landfill leachate consisting of chlorinated organic compounds as well as proprietary pesticide compounds. The remedial technologies which were evaluated included leachate collection alternatives, onsite treatment alternatives and offsite disposal methods. An analysis was performed for onsite treatment technologies which included constructed wetlands, biological fluidized bed reactor, and granular activated carbon adsorption. The technologies were assembled into four feasible remedial alternatives and treatability studies were recommended to confirm the suitability of selected processes.

**PROFESSIONAL AFFILIATIONS**

National Society of Professional Engineers

American Society of Civil Engineers

WEF Hazardous Waste Committee, 1996 – 1998

**PUBLICATIONS**

*Assessment and Remediation of Off-Spec Asphalt Disposal Areas* - Co-authored, Contaminated Soils, Volume 3, Amherst Scientist Publishers, 1998

*Use of a Subsurface Flow Constructed Wetlands for Collection and Removal of Water Containing BTEX*, Co-authored, Proceedings of the 2000 Petroleum Hydrocarbons and Organic Chemicals in Groundwater Conference, National Ground Water Association

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# PROFESSIONAL PROFILE

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**EDUCATION**
BS, Geology, SUNY Oneonta College, 2012
MS, Geology, SUNY Binghamton University, 2014

## Lauren Dolginko

### Senior Geologist I

**EXPERIENCE SUMMARY**
Nine years of experience: Senior, Project, and Staff Geologist at Roux, Islandia, NY.

**TECHNICAL SPECIALTIES**
Design, implementation, and management of Remedial Investigations and Remedial Actions for regulatory programs including New York State Department of Environmental Conservation Brownfield Cleanup Program (NYSDEC BCP) and New York City Office of Environmental Remediation (NYCOER) sites. Management of due diligence Site Assessments; preparation and management of BCP Applications, Remedial Investigation Work Plans, Remedial Investigation Reports, Remedial Action Work Plans, and Remedial Action Reports; investigation and evaluation of petroleum, polychlorinated biphenyl (PCB), and per- and poly fluoroalkyl substances (PFAS)-related contamination; and management of large-scale soil excavation projects including demolition, waste characterization, and construction activities.

**REPRESENTATIVE PROJECTS**

- Project manager for an affordable housing redevelopment site enrolled in the NYSDEC BCP, located in the Hunts Point neighborhood of the Bronx, New York. The site was formally used as a juvenile detention center. This project included due diligence (Phase I and Phase II investigations), remedial investigations (soil, groundwater, and soil vapor), site-wide in situ a waste characterization sampling program to characterize and properly dispose of over 62,000 tons of contaminated soil. Responsibilities also included the implementation and a NYSDEC-approved Remedial Action Work Plan and attainment of a Certificate of Completion under the NYSDEC BCP. The site will be redeveloped into a 100% affordable housing mixed-use campus that includes 740 residential units, 53,000 SF of community space, 15,000 SF of commercial space, and 260 parking spaces. Additional redevelopment responsibilities included coordination and attainment of New York City Department of Environmental Protection discharge permit for dewatering during construction activities and coordination with New York City Office of Environmental Remediation to meet the requirements of a Noise Attenuation and Air Quality E-Designation.

- Project manager for an affordable housing and community art center redevelopment site enrolled in the NYSDEC BCP, located in Brownsville, New York. The site is approximately 1.31 acres and was formerly used for automobile repair, furniture/cabinet manufacturing, residential, and various commercial spaces. Project responsibilities included successful completion of a NYSDEC BCP Eligibility investigation, acceptance into the NYSDEC BCP, approval of the Remedial Investigation Work Plan (RIWP), implementation of the RIWP, and preparation and implementation of an in-situ waste characterization sampling plan for approximately 22,000 CY of soil. Coordination with NYSDEC will continue through Remedial Action Work Plan (RAWP) preparation, RAWP approval, and environmental oversight during redevelopment of the property.

- Project manager for an affordable housing redevelopment under NYCDEP jurisdiction located in the Bedford-Stuyvesant neighborhood of Brooklyn. Responsibilities included environmental oversight and ensuring compliance with the NYCDEP-approved Remedial Action Plan (RAP), development and implementation of an in-situ waste characterization sampling plan for approximately 5,000 CY of soil, support through offsite disposal and soil management coordination, coordination with foundation contractors during submittal review for vapor barrier and sub-slab depressurization (SSDS) construction, and vapor barrier and SSDS installation inspections. The property will be redeveloped into community facility space and 60 affordable housing residential units.

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- Project manager for neighboring sites enrolled in the NYSDEC BCP, located along the Harlem River in the Mott Haven neighborhood of the Bronx, New York. Site contamination included historic fill and petroleum associated with 18 underground storage tanks (USTs), hydraulic lifts, and an oil/water separator. Responsibilities included the preparation and implementation of the NYSDEC-approved RIWP and RAWP, management during construction operations to ensure successful implementation of remedial elements including the proper offsite disposal of over 70,000 tons of contaminated soil, and receipt of a Certificate of Completion under the NYSDEC BCP. Additional redevelopment responsibilities included support during obtainment of a State Pollutant Discharge Elimination System (SPDES) Permit, NYSDEC Water Withdrawal Permit for construction dewatering, and shoreline permitting. The sites will be redeveloped to include over 34,000 square feet (SF) of public waterfront parkland, over 1,350 apartments, a portion of which include affordable housing units, 15,000 SF of retail space, 598 parking spaces, and a technology-oriented community center.
- Project manager for an affordable housing redevelopment under NYCDEP jurisdiction located in the Bushwick neighborhood of Brooklyn. Responsibilities included environmental oversight and ensuring compliance with the NYCDEP-approved Remedial Action Plan (RAP), support through offsite disposal of approximately 2,000 CY of soil, and coordination with foundation contractors during submittal review for vapor barrier installation, and vapor barrier compliance inspections. The property will be redeveloped into community facility space and 155 affordable housing residential units.
- Project manager for the redevelopment of a former powerplant located in the Gowanus neighborhood of Brooklyn, New York. The site is enrolled in the NYSDEC BCP and was remediated to allow for restricted residential use. The industrial site history and proximity to the Gowanus Canal Superfund Site requires a United States Environmental Protection Agency (USEPA)-approved remediation. Project responsibilities included management and disposal of over 30,000 tons of non-hazardous soil and over 8,000 tons of Toxic Substances Control Act (TSCA)-regulated hazardous soil, health and safety oversight, and oversight of contractors during implementation of the NYSDEC-approved Remedial Action Work Plan and Site Management Plan. Additional redevelopment coordination includes obtainment of a NYCDEP Industrial Wastewater Permit, asbestos containing material (ACM) abatement coordination and oversight, and coordination and oversight during installation of a new steel sheet pile bulkhead along the Gowanus Canal.
- Project manager for the redevelopment of a former railyard and freight terminal in Sunset Park, Brooklyn, New York. The redevelopment spans over 30-acres and is under multi-agency jurisdiction including the NYCDEP, NYSDEC under the BCP, and NYSDEC under the State Superfund Program. The portion of the site enrolled in the NYSDEC BCP and will be remediated to allow for future industrial use. Project responsibilities include BCP application preparation; Remedial Investigation Work Plan development and implementation; Remedial Investigation Report preparation; Interim Remedial Measure Work Plan preparation; excavation and construction oversight; and work plan compliance monitoring. NYCDEP coordination includes the preparation of a Remedial Action Plan and Health and Safety Plan; and work plan compliance monitoring. Additional responsibilities include Tidal Wetland Adjacent Area jurisdiction determination support, Tidal Wetland Permit Application preparation, and ensuring compliance of the Site Management Plan during improvement work to the State Superfund Site.
- Project manager for redevelopment of a Federal Superfund Site located on Long Island, New York, for future commercial use. Project responsibilities include coordination and compliance with NYSDEC and USEPA Site Management Plans, support during preparation of the Environmental Assessment Form for the local Town Department of Environmental Resources, infiltration/percolation testing for future stormwater system design, soil management specification preparation, and construction oversight and reporting to all environmental agencies.
- Project manager during the redevelopment of an over 65-acre property formerly utilized as a petroleum oil terminal for over 50 years in Perth Amboy, New Jersey. Site redevelopment will include the demolition of over 30 aboveground storage tanks (ASTs) ranging from 500 gallons to over 10 million gallons, and associated piping, support structures, and repair garage, onsite reuse of over 200,000 CY of soil, and import of over 350,000 CY of soil in order to construct a new 900,000 SF logistics warehouse. Environmental coordination with New Jersey Department of Environmental Protection (NJDEP) includes Phase I/Preliminary Assessment (PA) preparation, Phase II ESA implementation and report preparation, completion of soil sampling in accordance with NJDEP soil sampling protocols/regulatory requirements, preparation of a Remedial Action Workplan (RAW), and remediation oversight.
- Project manager for an over 20-acre property located in Jersey City, New Jersey under adjusted direct oversight of the NJDEP. Redevelopment of the property includes the demolition of three existing onsite warehouse buildings, onsite reuse of over 13,000 CY of demolition debris, onsite reuse of approximately 5,000 CY of soil, and import of over 150,000 CY of soil in order to construct a new 400,000 SF logistics warehouse. Onsite

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remediation includes the preparation of an Area of Concern (AOC)-specific Self-Implementing PCB Clean-up Plan, implementation of the PCB remediation in accordance with TSCA-regulations, proper offsite disposal of TSCA-regulated waste, and implementation of institutional and engineering controls in accordance with USEPA. Additional Site-wide remediation includes the installation of a Site-wide cap and deed notice in accordance with NJDEP Technical Requirements for Site Remediation.

- Project manager for the reconstruction of 1,500 linear feet of esplanade along the East River beneath the Brooklyn Bridge in Manhattan, New York. Responsibilities included coordination with the NYCDEP, New York City Economic Development Corporation (NYCEDC), and the redevelopment team to ensure compliance with the NYCDEP-approved Remedial Action Plan and Construction Health and Safety Plan; completion of an environmental summary report; implementation of a NYCDEP-approved Phase II Environmental Site Assessment; completion of Stormwater Pollution Prevention Plan (SWPPP) inspections and construction oversight; and support and coordination to ensure compliance with the NYSDEC tidal wetland permit. Reconstruction includes updating and improving the existing walkways, enhancing the public's access to the waterfront, restoration and replacement of the existing bulkhead, and improving upon the coastal resiliency of the site.
- Project manager for several redevelopment sites requiring soil transfers totaling over 20,000 cubic yards between sites in and outside of regulatory agencies. Responsibilities included coordination with the New York City Office of Environmental Remediation (NYCOER) Clean Soil Bank and NYSDEC, management and implementation of soil sampling programs in accordance with NYSDEC Part 360 and DER-10, including emerging contaminants (1,4-dioxane and PFAS).
- Field manager at a 1,300-acre former aluminum smelter site in Columbia Falls, Montana, listed as a Superfund site. Field work was completed in accordance with a USEPA-approved Remedial Investigation/Feasibility Study and Sampling and Analysis Plan including the collection of soil samples to characterize and investigate the contaminants of potential concern associated with former industrial uses at the site and investigated contamination levels within former wastewater percolation ponds.
- Field manager for bedrock core drilling for non-aqueous phase liquid (NAPL) delineation at a former manufacturing facility in Queens, New York. Oversight included inspection of bedrock cores for primary and secondary fractures, evidence of contamination, and completion of rock quality designation (RQD) calculations. Project also included oversight and inspection during the installation of the grout secant wall containment area to cut off NAPL source area. Secant wall oversight included, implementation of the Community Air Monitoring Plan (CAMP), health and safety oversight of worker breathing zone, and inspection of drilling secant wall installation to ensure hydraulic seal. The former manufacturing facility was remediated to allow for restricted residential use and was redeveloped into a mixed-used building consisting of 1,800 residential units.
- Field and remedial construction manager for the largest ongoing redevelopment project in New York. Project included subcontractor oversight and health and safety oversight during utility clearance, soil boring installation, and in situ waste characterization sampling. Additional responsibilities consisted of waste disposal and construction management oversight, support for soil excavation, and ensuring compliance with the Site Environmental Management Plan.
- Field manager for an environmental subsurface investigation in Enfield, Connecticut. Project responsibilities included managing subcontractors and health and safety oversight during the investigation of multiple former dry cleaners. Subcontractor oversight was completed during utility clearance, soil boring installation, Membrane Interface Probe/Cone Penetration Test soil screening, and groundwater monitoring well installation. The investigation of the former dry cleaners included the delineation of Tetrachloroethylene (PCE) and Trichloroethylene (TCE) through soil, groundwater, and soil vapor sampling. Investigation responsibilities included soil lithology classification, soil vapor pin installation, preparation of soil boring logs using gINT software, and assistance with project planning and report preparation.
- Field manager responsible for construction and excavation oversight on Roosevelt Island, New York. Responsibilities included coordination between multiple general contractors by attending weekly construction meetings, excavation support and soil inspection, groundwater dewatering oversight, soil sampling, CAMP support, and weekly SWPPP inspections.
- Field manager for a NYCOER Voluntary Cleanup Program (VCP) Remedial Investigation for the redevelopment of a shopping mall in Staten Island, New York. Project responsibilities included health and safety oversight and management of subcontractors during utility clearance, soil boring installation, groundwater monitoring well installation, and soil vapor point installation. Coordinated and managed a field team to complete soil, groundwater, and soil vapor sampling (volatile organic compounds [VOCs] and methane). Office coordination included the preparation of soil boring logs using gINT software and assistance with project planning and report preparation.
- Field manager for in situ waste characterization of over 32,000 CY of soil and collection of endpoint samples in accordance

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with the NYCOER-approved investigation work plan for a redevelopment site in Astoria, Queens, New York. Responsibilities included health and safety oversight and management of subcontractors during utility clearance and soil boring installation. Completed soil lithology classification and collection of waste characterization and endpoint soil samples.

- Support to Expert Witness for an ongoing case between a major insurance carrier and a large multi-national chemical manufacturer. The case involved categorizing past costs for 12 chemical sites across the country. Assisted in the preparation of expert report on behalf of insurance carrier (Defendant).

  Complaint No. 84 Civ. 1968 (JSR); U.S. District Court, Southern District of New York.

**PROFESSIONAL TRAININGS**

OSHA 40-Hour HAZWOPER Training, 2014

OSHA Eight-Hour Refresher Training, Certificate Current

OSHA Ten-Hour Construction Outreach Training, 2015

OSHA 30-hour Construction Safety Training, 2019

Transit Worker Identification Credential Card Holder

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# PROFESSIONAL PROFILE

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**EDUCATION**
BS, Chemical Engineering,
Cornell University, 2000

## Dana M. Hignell

### Senior Engineer II

**EXPERIENCE SUMMARY**
Over twenty years of experience: Staff, Project, and Senior Engineer with Roux.

**TECHNICAL SPECIALTIES**
Engineering services for the investigation, design, construction, and operation and maintenance of remedial systems for the treatment of contaminated soil, sediment, and groundwater. Remedial designs have included excavation, in-situ groundwater remediation, groundwater pump and treat systems, air sparging with soil vapor extraction, vapor barriers and sub slab depressurization systems, and landfill soil cover systems.

**REPRESENTATIVE PROJECTS**

- Senior Engineer and Project Manager of a former wire and conduit manufacturer (former NYS Inactive Hazardous Waste Site) remediation in Syosset, NY. The Site was accepted into the NYSDEC BCP to support additional remediation and future redevelopment. Activities completed included development of RIR/RAWP and manage oversight of construction activities for approved remedy.
- Senior Engineer and Project Manager for the design and installation of a Constructed Treatment Wetlands (CTW) to treat nitrogen loading from a sanitary system in Brentwood, New York.
- Senior Engineer for the investigation of nitrogen loading to a creek in East Hampton, New York that is part of the Peconic Bay Estuary, and evaluation of the use of a permeable reactive barrier to reduce the flux of nitrogen.
- Senior Engineer for the design and start-up of a soil vapor extraction (SVE) and air sparge (AS) system at an active gasoline station in Staten Island, New York. The system was installed to address soil and groundwater contaminants and consists of 17 vertical SVE wells and 10 AS wells. The recovered soil vapor is treated by catalytic oxidation before being discharged. Over 1,200 pounds of hydrocarbon have been recovered since the system start-up.
- Senior Engineer for the design of in-situ groundwater remediation to treat chlorinated volatile organic compounds (CVOCs) at a former dry cleaner in Bronx, New York. In-situ chemical oxidation (ISCO) was selected as the groundwater remedy, with injections completed over a half an acre of property. The ISCO remedy was successful and allowed for redevelopment of the property within the required schedule.
- Senior Engineer for the design and implementation of a passive product-recovery system using horizontal recovery wells at a former bus garage in Newark, New Jersey. The remedial action also included excavation and offsite disposal of approximately 7,000 tons of petroleum contaminated soil, and in-situ chemical oxidation to treat residual soil and groundwater contamination.
- Senior Engineering managing the investigation, design, and implementation of product-recovery skimming systems for a former petroleum refinery in Queens, New York. Over 100,000 gallons of product has been recovered to date.
- Senior Engineer for the design of a sub-slab depressurization system with vapor barrier for the construction of a 19-story residential building in Brooklyn, New York.

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- Senior Engineer for the investigation, design, and implementation of a soil remediation project at a Former Oil Terminal in Sag Harbor, New York. The remedy completed includes excavation and offsite disposal of approximately 2,000 tons of petroleum contaminated soil in an active roadway surrounded by underground utilities.
- Senior Engineer for the investigation, design, and implementation of a soil remediation project at a 4-acre Former Oil Terminal in Cold Spring Harbor, New York. The remedy completed includes excavation and offsite disposal of approximately 20,000 tons of petroleum contaminated and/or hazardous lead contaminated soil in accordance with the future use of the site under an Environmental Easement. Additional activities completed at the site included asbestos remediation followed by building demolition, UST removal, and cesspool remediation.
- Project Engineer for the complete design for a 9-acre landfill in Rensselaer, New York as part of the NYSDEC Voluntary Cleanup Program. The design was in accordance with the future use of the Site as a landfill with an integrated wildlife habitat vegetative cap and included hot spot soil excavation and installation of a vegetative cap.
- Project Engineer for the design of a soil and groundwater remediation system for a Former Oil Terminal in Oceanside, New York. A risk based remedial approach that called for the remediation of "hot spot" source area soils, and mass-reduction of VOCs in groundwater was successfully utilized for the Site. To address the soil contamination in the source areas, "hot spot" soil excavation was completed. A groundwater pump and treat system was designed, constructed, and continues to be operated and maintained to address the VOC contaminants in groundwater. The system consists of seven recovery wells, an oil/water separator, and a packed column air stripping tower. Over 11 million gallons of groundwater have been recovered and treated.
- Project Engineer for the design and startup of a soil vapor extraction (SVE) and air sparge (AS) system at an 11-acre active Oil Terminal in Glenwood Landing, New York. The system was installed to address soil and groundwater contaminants and consists of four horizontal SVE wells and 8 AS wells. The recovered soil vapor is treated by carbon units before being discharged. Approximately 12,000 pounds of hydrocarbon have been recovered since system start up.
- Project Engineer for the design and startup of a soil vapor extraction (SVE) and air sparge (AS) system at an 11-acre active Oil Terminal in Inwood, New York. The system was installed to address soil and groundwater contaminants and consists of 4 vertical SVE wells and six AS wells. The recovered soil vapor is treated by carbon units before being discharged. Approximately 32,000 pounds of hydrocarbon have been recovered since system start up.

### Operation and Maintenance (O&M) Experience

- Project Engineer responsible for the O&M and monitoring of a SVE system and a dual-pump, product recovery system at an active Oil Terminal in Inwood, New York. O&M activities included system operation and maintenance, performance monitoring, and preparation of quarterly status reports for submission to the NYSDEC. The SVE system consists of 5 SVE wells and was designed, constructed, operated, and maintained for a period of approximately 6 years. The SVE system was permanently shut down and this area of the Site is currently in the post-remediation monitoring phase. The dual-pump system, including groundwater and product recovery and packed column air stripping towers, is currently still in operation.
- Project Engineer responsible for the operation and maintenance of soil and groundwater remediation systems for an active Oil Terminal in Glenwood Landing, New York. A groundwater pump and treat system, consisting of 1 recovery well, two packed column air stripping towers, bag filters and granular activated carbon units, has been in operation at the Site to address VOC contaminants in groundwater. In addition, an SVE/AS system, previously installed, was upgraded to further address soil and groundwater contaminants at the Site boundaries. The SVE system consisted of vertical wells in an area of shallow groundwater. The system was upgraded with seven horizontal wells and an additional five AS wells were installed. Following an on-site diesel spill of approximately 5,000 gallons in 2005, free-product recovery efforts were implemented, including removal of saturated soils and installation of a free-product recovery system.
- Staff Engineer responsible for the O&M and monitoring of an SVE/AS system for nationwide distribution center in Brooklyn, New York as part of the NYSDEC Voluntary Cleanup Program. O&M activities included system operation and maintenance, performance monitoring, soil gas monitoring, quarterly monitoring, and preparation of quarterly and annual status reports for submission to the NYSDEC. The SVE and AS system consists of 8 SVE wells and 17 AS wells and was designed, constructed, operated and maintained for a period of approximately 3 years. The SVE and AS system is permanently shut down and the Site is currently in the post-remediation monitoring phase.
- Staff Engineer responsible for the O&M of a 430 gpm, dual-pump, product recovery system in Greenpoint, Brooklyn, New York. Processes and system maintained include dual-pump groundwater and product recovery, low profile air strippers and a catalytic oxidation unit. The Site encompasses one of the nation's largest petroleum releases (18 million gallons).

### UST Experience

- Project Engineer for the management of the excavation and removal of a 10,000-gallon UST and four ASTs ranging from 284,000-gallon capacity to 976,000-gallon capacity at a former Oil Terminal in Cold Spring Harbor, New York. The scope of

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work entailed preparation of a UST and AST closure work plan, project management of the field work, post excavation and tank footprint sampling and preparation of a UST and AST Closure Report.

- Project Engineer for the excavation oversight of a 2,000-gallon heating oil UST at an active Oil Terminal in Glenwood Landing, New York. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs and preparation of a Closure Report.
- Project Engineer for the excavation oversight of a 2,000-gallon heating oil UST at an active Oil Terminal in Inwood, New York. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs and preparation of a Closure Report. Also included was the management and field oversight of the closure of an in-ground oil/water separator at an active Oil Terminal Inwood, New York. The scope of work entailed preparation of an oil/water separator closure work plan, project management of the field work, excavation of petroleum contaminated soils associated with the separator, post-excavation sampling, and preparation of an Oil/Water Separator Closure Report.
- Staff Engineer for the excavation oversight of three 8,000-gallon USTs, two pump islands and three hydraulic lifts and all associated piping at a former service station in Norwalk, Connecticut. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs, and preparation of a Closure Report.
- Staff Engineer for the excavation oversight of three 8,000-gallon USTs, two pump islands and all associated piping at a former service station in Hartford, Connecticut. Field oversight included post-excavation and waste characterization soil sampling, health and safety monitoring, supervision during the removal, cleaning, and disposal of the USTs and preparation of a Closure Report.

### Soil and Groundwater Remediation

- Project Engineer for the design of soil remediation at an active Oil Terminal in Stamford, Connecticut to remove contaminated soils following a 30,000-gallon petroleum spill in 2006. The remediation included excavation of approximately 1,000 cubic yards of petroleum-impacted soil with post-excavation sampling.
- Staff Engineer responsible for construction management of remediation of a former major pharmaceutical plant located in Hicksville, New York as part of the State Superfund Program. The project consisted of the excavation of non-hazardous soil from five on-site drywells and a former waste disposal area, implementation of a community air monitoring plan, coordination with the Long Island Rail Road (LIRR) for work performed within the LIRR's right of way, steel sheeting installation and removal, backfilling, monitoring well abandonment and replacement, transportation and disposal of 3,300 tons of VOC, SVOC and metal contaminated soil, and restoration of approximately 9,800 square feet of asphalt. A 7-foot diameter steel caisson was used to support the deeper excavation required at the invert of two drywells. This innovative approach saved the client approximately $50,000 in costs that would have been incurred by using a traditional steel sheeting support system to protect the on-site commercial building.

### Stormwater

- Project Engineer for the design and construction management of a stormwater drainage upgrade project for the parking lot of a former manufacturing facility (costume jewelry and then surgical needles) located in Queens Village, New York. The stormwater drainage system consisted of multiple catch basins, a new drain and curb, and all associated piping.
- Project Engineer for the design and construction of two stormwater management ponds and swales for a former landfill in Rensselaer, New York. The ponds and swales were constructed as part of the landfill cap project to direct stormwater to existing catch basins, allow stormwater overflow control and to enhance the wildlife habitat.

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**JUDY V. HARRY**
**P. O. Box 208**
**120 Cobble Creek Rd.**
**North Creek, NY 12853**

***Occupation:*** Data Validator/Environmental Technical Consultant

***Years Experience:*** 41

***Education:*** B.S., Chemistry, Magna cum laude, 1976, Phi Beta Kappa

***Certifications:*** New York State Woman-Owned Business Enterprise (WBE)

***Relevant Work History:***

**Data Validation Services: September 1989 - present**

Sole proprietor of Data Validation Services, a woman-owned small business registered with SAM, providing consultation/validation services to regulatory and commercial clients.

These services include the review of analytical laboratory data for compliance with respect to specific protocols, accuracy and defensibility of data, verification of reported values, and evaluation of quality parameters for analytical usability of results. Approved by USEPA, NYSDEC, NJDEP, NYSERDA, and NYCDEP as a data validator for projects, including USEPA Superfund, Brownfield, and lead sites, and those contracted through the NYSDEC Division of Hazardous Waste Remediation, Division of Solid Waste, and Division of Water Quality.

Performed validation for compliance with laboratory analytical protocols including USEPA OLM, USEPA OLC, USEPA ILM, USEPA DFLM, USEPA SOW3/90, USEPA SOW 7/87 CLP, USEPA SOW 2/88 CLP, USEPA SW846, RCRA, AFCEE, NYS 6 NYCRR Part 360, 40 CFR, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, including TO-15, 1989/1991/1995/2000/2005 NYSDEC ASPs, and 1987 NYSDEC CLP.

Performed validation according to the USEPA National and Regional SOPs and Functional Guidelines, AFCEE requirements, NYSDEC Validation Scope of Work, NYS DUSR, and NJDEP Division of Hazardous Site Mitigation/Publicly Funded Site Remediation SOPs.

Performed validation for USEPA Superfund Sites including Salem Acres, York Oil, Port Washington L-4 Landfill, Bridgeport Rental and Oil Services, GE-MRFA, MMR/ OTIS AFB, LCP, and Peter Cooper site; and for USEPA lead sites including SJ&J Piconne, Maska, Bowe System, Jones Sanitation, and Syossett Landfill, involving CLP, RAS, and SAS protocols.

Contracted for NYSDEC Superfund Standby Contracts with LMS Engineers, HDR, CDM Smith, Malcolm-Pirnie/ARCADIS, Ecology & Environment, Shaw Environmental, CG&I, O'Brien & Gere Engineers, and EC Jordan, involving samples collected at NYS Superfund Sites and analyzed under the NYSDEC ASP.

Performed validation services for NYSDEC Phase II remedial investigations, RI/FS projects, Brownfield sites, and PRP over-site projects for hazardous waste sites.

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Performed validation services for clients conducting RI/FS activities involving samples of many matrices, including waste, air, sludges, leachates, solids/sediments, aqueous, and biota.

Clients have included AECOM, ARCADIS, Barton & Loguidice, Benchmark Engineering, Bergmann Associates, Blasland, Bouck & Lee, Brown and Caldwell, CDM Smith, CB&I Shaw Environmental, C&S Consulting Engineers, Chazen Companies, Clough Harbour & Associates, Columbia Analytical Services, C.T. Male, Dames & Moore, Day Engineering, EA Engineering, EcolSciences, Ecology & Environment, Ecosystems, EC Jordan, Environmental Chemical Corporation, EHRT, ENSR Consulting, ELM, ERM-Northeast, Fagan Engineers, Fanning Phillips & Molnar, FluorDaniel GTI, Frontier, Foster Wheeler Environmental Corp, Frontier Technical, Galson Consultants, GE&R, Geomatrix Consultants, GZA Environmental, Handex of N, H2M Group, HDR, HRP, IT Corp, Jacques Whitford, JTM Associates, Labella Associates, Langan Engineers, Leader Environmental, Lockwood, Kessler & Bartlett, LMS Engineers, Malcolm-Pirnie, Metcalf & Eddy, NWEC&C, O'Brien & Gere Engineers, Pace, Parsons Engineering-Science, Plumley Engineering, Prescott Environmental, P. W. Grosser, Rizzo Associates, Roux Associates, Sear Brown Group, SECOR, Shaw Environmental, Stantec, ThermoRemediation Inc., TRC Environmental, Turnkey Environmental Restoration, TVGA Engineering, URS Consultants, Wehran Emcon, Weston, YEC, and private firms.

Provided consultation services to laboratories regarding analytical procedures and protocol interpretation, and to law firms for litigation support.

Provided services to firms involving audits of environmental analytical laboratories to determine analytical capability, particularly for compliance with NYSDEC ASP and AFCEE requirements.

Guest speaker on a panel discussing Data Review/Compliance and Usability, for an analysis workshop for the New York Association of Approved Environmental Laboratories, 1993.

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**Adirondack Environmental Services: June 1987 - August 1989**

Senior mass spectroscopist for AES. Responsible for GC/MS analyses of environmental samples by USEPA and NYSDEC protocols, development of the GC/MS laboratory, initiating the instrumental and computer operations from the point of installation, and for implementing the procedures and methodologies for Contract Laboratory Protocol.

**CompuChem Laboratories: May 1982 - January 1987**

Managed a GC/MS production laboratory; developed, implemented, and supervised QA/QC criteria at three different levels of review; and was responsible for the development and production of the analysis of environmental and clinical samples. Directed a staff of 23 technical and clerical personnel, and managed the extraction and GC/MS labs and data review operations.

### Research Triangle Institute: December 1979 - May 1982

Worked as an analytical research chemist responsible for development of analytical methods for the EPA Federal Register at RTI. This involved analysis of biological and environmental samples for priority pollutants, primarily relating to wastewaters and to human sampling studies. Method development included modification and interfacing of the initially developed Tekmar volatile purge apparatus to GC/MS, development and refinement of methods for entrapment and concentration of the air medium for subsequent volatile analysis, and the analysis and resolution/ identification of individual PCB congeners within Aroclor mixtures by capillary column and mass spectra.

### Guardsman Chemical Company: February 1977 - November 1979

Performed all quality control functions for the manufacturing plant. Performed research and development on coatings and dyes.

### Almay Cosmetics: May 1976 - December 1976

Product evaluation chemist. Responsible for analytical QC of manufactured products.

### Publication

Pellizzzari, E.D., Moseley, M.A., Cooper, S.D., Harry, J.V., Demian, B., & Mullin, M. D. (1985). Recent Advances in the Analysis of Polychlorinated Biphenyls in Environmental and Biological Media. *Journal of Chromatography*, 334(3) 277-314.

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# APPENDIX G

Request for Import/Reuse Fill Material Form

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**NEW YORK STATE**
**DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

***Request to Import/Reuse Fill or Soil***

*This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.*

## SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

## SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that passes a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

## SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

---

*Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.*

*If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.*

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## SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

---

*Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.*

*If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.*

## SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

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The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

_____

Firm

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# APPENDIX H

Green and Sustainable Remediation

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# Environmental Footprint Summary

| Core Element | Metric | | Unit of Measure | Footprint | |
|---|---|---|---|---|---|
| | | | | Track 1 | Track 2 & Track 4 |
| Materials & Waste | M&W-1 | Refined materials used on-site | Tons | 0.0 | 0.0 |
| | M&W-2 | % of refined materials from recycled or reused material | % | | |
| | M&W-3 | Unrefined materials used on-site | Tons | 32,721.053 | 4,648.630 |
| | M&W-4 | % of unrefined materials from recycled or reused material | % | 0.4% | 1.0% |
| | M&W-5 | On-site hazardous waste disposed of off-site | Tons | 0.0 | 0.0 |
| | M&W-6 | On-site non-hazardous waste disposed of off-site | Tons | 36,112.0 | 6,386.6 |
| | M&W-7 | Recycled or reused waste | Tons | 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 |
| | W-2 | Groundwater use | MG | 0.5 | 0.1 |
| | W-3 | Surface water use | MG | 0.0 | 0.0 |
| | W-4 | Reclaimed water use | MG | 0.0 | 0.0 |
| | W-5 | Storm water use | MG | 0.0 | 0.0 |
| | W-6 | User-defined water resource #1 | MG | 0.0 | 0.0 |
| | W-7 | User-defined water resource #2 | MG | 0.0 | 0.0 |
| | W-8 | Wastewater generated | MG | 0.0 | 0.0 |
| Energy | E-1 | Total energy used (on-site and off-site) | MMBtu | 33,141.4 | 9,386.6 |
| | 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 |
| | E-2B | Voluntary purchase of renewable electricity | MWh | 0.0 | 0.0 |
| | E-3 | Voluntary purchase of RECs | MWh | 0.0 | 0.0 |
| | E-4 | On-site grid electricity use | MWh | 0.000 | 0.000 |
| Air | A-1 | On-site NOx, SOx, and PM emissions | Pounds | 11,487.4 | 4,864.2 |
| | A-2 | On-site HAP emissions | Pounds | 3.9 | 1.5 |
| | A-3 | Total NOx, SOx, and PM emissions | Pounds | 48,759.4 | 11,954.0 |
| | A-3A | Total NOx emissions | Pounds | 27,683.6 | 7,588.5 |
| | A-3B | Total SOx emissions | Pounds | 4,880.4 | 1,190.6 |
| | A-3C | Total PM emissions | Pounds | 16,195.4 | 3,174.9 |
| | A-4 | Total HAP emissions | Pounds | 312.5 | 100.1 |
| | A-5 | Total greenhouse gas emissions | Tons CO2e* | 2,661.8 | 763.7 |
| Land & Ecosystems | Implementation of the proposed remedial action (Track 2 and Track 4 Restricted Residential cleanup) will temporarily disturb site soils and subsurface conditions through excavation, dewatering, and material handling; however, these activities are expected to result in an overall positive long-term impact on both the land and surrounding ecosystem. Excavation of impacted fill to depths of up to 15 feet below land surface for the building foundation, to 9 feet below land surface for utility installation, and to 2 feet below land surface for the remainder of the Site will remove contaminants associated with historic use and fill material, thereby reducing the total mass and mobility of contaminants onsite.<br>Short-term impacts may include soil disturbance, generation of dust, increased emissions from construction equipment, and temporary disruption to nearby urban ecological conditions. These effects will be controlled through implementation of best management practices such as dust suppression, air monitoring (CAMP), and limited equipment idling, which are designed to minimize offsite migration of particulates and protect nearby receptors.<br>Dewatering activities may locally alter groundwater levels during construction; however, extracted water will be treated or properly managed in accordance with regulatory requirements, minimizing impacts to groundwater quality and preventing uncontrolled discharge.<br>Following remediation, placement of clean fill and redevelopment will eliminate direct exposure pathways to contaminated soil and stabilize site conditions, reducing the potential for contaminant migration to surrounding media. Long-term ecological impacts are expected to be minimal because the site is highly urbanized, will be paved or covered by a coulding foundation, and does not support significant habitat or identified fish and wildlife resources.<br>Overall, while short-term construction-related disturbances will occur, the remedial action will improve soil quality, reduce environmental risk, and provide a more stable and protective land condition, resulting in net beneficial effects to the local environment. | | | | |

** 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:

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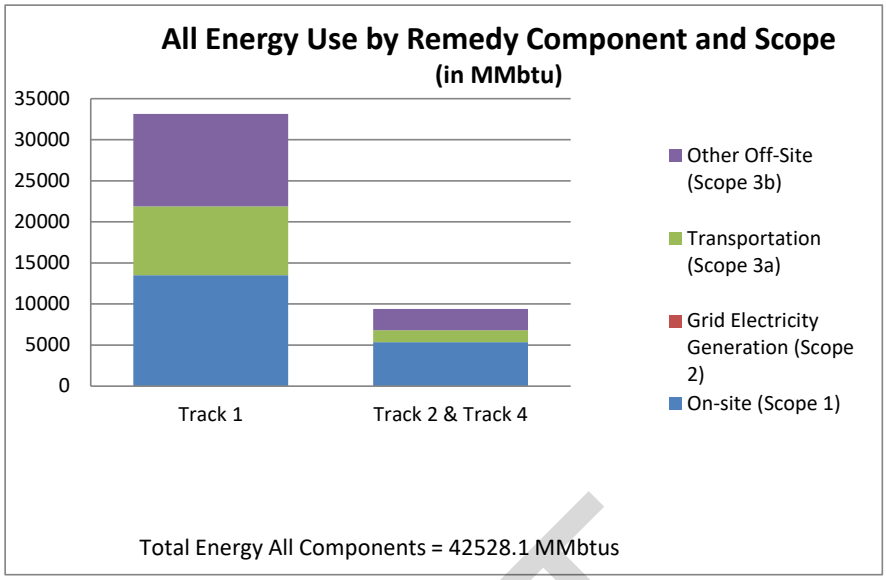
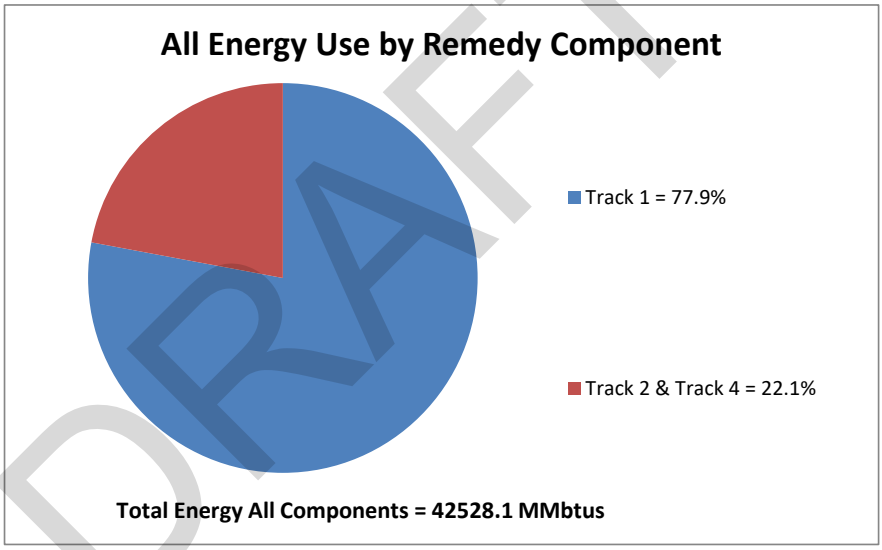
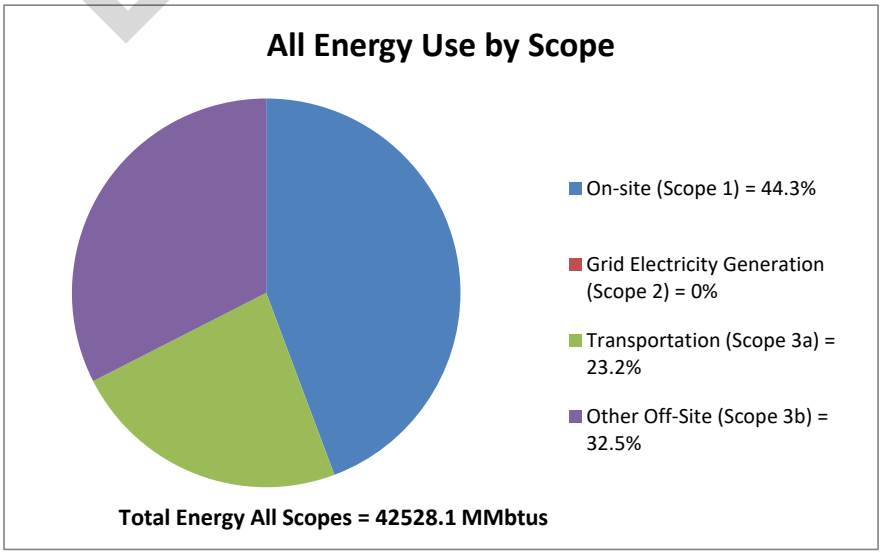

All Energy Use by Remedy Component and Scope
(in MMbtu)
35000
30000
25000
20000
15000
10000
5000
0
Track 1
Track 2 & Track 4
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 42528.1 MMbtus


All Energy Use by Remedy Component
Track 1 = 77.9%
Track 2 & Track 4 = 22.1%
Total Energy All Components = 42528.1 MMbtus


All Energy Use by Scope
On-site (Scope 1) = 44.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 23.2%
Other Off-Site (Scope 3b) = 32.5%
Total Energy All Scopes = 42528.1 MMbtus

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Total Energy
MMbtus

| | Track 1 | Track 2 & T | < Compon | < Compon | < Compon | < Compon | Total |
|---|---|---|---|---|---|---|---|
| On-site (Scope 1) | 13,495.7 | 5,339.3 | 0.0 | 0.0 | 0.0 | 0.0 | 18,834.9 |
| Grid Electricity Generation (Scope 2) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Transportation (Scope 3a) | 8,388.7 | 1,481.3 | 0.0 | 0.0 | 0.0 | 0.0 | 9,870.0 |
| Other Off-Site (Scope 3b) | 11,257.1 | 2,566.1 | 0.0 | 0.0 | 0.0 | 0.0 | 13,823.1 |
| Total | 33,141.4 | 9,386.6 | 0.0 | 0.0 | 0.0 | 0.0 | 42,528.1 |

Track 1 = 77.9%
Track 2 & Track 4 = 22.1%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 44.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 23.2%
Other Off-Site (Scope 3b) = 32.5%

Total Energy All Components = 42528.1 MMbtus
Total Energy All Scopes = 42528.1 MMbtus

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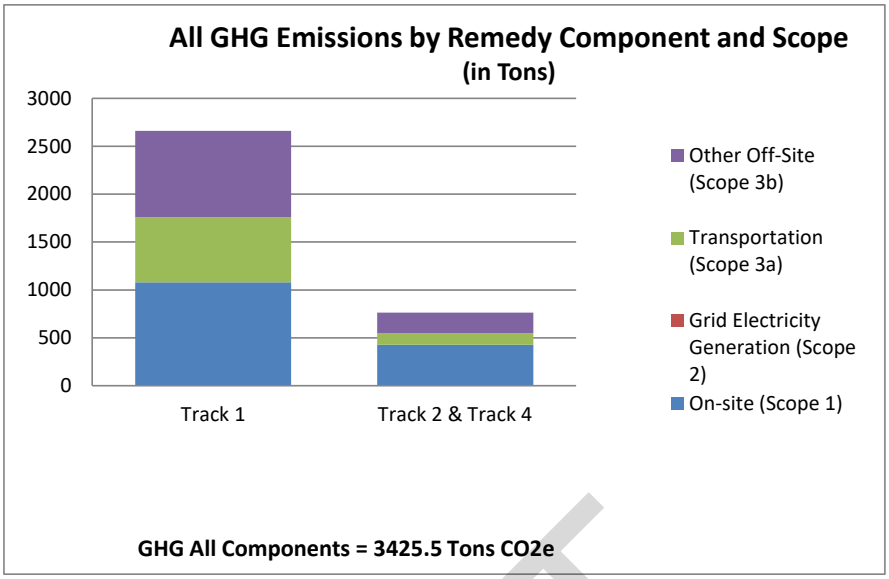
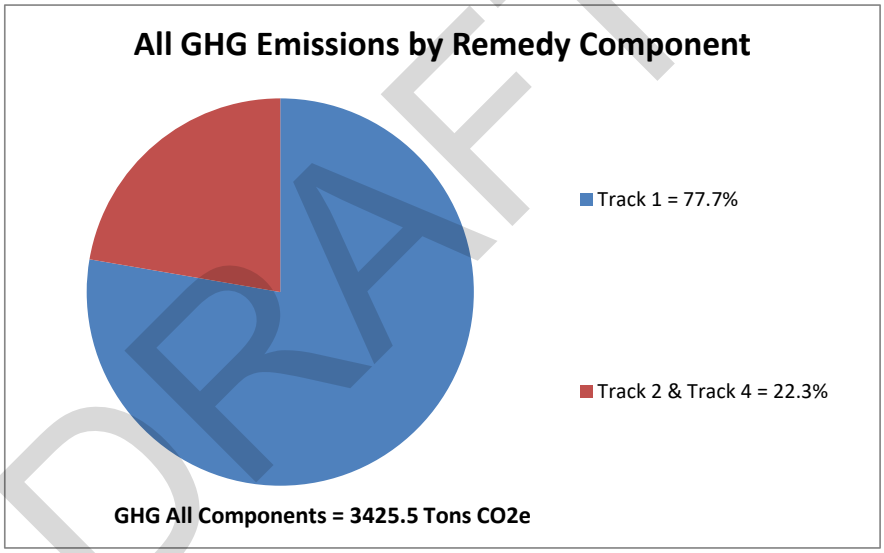
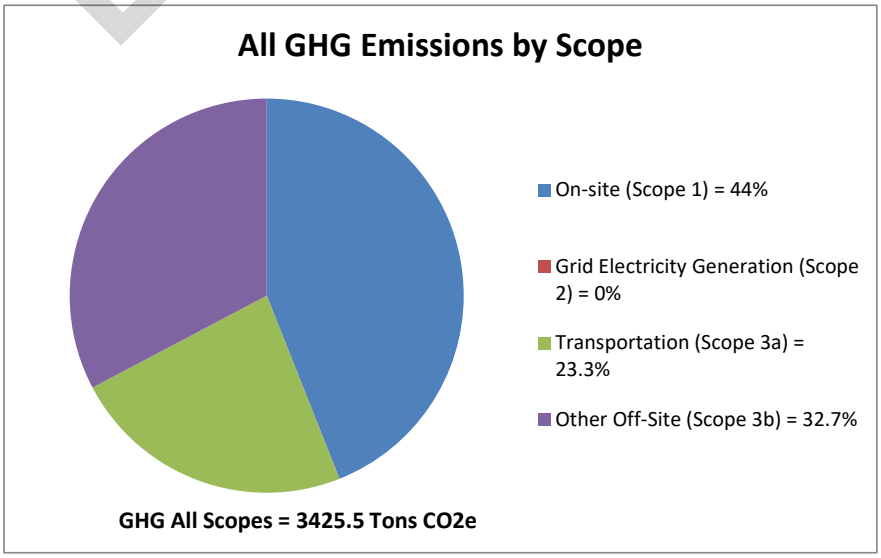

All GHG Emissions by Remedy Component and Scope
(in Tons)
3000
2500
2000
1500
1000
500
0
Track 1
Track 2 & Track 4
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 3425.5 Tons CO2e


All GHG Emissions by Remedy Component
Track 1 = 77.7%
Track 2 & Track 4 = 22.3%
GHG All Components = 3425.5 Tons CO2e


All GHG Emissions by Scope
On-site (Scope 1) = 44%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 23.3%
Other Off-Site (Scope 3b) = 32.7%
GHG All Scopes = 3425.5 Tons CO2e

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| GHG Tons CO2e | Track 1 | Track 2 & T | < Compon | < Compon | < Compon | < Compon | Total |
|---|---|---|---|---|---|---|---|
| On-site (Scope 1) | 1,079.5 | 427.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1,506.4 |
| Grid Electricity Generation (Scope 2) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Transportation (Scope 3a) | 678.3 | 119.7 | 0.0 | 0.0 | 0.0 | 0.0 | 797.9 |
| Other Off-Site (Scope 3b) | 904.0 | 217.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1,121.1 |
| Total | 2,661.8 | 763.7 | 0.0 | 0.0 | 0.0 | 0.0 | 3,425.5 |

Track 1 = 77.7%
Track 2 & Track 4 = 22.3%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 44%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 23.3%
Other Off-Site (Scope 3b) = 32.7%

GHG All Components = 3425.5 Tons CO2e
GHG All Scopes = 3425.5 Tons CO2e

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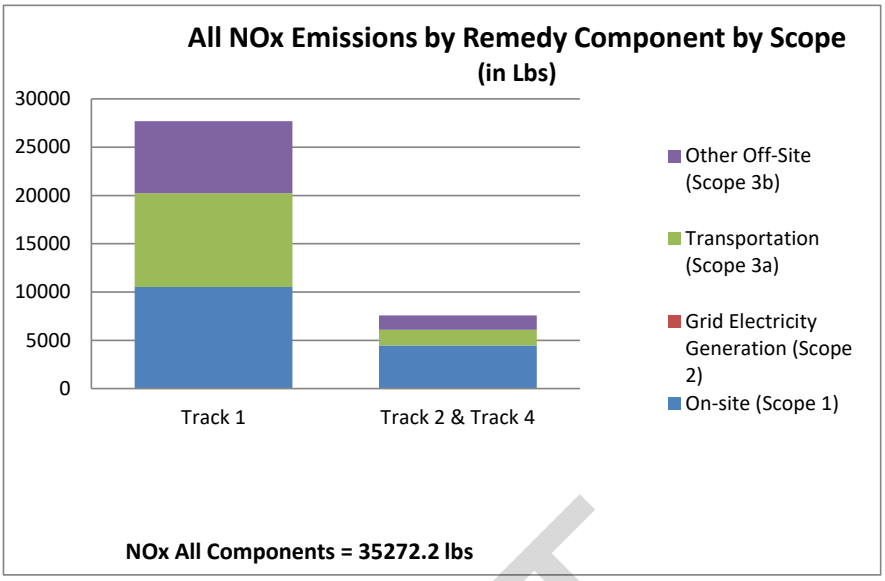
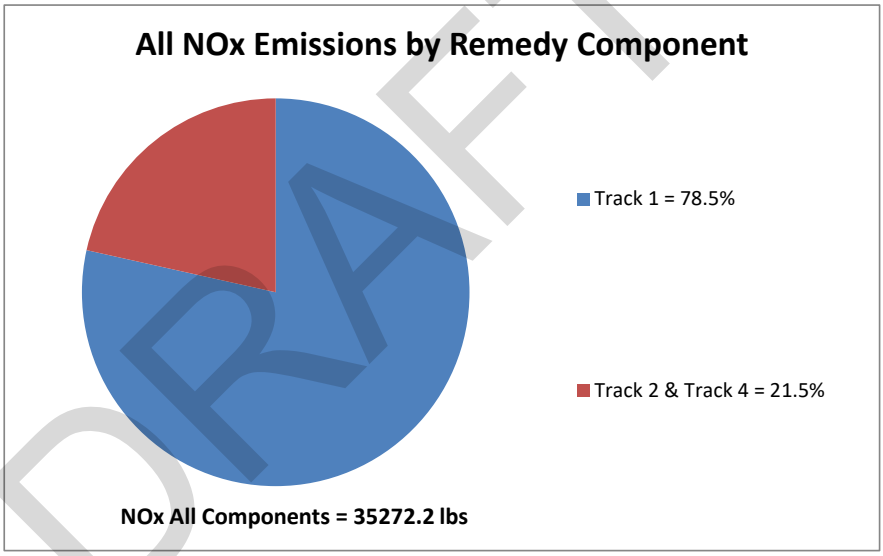
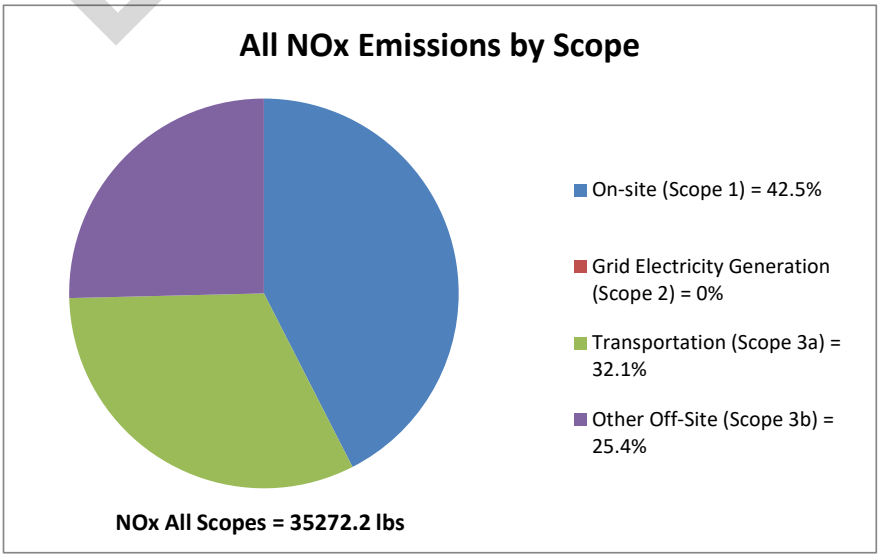

All NOx Emissions by Remedy Component by Scope
(in Lbs)
30000
25000
20000
15000
10000
5000
0
Track 1
Track 2 & Track 4
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 35272.2 lbs


All NOx Emissions by Remedy Component
Track 1 = 78.5%
Track 2 & Track 4 = 21.5%
NOx All Components = 35272.2 lbs


All NOx Emissions by Scope
On-site (Scope 1) = 42.5%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 32.1%
Other Off-Site (Scope 3b) = 25.4%
NOx All Scopes = 35272.2 lbs

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NOx lbs

| | Track 1 | Track 2 & T | < Compon | < Compon | < Compon | < Compon | Total |
|---|---|---|---|---|---|---|---|
| On-site (Scope 1) | 10,529.1 | 4,456.2 | 0.0 | 0.0 | 0.0 | 0.0 | 14,985.3 |
| Grid Electricity Generation (Scope 2) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Transportation (Scope 3a) | 9,706.9 | 1,626.9 | 0.0 | 0.0 | 0.0 | 0.0 | 11,333.8 |
| Other Off-Site (Scope 3b) | 7,447.6 | 1,505.4 | 0.0 | 0.0 | 0.0 | 0.0 | 8,953.0 |
| Total | 27,683.6 | 7,588.5 | 0.0 | 0.0 | 0.0 | 0.0 | 35,272.2 |

Track 1 = 78.5%
Track 2 & Track 4 = 21.5%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 42.5%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 32.1%
Other Off-Site (Scope 3b) = 25.4%

NOx All Components = 35272.2 lbs
NOx All Scopes = 35272.2 lbs

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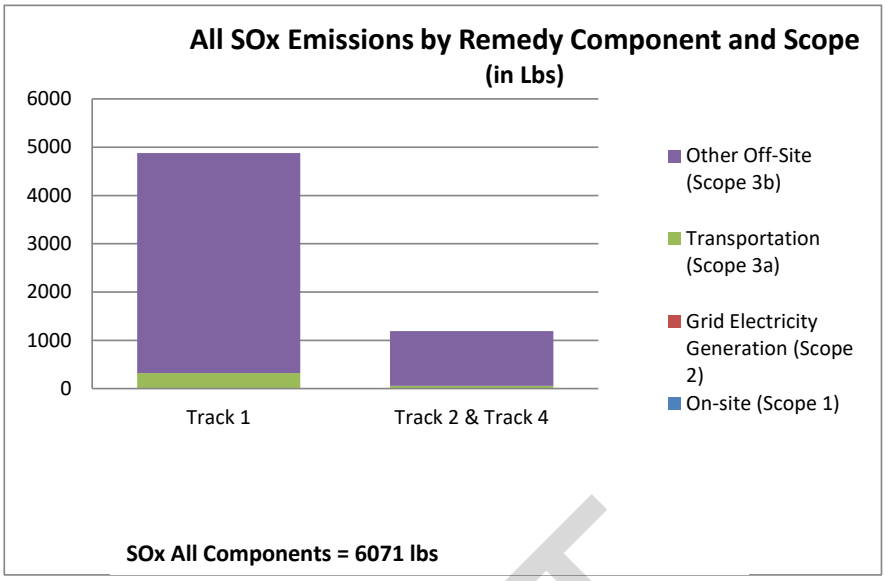
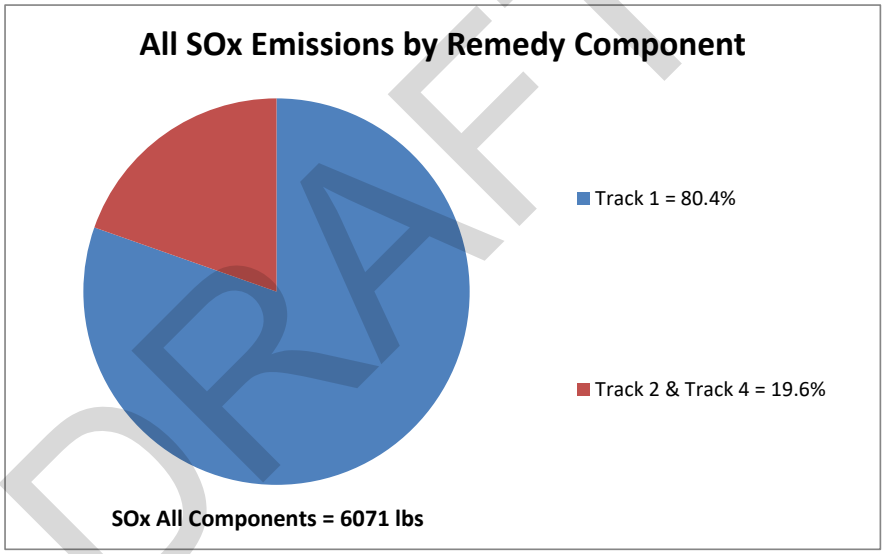
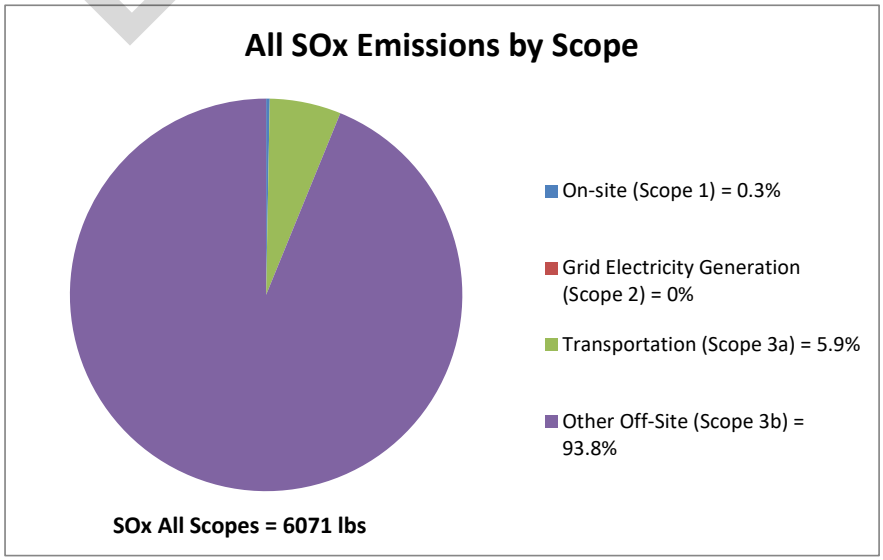

All SOx Emissions by Remedy Component and Scope
(in Lbs)
6000
5000
4000
3000
2000
1000
0
Track 1
Track 2 & Track 4
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 6071 lbs


All SOx Emissions by Remedy Component
Track 1 = 80.4%
Track 2 & Track 4 = 19.6%
SOx All Components = 6071 lbs


All SOx Emissions by Scope
On-site (Scope 1) = 0.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 5.9%
Other Off-Site (Scope 3b) = 93.8%
SOx All Scopes = 6071 lbs

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| SOx lbs | Track 1 | Track 2 & T | < Compon | < Compon | < Compon | < Compon | Total |
|---|---|---|---|---|---|---|---|
| On-site (Scope 1) | 12.8 | 5.1 | 0.0 | 0.0 | 0.0 | 0.0 | 18.0 |
| Grid Electricity Generation (Scope 2) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Transportation (Scope 3a) | 306.1 | 50.9 | 0.0 | 0.0 | 0.0 | 0.0 | 357.1 |
| Other Off-Site (Scope 3b) | 4,561.4 | 1,134.5 | 0.0 | 0.0 | 0.0 | 0.0 | 5,695.9 |
| Total | 4,880.4 | 1,190.6 | 0.0 | 0.0 | 0.0 | 0.0 | 6,071.0 |

Track 1 = 80.4%
Track 2 & Track 4 = 19.6%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 0.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 5.9%
Other Off-Site (Scope 3b) = 93.8%

SOx All Components = 6071 lbs
SOx All Scopes = 6071 lbs

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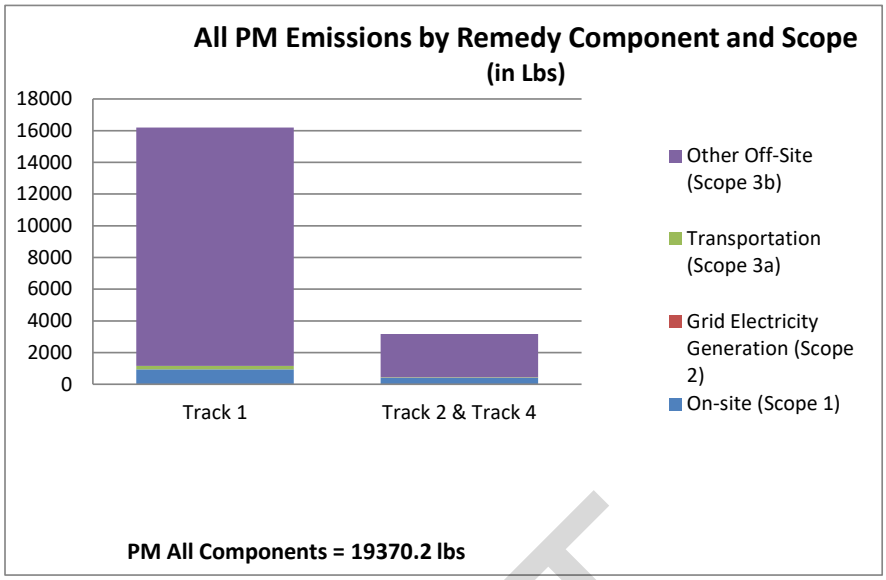
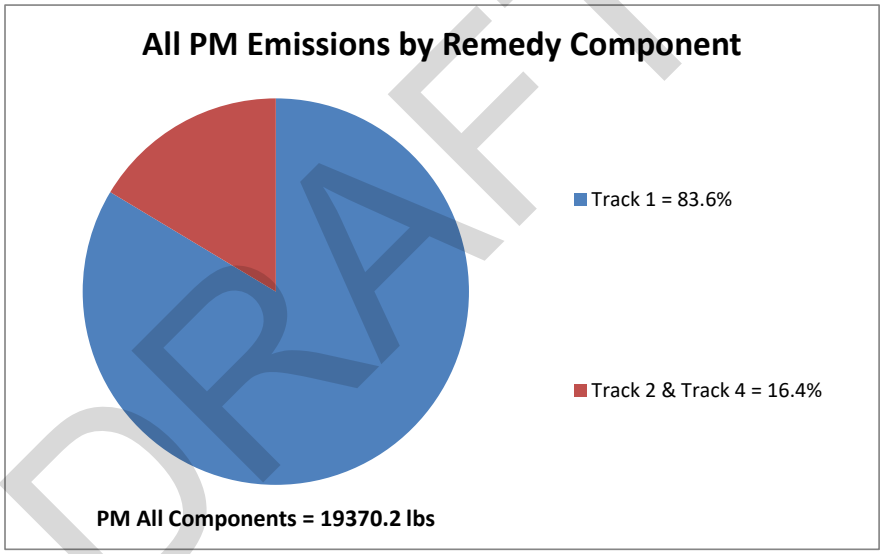
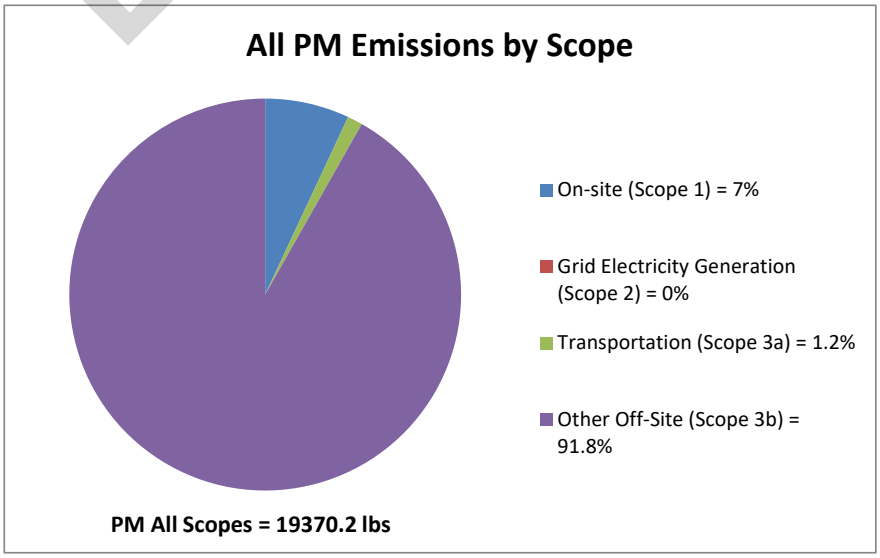

All PM Emissions by Remedy Component and Scope
(in Lbs)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Track 1
Track 2 & Track 4
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 19370.2 lbs


All PM Emissions by Remedy Component
Track 1 = 83.6%
Track 2 & Track 4 = 16.4%
PM All Components = 19370.2 lbs


All PM Emissions by Scope
On-site (Scope 1) = 7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.2%
Other Off-Site (Scope 3b) = 91.8%
PM All Scopes = 19370.2 lbs

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PM lbs

| | Track 1 | Track 2 & T | < Compon | < Compon | < Compon | < Compon | Total |
|---|---|---|---|---|---|---|---|
| On-site (Scope 1) | 945.5 | 402.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1,348.3 |
| Grid Electricity Generation (Scope 2) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Transportation (Scope 3a) | 205.0 | 36.2 | 0.0 | 0.0 | 0.0 | 0.0 | 241.2 |
| Other Off-Site (Scope 3b) | 15,044.9 | 2,735.8 | 0.0 | 0.0 | 0.0 | 0.0 | 17,780.7 |
| Total | 16,195.4 | 3,174.9 | 0.0 | 0.0 | 0.0 | 0.0 | 19,370.2 |

Track 1 = 83.6%
Track 2 & Track 4 = 16.4%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.2%
Other Off-Site (Scope 3b) = 91.8%

PM All Components = 19370.2 lbs
PM All Scopes = 19370.2 lbs

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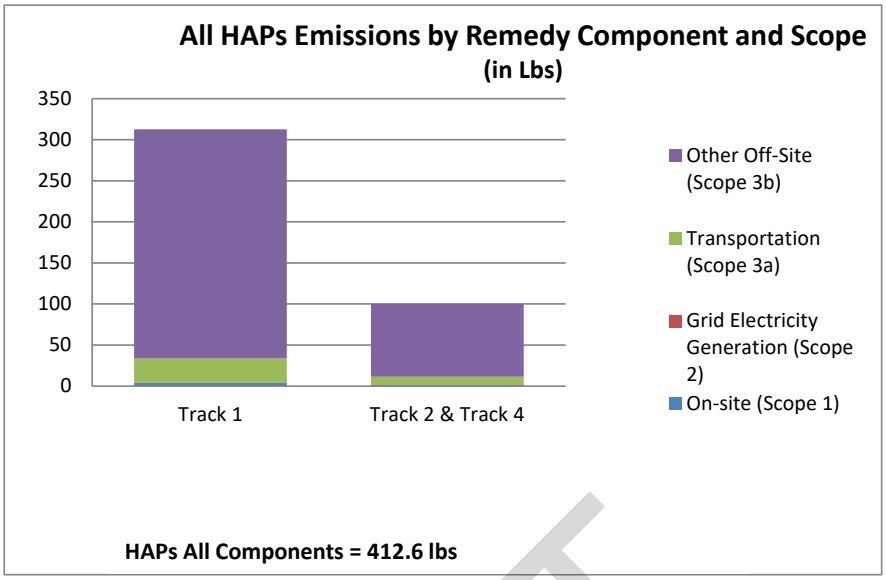
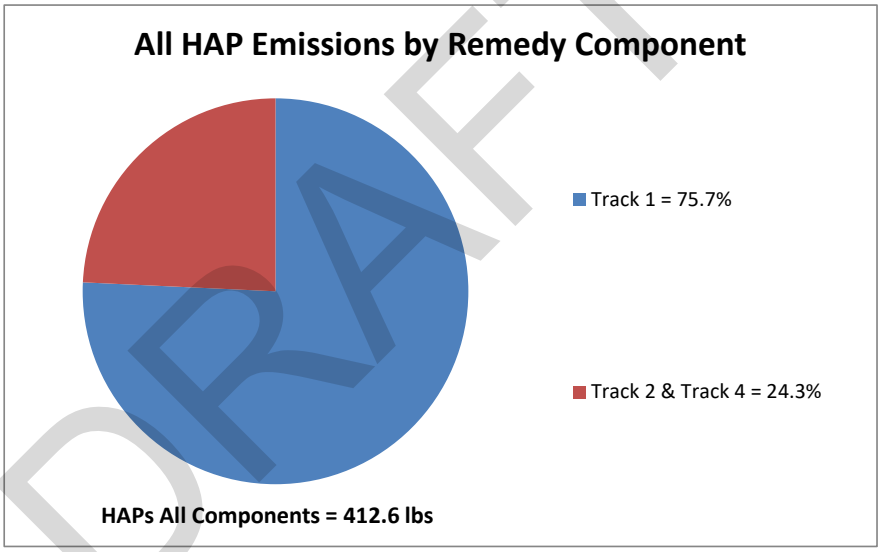
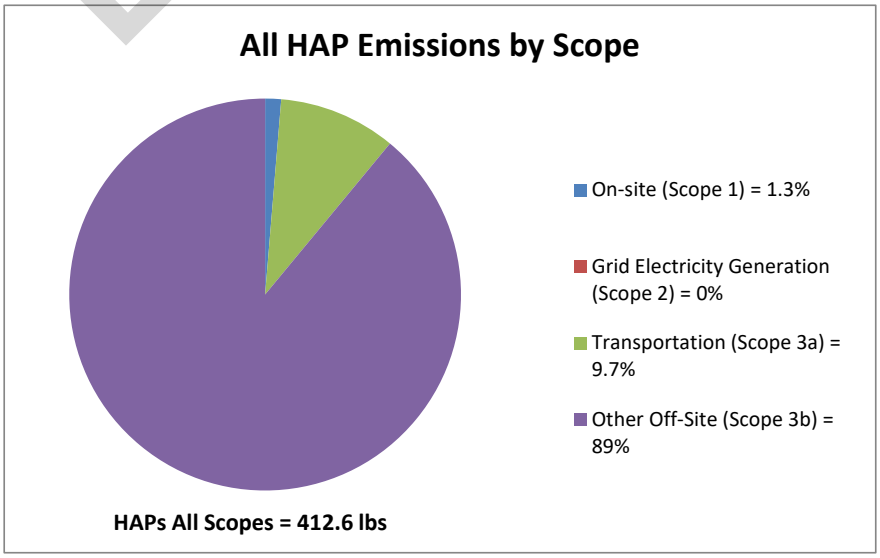

All HAPs Emissions by Remedy Component and Scope
(in Lbs)
350
300
250
200
150
100
50
0
Track 1
Track 2 & Track 4
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 412.6 lbs


All HAP Emissions by Remedy Component
Track 1 = 75.7%
Track 2 & Track 4 = 24.3%
HAPs All Components = 412.6 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 1.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 9.7%
Other Off-Site (Scope 3b) = 89%
HAPs All Scopes = 412.6 lbs

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HAPs
lbs

| | Track 1 | Track 2 & T | < Compon | < Compon | < Compon | < Compon | Total |
|---|---|---|---|---|---|---|---|
| On-site (Scope 1) | 3.9 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 5.4 |
| Grid Electricity Generation (Scope 2) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Transportation (Scope 3a) | 30.0 | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 | 40.0 |
| Other Off-Site (Scope 3b) | 278.6 | 88.6 | 0.0 | 0.0 | 0.0 | 0.0 | 367.2 |
| Total | 312.5 | 100.1 | 0.0 | 0.0 | 0.0 | 0.0 | 412.6 |

Track 1 = 75.7%
Track 2 & Track 4 = 24.3%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 1.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 9.7%
Other Off-Site (Scope 3b) = 89%

HAPs All Components = 412.6 lbs
HAPs All Scopes = 412.6 lbs

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# APPENDIX I

Storm Water Pollution Prevention Plan

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# Stormwater Pollution Prevention Plan (SWPPP)

*for*

## 280 East 161st Street

280 East 161st Street, Bronx, NY 10451

Block 2420 | Lots 120, 130, and 150

*Prepared For:*


## TEG Morrisania Development LLC

7 Jackson Walkway, Providence, RI 02903

Matthew Lawrence

401-456-5605

MLawrence@GilbaneCo.com


*Prepared By:*


## Philip Habib & Associates

440 Park Avenue South, New York, NY 10016

Sue McCoy

212-929-5656

smccoy@akrf.com


*SWPPP Preparation Date:*

January 2025

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**Sue McCoy, Senior Vice President**

State of New York Professional Engineer License #064477

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# Section 1: Contact Information and Responsibilities

**Instructions (CGP Part III.A.6):**

- This section is intended to be completed after the SWPPP is approved by DEP and before construction begins. Once completed, this section shall be attached to the approved SWPPP and kept on site.
- Identify the Contractor(s) that will be responsible for the installation, construction, repair, replacements, inspection, and maintenance of the erosion and sediment control (ESC) practices, or the post-construction stormwater management practices (SMP) at the site.
- See additional requirements in:
    - Appendix E: Certifications
    - Appendix F: Inspections

*Retain this instruction for use during construction.*

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| TABLE 1 – CONSTRUCTION TEAM | |
|---|---|
| **PRIMARY CONTRACTOR**<br>*Principal entity retained by the Owner/Applicant to construct the covered development project.*<br>*Responsible for compliance with the SWPPP.* | **NAME** Insert Name<br>**COMPANY/ORGANIZATION** Insert Company/Organization<br>**ADDRESS** Insert Address<br>**PHONE NUMBER** Insert Phone Number<br>**EMAIL** Insert Email |
| **SUB-CONTRACTOR(S)**<br>*Entity retained to construct some elements of the covered development project.*<br>*Responsible for compliance with the SWPPP.* | **NAME** Insert Name<br>**COMPANY/ORGANIZATION** Insert Company/Organization<br>**ADDRESS** Insert Address<br>**PHONE NUMBER** Insert Phone Number<br>**EMAIL** Insert Email |
| **TRAINED CONTRACTOR(S)**<br>*Person employed with the Primary Contractor or a Sub-Contractor and knowledgeable in the principles and practices of ESC.*<br>*Responsible for conducting daily inspections that ensure compliance with the SWPPP.* | **NAME** Insert Name<br>**COMPANY/ORGANIZATION** Insert Company/Organization<br>**ADDRESS** Insert Address<br>**PHONE NUMBER** Insert Phone Number<br>**EMAIL** Insert Email<br>**NYS DEC EROSION AND SEDIMENT CONTROL TRAINING:**<br>• **CERTIFICATE NUMBER:** Insert Number<br>• **EXPIRATION DATE:** Insert Date |
| **QUALIFIED PROFESSIONAL(S)**[1]<br>*Licensed professional knowledgeable in the principles and practices of stormwater management.*<br>*Responsible for certifying correct installation of SMPs* | **NAME** Insert Name<br>**COMPANY/ORGANIZATION** Insert Company/Organization<br>**ADDRESS** Insert Address<br>**PHONE NUMBER** Insert Phone Number<br>**EMAIL** Insert Email<br>**QUALIFYING LICENSE:**<br>☐ PE<br>☐ RLA |

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| | |
|---|---|
| **QUALIFIED INSPECTOR(S)**<br>*Licensed or Certified professional knowledgeable in the principles and practices of ESC.*<br>*Responsible for conducting and/or certifying QI inspections at the required frequency for the project.* | **NAME** Insert Name<br>**COMPANY/ORGANIZATION** Insert Company/Organization<br>**ADDRESS** Insert Address<br>**PHONE NUMBER** Insert Phone Number<br>**EMAIL** Insert Email<br>**NYS DEC EROSION AND SEDIMENT CONTROL TRAINING**<br>• **CERTIFICATE NUMBER:** Insert Number<br>• **EXPIRATION DATE:** Insert Date<br>**QUALIFYING CREDENTIALS[2]:**<br>☐ PE<br>☐ RLA<br>☐ CPESC<br>☐ NYSESCCP |
| **SUPERVISED QUALIFIED INSPECTOR(S)[3]**<br>*A person working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect.*<br>*May conduct QI inspections, under the supervision of the Licensed QI, provided they have received four (4) hours of NYS DEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District or other NYSDEC endorsed entity.* | **NAME** Insert Name<br>**COMPANY/ORGANIZATION** Insert Company/Organization<br>**ADDRESS** Insert Address<br>**PHONE NUMBER** Insert Phone Number<br>**EMAIL** Insert Email<br>**NYS DEC EROSION AND SEDIMENT CONTROL TRAINING:**<br>• **CERTIFICATE NUMBER:** Insert Number<br>• **EXPIRATION DATE:** Insert Date<br>**QUALIFYING SUPERVISOR[3]:** Insert name of Licensed QI under whose supervision the Supervised QI will work |

*[Add rows as needed.]*

*[1]The Qualified Professional must be a licensed Professional Engineer (PE) or Registered Landscape Architect (RLA) in the State of New York. The Qualified Professional may also serve as the Qualified Inspector.*

*[2]On projects that include post-construction SMPs, the Qualified Inspector must be a licensed Professional Engineer (PE) or Registered Landscape Architect (RLA) in the State of New York. On projects that only include ESC practices, the Qualified Inspector may be a CPESC or a NYSESCCP.*

*[3]The supervised Qualified Inspector must work at the same company and under the direct supervision of the Qualified Inspector listed in this table. This field only applies to projects with post-construction SMPs.*

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# Section 2: Project Location

| TABLE 2 – PROJECT LOCATION AND PLAN | |
|---|---|
| **PROJECT/SITE NAME(S):** | 280 East 161st Street |
| **PROJECT/SITE STREET ADDRESS(ES):** | 280 East 161st Street, Bronx, NY 10451 |
| **PROJECT PLAN OF DEVELOPMENT** | **Is this project part of a Larger Common Plan of Development[1]?**<br>☒ No<br>☐ Yes, the project is part of a Larger Common Plan of Development: |

[1]*A Larger Common Plan of Development is a contiguous area where multiple separate and distinct development activities are occurring, or will occur, under one plan. Refer to NYC SWM Glossary for a complete definition.*

# Section 3: Project Introduction

## Section 3.1: Project and Site Description

| TABLE 3.1 – NATURE OF CONSTRUCTION | | | |
|---|---|---|---|
| **COVERED DEVELOPMENT PROJECT:** | Are all of the development activities that are proposed for this project listed in Table 2.2 of NYC SWM?<br>☐ Yes, all activities are listed in Table 2.2 of NYC SWM<br>☒ No, at least one activity is not listed in Table 2.2 of NYC SWM | | |
| **TOTAL PROPERTY AREA[1]** | **DISTURBED AREA[2]** | **EXISTING IMPERVIOUS IN DISTURBED AREA[3]** | **FUTURE IMPERVIOUS IN DISTURBED AREA** |
| **121,494 sf** | Total = 95,931 sf<br>On-Site = 86,152 sf<br>ROW = 9,779 sf | Total = 74,452 sf<br>On-Site = 64,673 sf<br>ROW = 9,779 sf | Total = 84,890 sf<br>On-Site = 75,111 sf<br>ROW = 9,779 sf |

*[1]For projects that include multiple properties, use the sum of all property areas.*
*[2]Total disturbed area must include all disturbances within the property boundaries (on-site) and those outside the boundaries of properties (ROW).*
*[3]Existing impervious area may include impervious areas that were removed from a project site within the last 5 years of the proposed development.*

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### Section 3.1.1: Project Scope and Development Activity Description

The developer is proposing to develop a 2.79-acre site on Block 2420, Lots 120, 130, and 150 in the Concourse Village neighborhood of Bronx. The site is bounded by East 161st Street to the north, Concourse Village East (Morris Avenue) to the west, and the existing adjacent properties to the east and south. The previous lots for the site have been recently reapportioned and the approved RP-602 is attached in Appendix Z.

The proposed development will consist of two high-rise affordable buildings, parking lots, and a landscaped courtyard in the middle of the site. Lot 130 will include a 19-story building with supportive housing ("West Tower"). Lot 150 will include a 26-story multi-family residential building ("East Tower"). An existing 8-story residential building will remain on Lot 120. A Builder's Pavement Plan will be developed for work to be done in the adjacent public right-of-way, including reconstruction of the sidewalk and roadway along the site frontages of Concourse Village East and East 161st Street.

The site is located in an area served by combined sewers (CSS). The new buildings will have connections to the city sewer system in Concourse Village East and East 161st Street.

The site is not in an MS4 area, thus an NOI submission is not required.

The site is not part of a larger common plan of development.

In accordance with NYCDEP's Unified Stormwater Rule (USWR), development projects that disturb more than 20,000 square feet must obtain a Stormwater Construction Permit. Projects must obtain both a Sewer Connection Permit and a Stormwater Construction Permit. In order to obtain a Stormwater Construction Permit, the SWPPP is submitted to DEP Bureau of Environmental Planning (BEPA); and the Sewer Connection Permit is submitted to DEP Bureau of Water and Sewer Operations (BWSO). This SWPPP has been prepared in accordance with the requirements of the New York City Stormwater Manual.

### Section 3.1.2: Existing Site Conditions

The development site is bounded by East 161st Street to the north, Concourse Village East (Morris Avenue) to the west, and the existing adjacent properties to the east and south.

As shown on the survey in Appendix A, located within the northern half of the site is an existing 8-story brick masonry residential building to remain on Lot 120. An interior landscaped area is occupied by fountains, a paver patio, and trees. The southern half of the site is currently occupied by two parking lots for the neighboring 8-story building.

The site is generally graded from west to east with the highest elevation at the northwest corner of the site and the lowest elevation at the northeast corner of the site.

### Section 3.1.3: Proposed Site Conditions

The proposed development will consist of two high-rise affordable buildings, parking lots, and a landscaped courtyard in the middle of the site. Lot 130 will include a 19-story building with supportive housing ("West Tower"). Lot 150 will include a 26-story multi-family residential building ("East Tower").

The landscaped courtyard space in the middle of the site between the existing and proposed buildings will consist of pedestrian paths, plazas, seating, green space with plantings and trees, and stormwater planters to help facilitate stormwater management.

Three parking lots will be provided throughout the site: one lot at the southeast corner of the courtyard, a second small lot to the east of the existing 8-story building, and a third lot to the south of the proposed buildings. Vehicular access to the site will be from East 161st Street and along a private road that would run along the east side of the site.

Green roofs will be provided on portions of both the West Tower and East Tower roofs.

All excess stormwater will be collected and conveyed to a detention tank for each of the proposed West Tower and East Tower prior to discharge to the combined sewers in Concourse Village East and East 161st Street, respectively. Discharges from the detention tanks will be restricted to the allowable rates as required under the NYCDEP Unified Stormwater Rule.

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## Section 3.1.4: Soils Information

| TABLE 3.2 – HYDROLOGIC SOIL GROUP | | | |
|---|---|---|---|
| **HSG A** | **HSG B** | **HSG C** | **HSG D** |
| 0 % | 100 % | 0 % | 0 % |

The soils report developed by the United States Department of Agriculture Natural Resources Conservation classifies the site soil as 100% urban land with Greenbelt complex that has 0 to 3 percent slopes. Per this USDA report, the Hydrologic Soil Group assigned to this soil type is HSG B.

The project's geotechnical report identifies the upper layer as manmade fill consisting of sand, silt, gravel, brick, concrete, asphalt, wood, and cinders in thickness of 2.5 to 9 feet, averaging approximately 5 feet thick in the borings. These materials generally varied from loose to very compact.

Groundwater depths ranged from 25.4 to 26.0 feet, corresponding to elevation +24.7 to +25.3.

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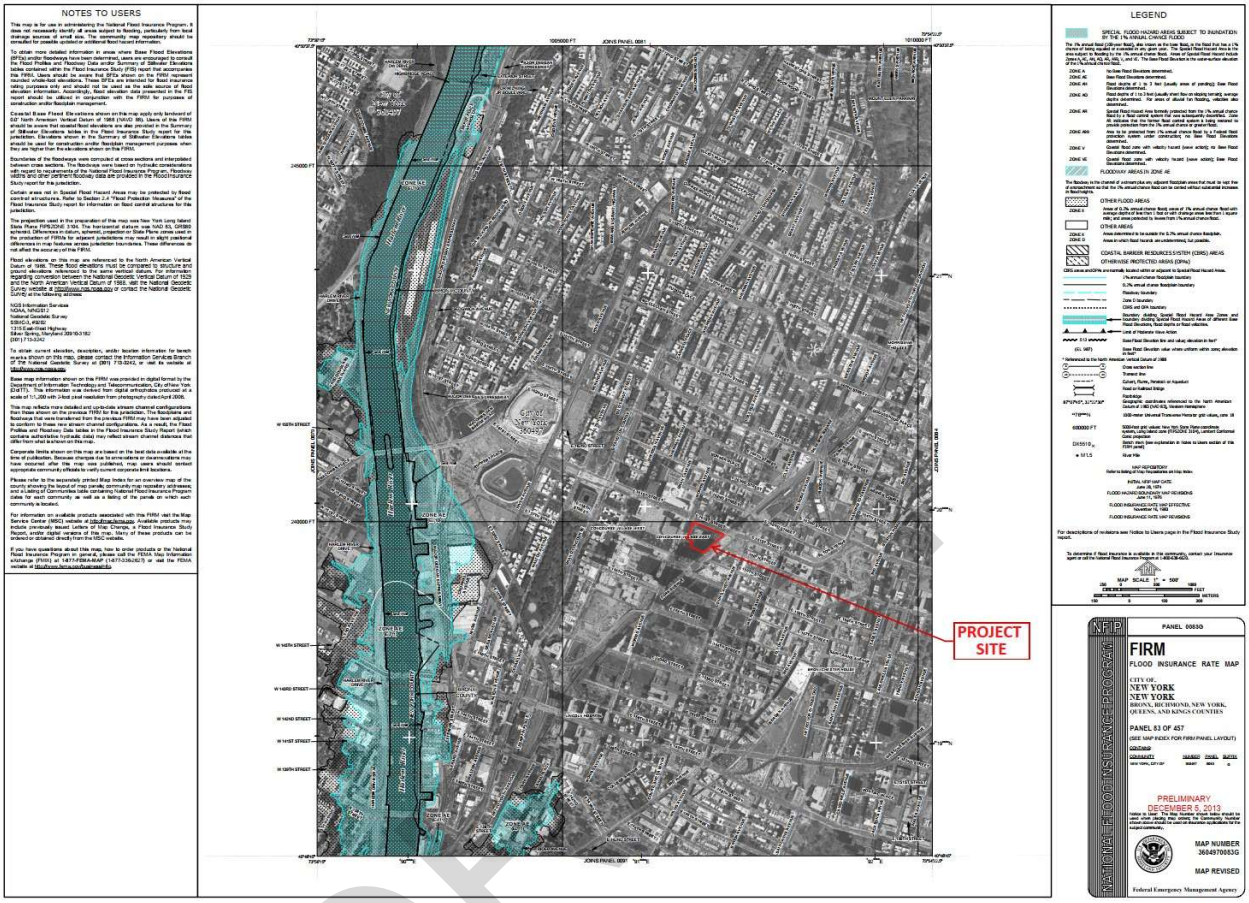
## Section 3.1.5: Flood Hazard Area

The project site is not located in a flood zone (see below).

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## Section 3.3: Applicable Stormwater Management Requirements

| TABLE 3.5 – APPLICABLE REQUIREMENTS | | |
|---|---|---|
| **REQUIREMENT** | **WHEN APPLICABLE** | **APPLICABLE ON THIS PROJECT?** |
| **EROSION & SEDIMENT CONTROL (ESC)** | All covered development projects | ☒ Yes |
| **WATER QUALITY ($WQ_V$)** | Covered development project<br>Except for activities listed in NYC SWM Table 2.2 | ☒ Yes ☐ No |
| **RUNOFF REDUCTION ($RR_V$)** | Covered development project<br>Except for activities listed in NYC SWM Table 2.2 | ☒ Yes ☐ No |
| **NO-NET INCREASE (NNI)** | Project area of 20,000 sf or more<br>AND Project located in MS4 area<br>AND Discharges to an impaired water body (NYC SWM Table 2.4)<br>AND increases impervious area | ☐ Yes ☒ No |
| **SEWER OPERATIONS ($V_V$)** | Project is connected to or will be connected to a sewer. | ☒ Yes ☐ No |
| **CHANNEL PROTECTION VOLUME ($CP_V$)** | Covered development project<br>Except in the following circumstances:<br>- Reduction of the entire $Cp_v$ volume is achieved at a site through green infrastructure or infiltration systems<br>- The site discharges directly to tidal water, fifth order (fifth downstream) or larger systems or CSS. | ☐ Yes ☒ No |
| **OVERBANK FLOOD CONTROL ($Q_P$)** | Covered development project<br>Except in the following conditions:<br>- The site discharges directly to tidal water, fifth order (fifth downstream) or larger systems or CSS.<br>- A downstream analysis reveals that overbank control is not needed | ☐ Yes ☒ No |
| **EXTREME FLOOD CONTROL ($Q_F$)** | Covered development project<br>Except in the following circumstances:<br>- The site discharges directly to tidal waters or fifth order (fifth downstream) or larger systems or CSS<br>- Development is prohibited within the ultimate 100-year floodplain<br>- A downstream analysis reveals that 100-year control is not needed | ☐ Yes ☒ No |

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# Section 4: Erosion and Sediment Control (ESC)

Soil erosion and sediment control plans shown in Appendix A have been developed to control the potential erosion and sediment generated by the project during the construction. Before work begins, the proposed sediment control measures shall be in place. The contractor is to maintain the measures installed, to inspect them after rainfalls, and to replace any non-functioning elements. All erosion and sediment control measures are to be installed and maintained per NYSDEC Standards and Specifications for Erosion and Sediment Control ('Blue Book', latest Edition).

All contractors and subcontractors shall sign a Certification Statement before undertaking any construction activity at the site. Copies of all such signed certifications shall be included in the copy of this plan that is maintained on the site.

A trained contractor will inspect the erosion and sediment control practices daily. Site inspections shall be conducted by a Qualified Inspector (QI) once every seven (7) calendar days. QI inspections will also be conducted within 24 hours of the end of a storm that is 0.5 inches or greater.

*Site Assessment and Inspections:*

The Inspection Report will be completed by a 'qualified professional' to fully document each inspection.

The term "qualified professional" means a person is knowledgeable in the principles and practices of stormwater management and treatment such as a licensed professional engineer or a registered landscape architect or other NYSDEC endorsed individual(s).

Individuals must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and the principles of hydraulics. All components of the SWPPP that involve the practices of engineering, as defined by Article 145 of the NYS Education Law, shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

The professional shall conduct a site assessment prior to the start of construction and certify in an inspection report that the specified soil erosion and sediment control measures have been adequately installed. The professional shall maintain a record of all inspection reports in a log book, maintained on site. Any changes to the proposed SWPPP shall be documented.

The professional shall perform regular inspections on all of the storm water management systems to ensure they are functioning properly. In any instance of non-compliance, corrective measures shall be implemented. All inspection reports will include color photos with date and time stamps.

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If soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed area, the qualified inspector shall conduct a site inspection at least once every 30 calendar days.

During each inspection, the following information shall be recorded:

- Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization.
- Indicate all disturbed site areas that have not undergone active site work during the previous 14 day period. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume.
- Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems and containment systems. Document any excessive deposition of sediment or ponding water along barrier or diversion systems.

Other elements that shall be inspected include:

- Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system.
- Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking. Excessive sediment accumulated on nearby roads shall be swept up.

A Safety and Health Plan has been developed for the site and will be maintained onsite during construction activities.

*Stabilization*

- *Temporary Stabilization:* The operator shall initiate surface stabilization measures as soon as is practical in portions of the site where the construction activities have permanently ceased and in no case more than 14 days after construction activity in that portion of the site has temporarily ceased. Note: Temporary seeding and final stabilization shall comply with NYSDEC specifications in 2016 Bluebook.
    - *Seeding:* During spring and summer, seed with ryegrass at 30 lbs. per acre. During late fall or early winter, seed with Aroostook winter rye at 100 lbs. per acre.
    - *Mulching:* Mulch with hay or straw at 2 tons/acre.
- *Permanent Stabilization:* The site shall be fully and permanently stabilized (i.e. permanent mulch/stone where applicable and 80% of live plants coverage of vegetation layer in vegetated SMP by the end of compliance period) before applying for NOT.

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## Section 4.1: Conforming ESC Practices

| TABLE 4.1(a) – CONFORMING ESC PRACTICE: STABILIZED CONSTRUCTION ACCESS | |
|---|---|
| **DESCRIPTION OF PRACTICE** | Aggregate pad with underlain filter cloth at all construction access points. |
| **INTENT** | Sediment Control<br>Prevent tracking of sediment onto public right-of-way and streets. |
| **REFERENCE DETAIL** | Appendix A, Figure 5, Detail #1 |
| **REFERENCED STANDARD** | NYS E&SC Standards & Specs Page 2.30 |
| **MINIMUM MAINTENANCE REQUIREMENTS** | Replace aggregate as voids become filled. |
| **STABILIZATION COMPLETION TIMELINE[1]** | N/A |

| TABLE 4.1(b) – CONFORMING ESC PRACTICE: CONCRETE TRUCK WASHOUT | |
|---|---|
| **DESCRIPTION OF PRACTICE** | Pre-fabricated washout box with plastic liner near stabilized construction access. |
| **INTENT** | Sediment Control<br>To prevent highly alkaline runoff from entering storm drainage systems or leaching into soil. |
| **REFERENCE DETAIL** | Appendix A, Figure 5, Detail #4 |
| **REFERENCED STANDARD** | NYS E&SC Standards & Specs Page 2.24 |
| **MINIMUM MAINTENANCE REQUIREMENTS** | Concrete shall be removed when 75% of storage capacity is filled. Excess wash water shall be pumped into a containment vessel and properly disposed off-site. |
| **STABILIZATION COMPLETION TIMELINE[1]** | N/A |

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| TABLE 4.1(c) – CONFORMING ESC PRACTICE: COMPOST FILTER SOCK | |
|---|---|
| **DESCRIPTION OF PRACTICE** | Degradable geotextile mesh tube filled with compost filter media. |
| **INTENT** | Sediment Control<br>To filter sediment and other pollutants associated with construction activity to prevent their migration offsite. |
| **REFERENCE DETAIL** | Appendix A, Figure 5, Detail #3 |
| **REFERENCED STANDARD** | NYS E&SC Standards & Specs Page 5.7 |
| **MINIMUM MAINTENANCE REQUIREMENTS** | Accumulated sediment shall be removed when it reaches half the above ground height of the sock. Biodegradable filter socks shall be replaced after 6 months and photodegradable filter socks after 1 year. |
| **STABILIZATION COMPLETION TIMELINE[1]** | N/A |

| TABLE 4.1(d) – CONFORMING ESC PRACTICE: STORM DRAIN INLET PROTECTION-FABRIC | |
|---|---|
| **DESCRIPTION OF PRACTICE** | A temporary barrier with low permeability, installed around inlets in areas that are disturbed or have active work. |
| **INTENT** | Sediment Control<br>To reduce sediment entering a storm drain system. |
| **REFERENCE DETAIL** | Appendix A, Figure 5, Detail #2 |
| **REFERENCED STANDARD** | NYS E&SC Standards & Specs Page 5.57 |
| **MINIMUM MAINTENANCE REQUIREMENTS** | Any sediment should be removed and disposed of onsite. Any broken or damaged components shall be replaced. |
| **STABILIZATION COMPLETION TIMELINE[1]** | N/A |

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| TABLE 4.1(e) – CONFORMING ESC PRACTICE: DUST CONTROL | |
|---|---|
| **DESCRIPTION OF PRACTICE** | Appropriate dust control shall be provided by sprinkling the work area until the surface is wet. |
| **INTENT** | Sediment Control<br>To prevent surface and air movement of dust from disturbed soil surfaces. |
| **REFERENCE DETAIL** | N/A |
| **REFERENCED STANDARD** | NYS E&SC Standards & Specs Page 2.25 |
| **MINIMUM MAINTENANCE REQUIREMENTS** | Maintain dust control measures through dry weather periods until all disturbed areas are stabilized. |
| **STABILIZATION COMPLETION TIMELINE[1]** | N/A |

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## Section 4.3: Allowable Non-Stormwater Discharges

| TABLE 4.3 – AUTHORIZED NON-STORMWATER DISCHARGES | |
|---|---|
| **TYPE OF AUTHORIZED NON-STORMWATER DISCHARGE** | **LIKELY TO BE PRESENT ON SITE?** |
| LANDSCAPE IRRIGATION | ☒ Yes ☐ No |
| WATERS USED TO WASH VEHICLES AND EQUIPMENT (CLEANSERS ARE NOT USED) | ☐ Yes ☒ No |
| WATER USED TO CONTROL DUST | ☒ Yes ☐ No |
| POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHINGS | ☐ Yes ☒ No |
| EXTERNAL BUILDING WASH DOWN (SOAPS/SOLVENTS ARE NOT USED, AND EXTERNAL SURFACES DO NOT CONTAIN HAZARDOUS SUBSTANCES) | ☐ Yes ☒ No |
| PAVEMENT WASH WATERS (SPILLS OR LEAKS HAVE NOT OCCURRED) | ☐ Yes ☒ No |
| UNCONTAMINATED AIR CONDITIONING OR COMPRESSOR CONDENSATE* | ☐ Yes ☒ No |
| UNCONTAMINATED, NON-TURBID DISCHARGES OF GROUND WATER OR SPRING WATER* | ☐ Yes ☒ No |
| FOUNDATION OR FOOTING DRAINS* | ☐ Yes ☒ No |
| DISCHARGES FROM CONSTRUCTION DE-WATERING OPERATIONS* | ☐ Yes ☒ No |

**Require permits from DEP's Bureau of Water and Sewer Operations, DEP's Bureau of Wastewater Treatment, Department of Buildings and/or NYSDEC.*

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## Section 4.4: Pollution Prevention Measures

The following best management practices are to be implemented to ensure the proper storage and disposal of construction site wastes:

- Designate waste collection areas that do not receive significant runoff from upland areas and that are not adjacent to water bodies.
- Waste containers should be covered.
- Waste collection should be scheduled at appropriate intervals to prevent overfilling of containers.
- All maintenance and washing of vehicles shall be conducted off-site.
- Any spills should be cleaned up immediately and disposed of in accordance with applicable state and local laws.
- Contractor to have adequate spill kits available on-site to be used in case of a spill, leak or other discharge of pollutants during construction. Spill kits are to contain materials to allow prompt response and clean-up of appropriate pollutants and shall include protective personnel equipment, sorbent materials and containers to collect and store the clean-up material on-site.
- Any petroleum products stored on-site should be placed in curbed/diked areas.
- In the event of a spill occurrence, the actions outlined in the NYSDEC Technical Field Guidance for Spill Reporting and Initial Notification Requirements shall be followed. All spills of petroleum products of five or more gallons must be reported to NYSDEC Spill Hotline at 1-800-457-7362.
- Disposal of hazardous waste (non-petroleum) should be conducted as follows:
    - In accordance with local hazardous waste management authorities, and State and Federal regulations.
    - Containers should be emptied prior to disposal.
    - Product labels from containers should not be removed.
    - All hazardous waste containers should be stored in a dry, curbed/diked area per environmental regulations.
- All sanitary waste generated on-site should be disposed of in accordance with local and State regulations.
- Pesticides and fertilizers should be stored in a dry, curbed/diked area.
- Manufacturer's application rates should be adhered to and pesticides shall be applied by licensed or certified personnel where applicable.
- All storage areas and waste containers are to be included in the regular inspection program of the site. Potential wastes and products that may be stored on-site include grubbing wastes, packaging materials, cleaning solvents, pesticides, petroleum products, and fertilizers. The Contractor is responsible for implementation of additional best management practices necessary to protect water quality.

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| TABLE 4.4 – POTENTIAL SOURCE OF POLLUTION PRESENT ON SITE | |
|---|---|
| **MATERIALS OR ACTIVITY** | **LIKELY TO BE PRESENT ON SITE?** |
| Dewatering Operations | ☐ Yes ☒ No |
| Paving Operations | ☒ Yes ☐ No |
| Concrere, Paint and Stucco Washout | ☒ Yes ☐ No |
| Fuelling and Maintenance of Equipment Vehicles | ☐ Yes ☒ No |
| Washing of Equipment, Vehicles, and Buildings | ☐ Yes ☒ No |
| Storage, Handling, and Disposal of Chemicals *(e.g. asphalt sealants, copper flashing, roofing materials, adhesives, concrete fixtures, gravel, mulch stockpiles)*. | ☒ Yes ☐ No |
| Construction and Domestic Wastes *(e.g. packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete)* | ☒ Yes ☐ No |
| Landscape Materials, Fertilizers, Pesticides, Herbicides | ☐ Yes ☒ No |
| Detergents | ☐ Yes ☒ No |
| Sanitary Waste | ☐ Yes ☒ No |
| Hazardous and Toxic Materials and Wastes (e.g. paints, solvents, petroleum-based products, wood preservatives, additives, curing compounds, acids) | ☒ Yes ☐ No |
| Other: Click or tap here to enter text. | ☐ Yes ☐ No |

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| TABLE 4.5(a) – MATERIALS OR ACTIVITY TO BE MITIGATED: PAVING OPERATIONS | |
|---|---|
| **POLLUTANTS AT RISK OF BEING DISCHARGED** | Petroleum |
| **POLLUTION PREVENTION MEASURE** | Any petroleum products stored on-site should be placed in curbed/diked areas. |
| **SPILL PREVENTION AND RESPONSE (if applicable)** | Spill kits are to contain materials to allow prompt response and clean-up of appropriate pollutants and shall include protective personnel equipment, sorbent materials and containers to collect and store the clean-up material onsite. |
| **DESIGN SPECIFICATIONS (if applicable)** | N/A |
| **MAINTENANCE REQUIREMENTS (if required)** | All storage areas and waste containers are to be included in the regular inspection program of the site. |

| TABLE 4.5(b) – MATERIALS OR ACTIVITY TO BE MITIGATED: PAINT WASHOUT | |
|---|---|
| **POLLUTANTS AT RISK OF BEING DISCHARGED** | Paint |
| **POLLUTION PREVENTION MEASURE** | Leak-proof paint washout container shall be provided. |
| **SPILL PREVENTION AND RESPONSE (if applicable)** | Washout container shall be regularly inspected for spills and leaks. Any spills should be cleaned immediately upon observation. |
| **DESIGN SPECIFICATIONS (if applicable)** | N/A |
| **MAINTENANCE REQUIREMENTS (if required)** | Container shall be emptied when 75% full. Paint and wash water shall be disposed per material data sheet and local guidelines. |

| TABLE 4.5(c) – MATERIALS OR ACTIVITY TO BE MITIGATED: CHEMICAL STORAGE | |
|---|---|
| **POLLUTANTS AT RISK OF BEING DISCHARGED** | Sealants, adhesives, paving materials |
| **POLLUTION PREVENTION MEASURE** | All hazardous waste containers should be stored in a dry, curbed/diked area per environmental regulations. |
| **SPILL PREVENTION AND RESPONSE (if applicable)** | Spill kits are to contain materials to allow prompt response and clean-up of appropriate pollutants and shall include protective personnel equipment, sorbent materials and containers to collect and store the clean-up material onsite. |
| **DESIGN SPECIFICATIONS (if applicable)** | N/A |
| **MAINTENANCE REQUIREMENTS (if required)** | All storage areas and waste containers are to be included in the regular inspection program of the site. |

| TABLE 4.5(d) – MATERIALS OR ACTIVITY TO BE MITIGATED: CONSTRUCTION/DOMESTIC WASTE | |
|---|---|
| **POLLUTANTS AT RISK OF BEING DISCHARGED** | Packaging and construction materials |
| **POLLUTION PREVENTION MEASURE** | Designate waste collection areas that do not receive significant runoff from upland areas and that are not adjacent to water bodies. Waste containers should be covered. |
| **SPILL PREVENTION AND RESPONSE (if applicable)** | N/A |
| **DESIGN SPECIFICATIONS (if applicable)** | N/A |
| **MAINTENANCE REQUIREMENTS (if required)** | Waste collection should be scheduled at appropriate intervals to prevent overfilling of containers. |

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| TABLE 4.5(e) – MATERIALS OR ACTIVITY TO BE MITIGATED: HAZARDOUS & TOXIC MATERIALS | |
|---|---|
| **POLLUTANTS AT RISK OF BEING DISCHARGED** | Paints, solvents, acids, additives, etc. |
| **POLLUTION PREVENTION MEASURE** | All hazardous waste containers should be stored in a dry, curbed/diked area per environmental regulations. |
| **SPILL PREVENTION AND RESPONSE (if applicable)** | Spill kits are to contain materials to allow prompt response and clean-up of appropriate pollutants and shall include protective personnel equipment, sorbent materials and containers to collect and store the clean-up material onsite. |
| **DESIGN SPECIFICATIONS (if applicable)** | N/A |
| **MAINTENANCE REQUIREMENTS (if required)** | All storage areas and waste containers are to be included in the regular inspection program of the site. |

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## Section 4.5: Construction Phasing, Staging, and Sequencing of Development Activities

The project will be developed in three phases. During construction, the project will have a non-stabilized disturbance of 1.98 acres. Construction fences will be installed and the project site will be secured at project initiation. In Phase I, the West Tower will be constructed. After the West Tower superstructure is erected, the East Tower and site will be constructed in Phase II. In Phase III, the sidewalk and roadway work along East 161st Street and Concourse Village East will be completed, along with the construction of the landscaped courtyard.

The following describes the anticipated construction sequencing, which can be subject to change depending upon multiple factors, such as weather, material deliveries, etc.

*Sequence of Construction for Phase I*

1. Hold a pre-construction meeting prior to starting construction.
2. Mobilize site and layout established limits of work prior to starting construction.
3. Install perimeter fence and temporary erosion and sediment controls, including installation of stabilized construction controls at vehicle access points, compost filter sock, soil stockpile area, tree protection, and concrete truck washout. All erosion and sediment control structures shall be in place prior to land disturbance.
4. Proceed with West Tower foundation and superstructure work.
5. Install detention tank and green roof SMPs for the West Tower.

*Sequence of Construction for Phase II*

1. Repair and maintain all temporary erosion and sediment controls installed in Phase I and modify as necessary for Phase II work.
2. Proceed with East Tower foundation and superstructure work.
3. Install detention tank and green roofs SMPs for the East Tower.
4. Maintain/modify existing site stabilization measures as construction progresses.

*Sequence of Construction for Phase III*

1. Repair and maintain all temporary erosion and sediment controls installed in Phase II and modify as necessary for Phase III work.
2. Construct landscaped courtyard area. Install stormwater planter SMPs in the courtyard.

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3. Maintain/modify existing site stabilization measures as construction progresses.
4. Install perimeter fences/barricades to delineate the work zone along East 161st Street and Concourse Village East.
5. Install storm drain inlet protection for all existing catch basins.
6. Construct new curbs, sidewalks and pavements along East 161st Street and Concourse Village East as required on the Builders Pavement Plan.
7. Remove erosion and sediment controls when courtyard and right-of-way work is complete.

| TABLE 4.6(a) – CONSTRUCTION SEQUENCING | | | |
|---|---|---|---|
| **PHASE # 1: West Tower Building Foundation and Superstructure**<br>**STAGE # 1:** | | | |
| **CONSTRUCTION ACTIVITY (in sequential order)** | **PRACTICE(S) INSTALLED PRIOR TO ACTIVTY[1]** | **PRACTICE(S) INSTALLED DURING ACTIVTY[1]** | **PRACTICE(S) INSTALLED WITHIN ONE BUSINESS DAY OF COMPLETING ACTIVTY[1]** |
| Building Foundation | Perimeter siltsoxx<br>Stabilized construction entrance<br>Soil stockpile<br>Concrete truck washout<br>Tree protection | None | None |
| Superstructure | Concrete truck washout<br>Tree protection | None | None |
| Install detention tank and green roof SMPs for the West Tower | None | None | None |

*[1]List the ESC practice or Pollution Prevention measures that will be installed in the appropriate chronological category. Repeat all practices that will be installed for each activity as necessary.*

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| TABLE 4.6(b) – CONSTRUCTION SEQUENCING | | | |
|---|---|---|---|
| **PHASE # 2: East Tower Building Foundation and Superstructure**<br>**STAGE # 1:** | | | |
| **CONSTRUCTION ACTIVITY (in sequential order)** | **PRACTICE(S) INSTALLED PRIOR TO ACTIVTY[1]** | **PRACTICE(S) INSTALLED DURING ACTIVTY[1]** | **PRACTICE(S) INSTALLED WITHIN ONE BUSINESS DAY OF COMPLETING ACTIVTY[1]** |
| Building Foundation | Perimeter siltsoxx<br>Stabilized construction entrance<br>Soil stockpile<br>Concrete truck washout<br>Tree protection | None | None |
| Superstructure | Concrete truck washout<br>Tree protection | None | None |
| Install detention tank and green roof SMPs for the East Tower | None | None | None |

*[1]List the ESC practice or Pollution Prevention measures that will be installed in the appropriate chronological category. Repeat all practices that will be installed for each activity as necessary.*

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| TABLE 4.6(c) – CONSTRUCTION SEQUENCING | | | |
|---|---|---|---|
| **PHASE # 3: Courtyard Work and Sidewalk and Roadway Work**<br>**STAGE # 1:** | | | |
| **CONSTRUCTION ACTIVITY (in sequential order)** | **PRACTICE(S) INSTALLED PRIOR TO ACTIVTY[1]** | **PRACTICE(S) INSTALLED DURING ACTIVTY[1]** | **PRACTICE(S) INSTALLED WITHIN ONE BUSINESS DAY OF COMPLETING ACTIVTY[1]** |
| Courtyard Work<br>Install Stormwater Planter SMPs | Perimeter siltsoxx<br>Stabilized construction entrance<br>Soil stockpile<br>Concrete truck washout | None | None |
| Remove existing curb and sidewalk | Storm Drain Inlet protection<br>Tree protection | None | None |
| Install new curb and sidewalk | Storm Drain Inlet protection<br>Tree protection | None | None |
| Pave street | Tree protection | None | None |
| | | | |

[1]*List the ESC practice or Pollution Prevention measures that will be installed in the appropriate chronological category. Repeat all practices that will be installed for each activity as necessary.*

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# Section 5: Construction Inspections

The Owner is responsible for retaining a Qualified Inspector to inspect and maintain the erosion and sediment control practices for the duration of construction.

| TABLE 5 – OVERVIEW OF INSPECTION REQUIREMENTS | |
|---|---|
| **TC INSPECTION FREQUENCY** | ☒ **Daily** |
| **QI INSPECTION FREQUENCY[1]** | ☒ **Standard inspection frequency applies:** The Qualified Inspector shall conduct a site inspection at least once every seven (7) calendar days.<br>☐ **Enhanced inspection frequency:** The Qualified Inspector shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days. This applies if one or both of the following conditions have been met:<br>• Sites that have received approval to disturb greater than five (5) acres of soil at any one time<br>• Sites that discharge to a 303(d) waterbody identified in Appendix E of the NYSDEC CGP. |

*[1]During a temporary shutdown, the Developer will be responsible for having a Qualified Inspector visit the site and inspect it, at least once every 30 days during the shutdown. Refer to NYC Rules Section 19.01-03 (b)(9)(ix) for additional requirements applicable to temporary shutdowns.*

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# Section 6: Post-Construction Stormwater Management

1.98 acres out of the total 2.79 acres of the site will be cleared to allow for construction of the two towers, courtyard, and parking lots. The disturbed portion of the site, located in a residential area, is 75 percent (64,673 square feet) impervious and 25 percent (21,478 square feet) pervious in the existing condition. With the proposed development, the disturbed portion of the site will be 87 percent (75,111 square feet) impervious and 13 percent (11,041 square feet) pervious as landscaped medians, green spaces in the courtyard, and stormwater planters would occupy parts of the site. The increase in impervious area with the proposed project is, therefore, 10,438 square feet.

The primary stormwater management practice (SMP) selected for the project is the provision of ET stormwater planters and green roofs, both of which are Tier 1 in the USWR hierarchy.

Runoff will be reduced through evapotranspiration provided by the stormwater planters and green roofs. The required minimum runoff reduction volume (RRv) is 496 cubic feet for the site, as there is an increase in impervious area from pre-to-post development.

A landscaped courtyard, consisting of pedestrian paths, plazas, seating, plantings and trees will be located to the north of the proposed buildings. Two stormwater planters with a total area of 950 square feet will be located in the middle of the courtyard.

A green roof with 6-inch soil depth will be installed on the southeast corner of the West Tower roof. Three green roofs with 6-inch soil depth will be installed on the East Tower roof. The rest of the roofs for both towers will be occupied by mechanical equipment.

As shown in the calculations in Appendix B, the required water quality volume WQv for the disturbed area is 8,988 cubic feet. The water quality volume provided by the stormwater planters and green roofs is 670 cubic feet and 354 cubic feet, respectively.

A detention tank, a Tier 3 SMP, will be provided for each building to comply with the stormwater release rate as required under the USWR. A tank with a capacity of 3,364 cubic feet will be provided in the West Tower and will exceed the Vv requirement of 2,951 cubic feet for Lot 130. A detention pipe system with a capacity of 7,462 cubic feet will be provided for the East Tower and will exceed the Vv requirement of 7,427 cubic feet for Lot 150, a part of Lot 130, and for the landscaped courtyard in part of Lot 120. The water quality volume is provided through the combination of stormwater planters, green roofs and detention tanks.

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# Section 6.1: Project Requirements

## Section 6.1.1: Requirements Applicable to All Areas

| TABLE 6.1 – PROJECT REQUIREMENTS | | | |
|---|---|---|---|
| **SITE-WIDE NUMERICAL REQUIREMENTS** | | | |
| **Water Quality ($WQ_V$)** | **Runoff Reduction ($RR_V$)** | **Sewer Operations ($V_V$)** | **Maximum Release Rate ($Q_{DRR}$)** |
| Required $WQ_V$ = 8,988 cf<br><br>Provided $WQ_V$ = 8,988 cf | Target $RR_V$ = 496 cf<br><br>Provided $RR_V$ = 1,024 sf | Required $V_V$ = 10,378 cf<br><br>Provided $V_V$ = 10,826 cf | Required $Q_{DRR}$ = 0.06 / 0.09 cfs<br><br>Provided $Q_{DRR}$ = 0.06 / 0.09 cfs |
| **ADJUSTMENTS TO REQUIREMENTS** | | | |
| **Storm Event Used to Establish Requirement** | **Were the $WQ_V$ and $RR_V$ requirements adjusted to meet enhanced phosphorus removal requirements?**<br>☒ No, the standard requirements provided by Eq. 2.1 of the NYC SWM were used. No adjustments applied.<br>☐ Yes, the requirements were enhanced to meet the 1-yr 24-hour storm event for enhanced phosphorus removal:<br>• Storm depth: _ _ _ _ inches<br>• Source[1]: Choose an item. | | |
| **Minimum Runoff Reduction** | **Was the total $WQ_V$ reduced using RR techniques?**<br>☐ Yes, the Provided $RR_V$ was greater than or equal to the Required $WQ_V$.<br>☒ No, the Provided $RR_V$ was less than the required $WQ_V$[2]<br>• Site limitations: Increase in impervious area from pre-to-post development<br>• Minimum $RR_V$ = 496 cf | | |
| **Applicability of Sewer Operations Requirements** | **Does the site connect to a sewer?**<br>☒ Yes, standard sewer operations requirements apply ($V_V$, $Q_{DRR}$).<br>☐ No, the site does not connect to a sewer, so sewer operations requirements above were marked as N/A. | | |

*[1]Data used for establishing storm event depths shall be taken from NRCC and NRCS joint collaborative website (http://precip.eas.cornell.edu); or National Oceanic and Atmospheric Administration (NOAA) - Atlas 14 (https://hdsc.nws.noaa.gov/hdsc/pfds/).*

*[2]If this checkbox is selected, describe the specific site limitations that prevent 100% reduction of the $WQ_V$ and calculate the Minimum $RR_V$ using NYC SWM Eq 2.2. In no case shall the Provided RRv be less than the Minimum $RR_V$.*

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## Section 6.2: Site Constraints Analysis

### Section 6.2.1 Site Constraints Summary

| TABLE 6.3 – SITE CONSTRAINTS SUMMARY | | | |
|---|---|---|---|
| **TYPE** | **PRESENT?** | **LOCATION AND IMPACT[1]** | **REFERENCE[2]** |
| Soil Constraints | ☐ Yes<br>☒ No | N/A | N/A |
| Subsurface Constraints | ☐ Yes<br>☒ No | N/A | N/A |
| Hotspot Constraints | ☐ Yes<br>☒ No | N/A | N/A |
| Surface Constraints | ☒ Yes<br>☐ No | Required parking lots, private road, pedestrian sidewalks and walkways require the use of paved surfaces. | Appendix A, Figure 9 |
| Space Constraints | ☒ Yes<br>☐ No | Existing building to remain occupies part of the site. Mechanical equipment and FDNY clear paths occupy portions of the roofs. | Appendix A, Figure 9 |

*[1]Provide a brief description of the areas affected by the constraints, and the resulting impacts on the selection and design of stormwater management practices.*
*[2]Refer to specific drawings and reports included in the appendices which delineate and describe the relevant constraints in detail.*

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## Section 6.2.2 Surface and Space Constraints

As shown in Figure 9 in Appendix A, the proposed development will have surface and space constraints that limit the design of stormwater management practices. The existing 8-story building and its frontages along Concourse Village East and East 161st Street on Lot 120 are to remain and will occupy portions of the property site.

Within the disturbed area, the two proposed high-rise buildings will be constructed in the middle of the site. The West Tower will have frontage on Concourse Village East while the East Tower will be set back from the street with vehicular and pedestrian access from East 161st Street.

The existing 81 parking spaces accessory to the existing building on Lot 120 serves the tenants of the building and will be rearranged within the proposed development. As such, three parking lots are provided on site with access from East 161st Street and a private road that would run along the east side of the site to the parking lots. Dead-end apparatus access roads that are more than 150 feet from the nearest public street requires an FDNY turnaround area which is provided to the east of the site (NYC Fire Code 503.2.9).

Sidewalks along the sides of the buildings and walkways within the landscaped courtyard space also occupy parts of the site for pedestrian circulation and egress for the three buildings.

The combination of parking lots, roads, sidewalks, walkways, plazas, and an FDNY turnaround area require the use of paved surfaces and limit the use of vegetated practices.

The West Tower and East Tower roofs will have space constraints due to clearances required to access the mechanical equipment located on the roofs. An FDNY clear path is also required around the sides of the roofs as shown in Figure 9. Green roofs will be provided on the remaining areas of the roofs.

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## Section 6.3: Stormwater Management Practices

### Section 6.3.1: Meeting Water Quality, Runoff Reduction, and Sewer Operations Requirements

***Section 6.3.1.1: Volume-Based SMPs***

***Tier 1 Practices***

| **TABLE 6.4(a) – TIER 1**<br>**SMP ID #** 1: STORMWATER PLANTER | | |
|---|---|---|
| **PRACTICE DESCRIPTION** | | |
| **Function & Narrative Description[1]** | | |
| **Primary Function:** Evapotranspiration<br>**Secondary Function:** Filtration<br>**Narrative Description:** Stormwater planter located in the landscaped courtyard. | | |
| **Location Category** | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | **Latitude:** 40.824848 °N<br>**Longitude:** - 73.918205 °W | |
| **Practice Area[2]** | **Drawing Reference** | |
| 653 sf | **LH-101** | |
| **SOIL AND PERMEABILITY TESTING INFORMATION[3]** | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | **Elevation of Bedrock Encountered** |
| 45.79 FT EL | _ _ _ _ FT EL<br>☐ Not encountered | _ _ _ _ FT EL<br>☐ Not encountered |
| **Soil Sample Test Elevations** | **Boring ID** | **USCS Symbol (% Passing No 200 Sieve)** |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | _ _<br>(_ _ %) |
| **Infiltration Test Elevation** | **Infiltration Test ID** | **Infiltration Rate** |
| _ _ _ _ FT EL | _ _ _ _ | _ _ _ _ in/hr |
| **PRACTICE DESIGN REQUIREMENTS[4]** | | |
| **Contributing Area[5]** | **Design Point ID[6]** | **Water Quality Volume Required to be Managed by Practice[7]** |
| A = 5,546 sf | DP# 1 | Required $WQ_v$ = 525 cf |

| **VOLUME MANAGED[8]** | | | |
|---|---|---|---|
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 555 cf | $WQ_v$ = 525 cf | $RR_v$ = 525 cf | $V_v$ = 0 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS[9]** | | | |

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| Detention System in Series? | Max Release Rate for Site[10] | Proportional Max Release Rate for Contributing Area[11] | Actual Detention Release Rate[12] |
|---|---|---|---|
| Choose an item. | $Q_{DRR,Site}$ = _ _ _ _ cfs | $Q_{DRR,Proportional}$ = _ _ _ _ cfs | $Q_O$ = _ _ _ _ cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.4(b-z).]*

*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*

*[2]The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*

*[3]Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*

*[4]This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*

*[5]The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*

*[6]The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*

*[7]The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*

*[8]$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_v$, $RR_v$ and $V_v$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*

*[9]Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*

*[10]The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*

*[11]The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*

*[12]The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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| TABLE 6.4(b) – TIER 1<br>**SMP ID #** 2: STORMWATER PLANTER | | | |
|---|---|---|---|
| **PRACTICE DESCRIPTION** | | | |
| **Function & Narrative Description**[1] | | | |
| **Primary Function:** Evapotranspiration<br>**Secondary Function:** Filtration<br>**Narrative Description:** Stormwater planter located in the landscaped courtyard. | | | |
| **Location Category** | | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | | **Latitude:** 40.824871 °N<br>**Longitude:** - 73.918144 °W | |
| **Practice Area**[2] | | **Drawing Reference** | |
| 297 sf | | **LH-101** | |
| **SOIL AND PERMEABILITY TESTING INFORMATION**[3] | | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | **Elevation of Bedrock Encountered** | |
| 49.00 FT EL | _ _ _ _ FT EL<br>☐ Not encountered | _ _ _ _ FT EL<br>☐ Not encountered | |
| **Soil Sample Test Elevations** | **Boring ID** | **USCS Symbol (% Passing No 200 Sieve)** | |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | _ _<br>(_ _ %) | |
| **Infiltration Test Elevation** | **Infiltration Test ID** | **Infiltration Rate** | |
| _ _ _ _ FT EL | _ _ _ _ | _ _ _ _ in/hr | |
| **PRACTICE DESIGN REQUIREMENTS**[4] | | | |
| **Contributing Area**[5] | **Design Point ID**[6] | **Water Quality Volume Required to be Managed by Practice**[7] | |
| A = 1,922 sf | DP# 2 | Required $WQ_v$ = 145 cf | |
| **VOLUME MANAGED**[8] | | | |
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 252 cf | $WQ_v$ = 145 cf | $RR_v$ = 145 cf | $V_v$ = 0 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS**[9] | | | |
| **Detention System in Series?** | **Max Release Rate for Site**[10] | **Proportional Max Release Rate for Contributing Area**[11] | **Actual Detention Release Rate**[12] |
| Choose an item. | $Q_{DRR,Site}$ = _ _ _ _ cfs | $Q_{DRR,Proportional}$ = _ _ _ _ cfs | $Q_O$ = _ _ _ _ cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.4(b-z).]*

*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*

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[2]*The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*
[3]*Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*
[4]*This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*
[5]*The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*
[6]*The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*
[7]*The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*
[8]*$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_V$, $RR_V$ and $V_V$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*
[9]*Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*
[10]*The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*
[11]*The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*
[12]*The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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| TABLE 6.4(c) – TIER 1<br>SMP ID # 3: GREEN ROOF #1 | | | |
|---|---|---|---|
| **PRACTICE DESCRIPTION** | | | |
| **Function & Narrative Description[1]** | | | |
| **Primary Function:** Evapotranspiration<br>**Secondary Function:** Filtration<br>**Narrative Description:** Green roof with 6" soil depth located on the West Tower roof. | | | |
| **Location Category** | | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | | **Latitude:** 40.824717 °N<br>**Longitude:** - 73.918348 °W | |
| **Practice Area[2]** | | **Drawing Reference** | |
| 1,435 sf | | **A-105.00** | |
| **SOIL AND PERMEABILITY TESTING INFORMATION[3]** | | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | **Elevation of Bedrock Encountered** | |
| _ _ _ _ FT EL | _ _ _ _ FT EL<br>☐ Not encountered | _ _ _ _ FT EL<br>☐ Not encountered | |
| **Soil Sample Test Elevations** | **Boring ID** | **USCS Symbol (% Passing No 200 Sieve)** | |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | _ _<br>(_ _ %) | |
| **Infiltration Test Elevation** | **Infiltration Test ID** | **Infiltration Rate** | |
| _ _ _ _ FT EL | _ _ _ _ | _ _ _ _ in/hr | |
| **PRACTICE DESIGN REQUIREMENTS[4]** | | | |
| **Contributing Area[5]** | **Design Point ID[6]** | **Water Quality Volume Required to be Managed by Practice[7]** | |
| A = 1,435 sf | DP# 3 | Required $WQ_v$ = 170 cf | |
| **VOLUME MANAGED[8]** | | | |
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 144 cf | $WQ_v$ = 144 cf | $RR_v$ = 144 cf | $V_v$ = 0 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS[9]** | | | |
| **Detention System in Series?** | **Max Release Rate for Site[10]** | **Proportional Max Release Rate for Contributing Area[11]** | **Actual Detention Release Rate[12]** |
| Choose an item. | $Q_{DRR,Site}$ = _ _ _ _ cfs | $Q_{DRR,Proportional}$ = _ _ _ _ cfs | $Q_O$ = _ _ _ _ cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.4(b-z).]*

*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*

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*[2]The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*
*[3]Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*
*[4]This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*
*[5]The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*
*[6]The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*
*[7]The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*
*[8]$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_V$, $RR_V$ and $V_V$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*
*[9]Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*
*[10]The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*
*[11]The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*
*[12]The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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| TABLE 6.4(d) – TIER 1<br>SMP ID # 4: GREEN ROOF #2 | | | |
|---|---|---|---|
| **PRACTICE DESCRIPTION** | | | |
| **Function & Narrative Description[1]** | | | |
| **Primary Function:** Evapotranspiration<br>**Secondary Function:** Filtration<br>**Narrative Description:** Green roof with 6" soil depth located on the East Tower roof. | | | |
| **Location Category** | | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | | **Latitude:** 40.824655 °N<br>**Longitude:** - 73.917977 °W | |
| **Practice Area[2]** | | **Drawing Reference** | |
| 1,152 sf | | **A-106.00** | |
| **SOIL AND PERMEABILITY TESTING INFORMATION[3]** | | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | **Elevation of Bedrock Encountered** | |
| _ _ _ _ FT EL | _ _ _ _ FT EL<br>☐ Not encountered | _ _ _ _ FT EL<br>☐ Not encountered | |
| **Soil Sample Test Elevations** | **Boring ID** | **USCS Symbol (% Passing No 200 Sieve)** | |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | _ _<br>(_ _ %) | |
| **Infiltration Test Elevation** | **Infiltration Test ID** | **Infiltration Rate** | |
| _ _ _ _ FT EL | _ _ _ _ | _ _ _ _ in/hr | |
| **PRACTICE DESIGN REQUIREMENTS[4]** | | | |
| **Contributing Area[5]** | **Design Point ID[6]** | **Water Quality Volume Required to be Managed by Practice[7]** | |
| A = 1,152 sf | DP# 4 | Required $WQ_v$ = 137 cf | |
| **VOLUME MANAGED[8]** | | | |
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 115 cf | $WQ_v$ = 115 cf | $RR_v$ = 115 cf | $V_v$ = 0 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS[9]** | | | |
| **Detention System in Series?** | **Max Release Rate for Site[10]** | **Proportional Max Release Rate for Contributing Area[11]** | **Actual Detention Release Rate[12]** |
| Choose an item. | $Q_{DRR,Site}$ = _ _ _ _ cfs | $Q_{DRR,Proportional}$ = _ _ _ _ cfs | $Q_O$ = _ _ _ _ cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.4(b-z).]*

*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*

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[2]*The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*
[3]*Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*
[4]*This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*
[5]*The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*
[6]*The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*
[7]*The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*
[8]*$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_V$, $RR_V$ and $V_V$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*
[9]*Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*
[10]*The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*
[11]*The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*
[12]*The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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| TABLE 6.4(e) – TIER 1<br>SMP ID # 5: GREEN ROOF #3 | | | |
|---|---|---|---|
| **PRACTICE DESCRIPTION** | | | |
| **Function & Narrative Description[1]** | | | |
| **Primary Function:** Evapotranspiration<br>**Secondary Function:** Filtration<br>**Narrative Description:** Green roof with 6" soil depth located on the East Tower roof. | | | |
| **Location Category** | | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | | **Latitude:** 40.824513 °N<br>**Longitude:** -73.918116 °W | |
| **Practice Area[2]** | | **Drawing Reference** | |
| 267 sf | | **A-106.00** | |
| **SOIL AND PERMEABILITY TESTING INFORMATION[3]** | | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | **Elevation of Bedrock Encountered** | |
| _ _ _ _ FT EL | _ _ _ _ FT EL<br>☐ Not encountered | _ _ _ _ FT EL<br>☐ Not encountered | |
| **Soil Sample Test Elevations** | **Boring ID** | **USCS Symbol (% Passing No 200 Sieve)** | |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | _ _<br>(_ _ %) | |
| **Infiltration Test Elevation** | **Infiltration Test ID** | **Infiltration Rate** | |
| _ _ _ _ FT EL | _ _ _ _ | _ _ _ _ in/hr | |
| **PRACTICE DESIGN REQUIREMENTS[4]** | | | |
| **Contributing Area[5]** | **Design Point ID[6]** | **Water Quality Volume Required to be Managed by Practice[7]** | |
| A = 267 sf | DP# 5 | Required $WQ_v$ = 32 cf | |
| **VOLUME MANAGED[8]** | | | |
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 27 cf | $WQ_v$ = 27 cf | $RR_v$ = 27 cf | $V_v$ = 0 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS[9]** | | | |
| **Detention System in Series?** | **Max Release Rate for Site[10]** | **Proportional Max Release Rate for Contributing Area[11]** | **Actual Detention Release Rate[12]** |
| Choose an item. | $Q_{DRR,Site}$ = _ _ _ _ cfs | $Q_{DRR,Proportional}$ = _ _ _ _ cfs | $Q_O$ = _ _ _ _ cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.4(b-z).]*

*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*

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[2]*The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*
[3]*Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*
[4]*This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*
[5]*The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*
[6]*The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*
[7]*The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*
[8]*$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_V$, $RR_V$ and $V_V$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*
[9]*Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*
[10]*The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*
[11]*The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*
[12]*The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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| TABLE 6.4(f) – TIER 1<br>SMP ID # 6: GREEN ROOF #4 | | | |
|---|---|---|---|
| **PRACTICE DESCRIPTION** | | | |
| **Function & Narrative Description[1]** | | | |
| **Primary Function:** Evapotranspiration<br>**Secondary Function:** Filtration<br>**Narrative Description:** Green roof with 6" soil depth located on the East Tower roof. | | | |
| **Location Category** | | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | | **Latitude:** 40.824467 °N<br>**Longitude:** -73.918083 °W | |
| **Practice Area[2]** | | **Drawing Reference** | |
| 683 sf | | **A-106.00** | |
| **SOIL AND PERMEABILITY TESTING INFORMATION[3]** | | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | **Elevation of Bedrock Encountered** | |
| _ _ _ _ FT EL | _ _ _ _ FT EL<br>☐ Not encountered | _ _ _ _ FT EL<br>☐ Not encountered | |
| **Soil Sample Test Elevations** | **Boring ID** | **USCS Symbol (% Passing No 200 Sieve)** | |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | _ _<br>(_ _ %) | |
| **Infiltration Test Elevation** | **Infiltration Test ID** | **Infiltration Rate** | |
| _ _ _ _ FT EL | _ _ _ _ | _ _ _ _ in/hr | |
| **PRACTICE DESIGN REQUIREMENTS[4]** | | | |
| **Contributing Area[5]** | **Design Point ID[6]** | **Water Quality Volume Required to be Managed by Practice[7]** | |
| A = 683 sf | DP# 6 | Required $WQ_v$ = 81 cf | |
| **VOLUME MANAGED[8]** | | | |
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 68 cf | $WQ_v$ = 68 cf | $RR_v$ = 68 cf | $V_v$ = 0 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS[9]** | | | |
| **Detention System in Series?** | **Max Release Rate for Site[10]** | **Proportional Max Release Rate for Contributing Area[11]** | **Actual Detention Release Rate[12]** |
| Choose an item. | $Q_{DRR,Site}$ = _ _ _ _ cfs | $Q_{DRR,Proportional}$ = _ _ _ _ cfs | $Q_O$ = _ _ _ _ cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.4(b-z).]*

*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*

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*[2]The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*
*[3]Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*
*[4]This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*
*[5]The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*
*[6]The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*
*[7]The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*
*[8]$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_V$, $RR_V$ and $V_V$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*
*[9]Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*
*[10]The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*
*[11]The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*
*[12]The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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***Tier 3 Practices***

| **TABLE 6.6(a) – TIER 3**<br>**SMP ID #** 7: DETENTION TANK #1 | | | |
|---|---|---|---|
| **PRACTICE DESCRIPTION** | | | |
| **Function & Narrative Description**[1] | | | |
| **Primary Function:** Detention<br>**Secondary Function:** None<br>**Narrative Description:** Detention tank located in the West Tower cellar. | | | |
| **Location Category** | | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | | **Latitude:** 40.824761 °N<br>**Longitude:** - 73.918546 °W | |
| **Practice Area**[2] | | **Drawing Reference** | |
| 520 sf | | Site Connection Proposal West Tower | |
| **SOIL AND PERMEABILITY TESTING INFORMATION**[3] | | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | **Elevation of Bedrock Encountered** | |
| _ _ _ _ FT EL | _ _ _ _ FT EL<br>☐ Not encountered | _ _ _ _ FT EL<br>☐ Not encountered | |
| **Soil Sample Test Elevations** | **Boring ID** | **USCS Symbol (% Passing No 200 Sieve)** | |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | _ _<br>(_ _ %) | |
| **Infiltration Test Elevation** | **Infiltration Test ID** | **Infiltration Rate** | |
| _ _ _ _ FT EL | _ _ _ _ | _ _ _ _ in/hr | |
| **PRACTICE DESIGN REQUIREMENTS**[4] | | | |
| **Contributing Area**[5] | **Design Point ID**[6] | **Water Quality Volume Required to be Managed by Practice**[7] | |
| A = 21,867 sf | DP# 7 | Required $WQ_v$ = 2,951 cf | |
| **VOLUME MANAGED**[8] | | | |
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 3,364 cf | $WQ_v$ = 2,951 cf | $RR_v$ = 0 cf | $V_v$ = 2,951 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS**[9] | | | |
| **Detention System in Series?** | **Max Release Rate for Site**[10] | **Proportional Max Release Rate for Contributing Area**[11] | **Actual Detention Release Rate**[12] |
| No. | $Q_{DRR,Site}$ = 0.06 cfs | $Q_{DRR,Proportional}$ = 0.06 cfs | $Q_O$ = 0.06 cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.6(b-z).]*

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*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*
*[2]The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*
*[3]Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*
*[4]This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*
*[5]The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*
*[6]The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*
*[7]The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*
*[8]$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_V$, $RR_V$ and $V_V$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*
*[9]Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*
*[10]The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*
*[11]The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*
*[12]The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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| TABLE 6.6(b) – TIER 3<br>**SMP ID #** 8: DETENTION TANK #2 | | | |
|---|---|---|---|
| **PRACTICE DESCRIPTION** | | | |
| **Function & Narrative Description**[1] | | | |
| **Primary Function:** Detention<br>**Secondary Function:** None<br>**Narrative Description:** Detention pipe system located in the private road. | | | |
| **Location Category** | | **Location Coordinates** | |
| ☒ On site<br>☐ Right-of-Way | | **Latitude:** 40.824688 °N<br>**Longitude:** - 73.917379 °W | |
| **Practice Area**[2] | | **Drawing Reference** | |
| 2,870 sf | | Site Connection Proposal East Tower | |
| **SOIL AND PERMEABILITY TESTING INFORMATION**[3] | | | |
| **Elevation of Bottom of Practice** | **Elevation of Groundwater Encountered** | | **Elevation of Bedrock Encountered** |
| _ _ _ _ FT EL | _ _ _ _ FT EL<br>☐ Not encountered | | _ _ _ _ FT EL<br>☐ Not encountered |
| **Soil Sample Test Elevations** | **Boring ID** | | **USCS Symbol (% Passing No 200 Sieve)** |
| Start Depth: _ _ _ _ FT EL<br>End Depth: _ _ _ _ FT EL | _ _ _ _ | | _ _<br>(_ _ %) |
| **Infiltration Test Elevation** | **Infiltration Test ID** | | **Infiltration Rate** |
| _ _ _ _ FT EL | _ _ _ _ | | _ _ _ _ in/hr |
| **PRACTICE DESIGN REQUIREMENTS**[4] | | | |
| **Contributing Area**[5] | **Design Point ID**[6] | | **Water Quality Volume Required to be Managed by Practice**[7] |
| A = 64,286 sf | DP# 8 | | Required $WQ_v$ = 7,427 cf |
| **VOLUME MANAGED**[8] | | | |
| **Storage Volume Provided** | **Water Quality Volume Achieved** | **Runoff Reduction Volume Achieved** | **Sewer Operations Volume Achieved** |
| $V_{SMP}$ = 7,462 cf | $WQ_v$ = 5,013 cf | $RR_v$ = 0 cf | $V_v$ = 7,427 cf |
| **RELEASE RATES FOR DETENTION SYSTEMS**[9] | | | |
| **Detention System in Series?** | **Max Release Rate for Site**[10] | **Proportional Max Release Rate for Contributing Area**[11] | **Actual Detention Release Rate**[12] |
| No. | $Q_{DRR,Site}$ = 0.09 cfs | $Q_{DRR,Proportional}$ = 0.09 cfs | $Q_O$ = 0.09 cfs |

*[Duplicate table as needed. One table shall be created per practice. Label subsequent tables alphabetically as Table 6.6(b-z).]*

*[1]Include a description of the practice, and any associated pre-treatment components. If any elements of the design are not in conformance with the performance criteria in the NYC SWM, include the reason for the deviation and provide information which demonstrates equivalent performance of the practice.*

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[2]*The practice area listed must be the contiguous area of a single practice. Each contiguous area requires its own table and SMP ID; the sum of areas of multiple identical practices may not be listed as a single practice.*
[3]*Soil and permeability testing are required at various depths; the soil and infiltration testing results requested in this table are intended specifically to highlight the test results 2 feet below the bottom of the practice for on-site practices, and at the base of the SMP for Right-of-Way practices.*
[4]*This section is intended to provide an overview of the practice-specific water quality volume requirements that this SMP must meet.*
[5]*The contributing area is the sum of the individual drainage areas from which stormwater drains to the specified design point at the practice location, except if that area exceeds the maximum practice-to-contributing area loading ratio defined in the NYC SWM (Tables 4.2-4.5). In the latter case, the maximum shall be used.*
[6]*The design point ID listed in this section must match the design point ID called out in the Cover and Contributing Drainage Area Plan in Appendix A.*
[7]*The required practice $WQ_v$ is calculated by plugging in the contributing area (A) in NYC SWM Eq. 2.1, and subtracting the storage volumes provided by upstream practices.*
[8]*$V_{SMP}$ listed in this section can be calculated using NYC SWM Eq. 4.1. The resulting $WQ_V$, $RR_V$ and $V_V$ reductions achieved can be calculated using NYC SWM Eq. 4.8 and NYC SWM Table 4.1.*
[9]*Complete this section if the SMP includes detention-based functions or leave blank if not applicable. For detention systems in series, NYC SWM Appendix G may be used for calculations, and included under Appendix B of the SWPPP.*
[10]*The maximum release rate from site can be calculated by plugging in the site area as A in NYC SWM Eq. 2.5.*
[11]*The proportional maximum release rate can be calculated by plugging in the contributing area (A) to the practice into NYC SWM Eq. 2.5, or by an accepted BWSO SCP Master Plan. This input is required for projects which connect to multiple sewers, or for projects where the detention practice contributes to meeting the Water Quality volume requirement.*
[12]*The actual detention release rate is based on the depth of flow from the practice and can be calculated using NYC SWM Eq. 4.15-4.17.*

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## Section 6.3.4: Meeting Underground Injection Control Requirements

| TABLE 6.15 – DETERMINATION OF UIC APPLICABILITY | |
|---|---|
| **QUESTION** | **ANSWER** |
| 1. ARE ANY OF THE PRACTICES USED ON THE PROJECT INFILTRATION PRACTICES? | ☒ Yes ☐ No |
| 2. DO ANY OF THE INFILTRATION PRACTICES USED DISCHARGE TO THE SUBSURFACE? | ☒ Yes ☐ No<br>☐ N/A |
| 3. DO ANY OF THE INFILTRATION PRACTICES USED CONSIST OF A DRILLED OR DRIVEN SHAFT, OR DUG HOLE, OR TRENCH THAT IS DEEPER THAN IT IS WIDE? | ☐ Yes ☒ No<br>☐ N/A |
| 4. DOES ANY OF THE INFILTRATION PRACTICES USED RELY ON A NATURALLY OCCURRING SINKHOLE, A DRYWELL, OR A SEEPAGE PIT FOR INFILTRATION? | ☐ Yes ☒ No<br>☐ N/A |
| 5. DOES ANY OF THE INFILTRATION PRACTICES USED INCLUDE ANY SUBSURFACE PIPING, PERFORATED PIPING, DRAIN TILES, OR ANY OTHER UNDERGROUND COMPONENTS THAT DISCHARGE FLUIDS TO THE SUBSURFACE? | ☐ Yes ☒ No<br>☐ N/A |
| 6. DOES ANY OF THE INFILTRATION PRACTICES USED INCLUDE ANY COMMERCIALLY MANUFACTURED STORMWATER INFILTRATION DEVICES, SUCH AS A DETENTION VAULT, CHAMBER, OR OTHER DEVICE DESIGNED TO CAPTURE AND INFILTRATE STORMWATER RUNOFF BELOW THE SURFACE OF THE GROUND? | ☐ Yes ☒ No<br>☐ N/A |
| **DETERMINATION** | |
| **Do the infiltration practices used on this project require compliance with UIC?**<br>☐ No, the Answers to Questions 1 and 2 were "No".<br>☐ Yes, at least one of the answers to Questions 3-6 was "Yes". The applicable practices are:<br>• **SMP ID # _ _:** Click or tap here to enter text.<br>• **SMP ID # _ _:** Click or tap here to enter text.<br>• **SMP ID # _ _:** Click or tap here to enter text.<br>• **SMP ID # _ _:** Click or tap here to enter text. | |

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# Appendix A: Drawings

## Documents included:

☐ Historical Impervious Area Plan **(Include when historical cover within the last 5-years does not match current surveyed conditions)**, including:

- Delineation of impervious and pervious surfaces, including impervious areas that were removed from a project site within the last 5-years (can be shown on aerial map).
- Area of impervious and pervious surfaces.

☒ Existing Site Plan, showing:

- A minimum of 50' beyond the project limits
- Total project site area, delineated by a line to show boundary
- Indicate area disturbed on-site and off-site, delineated separately by lines to show boundaries
- Existing site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any existing stormwater management practices (SMPs)
- On-site and adjacent off-site surface water(s)
- Callouts for key site features, as needed

☒ Existing Drainage Utility Plan, showing:

- Existing site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any existing SMPs
- Existing drainage structures, including manholes, inlets, rooftop drains, outfalls, and catch basins
- Existing drainage pipes
- Subsurface drainage features of existing SMPs, including the subsurface footprint (when different from the surface footprint) and any internal pipes or structures
- Existing on-site sewage treatment systems
- Existing topographic contours, or spot elevations if the site is relatively flat
- Callouts for all existing points of discharge from the site, including sewer connections, outfalls, on-site disposal systems, direct discharges, or any others related to other SPDES permits
- Callouts for each existing SMP, including the type, size, and storage volume
- Callouts for drainage structures and pipes, including sizes, materials, and inverts, as known

☒ Existing Cover and Contributing Drainage Area Plan, showing:

- Existing site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any existing SMPs
- Existing drainage structures, including manholes, inlets, rooftop drains, and catch basins
- Existing drainage pipes
- Delineation of all individual drainage areas across the entire site (i.e. no overlapping drainage areas). Indicate the "drainage point" (or cluster of points for simple sites and drainage areas) associated with each individual drainage area
- Within the boundary of each drainage area, also delineate each cover type shown in Table 2.8 of the NYC SWM, using a different hatch for each type
- Add "design points" of interest, where the total contributing drainage area to that point is required for design or reporting purposes. At a minimum, include design points for each

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existing SMP and any points of discharge, including sewer connections, outfalls, on-site disposal systems, direct discharges, or any others related to other SPDES permits
- Callouts for each design point, including the IDs of all individual drainage areas that contribute to the design point, the total contributing area to the design point, and the total area of each surface type within the total contributing area

☒ Construction Sequencing and ESC Site Plans, showing the following details for each phase and stage of construction (minimum of one separate plan per phase)**:**
- Sequence of construction activities
- Erosion and sediment control practices, including location and size
- Interim contributing drainage areas and point(s) of discharge
- Contract Limit Line
- Limit of Disturbance for the specific phase
- Wetland Boundary – Fresh Water (100) and Tidal
- Wetlands and drainage patterns that could be affected by construction activity
- Temporary stabilization practices
- Relevant off-site features that will be contributing drainage area during construction, including all staging areas

☒ Erosion and Sediment Control Practice Detail Plans, including:
- Dimensions
    - Note: details must indicate specific dimensions rather than "variable" dimensions, or include tables that specify dimensions in cases where standards include "variable" dimensions
- Material specifications
- Installation details
- Maintenance & replacement requirements

☒ Surface and Space Constraint Plan **(Include when these constraints impact the use of SMPs)**, showing:
- Delineation of each constraint area
- Notes with justification of each constraint, including references to supporting documentation
- When applicable, a drawing showing the sustainable roofing zone per Section 1512.2 of the NYC Building Code

☐ Soil, Subsurface, and Hotspot Constraint Plan **(Include when these constraints impact the use of SMPs),** showing:
- Delineation of each constraint area
- Notes with justification of each constraint, including references to supporting documentation

☒ Proposed Site Plan, showing:
- A minimum of 50' beyond the project limits
- Total project site area, delineated by line to show boundary
- Disturbed areas on-site and off-site, delineated separately by lines to show boundaries
- Proposed site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any proposed SMPs
- On-site and adjacent off-site surface water(s)
- Callouts for key site features, as needed
- Relevant off-site features that will be contributing drainage area during construction

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☒ Proposed Drainage Utility Plan, including:

- Proposed site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any proposed SMPs
- Proposed drainage structures, including manholes, inlets, rooftop drains, outfalls, and catch basins
- Proposed drainage pipes
- Subsurface drainage features of proposed SMPs, including the subsurface footprint (when different from the surface footprint) and any internal pipes or structures
- On-site sewage treatment system locations
- Proposed topographic contours, or spot elevations if the site is relatively flat
- Callouts for all points of discharge from the site, including sewer connections, outfalls, on-site disposal systems, direct discharges, or any others related to other SPDES permits
- Callouts for each proposed SMP, including the type, size, and storage volume
- Callouts for drainage structures and pipes, including sizes, materials, and inverts, as known

☒ Proposed Cover and Contributing Drainage Area Plan, including:

- Proposed site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any proposed SMPs
- Proposed drainage structures, including manholes, inlets, rooftop drains, and catch basins
- Proposed drainage pipes
- Delineation of all individual drainage areas across the entire site (i.e. no overlapping drainage areas). Indicate the "drainage point" (or points) associated with each individual drainage area
- Within the boundary of each drainage area, also delineate each cover type shown in Table 2.8 of the NYC SWM, using a different hatch for each type
- Add "design points" of interest, where the total contributing drainage area to that point is required for design or reporting purposes. At a minimum, include design points for each proposed SMP and any points of discharge, including sewer connections, outfalls, on-site disposal systems, direct discharges, or any others related to other SPDES permits
- Callouts for each design point, including the IDs of all individual drainage areas that contribute to the design point, the total contributing area to the design point, and the total area of each surface type within the total contributing area
- Delineation of the limits of disturbance

☒ Proposed Grading Plan, showing proposed topographic contours, or spot elevations if the site is relatively flat

☒ Final Landscaping and Stabilization Plan

- Can include landscaping plan and materials plan/roof plan.
- Delineation of all vegetated areas noting practices to achieve final stabilization
- Delineation of type of soil disturbance across the entire site, as categorized in NYS DEC Stormwater Design Manual Table 5.3
- Callouts for each runoff reduction practice that requires Soil Restoration measures to be applied over and adjacent to the practice.
- Callouts for each type of soil disturbance and soil restoration activity (see NYS DEC Stormwater Design Manual Table 5.3)

☒ SMP Section/Detail Plans, showing:

- Elevations for bottom of practice, interface of each media layer, top of ponding, and top of practice

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- Elevations for inverts in, inverts out, and/or overflows
- Elevations of any groundwater table or bedrock
- Elevations for the top and bottom of active storage zones
- Ponding depths
- Media slope, depths, and specifications
- Any observation wells and their materials specifications
- Any pre-treatment devices and proprietary SMPs

☒ Drainage Section/Detail Plans, for any manholes, inlets, outlet-control structures, or other drainage structures.

For projects that will disturb more than 5 acres at any one time,

☐ Cut and Fill Plan

☐ Phasing Plan defining maximum disturbed Area per phase

☐ Master Phasing Plan **(Include when project is part of a Larger Common Plan)**, showing a delineation of separate projects under the Larger Common Plan, their projected start/end dates, and their application IDs.

## If any of the above documents are not included, explain why below:

Click or tap here to enter text.

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REF. NO. B2420-120

EAST 161st (100' WIDE) STREET

EAST (81' WIDE)

CONCOURSE VILLAGE

NO. 280/330
EIGHT STORY
BRICK APARTMENT
BUILDING

OPEN AT FIRST FLOOR
(SUPPORTED BY COLUMNS)

TAX LOT 120
LOT AREA = 57,199.51 SQ.FT.

TAX LOT 150
LOT AREA = 39,161.06 SQ.FT.

TAX LOT 130
LOT AREA = 25,133.45 SQ.FT.

FORMER 160th STREET (60' WIDE)

TOTAL LOT AREA = 121,494.02 SQ.FT. = 2.7891 ACRES

UNAUTHORIZED ALTERATIONS AND/OR ADDITIONS TO THIS SURVEY BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW. COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYORS INKED OR EMBOSSED SEAL SHALL NOT BE CONSIDERED TO BE A VALID TRUE COPY. CERTIFICATIONS INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED, THE TITLE COMPANY, THE GOVERNMENTAL AGENCY AND THE LENDING INSTITUTION LISTED ON THIS SURVEY MAP. CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS AND/OR SUBSEQUENT OWNERS. FENCE OFFSETS TAKEN AT FABRIC. ENCROACHMENTS OR VAULTS BELOW SURFACE ARE NOT SHOWN. RIGHT OF WAYS AND/OR EASEMENTS OF RECORD NOT SHOWN ON THIS SURVEY ARE NOT CERTIFIED. OFFSETS AND DIMENSIONS HEREON ARE FOR A SPECIFIC PURPOSE AND ARE NOT TO BE USED IN THE ERECTION OF ADDITIONAL STRUCTURES, FENCES OR OTHER IMPROVEMENTS.
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TAX LOT 120
280-308 EAST 161st STREET
BRONX, NY

TAX LOT 150
CURRENTLY VACANT LOT
BRONX, NY

TAX LOT 130
CURRENTLY VACANT LOT
BRONX, NY

NOTES

ALL ELEVATIONS AND LEGAL GRADES SHOWN ON THIS SURVEY ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88 DATUM). TO CONVERT THIS DATUM TO THE BRONX DATUM, SUBTRACT 1.51 FEET FROM EACH ELEVATION.

LEGAL GRADES ARE REFERRED TO THE TOP OF THE CURB AND ARE DERIVED FROM THE NEW YORK CITY SECTION MAPS.

INVERT ELEVATION ARE DERIVED FROM CITY AGENCY RECORDS WHEN NOT AVAILABLE BY FIELD SURVEY.

ONLY SEWER AND WATER UTILITIES ARE SHOWN. CONSULT WITH APPROPRIATE UTILITY COMPANIES AND/OR AGENCIES PRIOR TO DESIGNING IMPROVEMENTS.

SUBSURFACE UTILITIES SHOWN ARE TAKEN FROM RECORDS OF GOVERNMENTAL AGENCIES AND UTILITY COMPANIES UNLESS OTHERWISE SHOWN.

COVER OR DEPTH OF UTILITIES IS NOT SHOWN AND MUST BE VERIFIED WITH PROPER AGENCIES PRIOR TO CONSTRUCTION OF PROJECT.

UNDERGROUND, OVERHEAD AND GROUND LEVEL UTILITIES ARE NOT GUARANTEED AS TO ACCURACY, EXACT LOCATION, TYPE OR USE, ACTIVE OR INACTIVE. VERIFICATION IS MANDATORY WITH MUNICIPAL AGENCIES, PUBLIC AND PRIVATE UTILITY COMPANIES PRIOR TO TAKING TITLE AND/OR DESIGN WORK. BOUNDARIES ARE NOT GUARANTEED UNLESS SO NOTED.

UNDERGROUND UTILITIES MUST BE VERIFIED AND MARKED OUT BEFORE CONSTRUCTION. ALL APPROPRIATE UTILITY COMPANIES AN/OR AGENCIES MUST BE NOTIFIED AT LEAST 72 HOURS PRIOR TO ANY CONSTRUCTION, EXCAVATION OR DEMOLITION AT OR NEAR THE PROPERTY IN ACCORDANCE WITH NYS CODE RULE 753.

ALL OPERATIONS OF UNDERGROUND FACILITIES AND ALL EXCAVATORS ARE OBLIGATED TO COMPLY WITH ARTICLE 36 OF THE GENERAL BUSINESS LAW AND WITH PROVISIONS OF INDUSTRIAL CODE PART (RULE NO. 35) BEFORE ANY EXCAVATION OR DEMOLITION IS COMMENCED. EVERY EXCAVATOR IS REQUIRED BY THESE LAWS TO GIVE ADVANCE NOTICE TO EVERY OPERATOR OF UNDERGROUND FACILITIES OF HIS INTENT TO PERFORM EXCAVATION OR DEMOLITION WORK IN THE SPECIFIED AREA.

EMPIRE STATE LAND SURVEYOR, P.C. AND FRANK GALLUZZO, PLS MAKES NO CLAIM AND DOES NOT GUARANTEE THAT THE SEWERS SHOWN HEREON ARE PUBLIC AND THAT THE LOT OR LOTS DEPICTED ON THIS SURVEY WILL BE ABLE TO CONNECT TO SAME.

A THOROUGH INVESTIGATION BY THE OWNER, DEVELOPER AND/OR THE ARCHITECT MUST BE MADE WITH THE NEW YORK CITY SEWER DEPARTMENT ON THE FEASIBILITY TO CONNECT TO THE EXISTING SEWER LINES BEFORE PURCHASING AND/OR DESIGNING.

THIS SURVEY WAS PREPARED IN A ELECTRONIC MEDIA FORMAT, IT IS UNDERSTOOD AND AGREED THAT EMPIRE STATE LAND SURVEYOR, P.C. AND FRANK GALLUZZO, PLS UPON RELEASE OF THESE ELECTRONIC FILES NO LONGER MAINTAINS CONTROL OF ITS USE, REUSE OR MODIFICATION. ONLY THE DIMENSIONS SHOWN ON THE HARD COPY ORIGINAL RECORD SIGNED AND SEALED DOCUMENTS PREPARED BY THIS OFFICE WILL BE CERTIFIED FOR ACCURACY. THE USER OF THIS ELECTRONIC MEDIA ACCEPTS FULL RESPONSIBILITY AND LIABILITY FOR ANY CONSEQUENCES ARISING OUT OF USE OF THIS DATA.

PROPERTY LINE DIMENSIONS SHOWN ARE DERIVED FROM DEEDS AND TAX MAPS. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN ABSTRACT OF TITLE AND IS SUBJECT TO ANY STATE OF FACTS THAT MAY BE REVEALED BY AN EXAMINATION OF SUCH.

THIS IS TO CERTIFY THAT THERE ARE NO VISIBLE STREAMS OR NATURAL WATER COURSES ON THE PROPERTY EXCEPT AS SHOWN ON THIS SURVEY.

THE USE OF ANY INFORMATION ON THIS SURVEY CONSTITUTES AN AGREEMENT TO ALL OF THE ABOVE.

LEGEND:

| | |
|---|---|
| TRAFFIC LIGHT | T.L. |
| FIRE HYDRANT | HYD. |
| LIGHT POLE | L.P. |
| CATCH BASIN | C.B. |
| TREE | |
| UTILITY POLE | U.P. |
| VALVES GAS-G.V. | WATER-W.V. |
| OVERHEAD SERVICE WIRES | O.H.S.W. |
| TRAFFIC SIGN | T.S. |
| LEGAL GRADES | L.G. |
| PEDESTRIAN RAMP | P.R. |
| FIRE PULL BOX | F.B. |
| CURB AND CURB CUT | C.C. |
| DRAIN | DR. |
| MAIL BOX | M.B. |
| CABLE MANHOLE | C.A.T. |
| MANHOLES | M |
| HANDICAP SPACE | |
| METAL COVER MANHOLE | M.C. |
| MONITORING WELL | M.V. |

GRAPHIC SCALE 1'=20'

| NO. | DATE | REVISION |
|---|---|---|
| 5. | AUGUST 28, 2023 | ADDED TAX LOT NUMBERS AND ADDRESS |
| 4. | MAY 18, 2023 | REVISED SUBDIVISION LOTS |
| 3. | APRIL 5, 2023 | NEW SUBDIVISION LOTS ADDED |
| 2. | MARCH 10, 2023 | ARCHITECTURAL SURVEY |
| 1. | FEBRUARY 25, 2019 | NEW LOT NUMBERS ADDED |

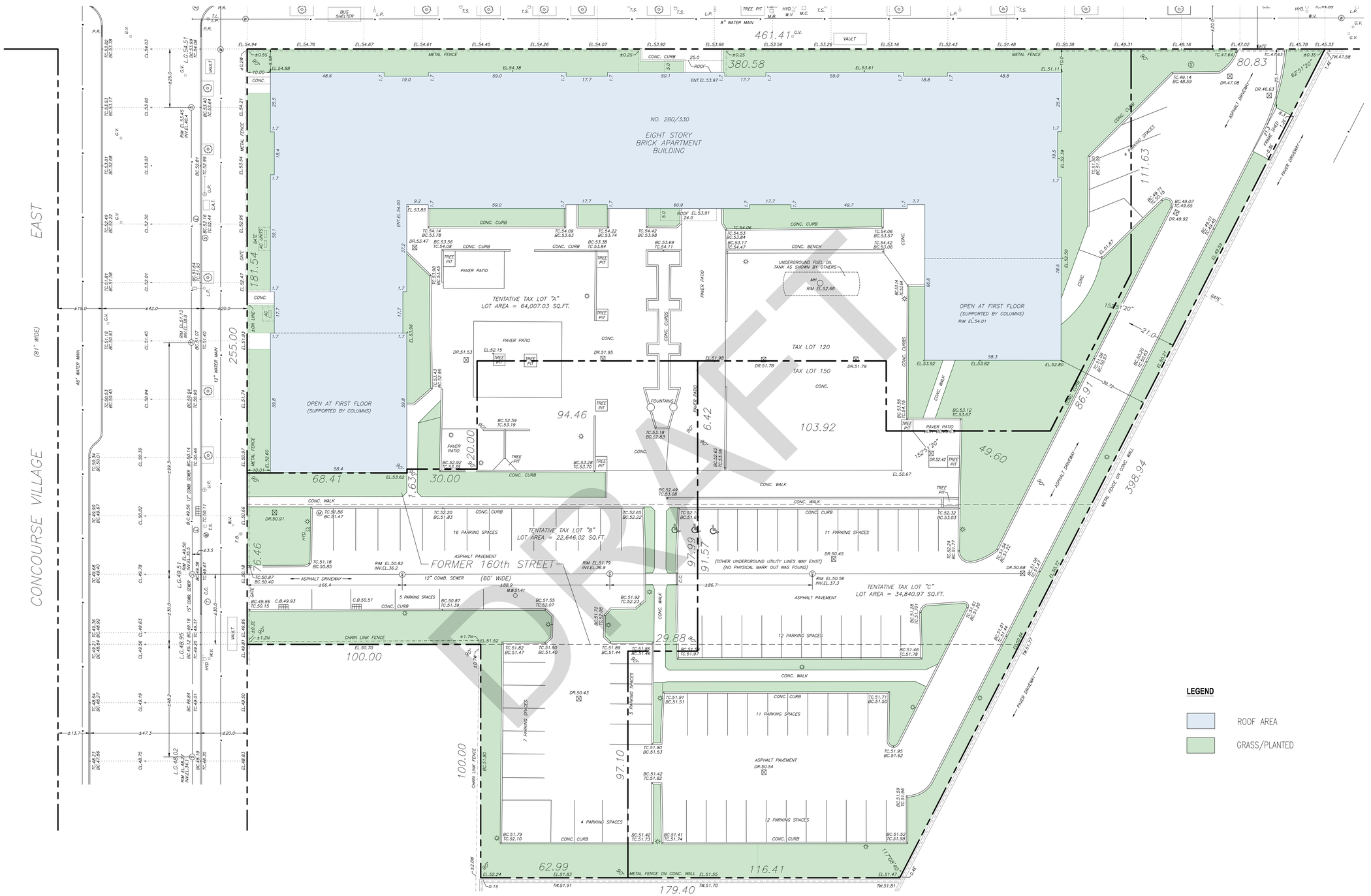
STATE OF NEW YORK FRANK GALLUZZO 050788 PROFESSIONAL LAND SURVEYOR

SURVEYED: OCTOBER 9, 2018

MAP OF PROPERTY SITUATED IN
THE BRONX
BRONX COUNTY, N.Y.
TAX SECT.: 9 TAX BLOCK: 2420 TAX LOT(S): 120 & 150

Empire State Land Surveyor, P.C.
Frank I. Galluzzo Professional Land Surveyor
Records of Albert A. Bianco -Robert B. Holzman
Stephen J. Reid - M. Berry Carman - G. W. Haviland
Vandewater & Lapp - Robert E. Carlin - William J. Daly
1005 Glen Cove Avenue, Glen Head, NY, 11545
(516)-240-6901

DRAWN BY: JG


NO. 280/330
EIGHT STORY
BRICK APARTMENT
BUILDING
TENTATIVE TAX LOT "A"
LOT AREA = 64,007.03 SQ.FT.
OPEN AT FIRST FLOOR
(SUPPORTED BY COLUMNS)
OPEN AT FIRST FLOOR
(SUPPORTED BY COLUMNS)
RIM EL.54.01
UNDERGROUND FUEL OIL
TANK AS SHOWN BY OTHERS
MH
RIM EL52.68
TAX LOT 120
TAX LOT 150
PAVER PATIO
FOUNTAINS
TENTATIVE TAX LOT "B"
LOT AREA = 22,646.02 SQ.FT.
FORMER 160th STREET
16 PARKING SPACES
11 PARKING SPACES
(OTHER UNDERGROUND UTILITY LINES MAY EXIST)
(NO PHYSICAL MARK OUT WAS FOUND)
TENTATIVE TAX LOT "C"
LOT AREA = 34,840.97 SQ.FT.
ASPHALT PAVEMENT
12 PARKING SPACES
5 PARKING SPACES
7 PARKING SPACES
4 PARKING SPACES
12 PARKING SPACES
11 PARKING SPACES
ASPHALT PAVEMENT
DR.50.54
CONCOURSE VILLAGE EAST
(61' WIDE)
48" WATER MAIN
12" WATER MAIN
8" WATER MAIN
461.41
380.58
80.83
111.63
181.54
255.00
68.41
30.00
94.46
103.92
49.60
86.91
398.94
100.00
179.40
116.41
62.99
29.88
97.10
91.57
97.99
100.00
CHAIN LINK FENCE
METAL FENCE
METAL FENCE ON CONC. WALL
CONC. CURB
CONC. WALK
CONC. BENCH
CONC. CURBS
PAVER DRIVEWAY
ASPHALT DRIVEWAY
TRAINING GRASS
TRAINING SHED
GATE
VAULT
BUS SHELTER
TREE PIT
HYD.
M.H.
M.B.
W.V.
M.C.
T.S.
L.P.
G.V.
U.P.
C.A.T.
C.B.
C.C.
F.B.
P.R.
T.L.
ENT.EL.53.97
ROOF EL.53.91
ROOF
DR.51.53
DR.51.95
DR.51.78
DR.51.79
DR.52.42
DR.50.91
DR.50.43
DR.50.45
DR.50.68
DR.47.08
DR.46.63
DR.49.92
DR.49.65
DR.49.71
DR.49.72
DR.49.73
DR.49.74
DR.49.75
DR.49.76
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DR.49.79
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DR.49.81
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DR.49.87
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DR.50.46
DR.50.47
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DR.50.70
DR.50.71
DR.50.72
DR.50.73
DR.50.74
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DR.50.76
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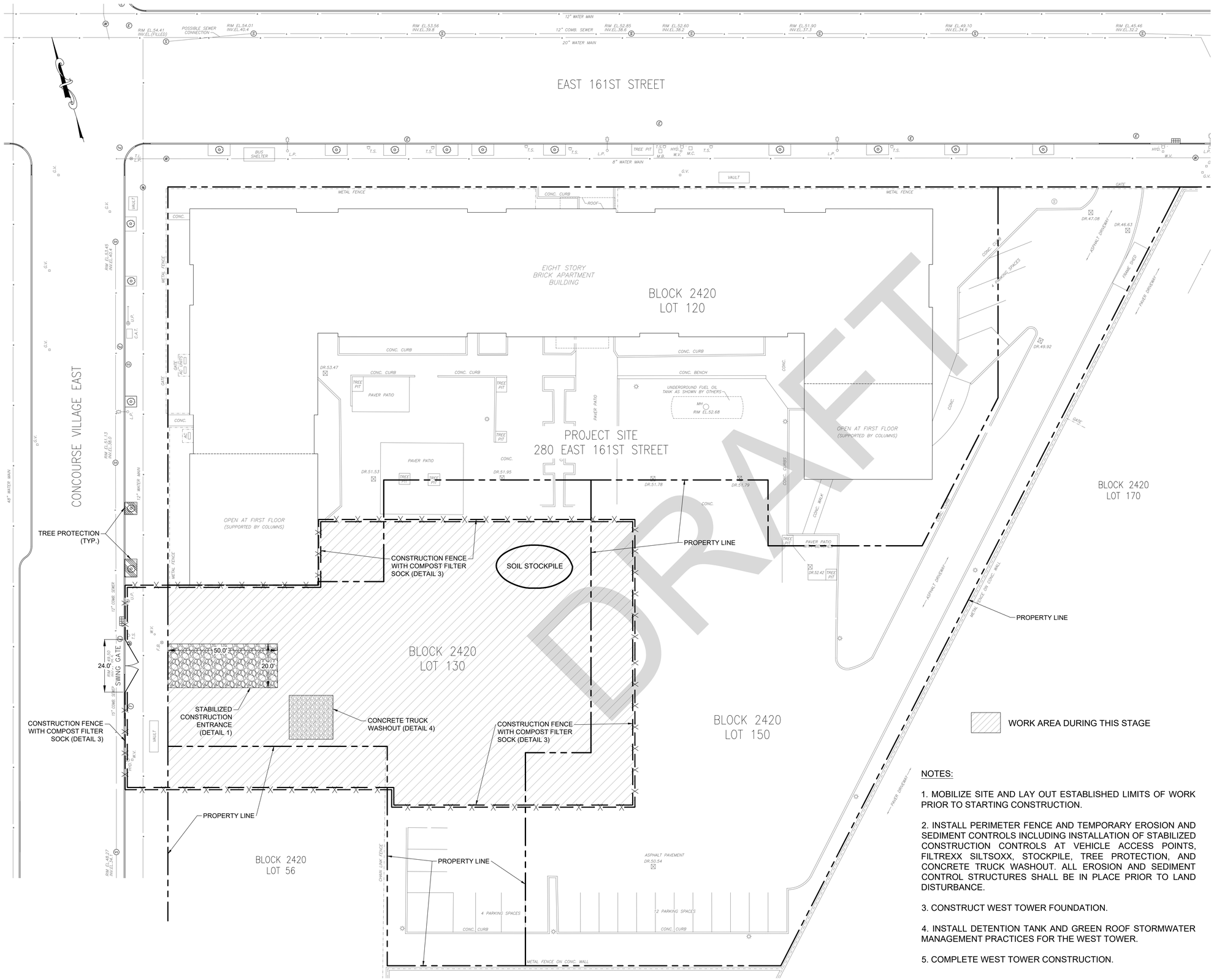
DR.51.07
DR.51.08




NOTES:

1. MOBILIZE SITE AND LAY OUT ESTABLISHED LIMITS OF WORK PRIOR TO STARTING CONSTRUCTION.

2. INSTALL PERIMETER FENCE AND TEMPORARY EROSION AND SEDIMENT CONTROLS INCLUDING INSTALLATION OF STABILIZED CONSTRUCTION CONTROLS AT VEHICLE ACCESS POINTS, FILTREXX SILTSOXX, STOCKPILE, TREE PROTECTION, AND CONCRETE TRUCK WASHOUT. ALL EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE IN PLACE PRIOR TO LAND DISTURBANCE.

3. CONSTRUCT WEST TOWER FOUNDATION.

4. INSTALL DETENTION TANK AND GREEN ROOF STORMWATER MANAGEMENT PRACTICES FOR THE WEST TOWER.

5. COMPLETE WEST TOWER CONSTRUCTION.

DRAFT

*PROJECT NAME*

280 EAST 161ST STREET

Bronx, New York 10451

*PREPARED BY:*

Philip Habib & Associates

432 Park Avenue South
New York, NY 10016
T: 212.929.5656 F: 212.929.5605

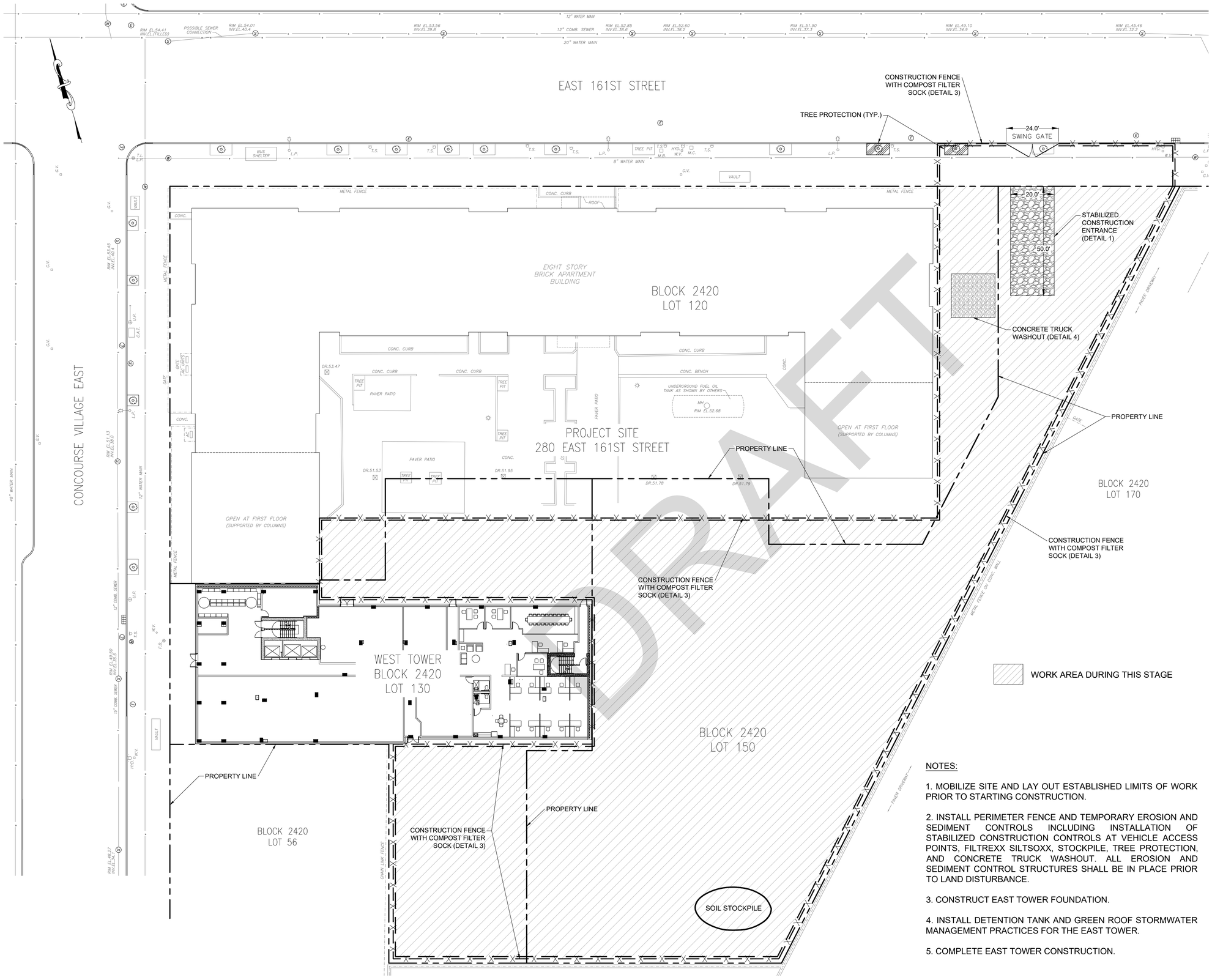
| | |
|---|---|
| *PROJECT NO.* | 2288C |
| *DATE:* | 09/26/2025 |
| *SCALE:* | 1" = 20' |
| *DRAWN BY:* | JY |
| *CHECKED BY:* | SM |

*DRAWING TITLE*

EROSION & SEDIMENT CONTROL
PHASE I

*DRAWING NO.*

FIGURE 3




DRAFT

NOTES:

1. MOBILIZE SITE AND LAY OUT ESTABLISHED LIMITS OF WORK PRIOR TO STARTING CONSTRUCTION.

2. INSTALL PERIMETER FENCE AND TEMPORARY EROSION AND SEDIMENT CONTROLS INCLUDING INSTALLATION OF STABILIZED CONSTRUCTION CONTROLS AT VEHICLE ACCESS POINTS, FILTREXX SILTSOXX, STOCKPILE, TREE PROTECTION, AND CONCRETE TRUCK WASHOUT. ALL EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE IN PLACE PRIOR TO LAND DISTURBANCE.

3. CONSTRUCT EAST TOWER FOUNDATION.

4. INSTALL DETENTION TANK AND GREEN ROOF STORMWATER MANAGEMENT PRACTICES FOR THE EAST TOWER.

5. COMPLETE EAST TOWER CONSTRUCTION.

*PROJECT NAME*

280 EAST 161ST STREET

Bronx, New York 10451

*PREPARED BY:*

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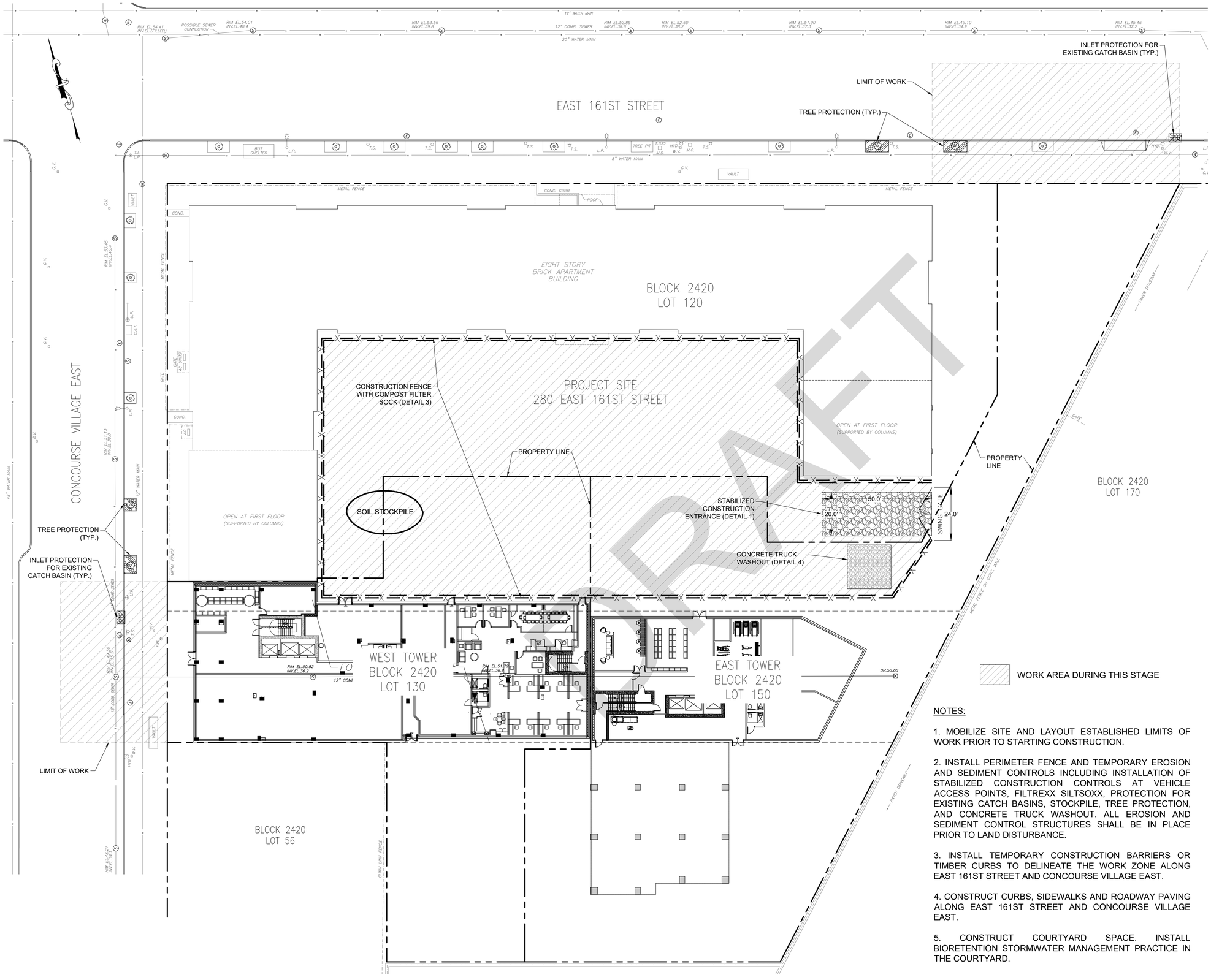
| | |
|---|---|
| *PROJECT NO.* | 2288C |
| *DATE:* | 09/26/2025 |
| *SCALE:* | 1" = 20' |
| *DRAWN BY:* | JY |
| *CHECKED BY:* | SM |

*DRAWING TITLE*

EROSION & SEDIMENT CONTROL PHASE II

*DRAWING NO.*

FIGURE 4




NOTES:

1. MOBILIZE SITE AND LAYOUT ESTABLISHED LIMITS OF WORK PRIOR TO STARTING CONSTRUCTION.

2. INSTALL PERIMETER FENCE AND TEMPORARY EROSION AND SEDIMENT CONTROLS INCLUDING INSTALLATION OF STABILIZED CONSTRUCTION CONTROLS AT VEHICLE ACCESS POINTS, FILTREXX SILTSOXX, PROTECTION FOR EXISTING CATCH BASINS, STOCKPILE, TREE PROTECTION, AND CONCRETE TRUCK WASHOUT. ALL EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE IN PLACE PRIOR TO LAND DISTURBANCE.

3. INSTALL TEMPORARY CONSTRUCTION BARRIERS OR TIMBER CURBS TO DELINEATE THE WORK ZONE ALONG EAST 161ST STREET AND CONCOURSE VILLAGE EAST.

4. CONSTRUCT CURBS, SIDEWALKS AND ROADWAY PAVING ALONG EAST 161ST STREET AND CONCOURSE VILLAGE EAST.

5. CONSTRUCT COURTYARD SPACE. INSTALL BIORETENTION STORMWATER MANAGEMENT PRACTICE IN THE COURTYARD.

DRAFT

*PROJECT NAME*

280 EAST 161ST STREET

Bronx, New York 10451

*PREPARED BY:*

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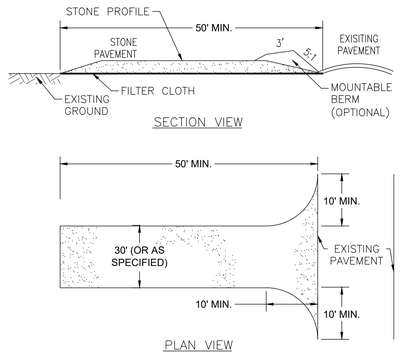
| | |
|---|---|
| *PROJECT NO.* | 2288C |
| *DATE:* | 09/26/2025 |
| *SCALE:* | 1" = 20' |
| *DRAWN BY:* | JY |
| *CHECKED BY:* | SM |

*DRAWING TITLE*

EROSION & SEDIMENT CONTROL PHASE III

*DRAWING NO.*

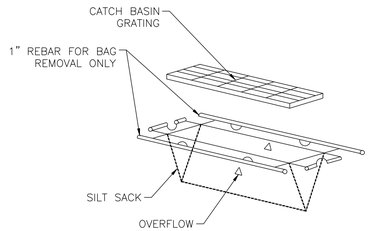
FIGURE 5

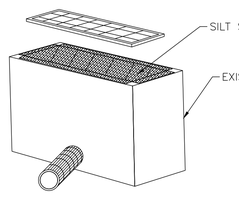


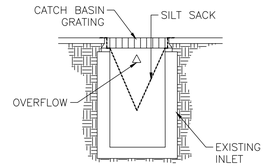

STABILIZED CONSTRUCTION ENTRANCE SPECIFICATIONS

1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN FIFTY (50) FEET.
3. THICKNESS - NOT LESS THAN 6 INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) IF SINGLE ENTRANCE TO SITE.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO THE PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICLE A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT INOT PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
10. STABILIZED CONSTRUCTION ENTRANCE TO MEET NYSDEC STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (BLUE BOOK, LATEST EDITION).

## 1 STABILIZED CONSTRUCTION ENTRANCE DETAIL (N.T.S.)



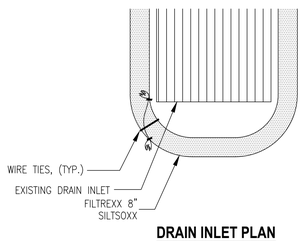




INSTALLATION DETAIL

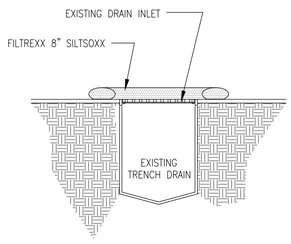
NOTE:

1. STORM DRAIN INLET PROTECTION TO MEET NYSDEC STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (BLUE BOOK, LATEST EDITION) FOR TYPE V- MANUFACTURED INSERT INLET PROTECTION DEVICES.

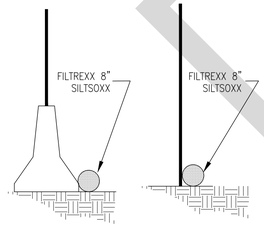
## 2 STORM DRAIN INLET PROTECTION DETAIL (N.T.S.)



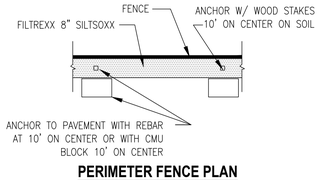

**DRAIN INLET PLAN**




**DRAIN INLET SECTION**




**PERIMETER FENCE SECTION**




**PERIMETER FENCE PLAN**

NOTES:

1. COMPOST FILTER SOCK TO MEET NYSDEC STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (BLUE BOOK, LATEST EDITION) FOR THE IV-PAVED SURFACE INLET PROTECTION.
2. FILTER MEDIA FILL TO MEET FILTREXX SPECIFICATIONS AND NYSDEC REQUIREMENTS.
3. COMPOST FILTER SOCK SHALL BE WEIGHTED, BRACED, TIED OR OTHERWISE ANCHORED TO PREVENT MOVEMENT OR SHIFTING OF LOCATION ON PAVED SURFACES.
4. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

## 3 COMPOST FILTER SOCK (N.T.S.)

### Our Services

**A Complete Solution - We Take Care of Everything.**

Concrete Washout Systems is an ideal solution for developers and contractors looking for a cost effective and fully compliant method of dealing with onsite washout. Here are just a few reasons why you should consider Concrete Washout Systems:

- Highly economical way to remove and recycle your concrete washout water
- Eliminates costly fines and fees for non-compliance
- Containment prevents spill damage to concrete and asphalt
- Replaces outdated washout procedures which are costly and damaging to the environment
- Reduces unsightly messes on job sites
- **Patented CWS containers meet the requirements of New York City Local Law 70 when used and serviced properly.**

**Rampless Washout Container**
The rampless has more holding capacity for jobsites that are not pumping or that have a need for more than one box on the jobsite.

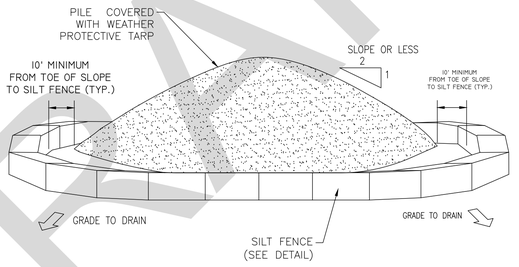
**SPECIFICATIONS:**

| | |
|---|---|
| **Holding Capacity** | 6 cubic yards and nearly 1200 gallons of jobsite capacity; capacity for washout from approximately 450 yards of poured material or containment for approximately 45 trucks. Capacity is controlled at the job site and is determined by the quantity of water used to clean each truck. |
| **Dimensions** | 12'L X 8'W X 2'H |
| **Hook Points** | The box can be configured with hook points for commercial applications |

NOTES:

1. ALL PRE-FABRICATED WASHOUT CONTAINERS SHALL BE LINED WITH PLASTIC SHEETING WITH NO HOLES OR TEARS THAT WOULD ALLOW WAS WATER TO ESCAPE. IF DAMAGE OCCURS, THE CONTAINER SHALL BE REPAIRED AND RELINED WITH NEW PLASTIC. PLASTIC LINER SHALL BE REPLACED WITH EACH CLEANING OF THE WASHOUT FACILITY.
2. CONCRETE WASHOUT CONTAINERS SHALL BE INSPECTED DAILY AND AFTER HEAVY RAINS TO CHECK FOR LEAKS AND IDENTIFY ANY PLASTIC LININGS AND SIDEWALLS THAT HAVE BEEN DAMAGED BY CONSTRUCTION ACTIVITIES. DAMAGES TO THE CONTAINER SHALL BE REPAIRED OR REPLACED PROMPTLY.
3. ACCUMULATED HARDENED MATERIAL SHALL BE REMOVED WHEN 75% OF THE STORAGE CAPACITY OF THE STRUCTURE IS FILLED. ANY EXCESS WASH WATER SHALL BE PUMPED INTO A CONTAINMENT VESSEL AND PROPERLY DISPOSED OF OFF-SITE.
4. THE MINIMUM SIZE SHALL BE 8' BY 8' BY 2' DEEP. CONTAINER SHALL BE SIZED BASED ON EXPECTED FREQUENCY OF CONCRETE POURS.

## 4 CONCRETE TRUCK WASHOUT DETAIL (N.T.S.)



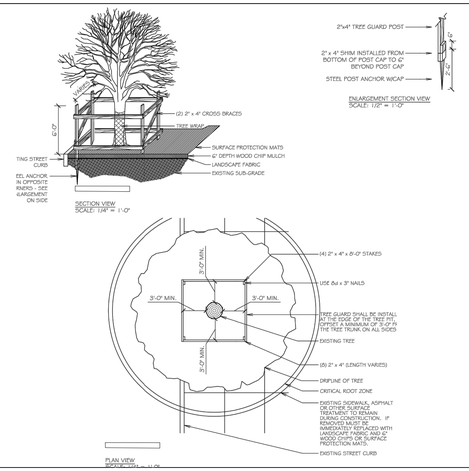

CONSTRUCTION SPECIFICATIONS

1. AREA CHOSEN FOR STOCKPILING SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1:2.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH SILT FENCE AND COVERED.

NOTES:

1. CONSTRUCTION STOCKPILING DETAIL TO MEET NYSDEC STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (BLUE BOOK, LATEST EDITION).
2. STOCKPILE TO BE LOCATED A MINIMUM OF 10 FEET FROM TOW OF STOCKPILE TO SILT FENCE.
3. SOIL STOCK PILES MUST BE COVERED DURING A RAIN EVENT AND IF LEFT ON SITE OVERNIGHT.

## 5 CONSTRUCTION STOCKPILING DETAIL (N.T.S.)




## 6 PROTECTING VEGETATION DURING CONSTRUCTION (N.T.S.)

DRAFT

*PROJECT NAME*

280 EAST 161ST STREET

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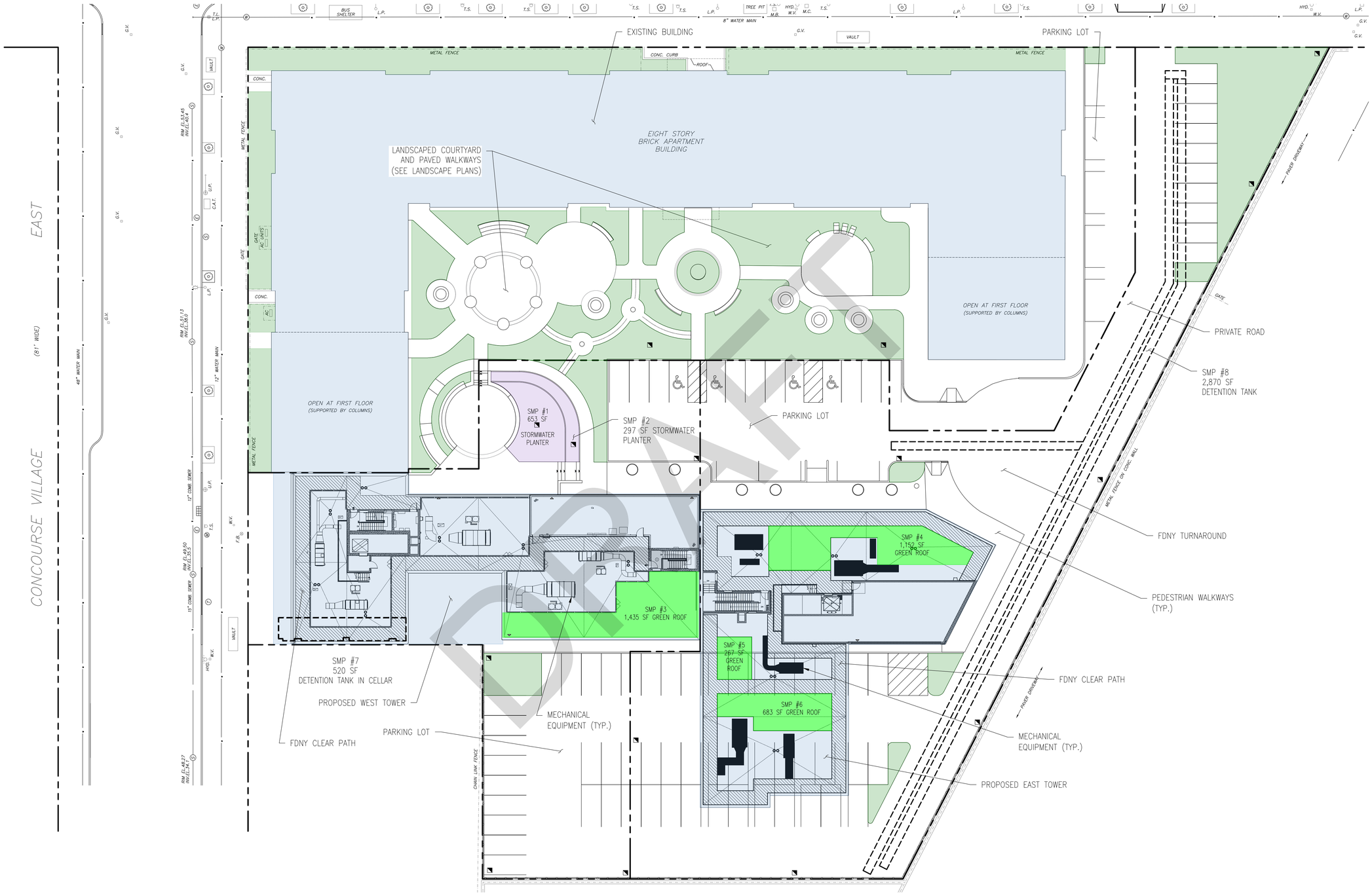
| | |
|---|---|
| *PROJECT NO.* | 2288C |
| *DATE:* | 09/26/2025 |
| *SCALE:* | N.T.S |
| *DRAWN BY:* | JY |
| *CHECKED BY:* | SM |

*DRAWING TITLE*

EROSION & SEDIMENT CONTROL DETAILS

*DRAWING NO.*

FIGURE 6




DRAFT

# 280 EAST 161ST STREET
**BRONX**

## SITE CONSTRAINT ANALYSIS

0 20 40 60 80
U.S. STANDARD SCALE: 1 INCH = 20 FEET

Philip Habib & Associates · Engineers and Planners
440 Park Avenue South · New York, NY · 10016

| | |
|---|---|
| SCALE: | 1"=20' |
| DATE: | 11/14/2025 |
| DRAWN BY: | JY |

DRAWING NO.: **Figure 7**
JOB NO.: 2288C

EAST 161ST STREET

CONCOURSE VILLAGE EAST

BLOCK 2420
LOT 120

EIGHT STORY
BRICK APARTMENT
BUILDING

PROJECT SITE
280 EAST 161ST STREET

WEST TOWER
BLOCK 2420
LOT 130

EAST TOWER
BLOCK 2420
LOT 150

BLOCK 2420
LOT 56

BLOCK 2420
LOT 170

OPEN AT FIRST FLOOR
(SUPPORTED BY COLUMNS)

OPEN AT FIRST FLOOR
(SUPPORTED BY COLUMNS)

METAL FENCE

CONC. CURB

ROOF

CONC.

GATE

VAULT

BUS SHELTER

TREE PIT

8" WATER MAIN

12" WATER MAIN

20" WATER MAIN

12" COMB. SEWER

45" WATER MAIN

12" WATER MAIN

15" COMB. SEWER

PAVER DRIVEWAY

METAL FENCE ON CONC. WALL

CHAIN LINK FENCE

RIM EL.54.41
INV.EL.(FILLED)

POSSIBLE SEWER CONNECTION

RIM EL.54.01
INV.EL.40.4

RIM EL.53.56
INV.EL.39.8

RIM EL.52.85
INV.EL.38.6

RIM EL.53.60
INV.EL.38.2

RIM EL.51.90
INV.EL.37.3

RIM EL.49.10
INV.EL.34.9

RIM EL.45.46
INV.EL.32.2

RIM EL.53.44
INV.EL.40.4

RIM EL.51.13
INV.EL.38.0

RIM EL.49.50
INV.EL.36.4

RIM EL.48.27
INV.EL.34.1

DRAFT

*PROJECT NAME*

280 EAST 161ST STREET

Bronx, New York 10451

*PREPARED BY:*

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|---|---|
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| *DATE:* | 11/05/2025 |
| *SCALE:* | 1" = 20' |
| *DRAWN BY:* | JY |
| *CHECKED BY:* | SM |

*DRAWING TITLE*

PROPOSED SITE PLAN

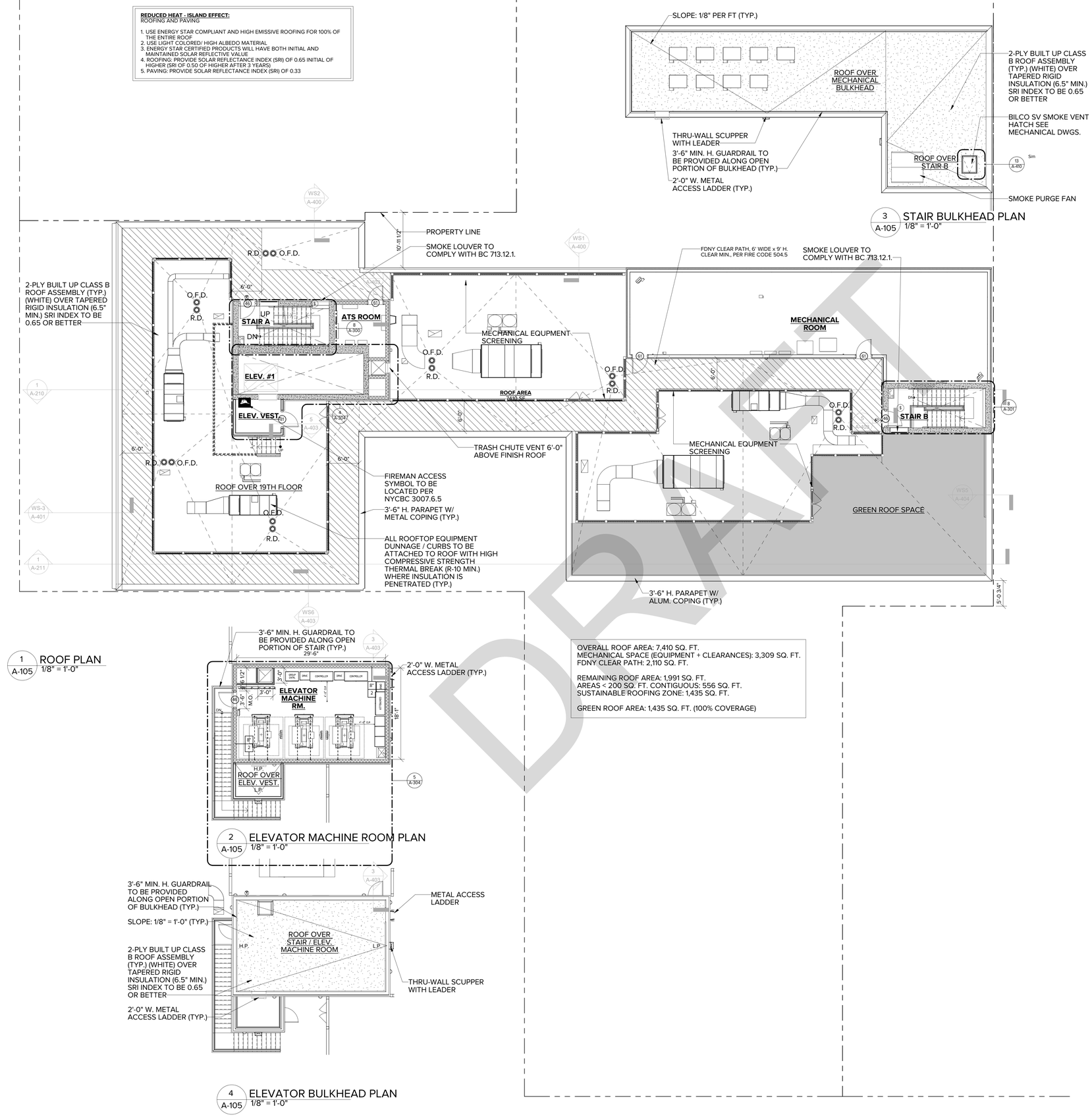
*DRAWING NO.*

FIGURE 8

SWPPP SUPPORTING DOCUMENT
PREPARED BY AUFGANG ARCHITECTURE

**REDUCED HEAT - ISLAND EFFECT:**
ROOFING AND PAVING

1. USE ENERGY STAR COMPLIANT AND HIGH EMISSIVE ROOFING FOR 100% OF THE ENTIRE ROOF
2. USE LIGHT COLORED/ HIGH ALBEDO MATERIAL
3. ENERGY STAR CERTIFIED PRODUCTS WILL HAVE BOTH INITIAL AND MAINTAINED SOLAR REFLECTIVE VALUE
4. ROOFING: PROVIDE SOLAR REFLECTANCE INDEX (SRI) OF 0.65 INITIAL OF HIGHER (SRI) OF 0.50 OF HIGHER AFTER 3 YEARS)
5. PAVING: PROVIDE SOLAR REFLECTANCE INDEX (SRI) OF 0.33




3 A-105 STAIR BULKHEAD PLAN
1/8" = 1'-0"

1 A-105 ROOF PLAN
1/8" = 1'-0"

OVERALL ROOF AREA: 7,410 SQ. FT.
MECHANICAL SPACE (EQUIPMENT + CLEARANCES): 3,309 SQ. FT.
FDNY CLEAR PATH: 2,110 SQ. FT.

REMAINING ROOF AREA: 1,991 SQ. FT.
AREAS < 200 SQ. FT. CONTIGUOUS: 556 SQ. FT.
SUSTAINABLE ROOFING ZONE: 1,435 SQ. FT.

GREEN ROOF AREA: 1,435 SQ. FT. (100% COVERAGE)




2 A-105 ELEVATOR MACHINE ROOM PLAN
1/8" = 1'-0"




4 A-105 ELEVATOR BULKHEAD PLAN
1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | INTERIOR FURRING - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (RTS) |
| 0-5 | TYPICAL PARTITION - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-8 | CHASE WALL PARTITION - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL. METAL STUDS @ 16" O.C. 5 1/2" (UNFACED) MINERAL WOOL BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BE |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U314 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING EAGLE-HEAD SCREWS 12" O.C., SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULFU907) (STC 50 MIN.) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1) LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULFU914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) (STC 50 MIN.) |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- RESIDENTIAL TYPE-B1 1BR 525 SF — APARTMENT TYPE
- MIH- INCLUSIONARY/SUPPORTIVE UNIT
- MI- MOBILITY UNIT
- HVI - HEARING/ VISUAL UNIT
- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- "T" FLOOR TURNING SPACE
- 5'-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET, 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.
- EXHAUST VENT

GENERAL NOTES:
1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE A-510 SERIES DWG'S
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-8" MIN A.F.F. AND 12" MIN. BELOW KITCH. CEILING
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIO UNIT KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO TYPICAL UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, AND RCP DWG'S FOR LOCATIONS
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(306)
13. REFER TO A-100 SERIES FLOOR PLANS, A-200 SERIES ELEVATIONS, A-600 SERIES WINDOW SCHEDULE, AND A-400 SERIES WINDOW DETAILS FOR WINDOW TYPES, SIZES, AND LOCATIONS

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 860 CONCOURSE VILLAGE EAST

BRONX, NY 10451

BLOCK: 2420 LOT: 130


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
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280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
100 William St.
Suite 1205
New York, NY 10038
212.257.6190

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656

Sustainability Engineer
**Steve Winter Assoc:**
New York, NY
220 E 42nd Street, Floor 28
New York, NY 10017
212.564.5800 (main)

Landscape Architect
**Bayview Landscape Architecture**
44-02 11th Street, Studio 611
Long Island City, New York 11101

Interior Designer
**Binder Design**
365 Rt. 59 Ste 166
Airmont, NY 10952
Phone: 845-517-2802
Website:
www.binderdesigngroup.com

Lighting Consultant
**ONELUXstudio**
158 West 29th Street, 10th Fl
New York, NY 10001
Main: 212-201-5790
Website:
www.oneluxstudio.com


| DATE | SUBMISSIONS / REVISIONS |
|---|---|
| 05/27/2025 | ISSUED FOR HPD |
| 08/25/2025 | 100% PLANS ISSUED FOR CLOSING |
| 07/31/2025 | ISSUED TO DOB |
| 03/29/2024 | ISSUED FOR 80% CD |
| 03/15/2024 | ISSUED FOR 70% CD |
| 10/27/2023 | ISSUED TO DOB |
| 8/25/2023 | ISSUED FOR SCHEMATIC DESIGN |

SHEET TITLE:

## ROOF PLAN


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SEAL & SIGNATURE

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PROJECT NO: 23010
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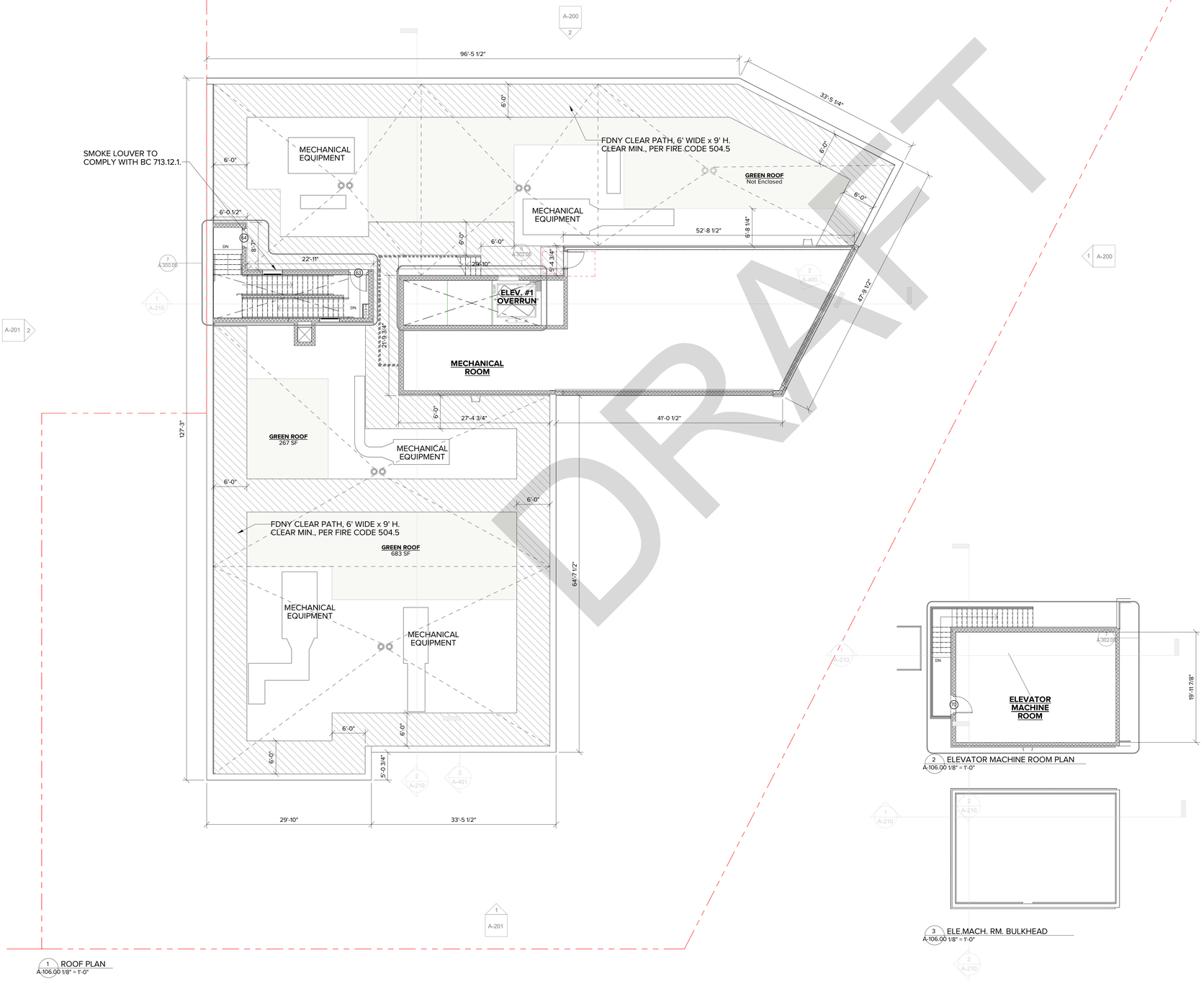
SCALE: As indicated
SHEET NO: OF
DRAWING NO: A-105.00

NYC DOB NUMBER: X00851840 - I1

DRAFT

SWPPP SUPPORTING DOCUMENT
PREPARED BY AUFGANG ARCHITECTURE




1 ROOF PLAN
A-106.00 1/8" = 1'-0"




2 ELEVATOR MACHINE ROOM PLAN
A-106.00 1/8" = 1'-0"




3 ELE.MACH. RM. BULKHEAD
A-106.00 1/8" = 1'-0"

| WALL TYPE LEGEND | |
|---|---|
| **NOTE: G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS.** | |
| (0) NON RATED | |
| 0-1 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. ON ONE SIDE OF 7/8" METAL FURRING CHANNEL 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-2 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" GYP. BD. OVER 1-1/2" GALV. METAL FURRING OR Z CHANNEL 1-1/2" RIGID INSULATION (R 7.5) AT EXTERIOR CONCRETE/CMU WALLS. W.P. GYP. BD. AT TOILET AND WET AREAS. |
| 0-3 | FURRING @ INTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) |
| 0-4 | FURRING @ EXTERIOR CIP/CMU - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 3-5/8" METAL STUDS @ 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE) 3-1/2" BATT INSULATION AT EXTERIOR WALLS (R15) |
| 0-5 | <varies> |
| 0-6 | PARTITION @ PANEL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. - W.P. GYP. BD. AND 1-1/2" SOUND ATTENUATION AT BATHROOM AND TOILET ROOMS. |
| 0-7 | VERTICAL PIPE CHASE WALL - (1) LAYER 5/8" TYPE "X" W.P. GYP. BD. ON ONE SIDE OF 1-5/8"" METAL STUDS 16" O.C. EXTEND STUDS UP TO UNDERSIDE OF FLOOR OR ROOF (ABOVE)-1-1/2" INSULATION AT COLD/HOT PIPES. |
| 0-8 | <varies> |
| | |
| (1) 1 HR RATED | |
| 1-1 | 1 HR RATED TENANT PARTITION - (1) LAYER OF 5/8" TYPE "X" GYP. BD.ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYP. BD. ON OTHER SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1052)(STC 50-54) |
| 1-2 | 1 HR RATED CHASE WALL PARTITION - (1) LAYER OF 5/8" TYPE "X" WATER RESISTANT GYP. BD. ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB/PLANK. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 1-3 | 1 HR RATED EXTERIOR WALL - (1) LAYER 5/8" TYPE "X" GYP. BD. ON INTERIOR SIDE, (1) LAYER 5/8" EXTERIOR GRADE GYP SHEATHING ON EXTERIOR SIDE OF 6" GAL METAL STUDS @ 16" O.C. 5 1/2" (UNFACED) BATT INSULATION (R-21) BETWEEN STUDS OVERLAP INSULATION TABS AT STUDS - (UL #U25) |
| SF-1 | STOREFRONT - FIXED PANE |
| SF-2 | STOREFRONT - FIXED PANE |
| SF-4 | STOREFRONT - FIXED PANE |
| SF-6 | STOREFRONT - FIXED PANE |
| SF-7 | STOREFRONT - FIXED PANE |
| SF-8 | STOREFRONT - FIXED PANE |
| SF-11 | STOREFRONT - FIXED PANE |
| SF-12 | STOREFRONT - DOOR + FIXED PANE |
| SF-14 | STOREFRONT - FIXED PANE |
| SF-15 | STOREFRONT - FIXED PANE |
| | |
| (2) 2HR RATED | |
| 2-1 | 2HR RATED CMU WALL- CMU (CLASS D-2) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF PLANK (UL#U906) |
| 2-2 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-3 | 2 HR RATED PARTITION - (2) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 3-5/8" METAL STUDS @ 16" O.C. W/ 3-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. (GA FILE #WP-1522)(STC 55-59) |
| 2-4 | 2 HR RATED CHASE WALL - (2) LAYERS OF 5/8" WATER RESISTANT GYP. BD. SHEATHING ON ONE SIDE OF 2-1/2" METAL STUDS @ 16" O.C. @ EACH SIDE OF CHASE. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF SLAB. SEAL TIGHT W/ CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS WITH FIRESAFING INSULATION & CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2-1/2" METAL STUD BRACING @ 48" O.C. MAX (UL-#V442)(STC 50 MIN) |
| 2-5 | 2 HR SHAFT WALL (4") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 2-1/2" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-6 | 2 HR SHAFT WALL (5") - (2) LAYERS OF 5/8" TYPE "X" GYP BD ON ONE SIDE OF 4" METAL C-H STUDS @ 16" O.C. W/ (1) LAYER OF 1" TYPE "X" GYP LINER PANEL ON SHFT SIDE W/ 1" MINERAL FIBER INSULATION IN CAVITY. - SEAL TOP OF WALL TO CONC/PLANK (FIRE TEST UL U514 / STC 45-49) |
| 2-7 | 2 HR SHAFT WALL - MASONARY EQUIVALENT - (1) LAYER OF 5/8" FIBER REINFORCED CEMENT BD. (ASTM C 1629-0 IMPACT CLASSIFICATION LEVEL 2) OVER 5/8" TYPE "X" GYP. BD. (STAGGERED JOINTS) OVER THE EXTERIOR SIDE OF 4" C-H 3 MILL (20GA) METAL STUDS 16" O.C. W/ 1" LINER BD. (ASTM C 1629-0 LEVEL 3) INSERTED IN H PORTION OF STUDS. TYPE "AR" FIRE CODE PANELS - WP AT WET AREA. SECURE PANELS WITH NO 8 SELF DRILLING BUGLE HEAD SCREWS 12" O.C.. SECURE TOP AND BOTTOM RUNNERS TO STRUCTURE. ASSEMBLY TEST ASTM 1629-0 LEVEL 2. FIRE TEST UL U415 SYSTEM E OR F / STC 45-49 W/1" MINERAL FIBER INSULATION IN CAVITY |
| | |
| (3) 3HR RATED | |
| 3-1 | 2HR RATED CMU WALL CMU (CLASS C-3) CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING @ ALTERNATIVE BLOCK COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF FLOOR/ROOF ABOVE CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULrU907) |
| 3-2 | 3 HR RATED CMU WALL PARTITION (1 LAYER OF 1/2" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CMU (CLASS D-2)/ CIP. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF SLAB ABOVE W/ CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF SLAB (ULrU914) (PROVIDE STC RATING OF 50-54 @ COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS.) |
| 3-3 | 3HR RATED PARTITION WALL (3) LAYER OF 5/8" TYPE "X" GYP. BD. ON EACH SIDE OF 2-1/2" METAL STUDS @ 16" O.C. W/ 1-1/2" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYP. BD. UP TO UNDERSIDE OF FLOOR/DECK & SEAL TIGHT TO UNDERSIDE OF FLOOR DECK AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT. |

LEGEND:

- CONCRETE WALL & COLUMN - SEE STRUCTURAL DWG'S.
- CONCRETE BLOCK WALL (CMU) - SEE PLANS FOR SIZE
- MASONRY VENEER W/ RIGID INSULATION
- EIFS FINISH
- METAL PANEL FINISH
- GYPSUM BOARD PARTITION (GYP BD.) - SEE PLAN FOR SIZE
- FIRE RATED SHAFT WALL
- DOOR & FRAME - SEE DOOR SCHEDULE
- PARTITION - SEE WALL TYPE LEGEND
- WINDOW - SEE WINDOW SCHEDULE
- EXIT LIGHT & SIGN
- SMOKE / CARBON MONOXIDE DETECTOR
- SMOKE DETECTOR
- APARTMENT DESIGNATION #(FLOOR) XX (APARTMENT NUMBER)
- MIH- INCLUSIONARY/SUPPORTIVE UNIT
- MI- MOBILITY UNIT
- HVI - HEARING/ VISUAL UNIT
- APARTMENT TYPE

TYPE-B1 1BR 525 SF

- ELEVATOR FIREMEN ACCESS
- COLUMN IDENTIFICATION SYMBOL
- CMU SIZE
- FIRE RATING
- 11" FLOOR TURNING SPACE
- 5'-0" DIAMETER CLEAR FLOOR TURNING SPACE
- 30" X 48" CLEAR FLOOR SPACE
- REMOVABLE KITCHEN BASE CABINET. 2'-6" WIDE X 2'-0" DEEP
- REFLECTED CEILING
- ELECTRIC HOUSE PANEL - SEE ELEC. DWGS.

GENERAL NOTES:
1. ALL PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.)
2. FOR KITCHEN AND TOILET ELEVATIONS SEE DWG'S A-510, A-511, A-512, A-513, A-514, A-515, A-516, A-517 & A-518
3. G.C. SHALL COORDINATE SIZE & LOCATION OF ALL HVAC OPENINGS IN PLANK/ SLAB/ DECKING WITH MECHANICAL DWGS.
4. G.C. SHALL COORDINATE SIZE AND LOCATION OF ALL MASONRY OPENINGS AT ELEVATOR ENTRANCES WITH ELEVATOR VENDOR.
5. BOTTOM OF DROPPED ARCH SHALL BE 6'-6" MIN A.F.F.
6. FOR ELECTRICAL OUTLETS, REFER TO LATEST ELEC. CODE FOR ALL REQUIREMENTS INCLUDING HEIGHT, SPACING, ETC.
7. ALL STUDIOS AND/OR KITCHENETTES SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. REFER TO ENLARGED UNIT PLANS AND MECHANICAL DWG'S FOR LOCATION
8. ALL BATHROOMS SHALL BE EQUIPPED WITH MECHANICAL VENTILATION. SEE TO MECHANICAL DWG'S
9. VISUAL SIGNALING DEVICE/ STROBE LIGHT SHALL BE PLACED IN ALL H.V.I UNITS. SEE ELEC. DWG'S FOR LOCATIONS
10. BUILDING SHALL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM. SEE SPRINKLER DWG'S, A-500 THRU A-508, AND A-700 THRU A-701 FOR LOCATION
11. ALL EGRESS ENCLOSURES SHALL BE IMPACT RESISTANT
12. ALL COUNTERTOPS SHALL PROVIDE KNEE AND TOE CLEARANCE AS PER A117.1-2009 SEC. 606.2(606)
13. REFER TO A-200 THRU A-201 AND A-602 FOR WINDOW TYPES
14. ALL COUNTERTOPS: A PORTION OF THE COUNTER SURFACE 36" INCHES IN LENGTH AND 36" MAXIMUM IN HEIGHT ABOVE THE FINISHED FLOOR SHALL COMPLY WITH A117.1 - 2009 SEC 904.3.1

PROPOSED NEW MIXED USE DEVELOPMENT FOR:

# 310 E. 161ST ST EAST TOWER

310 E. 161ST ST., BRONX, NY 10451

BLOCK: 2420 LOT: 120 & 150


Architect:
**AUFGANG.**
74 Lafayette Avenue
Suite 301
Suffern, NY 10901
845.368.0004
info@aufgang.com

Owner/Developer
**BRONX PARK GTAH II LLC:**
280 East 161st St.
Bronx, NY 10451

Structural Engineer
**DESIMONE ENGINEERING:**
140 Broadway
25th Floor
New York, NY 10005
212.532.2211

MEP Engineer
**EP ENGINEERING ASSOCIATES:**
110 William St.
32nd Floor
New York, NY 10038
646.779.0758

Civil Engineer
**PHILIP HABIB & ASSOCIATES:**
432 Park Ave. South
6th Floor
New York, NY 10016
212.929.5656


| | |
|---|---|
| 09/15/2025 | ISSUED TO DOB |
| 05/02/2025 | ISSUED FOR 50% DD |
| 11/08/2024 | ISSUED FOR 100% SD |
| DATE | SUBMISSIONS / REVISIONS |

SHEET TITLE:

## ROOF PLAN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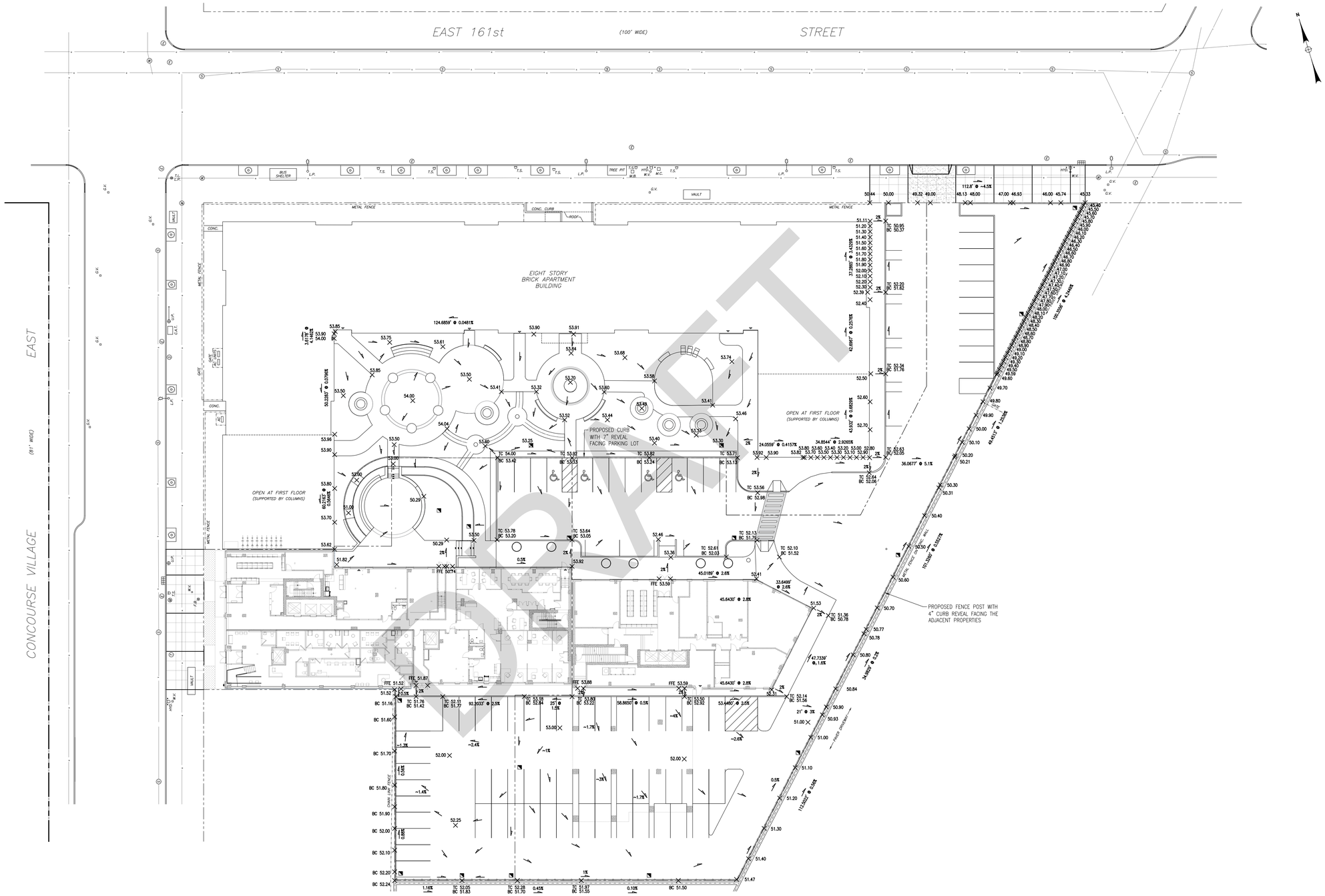
SEAL & SIGNATURE

ISSUE DATE: 05/03/23
PROJECT NO: Project Number
DRAWN BY: Author
CHECKED BY: Checker
SCALE: 1/8" = 1'-0"
SHEET NO: OF

DRAWING NO:
# A-106.00

NYC DOB NUMBER: X00945951-I1

DRAFT




DRAFT

# 280 EAST 161ST STREET

**THE BRONX**

## GRADING PLAN

0 20 40 60 80

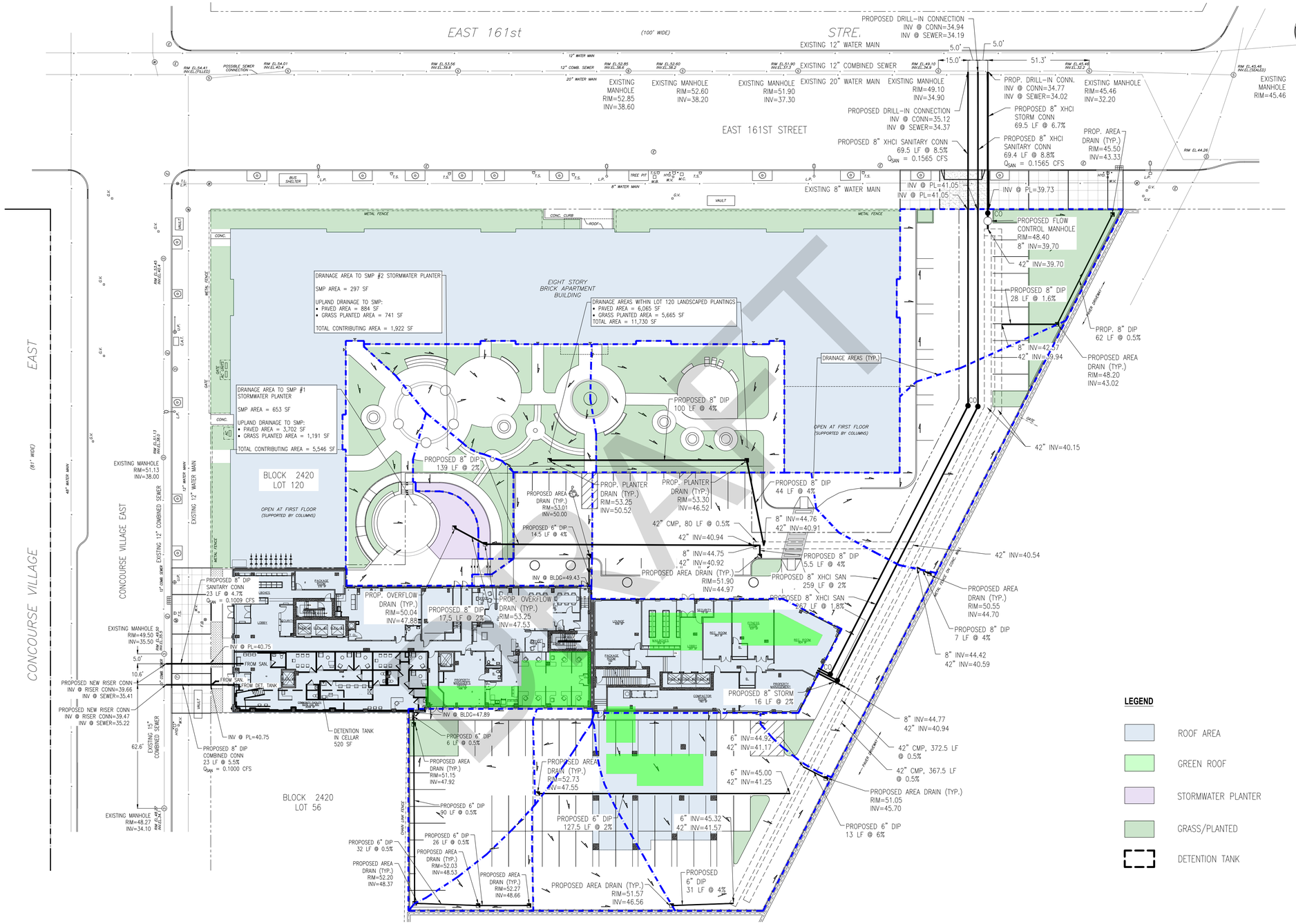
U.S. STANDARD SCALE: 1 INCH = 20 FEET

Philip Habib & Associates · Engineers and Planners
440 Park Avenue South · New York, NY · 10016

| | |
|---|---|
| SCALE: | 1"=20' |
| DATE: | 11/14/2025 |
| DRAWN BY: | JY |

DRAWING NO.: **Figure 9**

JOB NO.: 2288C




# 280 EAST 161ST STREET

**THE BRONX**

## DRAINAGE PLAN

0 20 40 60 80

U.S. STANDARD SCALE: 1 INCH = 20 FEET

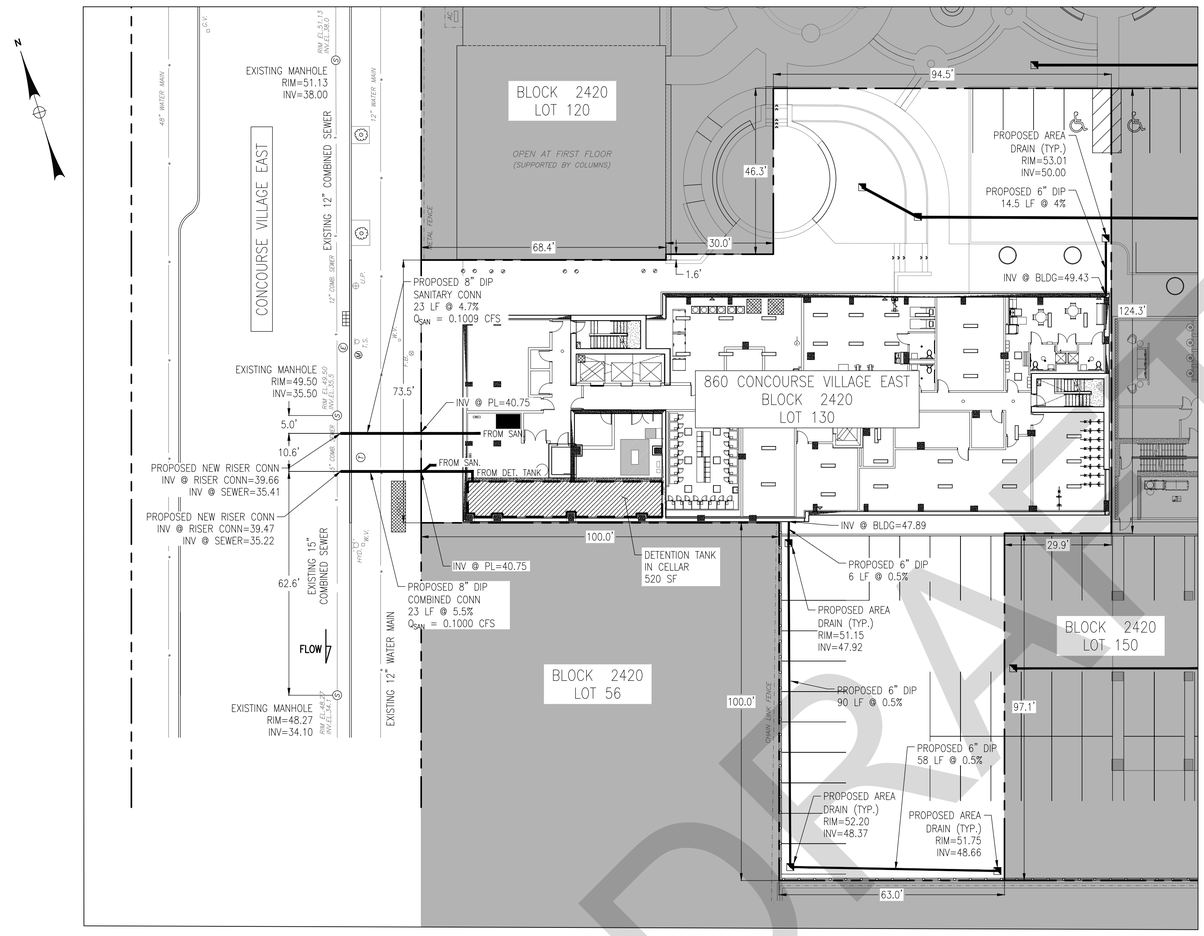

Philip Habib & Associates · Engineers and Planners
440 Park Avenue South · New York, NY · 10016


| | |
|---|---|
| SCALE: | 1"=20' |
| DATE: | 11/14/2025 |
| DRAWN BY: | JY |

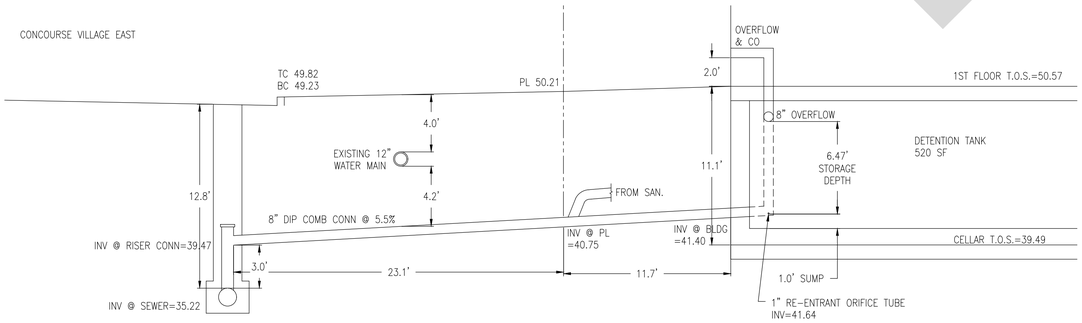
DRAWING NO.: **Figure 10**

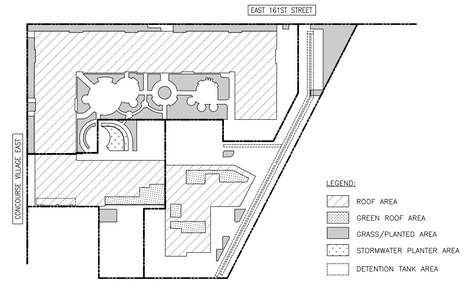
JOB NO.: 2288C

DRAFT




PLAN
SCALE: 1"=20'




SITE AREA
SCALE: NTS

## HYDRAULIC COMPUTATIONS

| | |
|---|---|
| ADDRESS | 860 CONCOURSE VILLAGE EAST |
| LOT | 130 |
| BLOCK | 2420 |
| ZONING | R8 |
| DOB# | |

| | AREA sq. ft. | AREA acres |
|---|---|---|
| LOT AREA: | 25,133 | 0.58 |
| ROOF AREA: | 10,568 | 0.24 |
| PAVED AREA: | 9,423 | 0.22 |
| GREEN ROOF AREA: | 1,435 | 0.03 |
| GRASS/PLANTED AREA: | 441 | 0.01 |
| TOTAL CONTRIBUTING AREA: | 21,867 | 0.50 |

### SANITARY DISCHARGE

TRIBUTARY AREA BY ZONING DISTRICT:
Qsan = (375 x 0.58 x 150) / (7.48 x 86,400) 0.0502 cfs
PEAK Qsan = 4 * Qsan 0.2009 cfs

TOTAL SANITARY FLOW= 0.20 cfs

### STORM DISCHARGE

| ACTUAL DEVELOPED FLOW | Q = CIA | | | |
|---|---|---|---|---|
| ROOF AREA (0.95): | Q1 = 0.95 | x 5.95 x 0.24 = | 1.37 | cfs |
| PAVED AREA (0.85): | Q2 = 0.85 | x 5.95 x 0.22 | 1.09 | cfs |
| GREEN ROOF AREA (0.70): | Q3 = 0.70 | x 5.95 x 0.03 | 0.14 | cfs |
| GRASS/PLANTED AREA (0.20): | Q4 = 0.20 | x 5.95 x 0.01 | 0.01 | cfs |
| TOTAL ACTUAL STORM DISCHARGE: | Q1 + Q2 + Q3 + Q4 = | | 2.61 | cfs |

### ALLOWABLE FLOW

MAXIMUM RELEASE RATE Qrr = 0.1 PER ACRE = 0.06 cfs

SINCE 10% ACRE > 0.046, USE 0.1 PER ACRE Qrr = 0.06 cfs

### SIZE OF DETENTION TANK

Cw, WEIGHTED C= 0.88
Rd = 1.85 in. (CSS AREAS WITH SCP)

REQUIRED DETENTION VOLUME Vv IN CUBIC FEET:

Vv = Rd/12*A*Cw = 2,951 CU FT

STORM DISCHARGE FROM DETENTION TANK WILL BE RESTRICTED TO 0.06 CFS

ORIFICE DESIGN

RE-ENTRANT ORIFICE TUBE, Cd = 0.52
DIAMETER OF ORIFICE (do) = 1.00 in.
Sdr=1930((Qdrr)^2/do^4) + do/24 = 6.47 FT

DETENTION TANK SIZE:
AREA = 520 SF
EFFECTIVE HEIGHT = 6.47 FT
CAPACITY = 3,364 CU FT

STORM FLOW OF 2.61 CFS WILL BE RESTRICTED TO 0.06 CFS
BY MEANS OF DETENTION FACILITIES AND CONTROLLED FLOW DEVICES

NOTES:
1. DETENTION TANKS PROVIDED VOLUME TO MEET THE POST-CONSTRUCTION STORMWATER FACILITY REQUIREMENTS = 10,378 CUBIC FEET
2. GREEN ROOF PROVIDED VOLUME TO MEET THE POST-CONSTRUCTION STORMWATER FACILITY REQUIREMENTS = 354 CUBIC FEET
2. STORMWATER PLANTER PROVIDED VOLUME TO MEET THE POST-CONSTRUCTION STORMWATER FACILITY REQUIREMENTS = 670 CUBIC FEET

ALL ELEVATIONS AND LEGAL GRADES SHOWN ON THIS SURVEY ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88 DATUM).

| REV. | DATE | DESCRIPTION | APPROVED |
|---|---|---|---|
| | | | |

OWNER: **BRONX PARK GTAH II LLC**
88 PINE STREET, NEW YORK, NY 10005

PROJECT:
860 CONCOURSE VILLAGE EAST
BOROUGH OF BRONX

TITLE:
SITE CONNECTION PROPOSAL
SCX-2623/25

| DOB. NO. | SCALE | DATE | SHEET |
|---|---|---|---|
| | 1" = 20' | 11/14/2025 | 1 OF 1 |

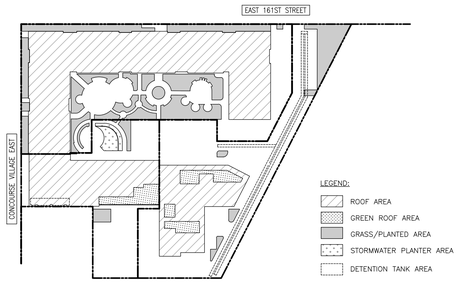
Philip Habib & Associates · Engineers and Planners
440 Park Avenue South · New York, NY · 10016

0 1 2 3 4
ORIGINAL SIZE IN INCHES

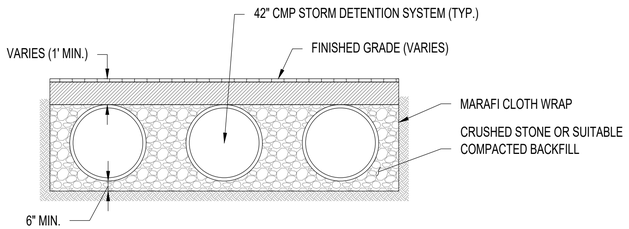
| | | | |
|---|---|---|---|
| PREPARED BY | JY | | |
| IN CHARGE | SM | DRAFTER | JY |
| DESIGNER | JY | CHECKER | SM |

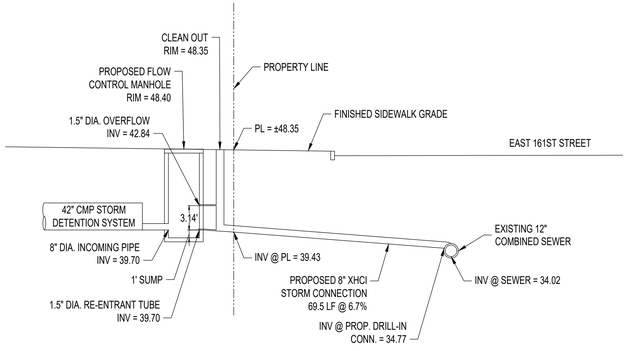
DRAFT

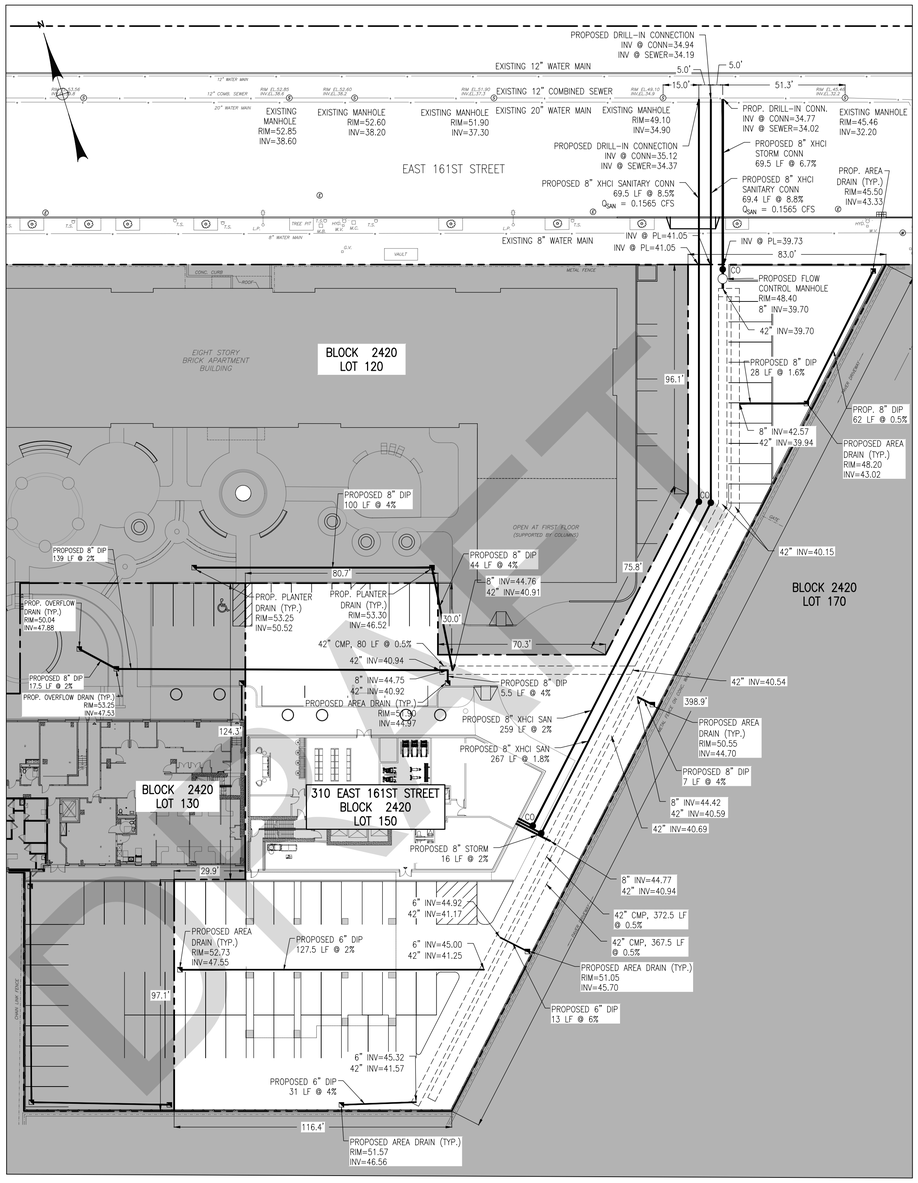
## SITE AREA
SCALE: NTS




NOTES:
1. DETENTION TANKS PROVIDED VOLUME TO MEET THE POST-CONSTRUCTION STORMWATER FACILITY REQUIREMENTS = 10,378 CUBIC FEET
2. GREEN ROOF PROVIDED VOLUME TO MEET THE POST-CONSTRUCTION STORMWATER FACILITY REQUIREMENTS = 354 CUBIC FEET
2. STORMWATER PLANTER PROVIDED VOLUME TO MEET THE POST-CONSTRUCTION STORMWATER FACILITY REQUIREMENTS = 670 CUBIC FEET




PLAN
SCALE: 1"=30'

## HYDRAULIC COMPUTATIONS

| | | |
|---|---|---|
| ADDRESS | 310 EAST 161ST STREET | |
| LOT | 150 | |
| BLOCK | 2420 | |
| ZONING | R8 | |
| DOB# | | |

| | AREA sq. ft. | AREA acres |
|---|---|---|
| LOT 150 AREA: | 39,161 | 0.90 |
| ROOF AREA: | 8,723 | 0.20 |
| PAVED AREA: | 25,405 | 0.58 |
| GREEN ROOF AREA: | 2,102 | 0.05 |
| GRASS/PLANTED AREA: | 2,932 | 0.07 |
| FROM P/O LOT 120: | 21,858 | 0.50 |
| PAVED AREA: | 14,628 | 0.33 |
| GRASS/PLANTED AREA: | 7,230 | 0.17 |
| FROM P/O LOT 130: | 3,266 | 0.07 |
| PAVED AREA: | 1,888 | 0.04 |
| STORMWATER PLANTER (C=0.70): | 950 | 0.02 |
| GRASS/PLANTED AREA: | 428 | 0.01 |
| TOTAL CONTRIBUTING AREA TO TANK: | 64,286 | 1.48 |

## SANITARY DISCHARGE

TRIBUTARY AREA BY ZONING DISTRICT:
Qsan = (375 x 0.90 x 150) / (7.48 x 86,400) 0.0783 cfs
PEAK Qsan = 4 * Qsan 0.3130 cfs

TOTAL SANITARY FLOW= 0.31 cfs

## STORM DISCHARGE

| ACTUAL DEVELOPED FLOW | Q = CIA | | | | |
|---|---|---|---|---|---|
| ROOF AREA (0.95): | Q1 = 0.95 | x 5.95 x 0.20 | = | 1.13 | cfs |
| PAVED AREA (0.85): | Q2 = 0.85 | x 5.95 x 0.96 | = | 4.87 | cfs |
| GREEN ROOF AREA (0.70): | Q3 = 0.70 | x 5.95 x 0.07 | = | 0.29 | cfs |
| GRASS/PLANTED AREA (0.20): | Q4 = 0.20 | x 5.95 x 0.24 | = | 0.29 | cfs |
| TOTAL ACTUAL STORM DISCHARGE: | Q1 + Q2 + Q3 + Q4 | | = | 6.58 | cfs |

## ALLOWABLE FLOW

MAXIMUM RELEASE RATE Qrr = 0.1 PER ACRE = 0.09 cfs

SINCE 10% ACRE > 0.046, USE 0.1 PER ACRE Qrr = 0.09 cfs

## SIZE OF DETENTION TANK

Cw, WEIGHTED C= 0.75
Rd = 1.85 in. (CSS AREAS WITH SCP)

REQUIRED DETENTION VOLUME Vv IN CUBIC FEET:

Vv = Rd/12*A*Cw = 7,427 CU FT

STORM DISCHARGE FROM DETENTION TANK WILL BE RESTRICTED TO 0.09 CFS

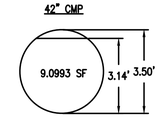
ORIFICE DESIGN

RE-ENTRANT ORIFICE TUBE, Cd = 0.52
DIAMETER OF ORIFICE (do) = 1.50 in.
Sdr=1930((Qdrr)^2/do^4) + do/24 = 3.14 FT

DETENTION PIPE SYSTEM:

| | |
|---|---|
| EFFECTIVE HEIGHT = | 3.14 FT |
| EFFECTIVE AREA = | 9.10 SF |
| LENGTH OF PIPE SYSTEM = | 820 FT |
| CAPACITY = | 7,462 CU FT |

STORM FLOW OF 6.58 CFS WILL BE RESTRICTED TO 0.09 CFS BY MEANS OF DETENTION FACILITIES AND CONTROLLED FLOW DEVICES




ALL ELEVATIONS AND LEGAL GRADES SHOWN ON THIS SURVEY ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88 DATUM).

| REV. | DATE | DESCRIPTION | APPROVED |
|---|---|---|---|

OWNER: **BRONX PARK GTAH II LLC**
88 PINE STREET, NEW YORK, NY 10005

PROJECT:
310 EAST 161ST STREET
BOROUGH OF BRONX

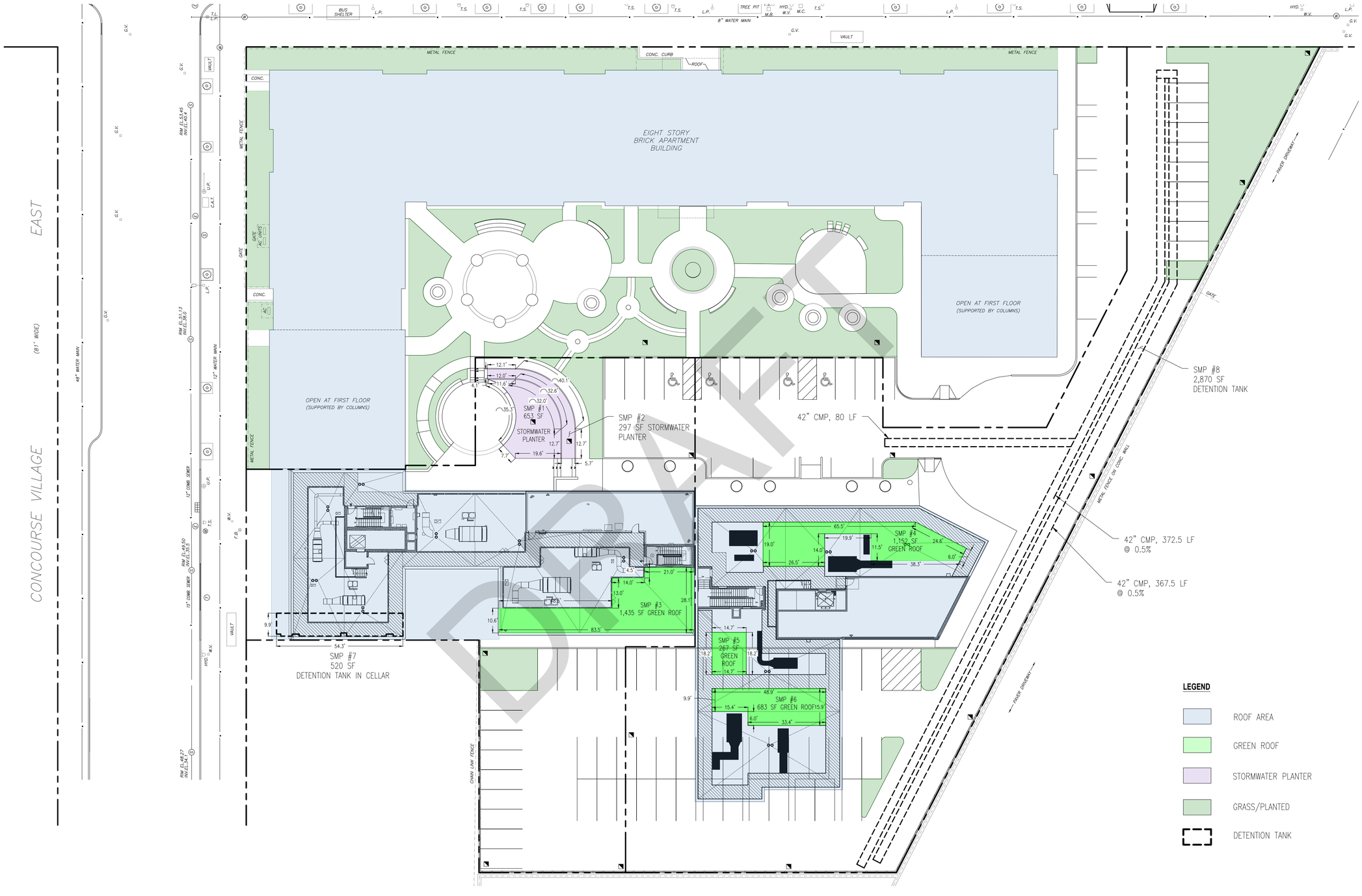
TITLE:
SITE CONNECTION PROPOSAL
SCX-3150/25

| DOB. NO. | SCALE | DATE | SHEET |
|---|---|---|---|
| | 1" = 30' | 11/14/2025 | 1 OF 1 |


Philip Habib & Associates · Engineers and Planners
440 Park Avenue South · New York, NY · 10016


0 1 2 3 4
ORIGINAL SIZE IN INCHES

PREPARED BY JY
IN CHARGE SM DRAFTER JY
DESIGNER JY CHECKER SM




DRAFT

# 280 EAST 161ST STREET
**BRONX**

## PROPOSED COVER AREAS

0 20 40 60 80
U.S. STANDARD SCALE: 1 INCH = 20 FEET

Philip Habib & Associates · Engineers and Planners
440 Park Avenue South · New York, NY · 10016

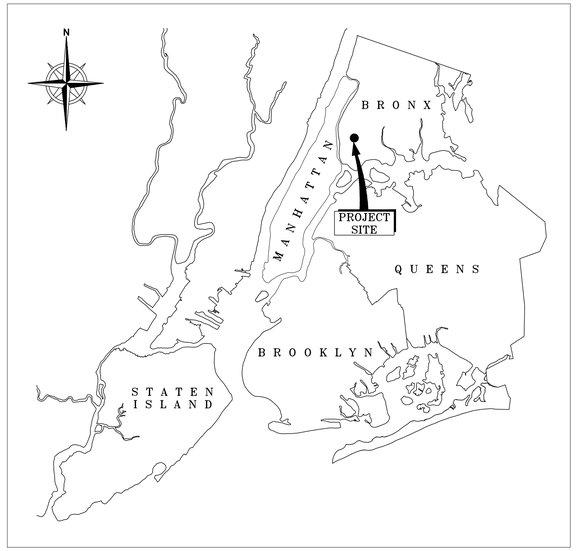
| | |
|---|---|
| SCALE: | 1"=20' |
| DATE: | 11/14/2025 |
| DRAWN BY: | JY |

DRAWING NO.: **Figure 11**
JOB NO.: 2288C

## DOT APPROVAL OF DESIGN ELEMENTS

For self-certified projects only

| Item requiring DOT approval | Approved by | Date |
|---|---|---|




KEY PLAN

SCALE: N.T.S.

LOCATION PLAN

SCALE: N.T.S.

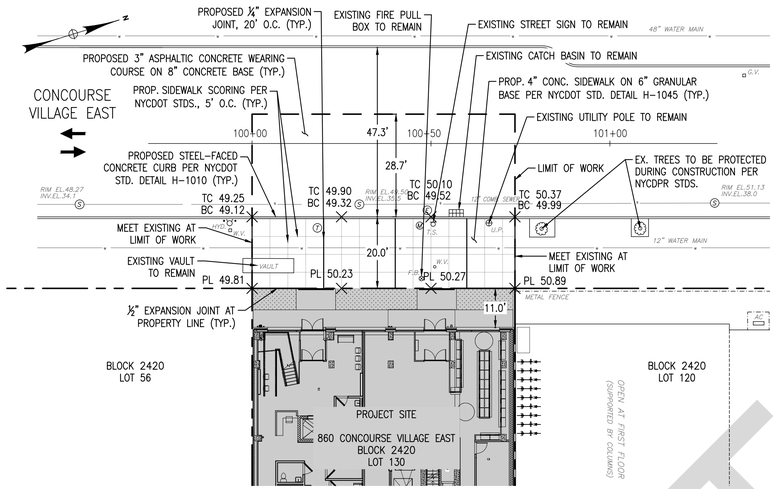
## LIST OF ESTIMATED QUANTITIES

| | | |
|---|---|---|
| New Curb | 73.5 | Lin. ft. |
| New Sidewalk | 1,470 | Sq. ft. |
| New Roadway | 234 | Sq. yds. |
| New Trees | 0 | Each |
| New CBs | 0 | Each |
| New DIP | 0 | Lin. ft. |
| New Manholes | 0 | Each |

## STREET TREE PLANTING CHECKLIST

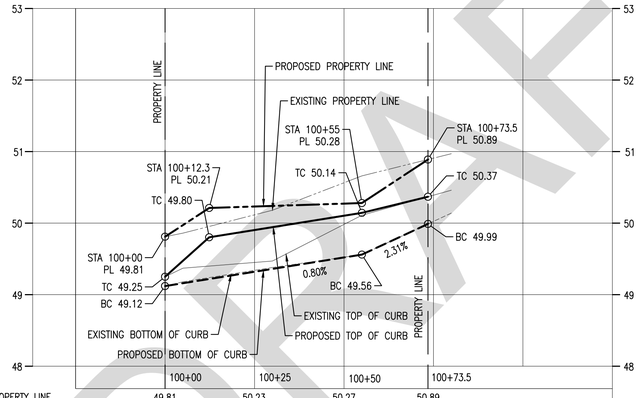
| | | |
|---|---|---|
| Total Zoning Lot Frontage | 716.4 | Lin. ft. |
| Total Number Of Trees Required By Zoning | 29 | Each |
| Total Number Of Existing Trees On Zoning Lot Frontage | 15 | Each |
| Tax Lot Frontage | 73.5 | Lin. ft. |
| Total Number Of Trees Required | 3 | Each |
| Existing Trees To Remain | 0 | Each |
| Existing Trees To Be Removed or Transplanted | 0 | Each |
| Proposed Trees To Plant On Site | 0 | Each |
| Trees to Pay Into Tree Fund as Off-Site Plantings | 3 | Each |

* TREE PLANTING PERMITS WILL BE FILED SEPARATELY TO THE NEW YORK CITY DEPARTMENT OF PARKS & RECREATION.




CONCOURSE VILLAGE EAST PLAN

SCALE: 1" = 20'




| | | | | |
|---|---|---|---|---|
| PROP. PROPERTY LINE | 49.81 | 50.23 | 50.27 | 50.89 |
| PROP. TOP OF CURB | 49.25 | 49.90 | 50.10 | 50.37 |
| PROP. BOTTOM OF CURB | 49.12 | 49.32 | 49.52 | 49.99 |
| PROP. SIDEWALK X-SLOPE | 2.8% | 1.6% | 0.8% | 2.6% |
| PROP. CURB REVEAL | 1.6" | 7.0" | 7.0" | 4.6" |
| | | | | |
| EXIST. PROPERTY LINE | 49.81 | 50.12 | 50.56 | 50.89 |
| EXIST. TOP OF CURB | 49.25 | 49.45 | 49.98 | 50.37 |
| EXIST. BOTTOM OF CURB | 49.12 | 49.34 | 49.52 | 49.99 |
| EXIST. SIDEWALK X-SLOPE | 2.8% | 3.3% | 2.9% | 2.6% |
| EXIST. CURB REVEAL | 1.6" | 1.3" | 5.5" | 4.6" |

CONCOURSE VILLAGE EAST PROFILE

H SCALE: 1" = 20'

V SCALE: 1" = 1'

LEGEND :

PLAN

| | |
|---|---|
| MANHOLE | |
| HYDRANT | |
| CATCH BASIN | |
| UTILITY POLE | |
| STREET SIGN | |
| EXISTING STREET TREE | |

| | |
|---|---|
| PL | PROPERTY LINE |
| TC | TOP OF CURB |
| BC | BOTTOM OF CURB |

PROFILE

- LIMIT OF WORK
- PROPOSED PROPERTY LINE
- EXISTING PROPERTY LINE
- PROPOSED TOP OF CURB
- EXISTING TOP OF CURB
- PROPOSED BOTTOM OF CURB
- EXISTING BOTTOM OF CURB

GENERAL NOTES:

1. ALL ELEVATIONS AND LEGAL GRADES SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88 DATUM).

2. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES, WHETHER FUNCTIONAL OR ABANDONED, WITHIN THE PROJECT AREA ARE SHOWN.

3. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF DESIGN ELEMENTS AND LOCATIONS OF EXISTING ELEMENTS. IMMEDIATELY INFORM THE ARCHITECT AND CONSTRUCTION MANAGER ABOUT ANY DIMENSIONAL DISCREPANCIES OR POTENTIAL CONFLICTS.

4. MATERIALS, CONSTRUCTION METHODS AND WORKMANSHIP FOR STANDARD DETAILS SHALL CONFORM WITH STANDARD DETAILS AND SPECIFICATIONS OF NEW YORK STATE DEPARTMENT OF TRANSPORTATION AND/OR THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY OPERATIONS (LATEST EDITION) AVAILABLE AT 40 WORTH STREET, ROOM 824.

5. PROVIDE ONE-QUARTER (1/4) INCH EXPANSION JOINTS WITH PREFORMED FILLER AND SEALANT IN ACCORDANCE WITH THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION STANDARDS. CONTRACTOR TO SUBMIT LOCATIONS OF EXPANSION JOINTS FOR ARCHITECTS APPROVAL.

6. EXPANSION JOINTS FOR ALL CURBS SHALL BE ONE-HALF (1/2) INCH WIDTH FILLED WITH PREMOLDED JOINT FILLER AND JOINT SEALANT. EXPANSION JOINTS FOR CURBS SHALL LINE UP WITH THE PROPOSED LOCATION OF EXPANSION JOINTS IN NEW ABUTTING CONC. SIDEWALK. FILLERS SHALL COMPLETELY FILL THE JOINT AND SHALL BE CUT FLUSH WITH ALL CURB SURFACES.

7. ALL EXISTING MANHOLES, VAULTS, VALVE BOXES AND OTHER SUCH HARDWARE IN THE ADJACENT SIDEWALKS SHALL BE ABANDONED IF NOT UTILIZED IN THE FINAL BUILDING PLANS. IF EXISTING HARDWARE AND UTILITIES WILL BE REUSED IN THE FINAL BUILDING PLAN, THEY SHALL BE ADJUSTED TO FINISH GRADES AS NECESSARY. THIS HARDWARE MAY NOT BE SHOWN ON THESE PLANS. CONTRACTOR SHALL VERIFY LOCATIONS OF THIS HARDWARE IN THE FIELD AND WITH THE SIGNED AND SEALED SURVEY.

8. ALL EXISTING HYDRANTS AND CATCH BASINS WITHIN THE WORK LIMITS SHALL BE MADE OPERABLE PER THE LATEST NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARDS AND REQUIREMENTS.

DRAINAGE NOTES:

1. ALL CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARDS AND REQUIREMENTS. ALL NEW CATCH BASIN CONNECTIONS SHALL BE MADE TO THE EXISTING SEWERS AT MANHOLES AND SHALL CONSIST OF 12" DUCTILE IRON PIPE CLASS 56, "PUSH-ON" JOINTS LAID ON BROKEN STONE.

2. ALL EXISTING NON-STANDARD BASINS WITHIN THE PROJECT LIMITS SHALL BE REPLACED OR MODIFIED TO CONFORM WITH THE LATEST NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARDS AND REQUIREMENTS.

3. ALL EXISTING BASINS, INLETS, AND DRAINAGE STRUCTURES TO BE ABANDONED SHALL BE BULKHEADED AND CUT DOWN TO TWO (2) FEET BELOW SUBGRADE, HOLES PUNCHED IN BOTTOM SLAB AND FILLED WITH COMPACTED CLEAN SAND. BASIN CONNECTIONS TO BE ABANDONED SHALL BE PLUGGED AT BOTH ENDS.

4. ALL DAMAGED MANHOLES DAMAGED BY THE CONTRACTOR'S WORK SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AS DIRECTED BY THE ENGINEER, AT NO COST TO THE CITY.

5. PRIOR TO INSTALLATION OF THE DRAINAGE FACILITIES PROPOSED UNDER THIS PLAN, PERMITS ARE TO BE OBTAINED FROM THE LOCAL SEWER RECORDS OFFICE OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (D.E.P.). CONSTRUCTION INSPECTION IS TO BE REQUESTED AT LEAST 24 HOURS IN ADVANCE FROM THE HOUSE CONNECTION INSPECTION UNIT OF THE D.E.P. DIVISION OF SEWER REGULATION AND CONTROL.

DRAFT

Borough: BRONX

NEW YORK CITY
DEPARTMENT OF TRANSPORTATION

# BUILDERS PAVEMENT PLAN

PROJECT DATA

Block: 2420 Lot(s): 130
Zoning: R8 Zoning Map No.: 6a

Project Name: 860 CONCOURSE VILLAGE EAST
Street Address: 860 CONCOURSE VILLAGE EAST, BRONX, NY 10451

Owner: Name: BRONX PARK GTAH II LLC
Address: 88 PINE STREET, 27TH FLOOR
NEW YORK, NY 10005

Plan prepared by:
Philip Habib & Associates
432 Park Avenue South, 6th Floor
New York, NY 10016
(212) 929-5656

STATE OF NEW YORK
SUE E. McCOY
No. 056477
LICENSED PROFESSIONAL ENGINEER

WAIVERS

DOT requirement waived — As per [illegible]

1)
2)
3)
4)

NOTES

GENERAL REQUIREMENTS

1. ALL DESIGNS, MATERIALS, CONSTRUCTION METHODS AND WORKMANSHIP SHALL COMPLY WITH THE FOLLOWING PUBLICATIONS OF THE BUREAU OF HIGHWAYS: STANDARD SPECIFICATIONS, STANDARD DETAILS OF CONSTRUCTION; RULES OF THE BUREAU OF HIGHWAY OPERATIONS; GUIDELINES FOR THE DESIGN INFRASTRUCTURE COMPONENTS.
2. ALL NON STANDARD MATERIALS AND CONSTRUCTION PROCEDURES SHALL BE SPECIFICALLY APPROVED IN WRITING BY THE DOT.
3. ANY WORK NOT COMPLYING WITH THE REQUIREMENTS OF THE DOT SHALL BE REMOVED AND REPLACED.
4. THIS PLAN SHALL BE VALID FOR THE ISSUANCE OF CONSTRUCTION PERMITS FOR A PERIOD OF ONE YEAR FROM THE DATE OF APPROVAL OR SELF-CERTIFICATION, AS APPLICABLE.
5. ALL SIDEWALK AND STREET AREAS CONSTRUCTED UNDER THIS PLAN SHALL REMAIN OPEN TO THE PUBLIC AT ALL TIMES.

ISSUANCE OF PERMITS

6. NO SIDEWALK, CURB OR ROADWAY WORK SHALL BE DONE WITHOUT A PERMIT FROM THE BOROUGH HIGHWAY SUPERINTENDANT. APPLICATION SHALL BE MADE THREE DAYS BEFORE STARTING CONSTRUCTION. THE CONTRACTOR SHALL HAVE ALL REQUIRED INSURANCE COVERAGE ON FILE.
7. NO WORK ON DRAINAGE STRUCTURES SHALL BE DONE WITHOUT A PERMIT FROM THE BOROUGH OFFICE OF THE DEPARTMENT OF ENVIROMENTAL PROTECTION.
8. ANY VAULT WORK AT THE SITE SHALL BE DONE AS PER THE APPLICABLE RULES OF THE DOT AND THE DEPT. OF BUILDINGS.

CONSTRUCTION ACTIVITY

9. A CONSTRUCTION PLAN SHOWING MAINTENANCE AND PROTECTIONOF TRAFFIC, INCLUDING PLACEMENT OF SIDEWALK BRIDGES, BARRIERS AND SIGNAGE, SHALL BE SUBMITTED TO THE BOROUGH HIGHWAY OFFICE BEFORE CONSTRUCTION BEGINS.
10. NO SIDEWALK SHALL BE CLOSED WITHOUT A PERMIT. PEDESTRIAN AND TRAFFIC SAFETY SHALL BE PROTECTED AT ALL TIMES. ROADWAY CLOSINGS SHALL BE AS DIRECTED.
11. THE SITE SHALL BE MAINTAINED IN A CLEAN AND SAFE CONDITION.

FINAL SIGN-OFF

12. PERMITS SHALL BE PRESENTED FROM ALL PUBLIC AGENCIES AND UTILITIES HAVING OWNERSHIP OF STRUCTURES RELOCATED OR REMOVED DURING CONSTRUCTION
13. ALL PAVEMENT MARKINGS INCLUDING THERMOPLASTIC LANE DIVIDERS, REMOVED DURING CONSTRUCTION SHALL BE REPLACED IN KIND TO THE BUREAU OF TRAFFIC STDS.
14. ALL EXISTING CATCH BASINS ON SITE SHALL BE CLEANED AND MADE OPERABLE.
15. ALL DAMAGE CAUSED BY CONSTRUCTION ON THIS PROJECT OUTSIDE THE PROJECT LIMITS SHALL BE REPAIRED AS DIRECTED.
16. THE ROADWAY SHALL BE PAVED TO THE REQUIREMENTS OF THE DOT AND AS DIRECTED.

*PROFESSIONAL CERTIFICATION*

(Optional)

I am submitting this plan under professional certification in compliance with all applicable requirements.

Signature ____ /____ /____ Date

DOT APPROVAL NOT REQUIRED

*DOT APPROVAL*

Proposed and existing work shown here reviewed for compliance with all applicable rules and requirements by:

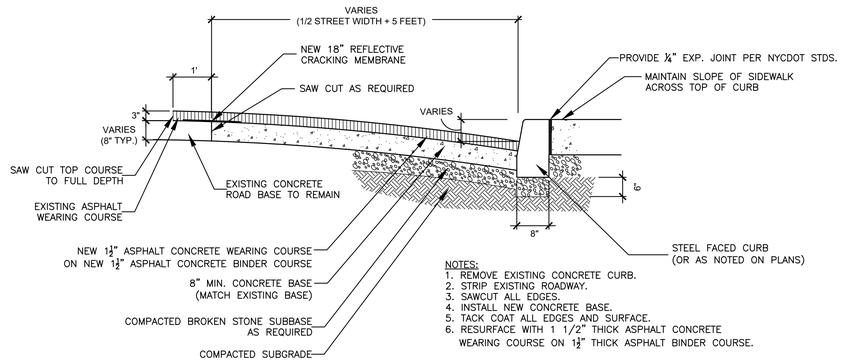
Plan Examiner

Approval for issuance of work permits granted by:

Chief / Builders Pavement Section ____ /____ /____ Date

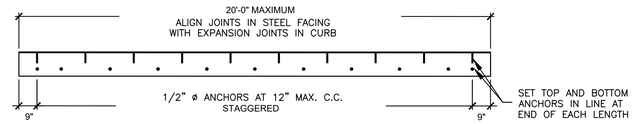
Date: 12/19/2024

DOB Ref. No.:

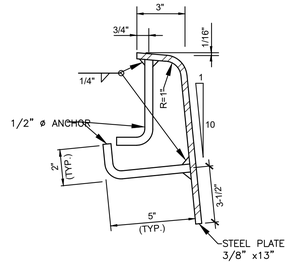



NOTES:
1. REMOVE EXISTING CONCRETE CURB.
2. STRIP EXISTING ROADWAY.
3. SAWCUT ALL EDGES.
4. INSTALL NEW CONCRETE BASE.
5. TACK COAT ALL EDGES AND SURFACE.
6. RESURFACE WITH 1 1/2" THICK ASPHALT CONCRETE WEARING COURSE ON 1½" THICK ASPHALT BINDER COURSE.

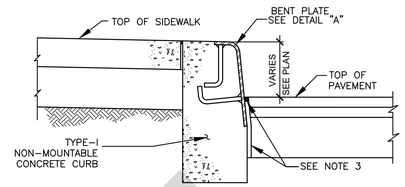
## 1 CURB AND PAVEMENT DETAIL
SCALE: N.T.S.




ELEVATION - STEEL FACING




DETAIL "A"



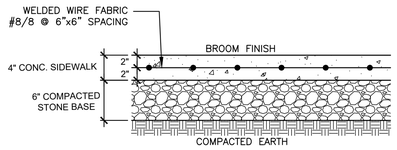

NOTES:

1. 1/2"ø X 5" LONG HEADED ANCHOR STUDS (GRANULAR OR SOLID FLUX FILLED) MAY BE SUBSTITUTED FOR ANCHORS SHOWN.

2. STEEL PLATE SHALL MEET ASTM A-36.

3. PROVIDE 1/2" X 1/2" JOINT SEALANT AND 1/2" PREMOLDED JOINT FILLER WHEN CONCRETE CURB IS PLACED AGAINST RIGID PAVEMENT.

## 2 TYPICAL STEEL FACED CONCRETE CURB DETAIL (H-1010)
SCALE: N.T.S.




NOTE: PROVIDE EXPANSION JOINTS AT 20' O.C.
PROVIDE SCORED JOINTS AT 5' O.C.

## 3 STANDARD 4" CONCRETE SIDEWALK (NYCDOT H-1045)
SCALE: N.T.S.




## 4 CURB EXPANSION JOINT DETAIL
SCALE: N.T.S.

GENERAL EXPANSION NOTE:
PROVIDE 1/4" EXPANSION JOINT FOR ALL HARDWARE OR FIXED OBJECTS IN CONCRETE SIDEWALK AREAS AND 1/2" EXPANSION JOINT IN CONCRETE SIDEWALK AT BUILDING LINE AND CURB.




## 5 EXPANSION JOINT DETAIL
SCALE: N.T.S.

DRAFT

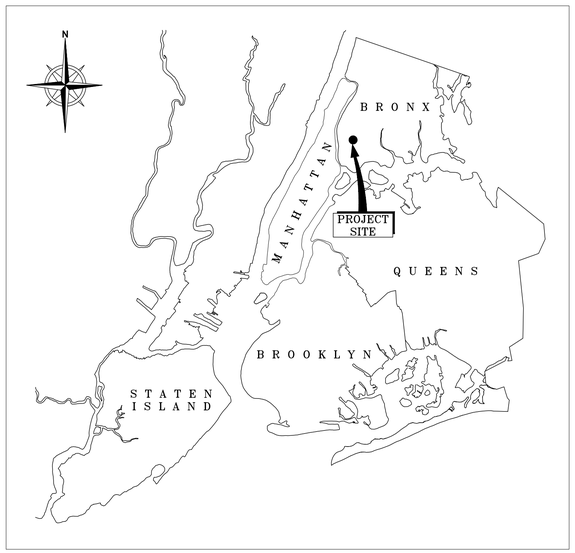
| | |
|---|---|
| 860 CONCOURSE VILLAGE EAST BRONX | |
| DETAILS | |
| PHILIP HABIB & ASSOCIATES<br>432 PARK AVENUE SOUTH, 6TH FLOOR<br>NEW YORK, NY 10016 | DATE 12/19/2024 |
| Scale: AS SHOWN | SHEET 2 OF 2 |
| DOB Ref. No.: | BPP - 002.00 |

STATE OF NEW YORK · SUE E. McCOY · No. 064471 · LICENSED PROFESSIONAL ENGINEER

## DOT APPROVAL OF DESIGN ELEMENTS

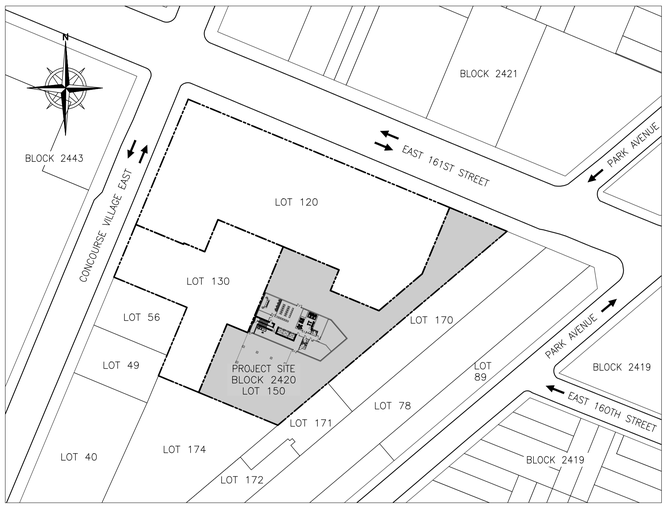
For self-certified projects only

| Item requiring DOT approval | Approved by | Date |
|---|---|---|



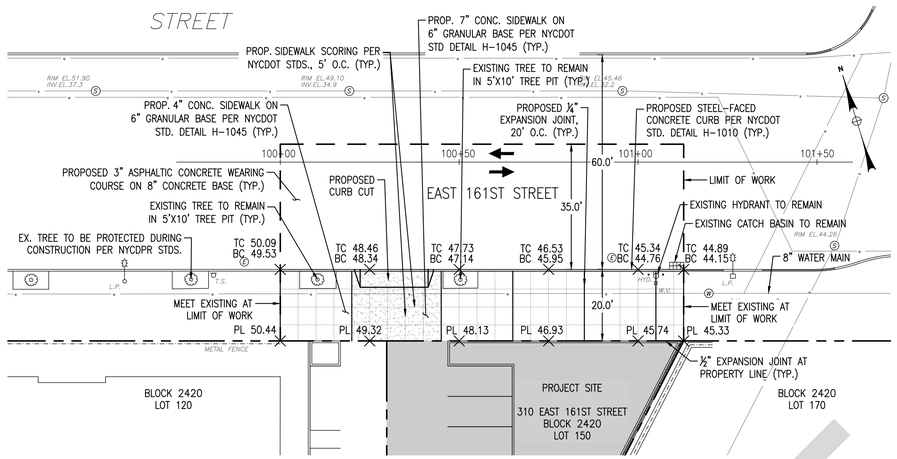

## KEY PLAN

SCALE: N.T.S.



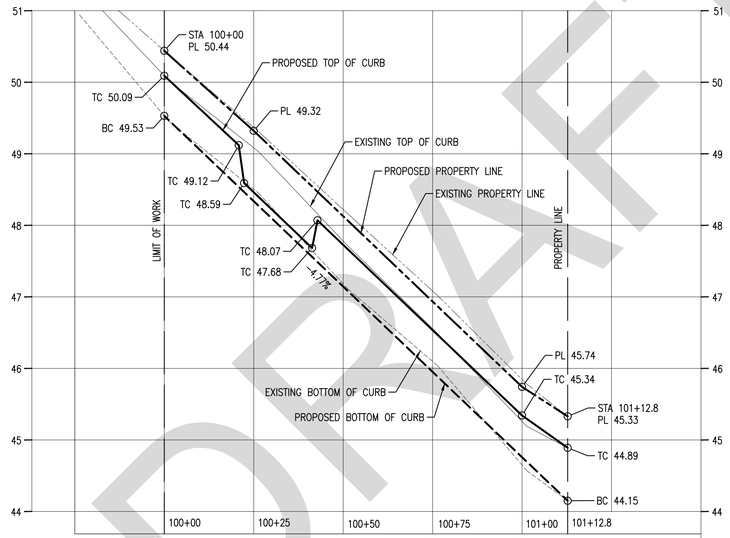

## LOCATION PLAN

SCALE: N.T.S.




EAST 161ST STREET PLAN

SCALE: 1" = 20'




| | | | | | | |
|---|---|---|---|---|---|---|
| PROP. PROPERTY LINE | 50.44 | 49.32 | 48.13 | 46.93 | 45.74 | 45.33 |
| PROP. TOP OF CURB | 50.09 | 48.46 | 47.73 | 46.53 | 45.34 | 44.89 |
| PROP. BOTTOM OF CURB | 49.53 | 48.34 | 47.14 | 45.95 | 44.76 | 44.15 |
| PROP. SIDEWALK X-SLOPE | 1.7% | N/A | 2.0% | 2.0% | 2.0% | 2.2% |
| PROP. CURB REVEAL | 6.7" | 1.5" | 7.0" | 7.0" | 7.0" | 8.9" |
| | | | | | | |
| EXIST. PROPERTY LINE | 50.44 | 49.37 | 48.22 | 47.08 | 45.85 | 45.33 |
| EXIST. TOP OF CURB | 50.09 | 49.08 | 47.78 | 46.56 | 45.26 | 44.89 |
| EXIST. BOTTOM OF CURB | 49.53 | 48.50 | 47.18 | 46.10 | 44.65 | 44.15 |
| EXIST. SIDEWALK X-SLOPE | 1.7% | 1.4% | 2.2% | 2.6% | 2.9% | 2.2% |
| EXIST. CURB REVEAL | 6.7" | 7.0" | 7.2" | 5.5" | 7.3" | 8.9" |

EAST 161ST STREET PROFILE

H SCALE: 1" = 20'

V SCALE: 1" = 1'

GENERAL NOTES:

1. ALL ELEVATIONS AND LEGAL GRADES SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88 DATUM).

2. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES, WHETHER FUNCTIONAL OR ABANDONED, WITHIN THE PROJECT AREA ARE SHOWN.

3. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF DESIGN ELEMENTS AND LOCATIONS OF EXISTING ELEMENTS. IMMEDIATELY INFORM THE ARCHITECT AND CONSTRUCTION MANAGER ABOUT ANY DIMENSIONAL DISCREPANCIES OR POTENTIAL CONFLICTS.

4. MATERIALS, CONSTRUCTION METHODS AND WORKMANSHIP FOR STANDARD DETAILS SHALL CONFORM WITH STANDARD DETAILS AND SPECIFICATIONS OF NEW YORK STATE DEPARTMENT OF TRANSPORTATION AND/OR THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY OPERATIONS (LATEST EDITION) AVAILABLE AT 40 WORTH STREET, ROOM 824.

5. PROVIDE ONE-QUARTER (1/4) INCH EXPANSION JOINTS WITH PREFORMED FILLER AND SEALANT IN ACCORDANCE WITH THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION STANDARDS. CONTRACTOR TO SUBMIT LOCATIONS OF EXPANSION JOINTS FOR ARCHITECTS APPROVAL.

6. EXPANSION JOINTS FOR ALL CURBS SHALL BE ONE-HALF (1/2) INCH WIDTH FILLED WITH PREMOLDED JOINT FILLER AND JOINT SEALANT. EXPANSION JOINTS FOR CURBS SHALL LINE UP WITH THE PROPOSED LOCATION OF EXPANSION JOINTS IN NEW ABUTTING CONC. SIDEWALK. FILLERS SHALL COMPLETELY FILL THE JOINT AND SHALL BE CUT FLUSH WITH ALL CURB SURFACES.

7. ALL EXISTING MANHOLES, VAULTS, VALVE BOXES AND OTHER SUCH HARDWARE IN THE ADJACENT SIDEWALKS SHALL BE ABANDONED IF NOT UTILIZED IN THE FINAL BUILDING PLANS. IF EXISTING HARDWARE AND UTILITIES WILL BE REUSED IN THE FINAL BUILDING PLAN, THEY SHALL BE ADJUSTED TO FINISH GRADES AS NECESSARY. THIS HARDWARE MAY NOT BE SHOWN ON THESE PLANS. CONTRACTOR SHALL VERIFY LOCATIONS OF THIS HARDWARE IN THE FIELD AND WITH THE SIGNED AND SEALED SURVEY.

8. ALL EXISTING HYDRANTS AND CATCH BASINS WITHIN THE WORK LIMITS SHALL BE MADE OPERABLE PER THE LATEST NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARDS AND REQUIREMENTS.

DRAINAGE NOTES:

1. ALL CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARDS AND REQUIREMENTS. ALL NEW CATCH BASIN CONNECTIONS SHALL BE MADE TO THE EXISTING SEWERS AT MANHOLES AND SHALL CONSIST OF 12" DUCTILE IRON PIPE CLASS 56, "PUSH-ON" JOINTS LAID ON BROKEN STONE.

2. ALL EXISTING NON-STANDARD BASINS WITHIN THE PROJECT LIMITS SHALL BE REPLACED OR MODIFIED TO CONFORM WITH THE LATEST NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARDS AND REQUIREMENTS.

3. ALL EXISTING BASINS, INLETS, AND DRAINAGE STRUCTURES TO BE ABANDONED SHALL BE BULKHEADED AND CUT DOWN TO TWO (2) FEET BELOW SUBGRADE, HOLES PUNCHED IN BOTTOM SLAB AND FILLED WITH COMPACTED CLEAN SAND. BASIN CONNECTIONS TO BE ABANDONED SHALL BE PLUGGED AT BOTH ENDS.

4. ALL DAMAGED MANHOLES DAMAGED BY THE CONTRACTOR'S WORK SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AS DIRECTED BY THE ENGINEER, AT NO COST TO THE CITY.

5. PRIOR TO INSTALLATION OF THE DRAINAGE FACILITIES PROPOSED UNDER THIS PLAN, PERMITS ARE TO BE OBTAINED FROM THE LOCAL SEWER RECORDS OFFICE OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (D.E.P.). CONSTRUCTION INSPECTION IS TO BE REQUESTED AT LEAST 24 HOURS IN ADVANCE FROM THE HOUSE CONNECTION INSPECTION UNIT OF THE D.E.P. DIVISION OF SEWER REGULATION AND CONTROL.

## LIST OF ESTIMATED QUANTITIES

| | | |
|---|---|---|
| New Curb | 112.8 | Lin. ft. |
| New Sidewalk | 2,255 | Sq. ft. |
| New Roadway | 438 | Sq. yds. |
| New Trees | 0 | Each |
| New CBs | 0 | Each |
| New DIP | 0 | Lin. ft. |
| New Manholes | 0 | Each |

## STREET TREE PLANTING CHECKLIST

| | | |
|---|---|---|
| Total Zoning Lot Frontage | 716.4 | Lin. ft. |
| Total Number Of Trees Required By Zoning | 29 | Each |
| Total Number Of Existing Trees On Zoning Lot Frontage | 14 | Each |
| Tax Lot Frontage | 83.0 | Lin. ft. |
| Total Number Of Trees Required | 4 | Each |
| Existing Trees To Remain | 1 | Each |
| Existing Trees To Be Removed or Transplanted | 0 | Each |
| Proposed Trees To Plant On Site | 0 | Each |
| Trees to Pay Into Tree Fund as Off-Site Plantings | 3 | Each |

* TREE PLANTING PERMITS WILL BE FILED SEPARATELY TO THE NEW YORK CITY DEPARTMENT OF PARKS & RECREATION.

LEGEND :

PLAN

- MANHOLE
- HYDRANT
- CATCH BASIN
- STREET LIGHT
- STREET SIGN
- EXISTING STREET TREE

| | |
|---|---|
| PL | PROPERTY LINE |
| TC | TOP OF CURB |
| BC | BOTTOM OF CURB |

PROFILE

- LIMIT OF WORK
- PROPOSED PROPERTY LINE
- EXISTING PROPERTY LINE
- PROPOSED TOP OF CURB
- EXISTING TOP OF CURB
- PROPOSED BOTTOM OF CURB
- EXISTING BOTTOM OF CURB

Date: 09/22/2025

Borough: BRONX

NEW YORK CITY
DEPARTMENT OF TRANSPORTATION

# BUILDERS PAVEMENT PLAN

PROJECT DATA

Block: 2420 Lot(s): 150
Zoning: R8 Zoning Map No.: 6a

Project Name: 310 EAST 161ST STREET
Street Address: 310 EAST 161ST STREET, BRONX, NY 10451

Owner: Name: BRONX PARK GTAH II LLC
Address: 88 PINE STREET, 27TH FLOOR
NEW YORK, NY 10005


Plan prepared by:
Philip Habib & Associates
432 Park Avenue South, 6th Floor
New York, NY 10016
(212) 929-5656


Seal

Signature

## WAIVERS

| DOT requirement waived | As per/Date |
|---|---|
| 1) | |
| 2) | |
| 3) | |
| 4) | |

NOTES

GENERAL REQUIREMENTS

1. ALL DESIGNS, MATERIALS, CONSTRUCTION METHODS AND WORKMANSHIP SHALL COMPLY WITH THE FOLLOWING PUBLICATIONS OF THE BUREAU OF HIGHWAYS: STANDARD SPECIFICATIONS, STANDARD DETAILS OF CONSTRUCTION; RULES OF THE BUREAU OF HIGHWAY OPERATIONS; GUIDELINES FOR THE DESIGN INFRASTRUCTURE COMPONENTS.
2. ALL NON STANDARD MATERIALS AND CONSTRUCTION PROCEDURES SHALL BE SPECIFICALLY APPROVED IN WRITING BY THE DOT.
3. ANY WORK NOT COMPLYING WITH THE REQUIREMENTS OF THE DOT SHALL BE REMOVED AND REPLACED.
4. THIS PLAN SHALL BE VALID FOR THE ISSUANCE OF CONSTRUCTION PERMITS FOR A PERIOD OF ONE YEAR FROM THE DATE OF APPROVAL OR SELF-CERTIFICATION, AS APPLICABLE.
5. ALL SIDEWALK AND STREET AREAS CONSTRUCTED UNDER THIS PLAN SHALL REMAIN OPEN TO THE PUBLIC AT ALL TIMES.

ISSUANCE OF PERMITS

6. NO SIDEWALK, CURB OR ROADWAY WORK SHALL BE DONE WITHOUT A PERMIT FROM THE BOROUGH HIGHWAY SUPERINTENDANT. APPLICATION SHALL BE MADE THREE DAYS BEFORE STARTING CONSTRUCTION. THE CONTRACTOR SHALL HAVE ALL REQUIRED INSURANCE COVERAGE ON FILE.
7. NO WORK ON DRAINAGE STRUCTURES SHALL BE DONE WITHOUT A PERMIT FROM THE BOROUGH OFFICE OF THE DEPARTMENT OF ENVIROMENTAL PROTECTION.
8. ANY VAULT WORK AT THE SITE SHALL BE DONE AS PER THE APPLICABLE RULES OF THE DOT AND THE DEPT. OF BUILDINGS.

CONSTRUCTION ACTIVITY

9. A CONSTRUCTION PLAN SHOWING MAINTENANCE AND PROTECTIONOF TRAFFIC, INCLUDING PLACEMENT OF SIDEWALK BRIDGES, BARRIERS AND SIGNAGE, SHALL BE SUBMITTED TO THE BOROUGH HIGHWAY OFFICE BEFORE CONSTRUCTION BEGINS.
10. NO SIDEWALK SHALL BE CLOSED WITHOUT A PERMIT. PEDESTRIAN AND TRAFFIC SAFETY SHALL BE PROTECTED AT ALL TIMES. ROADWAY CLOSINGS SHALL BE AS DIRECTED.
11. THE SITE SHALL BE MAINTAINED IN A CLEAN AND SAFE CONDITION.

FINAL SIGN-OFF

12. PERMITS SHALL BE PRESENTED FROM ALL PUBLIC AGENCIES AND UTILITIES HAVING OWNERSHIP OF STRUCTURES RELOCATED OR REMOVED DURING CONSTRUCTION
13. ALL PAVEMENT MARKINGS INCLUDING THERMOPLASTIC LANE DIVIDERS, REMOVED DURING CONSTRUCTION SHALL BE REPLACED IN KIND TO THE BUREAU OF TRAFFIC STDS.
14. ALL EXISTING CATCH BASINS ON SITE SHALL BE CLEANED AND MADE OPERABLE.
15. ALL DAMAGE CAUSED BY CONSTRUCTION ON THIS PROJECT OUTSIDE THE PROJECT LIMITS SHALL BE REPAIRED AS DIRECTED.
16. THE ROADWAY SHALL BE PAVED TO THE REQUIREMENTS OF THE DOT AND AS DIRECTED.

## *PROFESSIONAL CERTIFICATION*

(Optional)

I am submitting this plan under professional certification in compliance with all applicable requirements.

Signature ____ /____ /____ Date

DOT APPROVAL NOT REQUIRED

## *DOT APPROVAL*

Proposed and existing work shown here reviewed for compliance with all applicable rules and requirements by:

Plan Examiner

Approval for issuance of work permits granted by:

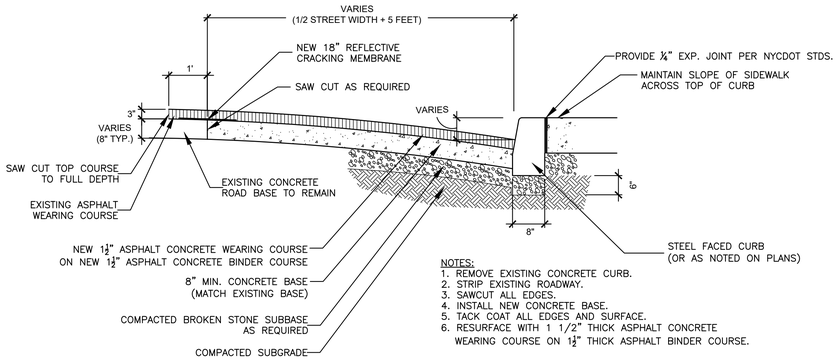
Chief / Builders Pavement Section ____ /____ /____ Date

DOB Ref. No.:

SHEET 1 OF 2

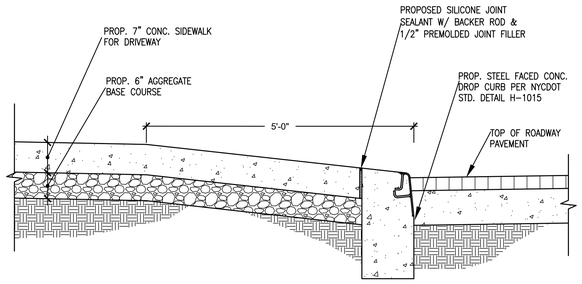
BPP - 001.00

DRAFT

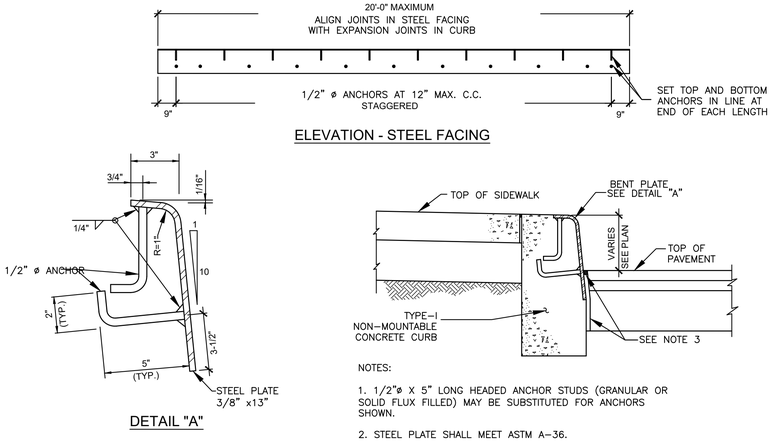



NOTES:
1. REMOVE EXISTING CONCRETE CURB.
2. STRIP EXISTING ROADWAY.
3. SAWCUT ALL EDGES.
4. INSTALL NEW CONCRETE BASE.
5. TACK COAT ALL EDGES AND SURFACE.
6. RESURFACE WITH 1 1/2" THICK ASPHALT CONCRETE WEARING COURSE ON 1½" THICK ASPHALT BINDER COURSE.

## 1 CURB AND PAVEMENT DETAIL
SCALE: N.T.S.




## 2 TYPICAL SIDEWALK/ROADWAY DETAIL FOR DRIVEWAY
SCALE: N.T.S.




ELEVATION - STEEL FACING




DETAIL "A"




NOTES:

1. 1/2"ø X 5" LONG HEADED ANCHOR STUDS (GRANULAR OR SOLID FLUX FILLED) MAY BE SUBSTITUTED FOR ANCHORS SHOWN.

2. STEEL PLATE SHALL MEET ASTM A-36.

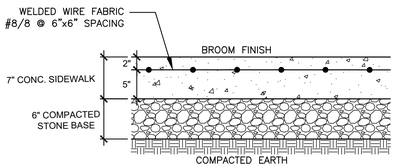
3. PROVIDE 1/2" X 1/2" JOINT SEALANT AND 1/2" PREMOLDED JOINT FILLER WHEN CONCRETE CURB IS PLACED AGAINST RIGID PAVEMENT.

## 3 TYPICAL STEEL FACED CONCRETE CURB DETAIL (H-1010)
SCALE: N.T.S.



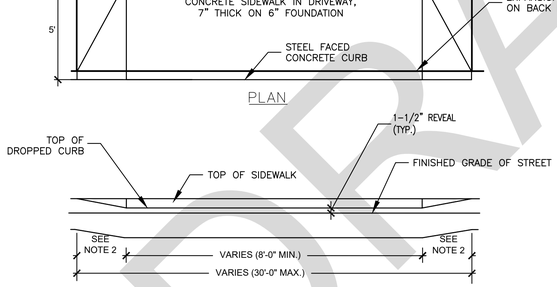

NOTE: PROVIDE EXPANSION JOINTS AT 20' O.C.
PROVIDE SCORED JOINTS AT 5' O.C.

## 4 STANDARD 4" CONCRETE SIDEWALK (NYCDOT H-1045)
SCALE: N.T.S.



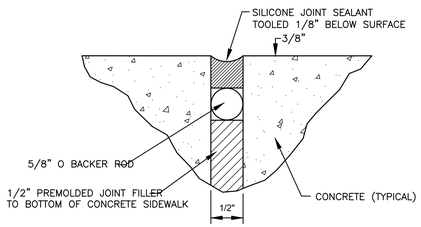

NOTE: PROVIDE EXPANSION JOINTS AT 20' O.C.
PROVIDE SCORED JOINTS AT 5' O.C.
7" CONCRETE SIDEWALK TO BE INSTALLED
AS PER NYCDOT H-1045

## 5 SIDEWALK AT DRIVEWAYS AND CORNER QUADRANTS (NYCDOT H-1045)
SCALE: N.T.S.



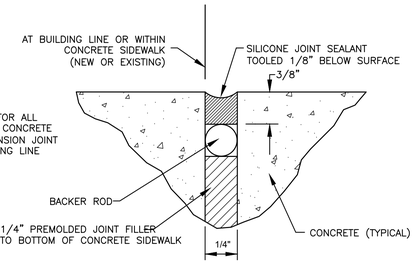

NOTES: 1. DROP CURB TO BE INSTALLED AS PER DETAILS ON H-1015.
2. SPLAY WIDTH: 1'-6" RESIDENTIAL, 2'-6" COMMERCIAL.

## 6 DROP-CURB AT DRIVEWAY
SCALE: N.T.S.




## 7 CURB EXPANSION JOINT DETAIL
SCALE: N.T.S.

GENERAL EXPANSION NOTE:
PROVIDE 1/4' EXPANSION JOINT FOR ALL HARDWARE OR FIXED OBJECTS IN CONCRETE SIDEWALK AREAS AND 1/2" EXPANSION JOINT IN CONCRETE SIDEWALK AT BUILDING LINE AND CURB.

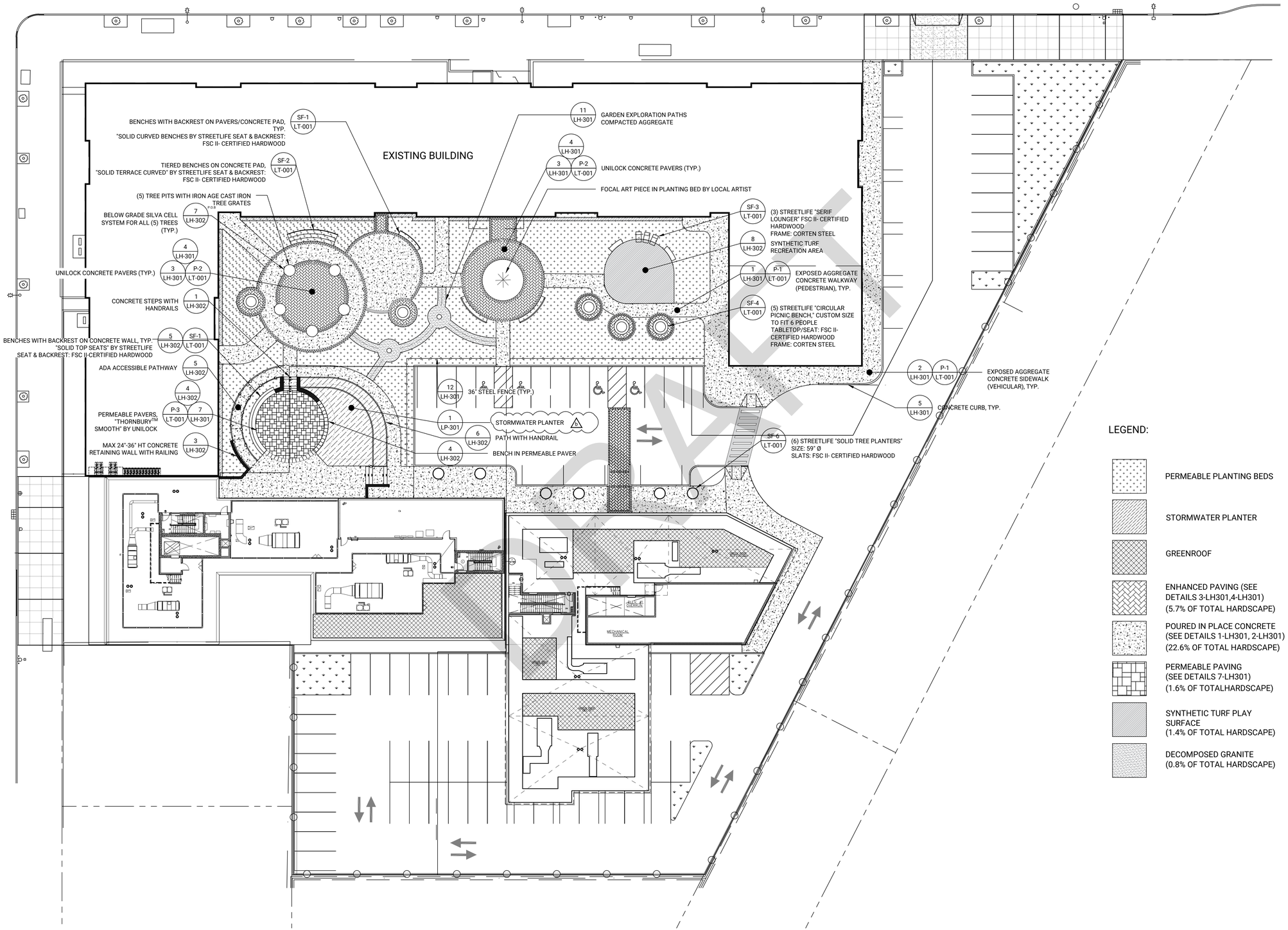



## 8 EXPANSION JOINT DETAIL
SCALE: N.T.S.

DRAFT

| | |
|---|---|
| 310 EAST 161ST STREET<br>BRONX | |
| DETAILS | |
| PHILIP HABIB & ASSOCIATES, AN AKRF DIVISION<br>440 PARK AVENUE SOUTH, 7TH FLOOR<br>NEW YORK, NY 10016 | DATE 09/22/2025 |
| Scale: AS SHOWN | SHEET 2 OF 2 |
| DOB Ref. No.: | BPP - 002.00 |

SWPPP SUPPORTING DOCUMENT
PREPARED BY BAYVIEW LANDSCAPE ARCHITECTURE

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INFORMATION FOR BASE PLAN COMPILED BY:

AUFGANG
74 LAFAYETTE AVENUE
SUITE 301 SUFFERN, NY 10901

BLOCK: 2420 LOT: 120 & 150

NOTES:

START DATE: FEBRUARY, 2023
EXPORT DATE: August 25, 2025

**REVISIONS**

| DELTA | DATE | D.B. | NOTES |
|---|---|---|---|
| | 02/16/23 | MG | SP - MODIFIED PARKING |
| | 02/22/23 | MG | FIRE LANE AND PARKING |
| | 03/01/23 | MG | COURTYARD LAYOUT |
| | 06/20/23 | MG | MODIFIED SP BASED ON FFE |
| | 11/16/23 | JCJ | PRELIMINARY PRICING SET |
| | 06/27/24 | MG | COURTYARD REVISIONS |
| | 12/13/24 | MG | 90% CD SET |
| 1 | 5/9/25 | MG | REVISIONS PER DEP COMMENTS |
| | 8/18/25 | MG | ISSUED FOR PRICING |
| | 8/25/25 | MG | 100% CONSTRUCTION DOCUMENTS |
| | 10/31/25 | MG | ISSUE FOR CONSTRUCTION |
| 1 | 11/3/25 | MG | REVISIONS PER SWPPP |

100% CONSTRUCTION DOCUMENTS

bayview landscape architecture
44-02 11th street, studio 611
long island city, ny 11101
646.389.0147
www.bayviewla.com

STAMP:

CLIENT:
**280-330 E. 161ST ST**
BRONX, NY 10451

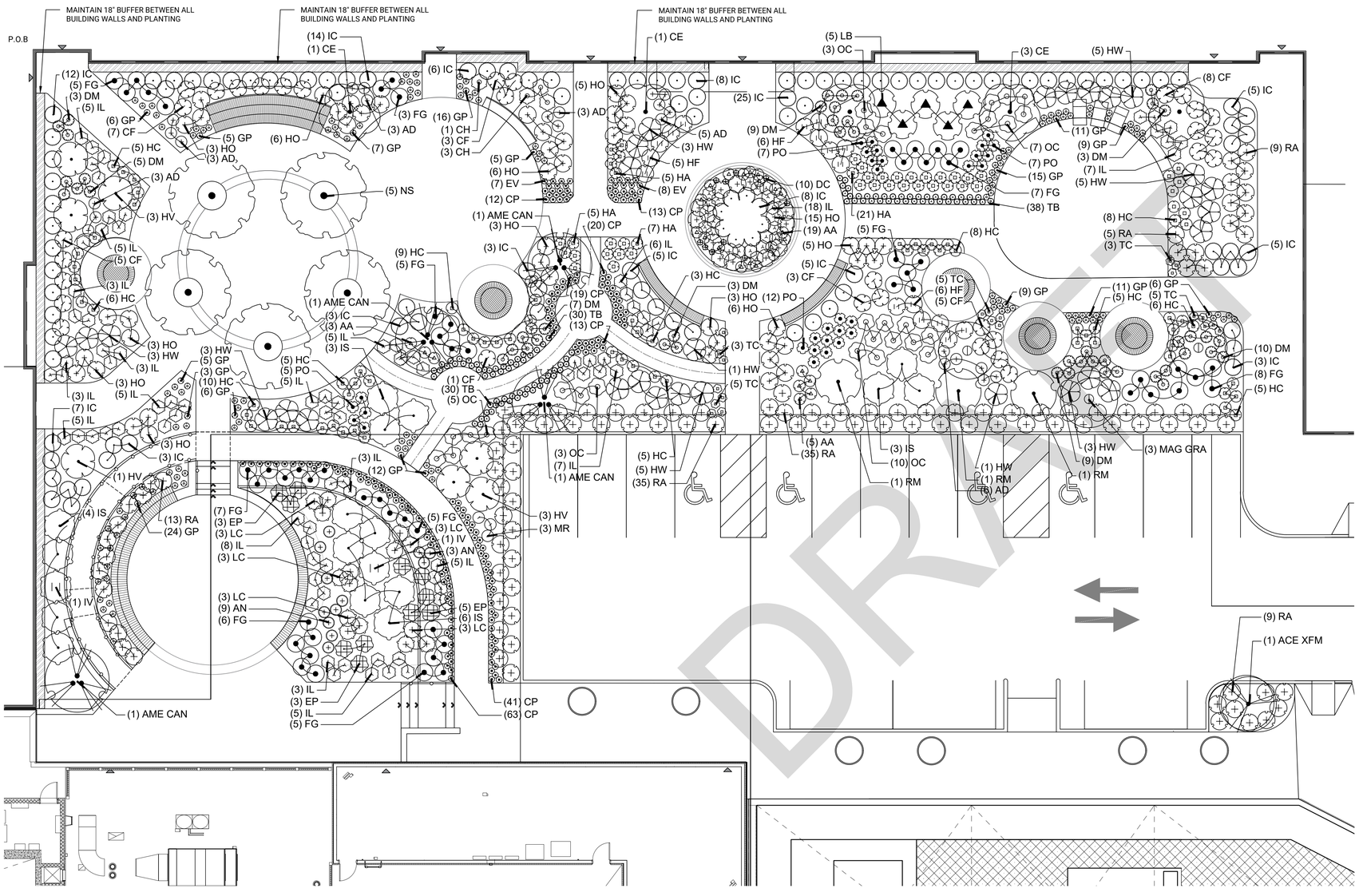
ASSUMED NORTH:

GRAPHIC SCALE:
0' 10' 40'
5' 20' 20 SCALE

SHEET NAME:
**HARDSCAPE PLAN**

SCALE: 1" = 20'
SHEET: **LH-101**
PAGE: 3 OF 9

SWPPP SUPPORTING DOCUMENT
PREPARED BY BAYVIEW LANDSCAPE ARCHITECTURE




## PLANT SCHEDULE - INTERIOR COURTYARD ONLY

| SYMBOL | CODE | QTY | BOTANICAL / COMMON NAME |
|---|---|---|---|
| **TREES** | | | |
| ● | ACE XFM | 1 | Acer x freemanii / Freeman Maple |
| ● | AME CAN | 4 | Amelanchier canadensis `Autumn Brilliance` / Autumn Brilliance Ser |
| ● | CE | 5 | Cercis canadensis / Eastern Redbud Multi-trunk |
| ● | MAG GRA | 3 | Magnolia grandiflora / Southern Magnolia |
| ● | NS | 5 | Nyssa sylvatica / Tupelo |
| **SHRUBS** | | | |
| ● | CH | 4 | Clethra alnifolia 'Hummingbird' / Hummingbird Summersweet |
| ● | CF | 32 | Cornus sericea 'Farrow' / Arctic Fire® Red Twig Dogwood |
| ○ | DC | 10 | Dicentra spectabilis / Bleeding Heart |
| ● | FG | 56 | Fothergilla gardenii / Dwarf Fothergilla |
| ○ | GP | 150 | Gaultheria procumbens / Wintergreen |
| ● | HV | 7 | Hamamelis virginiana / Common Witch Hazel |
| ● | HW | 29 | Hydrangea quercifolia 'Pee Wee' / Pee Wee Oakleaf Hydrangea |
| ○ | IC | 112 | Ilex glabra `Compacta` / Compact Inkberry |
| ● | IV | 2 | Ilex verticillata 'Jim Dandy' / Jim Dandy Winterberry |
| ● | IS | 16 | Ilex verticillata 'Spravy' / Berry Heavy® Winterberry |
| ● | IL | 101 | Itea virginica `Little Henry` / Virginia Sweetspire |
| ● | LB | 5 | Lindera benzoin / Spicebush |
| ● | RM | 3 | Rhododendron maximum / Rosebay Rhododendron |
| ● | RA | 106 | Rhus aromatica `Gro-Low` / Gro-Low Fragrant Sumac |
| **PERENNIALS** | | | |
| ● | AD | 23 | Aruncus dioicus / Goatsbeard |
| ● | AN | 12 | Asclepias incarnata / Swamp Milkweed |
| ○ | AA | 27 | Astilbe x arendsii 'Deutschland' / Deutschland Astilbe |
| ● | CP | 181 | Carex pensylvanica / Pennsylvania Sedge |
| ● | DM | 49 | Dryopteris marginalis / Marginal Shield Fern |
| ○ | EV | 15 | Epimedium x versicolor / Barrenwort |
| ● | EP | 11 | Eutrochium purpureum / Joe Pye Weed |
| ○ | HA | 38 | Hakonechloa macra 'Aureola' / Golden Variegated Forest Grass |
| ● | HC | 75 | Heuchera americana / American Alumroot |
| ○ | HF | 17 | Hosta x 'Frances Williams' / Frances Williams Hosta |
| ○ | HO | 61 | Hosta x 'Halcyon' / Halcyon Hosta |
| ● | LC | 15 | Lobelia cardinalis / Cardinal Flower |
| ● | MR | 3 | Maianthemum racemosum / False Solomon's Seal |
| ● | OC | 28 | Osmunda cinnamomea / Cinnamon Fern |
| ○ | PO | 31 | Polygonatum odoratum / Solomon's Seal |
| ● | TC | 21 | Tiarella cordifolia / Foamflower |
| ● | TB | 98 | Tiarella cordifolia 'Brandywine' / Brandywine Foamflower |

● NATIVE PLANT (ACCORDING TO THE LADY BIRD JOHNSON WILDFLOWER CENTER PLANT DIRECTORY

○ NON-INVASIVE (ACCORDING TO INVASIVE.ORG CENTER FOR INVASIVE SPECIES AND ECOSYSTEM HEALTH AND THE NEW YORK STATE INVASIVE PLANTS LIST)

NOTE: CAMPUS PLANTING DOES NOT INCLUDE ANY INVASIVE SPECIES. SEE PLANT LIST AND KEY ABOVE FOR NATIVE AND NON-INVASIVE IDENTIFICATION

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INFORMATION FOR BASE PLAN COMPILED BY:

AUFGANG
74 LAFAYETTE AVENUE
SUITE 301 SUFFERN, NY 10901

BLOCK: 2420 LOT: 120 & 150

NOTES:

START DATE: FEBRUARY, 2023
EXPORT DATE: August 25, 2025

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100% CONSTRUCTION DOCUMENTS

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BRONX, NY 10451

ASSUMED NORTH:

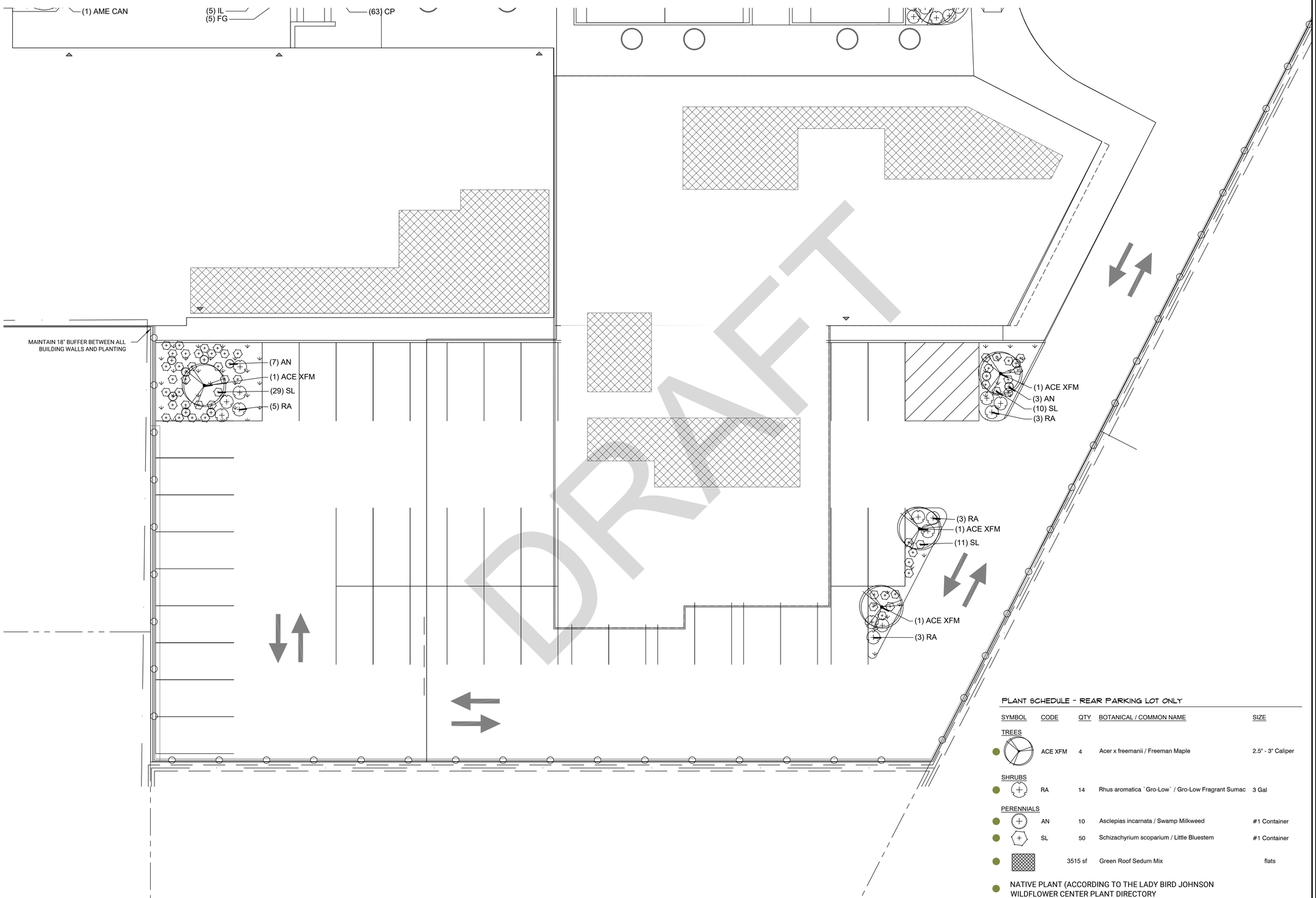
GRAPHIC SCALE:
0' 5' 20'
2.5' 10' 10 SCALE

SHEET NAME:

**PLANTING PLAN**

SCALE: 1" = 10'
SHEET: **LP-101**
PAGE: 7 OF 9

SWPPP SUPPORTING DOCUMENT
PREPARED BY BAYVIEW LANDSCAPE ARCHITECTURE




DRAFT

PLANT SCHEDULE - REAR PARKING LOT ONLY

| SYMBOL | CODE | QTY | BOTANICAL / COMMON NAME | SIZE |
|---|---|---|---|---|
| TREES | | | | |
| | ACE XFM | 4 | Acer x freemanii / Freeman Maple | 2.5" - 3" Caliper |
| SHRUBS | | | | |
| | RA | 14 | Rhus aromatica `Gro-Low` / Gro-Low Fragrant Sumac | 3 Gal |
| PERENNIALS | | | | |
| | AN | 10 | Asclepias incarnata / Swamp Milkweed | #1 Container |
| | SL | 50 | Schizachyrium scoparium / Little Bluestem | #1 Container |
| | | 3515 sf | Green Roof Sedum Mix | flats |

NATIVE PLANT (ACCORDING TO THE LADY BIRD JOHNSON WILDFLOWER CENTER PLANT DIRECTORY

NOTE: CAMPUS PLANTING DOES NOT INCLUDE ANY INVASIVE SPECIES. SEE PLANT LIST AND KEY ABOVE FOR NATIVE AND NON-INVASIVE IDENTIFICATION

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INFORMATION FOR BASE PLAN COMPILED BY:

AUFGANG
74 LAFAYETTE AVENUE
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BLOCK: 2420 LOT: 120 & 150

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SCALE: 1" = 10'
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PAGE: 8 OF 9

SWPPP SUPPORTING DOCUMENT
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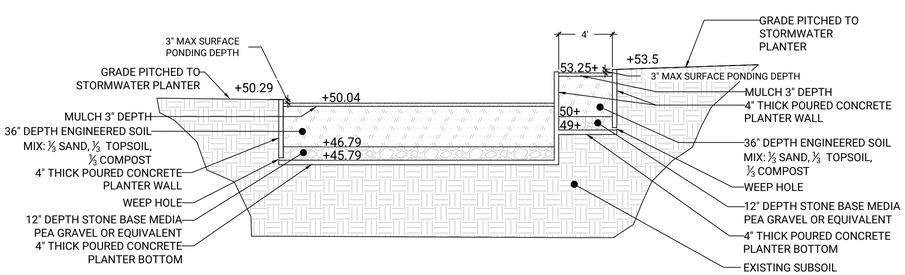
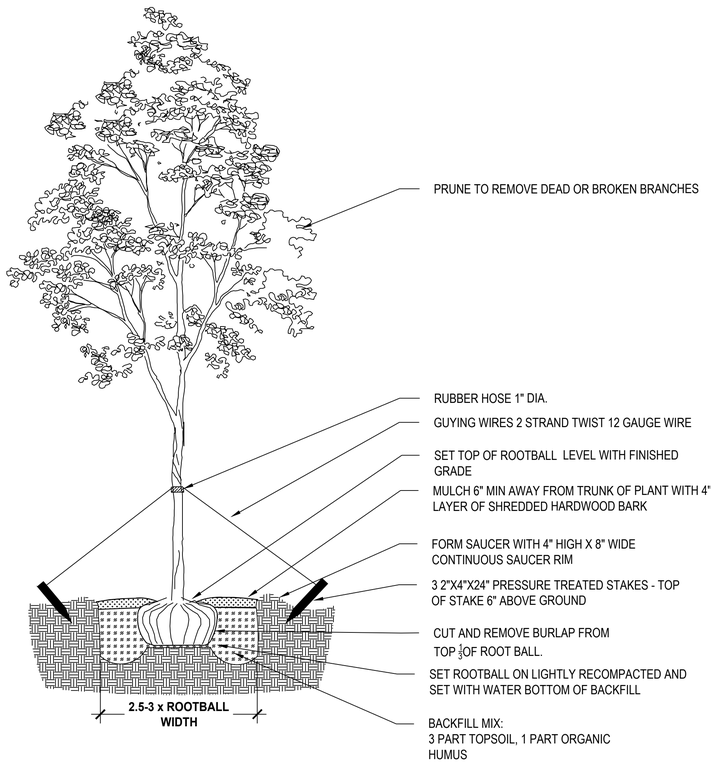
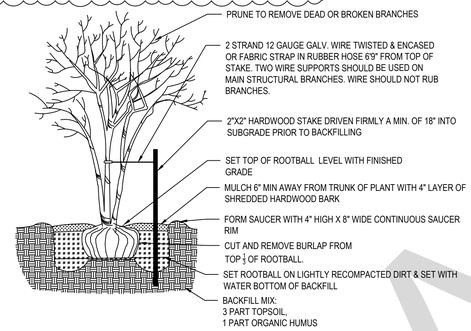



1 STORMWATER PLANTER DETAIL
NTS

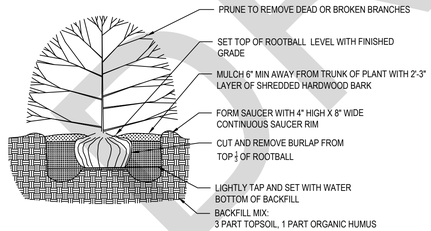
b



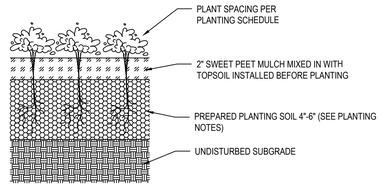

3 DECIDUOUS TREE PLANTING
NTS



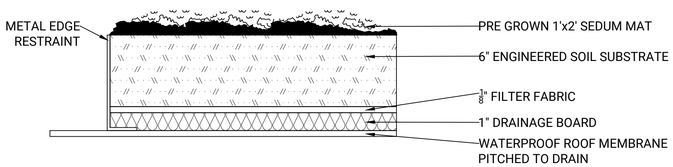

2 MULTI-STEM TREE PLANTING
NTS




4 SHRUB PLANTING
NTS




5 PERENNIAL PLANTING
NTS




6 GREEN ROOF DETAIL
NTS

## GENERAL PLANTING NOTES:

1. SCOPE OF WORK:
   1.1. PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT FOR COMPLETE INSTALLATION OF LANDSCAPING, AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN.
2. QUALITY ASSURANCE:
   2.1. PROVIDE PLANT MATERIALS IN COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS RELATING TO INSPECTION FOR DISEASES AND INSECT INFESTATION AT GROWING RATE.
   2.2. PLANTS ARE SUBJECT TO INSPECTION AND APPROVAL BY THE LANDSCAPE ARCHITECT. PLANTS REQUIRED FOR THE WORK MAY BE INSPECTED AND TAGGED AT THE GROWING SITE BEFORE BEING DUG.
   2.3. OBSERVATION AT GROWING SITE DOES NOT PRECLUDE RIGHT OF REJECTION AT JOB SITE. PLANTS DAMAGED IN TRANSIT OR AT JOB SITE MAY BE REJECTED.
   2.4. EMPLOY ONLY QUALIFIED PERSONNEL FAMILIAR WITH REQUIRED WORK.
3. REFERENCED STANDARDS:
   3.1. A. AMERICAN STANDARD FOR NURSERY STOCK, APPROVED 1986 BY AMERICAN NATIONAL STANDARDS INSTITUTE, INC. - PLANT MATERIALS.
   3.2. B. HORTUS THIRD, 1976 - CORNELL UNIVERSITY - PLANT NOMENCLATURE.
   3.3. C. ASTM - AMERICAN STANDARD TESTING MATERIAL - SHARP SAND.

4. PRODUCT DELIVERY, STORAGE AND HANDLING:
   4.1. PREPARATION FOR DELIVERY:
      4.1.1. BALLED AND BURLAPPED (B&B) PLANTS: DIG AND PREPARE SHIPMENT IN A MANNER THAT WILL NOT DAMAGE ROOTS, BRANCHES, SHAPE, AND FUTURE DEVELOPMENT.
      4.1.2. CONTAINER GROWN PLANTS: DELIVER PLANTS IN CONTAINERS SUFFICIENTLY RIGID TO HOLD BALL SHAPE AND PROTECT ROOT MASS DURING SHIPPING.
   1.1. DELIVERY:
      1.1.1. DELIVER PACKAGED MATERIALS IN SEALED CONTAINERS SHOWING WEIGHT, ANALYSIS AND NAME OF MANUFACTURER. PROTECT MATERIALS FROM DETERIORATION DURING DELIVERY AND WHILE STORED AT SITE.
      1.1.2. DO NOT DELIVER MORE PLANT MATERIALS THAN CAN BE PLANTED IN ONE DAY UNLESS ADEQUATE STORAGE AND WATERING FACILITIES ARE AVAILABLE ON JOB SITE. STORAGE OF MATERIALS AND EQUIPMENT AT THE JOB SITE WILL BE AT THE RISK OF THE LANDSCAPE CONTRACTOR. THE OWNER WILL NOT BE HELD RESPONSIBLE FOR THEFT OR DAMAGE.
      1.1.3. IF BALLED PLANTS CANNOT BE PLANTED WITHIN 24 HOURS AFTER DELIVERY TO SITE, PROTECT ROOT BALLS BY HEELING IN WITH SAW DUST OR OTHER APPROVED MATERIAL.
      1.1.4. PROTECT DURING DELIVERY TO PREVENT DAMAGE TO ROOT BALL OR DESICCATION OF LEAVES.
      1.1.5. NOTIFY LANDSCAPE ARCHITECT OF DELIVERY SCHEDULE 48 HOURS IN ADVANCE SO PLANT MATERIAL MAY BE OBSERVED UPON ARRIVAL AT JOB SITE.
      1.1.6. REMOVE REJECTED PLANT MATERIAL IMMEDIATELY FROM SITE.

1. JOB CONDITIONS:
   1.1. PLANTING RESTRICTIONS: PERFORM ACTUAL PLANTING ONLY WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE IN ACCORDANCE WITH LOCALLY ACCEPTED PRACTICE.
   1.2. PROTECTIONS:
      1.2.1. DO NOT MOVE EQUIPMENT OVER EXISTING OR NEWLY PLACED STRUCTURES WITHOUT APPROVAL OF LANDSCAPE ARCHITECT AND GENERAL CONTRACTOR.
      1.2.2. PROVIDE BOARD-ROADING AND SHEETING AS REQUIRED TO PROTECT PAVING AND OTHER IMPROVEMENTS FROM DAMAGE.
      1.2.3. IN NO WAY SHALL ANY TREES, PLANTS, GROUND COVER OR SEASONAL COLOR OBSTRUCT DRAINAGE OR BLOCK A 2% MINIMUM POSITIVE SLOPE AWAY FROM BUILDINGS.

2. WARRANTY:
   2.1. WARRANT PLANTS AND TREES FOR ONE YEAR AFTER FINAL ACCEPTANCE. REPLACE DEAD MATERIALS AND MATERIALS NOT IN VIGOROUS, THRIVING CONDITION AS SOON AS WEATHER PERMITS AND ON NOTIFICATION BY LANDSCAPE ARCHITECT. REPLACE PLANTS, INCLUDING TREES, WHICH IN THE OPINION OF LANDSCAPE ARCHITECT HAVE PARTIALLY DIED THEREBY DAMAGING SHAPE, SIZE, OR SYMMETRY.
   2.2. REPLACE PLANTS AND TREES WITH SAME KIND AND SIZE AS ORIGINALLY PLANTED, AT NO COST TO OWNER. PROVIDE ONE-YEAR WARRANTY ON REPLACEMENT PLANTS. THESE SHOULD BE REPLACED AT START OF NEXT PLANTING OR DIGGING SEASON. IN SUCH CASES, REMOVE DEAD TREES IMMEDIATELY. PROTECT IRRIGATION SYSTEM AND OTHER PIPING CONDUIT OR OTHER WORK DURING REPLACEMENT. REPAIR ANY DAMAGE IMMEDIATELY.
   2.3. WARRANTY EXCLUDES REPLACEMENT OF PLANTS AFTER FINAL ACCEPTANCE BECAUSE OF INJURY BY STORM, DROUGHT, DROWNING, HAIL, FREEZE, INSECTS OR DISEASES.
   2.4. AT THE END OF THE WARRANTY PERIOD, STAKING AND GUYING MATERIALS SHALL BE REMOVED FROM THE SITE.

3. MAINTENANCE:
   3.1. WATER: WILL BE AVAILABLE ON SITE. PROVIDE NECESSARY HOSES AND OTHER WATERING EQUIPMENT REQUIRED TO COMPLETE WORK.
   3.2. UNTIL FINAL ACCEPTANCE, MAINTAIN PLANTINGS AND TREES BY WATERING, CULTIVATING, MOWING, WEEDING, SPRAYING, CLEANING AND REPLACING AS NECESSARY TO KEEP LANDSCAPE IN A VIGOROUS, HEALTHY CONDITION AND RAKE BED AREAS AS REQUIRED.
   3.3. A WRITTEN NOTICE REQUESTING FINAL INSPECTION AND ACCEPTANCE SHOULD BE SUBMITTED TO LANDSCAPE ARCHITECT SEVEN (7) DAYS PRIOR TO COMPLETION. AT THAT TIME OWNER AND LANDSCAPE ARCHITECT WILL PREPARE A FINAL PUNCH LIST TO BE REVIEWED WITH LANDSCAPE CONTRACTOR. WHEN SUCH PROJECT IS DEEMED COMPLETE BY LANDSCAPE ARCHITECT, AN ON-SITE INSPECTION BY OWNER, LANDSCAPE CONTRACTOR AND LANDSCAPE ARCHITECT WILL BE COMPLETED PRIOR TO WRITTEN ACCEPTANCE.
   3.4. FOLLOWING FINAL ACCEPTANCE, MAINTENANCE OF PLANT MATERIAL WILL BECOME THE OWNER'S RESPONSIBILITY. THE CONTRACTOR SHALL PROVIDE OWNER WITH A RECOMMENDED MAINTENANCE PROGRAM.

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long island city, ny 11101
646.389.0147
www.bayviewla.com

STAMP:

CLIENT:
**280-330 E. 161ST ST**
BRONX, NY 10451

ASSUMED NORTH:

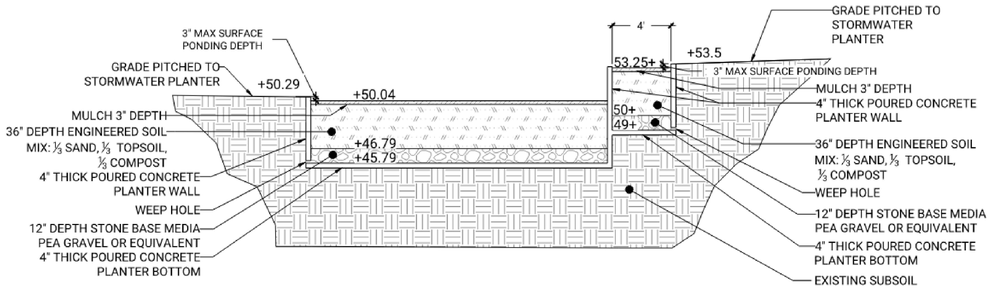
GRAPHIC SCALE:

SHEET NAME:
**PLANTING DETAILS & NOTES**

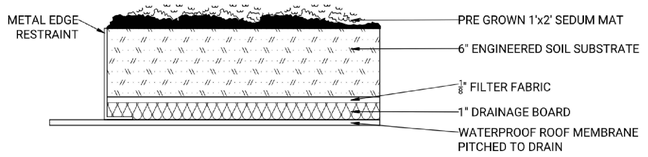
SCALE:

SHEET: **LP-301**

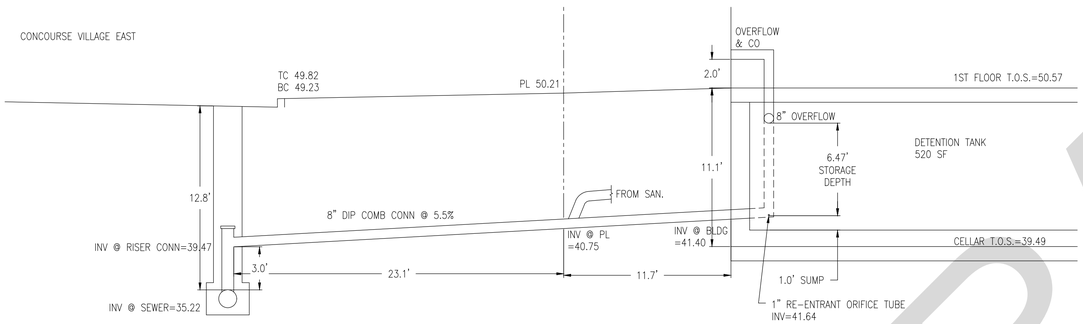
PAGE: 9 OF 9



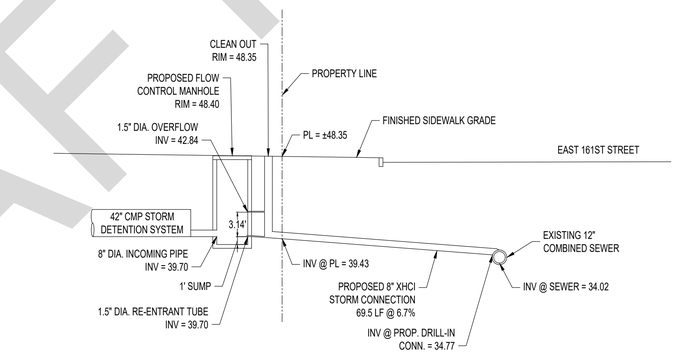

## 1 STORMWATER PLANTER DETAIL
NTS



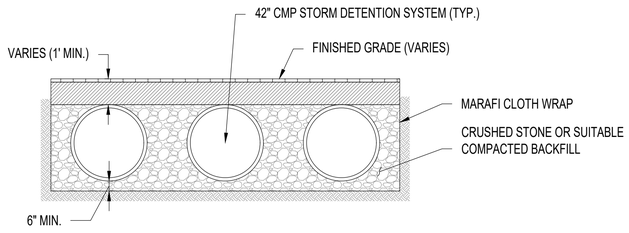

## 2 GREEN ROOF DETAIL
NTS




## 3 WEST TOWER DETENTION TANK SECTION
SCALE: N.T.S.




## 4 EAST TOWER DETENTION TANK SECTION
SCALE: N.T.S.




## 5 TYPICAL CORRUGATED METAL PIPE DETENTION SYSTEM
SCALE: N.T.S.

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# 280 EAST 161ST STREET
**THE BRONX**

**SMP SECTIONS AND DETAILS**

0 20 40 60 80
U.S. STANDARD SCALE: 1 INCH = 20 FEET

Philip Habib & Associates · Engineers and Planners
440 Park Avenue South · New York, NY · 10016

| | |
|---|---|
| SCALE: | 1"=20' |
| DATE: | 11/05/2025 |
| DRAWN BY: | JY |

DRAWING NO.: **Figure 12**
JOB NO.: 2288C

# Appendix B: Calculations

## Documents included:

☐ Erosion and Sediment Control Practice Calculations, showing that the project meets ESC requirements and that practices have been sized in accordance with the NYS DEC Standards and Specifications for Erosion and Sediment Control

☒ Design Calculation Sheet, including:

- Required Site $WQ_v$
- Required Practice $WQ_v$ for each practice
- Target Site $RR_v$
- Minimum site $RR_v$
- Site $V_v$, $Q_{DRR}$, $Cp_v$, $Q_f$, $Q_p$, if applicable
- Practice storage volume $V_{SMP}$
- Performance of practice to meet $WQ_v$, $RR_v$, $V_V$, and $Q_{DRR}$
- Summary table showing the project meets requirements at the site and practice levels.

☐ NYC MS4 No-Net-Increase Calculator for Nitrogen (NYC SWM Appendix B), if applicable.

☐ Detention in Series Workbook (NYC SWM Appendix G), if applicable.

☐ Hydrologic and hydraulic analyses

## If any of the above documents are not included, explain why below:

Click or tap here to enter text.

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# Appendix B - Design Calculation Sheet

**Total Property Area = 121,494 square feet (2.79 acre):**

Roof: 49,104 square feet
Paved: 51,992 square feet
Green Roof #1: 1,435 square feet
Green Roof #2: 1,152 square feet
Green Roof #3: 267 square feet
Green Roof #4: 683 square feet
Stormwater Planter #1: 653 square feet
Stormwater Planter #2: 297 square feet
Total Grass/Planted: 15,911 square feet

Existing Permeable Area: 26,350 square feet (22%)
Existing Impermeable Area: 95,144 square feet (78%)

Proposed Permeable Area: 15,911 square feet (13%)
Proposed Impermeable Area: 105,583 square feet (87%)

**Disturbed Areas of Property = 86,152 square feet (1.98 acre):**

Roof: 19,291 square feet
Paved: 51,333 square feet
Green Roof #1: 1,435 square feet
Green Roof #2: 1,152 square feet
Green Roof #3: 267 square feet
Green Roof #4: 683 square feet
Stormwater Planter #1: 653 square feet
Stormwater Planter #2: 297 square feet
Total Grass/Planted: 11,041 square feet

Existing Permeable Area: 21,478 square feet (25%)
Existing Impermeable Area: 64,673 square feet (75%)

Proposed Permeable Area: 11,041 square feet (13%)
Proposed Impermeable Area: 75,111 square feet (87%)

**WQv Calculation for the disturbed area:**
**$WQ_v$ = (P*Rv*A)/12,** where
P = 1.5 (90% rainfall event number for New York City)
$R_v$ = 0.05 + 0.009I where I = 87, therefore $R_v$ = 0.83
A = 86,152 square feet
$WQ_v$ = 8,988 cubic feet

**Runoff Reduction Volume (RRv) for the disturbed area:**
**RRv = 1.5/12*0.95*Aic*S,** where
Aic = 10,438 square feet
S = 0.40 (HSG-B)
RRv = 496 cubic feet

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**Cover Areas (sf) Per Lot for the Disturbed Area**

| | P/O Lot 120 | Lot 130 | Lot 150 |
|---|---|---|---|
| Roof | 0 | 10,568 | 8,723 |
| Paved | 14,628 | 11,311 | 25,405 |
| Green Roof | 0 | 1,435 | 2,102 |
| Stormwater Planter | 0 | 950 | 0 |
| Grass/Planted | 7,230 | 869 | 2,932 |
| **TOTAL** | **21,858** | **25,133** | **39,161** |

**Vv Contributing Areas to Each Lot**

| | Lot 130 | Lot 150 | | |
|---|---|---|---|---|
| | | From Lot 120 | From Lot 130 | From Lot 150 |
| Roof | 10,568 | 0 | 0 | 8,723 |
| Paved | 9,423 | 14,628 | 1,888 | 25,405 |
| Green Roof | 1,435 | 0 | 0 | 2,102 |
| Stormwater Planter | 0 | 0 | 950 | 0 |
| Grass/Planted | 441 | 7,230 | 428 | 2,932 |
| **TOTAL** | **21,867** | **64,286** | | |
| **Cw** | **0.88** | **0.75** | | |

**Vv Calculation for Lot 130:**
**Vv = Rd/12*A*Cw,** where
Rd = 1.85 (CSS areas with SCP)
Cw = 0.88
A = 21,867 square feet
Vv = 2,951 cubic feet

**Vv Calculation for Lot 150:**
**Vv = Rd/12*A*Cw,** where
Rd = 1.85 (CSS areas with SCP)
Cw = 0.75
A = 64,286 square feet
Vv = 7,427 cubic feet

**Total Required Vv = 2,951 + 7,427 = 10,378 cubic feet**

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**Stormwater Planter #1 Calculations:**

SMP Area = 653 square feet
Upland Drainage to SMP
Paved: 3,702 square feet
Grass/Planted: 1,191 square feet
Total Contributing Area = 5,546 square feet

**WQv = (P*Rv*A)/12**, where
P = 1.5 (90% rainfall event number for New York City)
Rv = 0.05 + 0.009I where I = 79, therefore
Rv = 0.76
A = 5,546 square feet
WQv = 525 cubic feet

**Surface Ponding $Vp = A_{SMP}*Dp/12$**, where
$A_{SMP}$ = 653 square feet
Ds = 3 inches
Vp = 163 cubic feet

**Soil Media $Vs = A_{SMP}*Ds/12* ns$**, where
$A_{SMP}$ = 653 square feet
Ds = 36 inches
ns = 0.20 (porosity of soil media)
Vs = 392 cubic feet

**$V_{SMP} = Vp + Vs$**
$V_{SMP}$ = 555 cubic feet

**Drawdown Time for Surface Ponding**
$dt_P = V_P/((Ks/12)*(1+0.5*D_P/D_M)*((A_{P1}+A_{P2})/2))$
$dt_P = 163/((0.5/12)*(1+0.5*0.25/3)*((653+653)/2))$
$dt_P$ = 5.75 hours < 24 hours

**Stormwater Planter #2 Calculations:**

SMP Area = 297 square feet
Upland Drainage to SMP
Paved: 884 square feet
Grass/Planted: 741 square feet
Total Contributing Area = 1,922 square feet

**WQv = (P*Rv*A)/12**, where
P = 1.5 (90% rainfall event number for New York City)
Rv = 0.05 + 0.009I where I = 61, therefore
Rv = 0.60
A = 1,922 square feet
WQv = 145 cubic feet

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**Surface Ponding Vp = $A_{SMP}$*Dp/12**, where
$A_{SMP}$ = 297 square feet
Ds = 3 inches
Vp = 74 cubic feet

**Soil Media Vs = $A_{SMP}$*Ds/12* ns**, where
$A_{SMP}$ = 297 square feet
Ds = 36 inches
ns = 0.20 (porosity of soil media)
Vs = 178 cubic feet

**$V_{SMP}$ = Vp + Vs**
$V_{SMP}$ = 252 cubic feet

**Drawdown Time for Surface Ponding**
$dt_P = V_P/((Ks/12)*(1+0.5*D_P/D_M)*((A_{P1}+A_{P2})/2))$
$dt_P = 74/((0.5/12)*(1+0.5*0.25/3)*((297+297)/2))$
$dt_P$ = 5.74 hours < 24 hours

**Total WQv provided by ET stormwater planters = 525 + 145 = 670 cubic feet**

**<u>Green Roof #1 Calculations:</u>**

**$WQ_v$ = (P*Rv*A)/12,** where
P = 1.5 (90% rainfall event number for New York City)
$R_v$ = 0.05 + 0.009I where I = 100, therefore
$R_v$ = 0.95
A = 1,435 square feet
$WQ_v$ = 170 cubic feet

**$V_s$ = $A_{SMP}$*$D_s$/12* $n_s$,** where
$A_{SMP}$ = 1,435 square feet
$D_s$ = 6 inches
$n_s$ = 0.20 (porosity of soil media)
$V_s$ = 144 cubic feet

**<u>Green Roof #2 Calculations:</u>**

**$WQ_v$ = (P*Rv*A)/12,** where
P = 1.5 (90% rainfall event number for New York City)
$R_v$ = 0.05 + 0.009I where I = 100, therefore
$R_v$ = 0.95
A = 1,152 square feet
$WQ_v$ = 137 cubic feet

**$V_s$ = $A_{SMP}$*$D_s$/12* $n_s$,** where
$A_{SMP}$ = 1,152 square feet

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$D_s$ = 6 inches
$n_s$ = 0.20 (porosity of soil media)
$V_s$ = 115 cubic feet

**Green Roof #3 Calculations:**

**$WQ_v$ = (P*Rv*A)/12,** where
P = 1.5 (90% rainfall event number for New York City)
$R_v$ = 0.05 + 0.009I where I = 100, therefore
$R_v$ = 0.95
A = 267 square feet
$WQ_v$ = 32 cubic feet

**$V_s = A_{SMP}*D_s/12* n_s$,** where
$A_{SMP}$ = 267 square feet
$D_s$ = 6 inches
$n_s$ = 0.20 (porosity of soil media)
$V_s$ = 27 cubic feet

**Green Roof #4 Calculations:**

**$WQ_v$ = (P*Rv*A)/12,** where
P = 1.5 (90% rainfall event number for New York City)
$R_v$ = 0.05 + 0.009I where I = 100, therefore
$R_v$ = 0.95
A = 683 square feet
$WQ_v$ = 81 cubic feet

**$V_s = A_{SMP}*D_s/12* n_s$,** where
$A_{SMP}$ = 683 square feet
$D_s$ = 6 inches
$n_s$ = 0.20 (porosity of soil media)
$V_s$ = 68 cubic feet

**Total WQv provided by green roofs = 144 + 115 + 27 + 68 = 354 cubic feet**

**Detention Tank #1 Calculations:**
Lot 130 = 25,133 sf = 0.58 ac
Total contributing area = 21,867 sf

Maximum release rate, Qrr = 0.1 per acre = **0.06 cfs** > 0.046 cfs

Required detention volume, Vv = Rd/12*A*Cw
Vv = 1.85/12*21,867*0.88 = 2,951 cf

**Volume provided = 520 sf * 6.47 ft = 3,364 cubic feet > Vv = 2,951 cubic feet**

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Drawdown time:
$dt_{SMP}=V_{SMP}/(0.5*C_DA_O*(2*g*H)^0.5)*(1/3600)$
For a 1" diameter re-entrant orifice,
$dt_{SMP}$=3,364/(0.5*0.52*0.00545*(2*32.2*6.51)^0.5)*(1/3600) = **32 hours < 72 hours**

**Detention Tank #2 Calculations:**
Lot 150 = 39,161 sf = 0.90 ac
Total contributing area = 64,286 sf

Maximum release rate, Qrr = 0.1 per acre = **0.09 cfs** > 0.046 cfs

Required detention volume, Vv = Rd/12*A*Cw
Vv = 1.85/12*64,286*0.75 = **7,427 cf**

Detention pipe system:
42" CMP with an effective height of 3.14 feet (effective area = 9.1 square feet)
Length of pipe system = 650 feet
**Volume provided = 9.1 * 820 = 7,462 cubic feet > Vv = 7,427 cubic feet**

Drawdown time:
$dt_{SMP} = V_{SMP}/(0.5*C_DA_O*(2*g*H)^0.5)*(1/3600)$
For a 1.5" diameter re-entrant orifice,
$dt_{SMP}$ =5,915/(0.5*0.52*0.01227*(2*32.2*3.20)^0.5)*(1/3600) = **36 hours < 72 hours**

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**Summary**

| SMP | WQv (cf) | RRv (cf) | Vv (cf) |
|---|---|---|---|
| SMP #1 – ET Stormwater Planter #1 | 525 | 525 | --- |
| SMP #2 – ET Stormwater Planter #2 | 145 | 145 | --- |
| SMP #3 - Green Roof #1 | 144 | 144 | --- |
| SMP #4 - Green Roof #2 | 115 | 115 | --- |
| SMP #5 - Green Roof #3 | 27 | 27 | --- |
| SMP #6 - Green Roof #4 | 68 | 68 | --- |
| SMP #7 - Detention Tank #1 | 2,951 | --- | 2,951 |
| SMP #8 - Detention Tank #2 | 5,013 | --- | 7,427 |
| Total | 8,988 | 1,024 | 10,378 |

# Appendix C: Technical Documentation

## Documents included:

☒ Manufacturer Product Data

☒ Material specifications

☒ Installation details

☐ Technical documentation to demonstrate equivalence of non-conforming practices to requirements

☐ In cases where manufactured treatment devices are proposed, verification letters from established, third-party stormwater management practice evaluation and verification systems approved by NYS DEC for the use of Proprietary Practices, as outlined by **NYS SWMDM Section 9.4.1**.

☐ In cases where a request for disturbance of 5 acres or more at one time, a request for authorization that includes:

- An acknowledgement and implementation plan to meet the additional inspection and soil stabilization requirements associated with disturbing 5 acres or more at one time
- A phasing place that defined maximum disturbed area per phase and shows required cuts and fills
- A description of any additional site-specific practices or measures needed to protect water quality

## If any of the above documents are not included, explain why below:

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FERGUSON WATERWORKS



# SILTSACK®

## SEDIMENT CAPTURE DEVICE

## PROTECTS CATCH BASINS FROM CONSTRUCTION RUNOFF

Siltsack® is a temporary catch-basin filter that prevents sediment, trash and debris from entering a catch basin. Available in both high flow and regular flow, Siltsack can be manufactured with built-in curb deflectors and overflow holes.

Routine inspection of Siltsack's collected sediment level is important for preventing ponding around storm drains.

## AVAILABLE UNITS

- SiltSack
- SiltSack Curb
- SiltSack with Overflow
- SiltSack Curb with Overflow
- SiltSack with Frame

## ADVANTAGES

- Yellow geotextile fabric makes bag visible to inspectors, while design makes it unobtrusive
- Keep debris, silt, and sediment out of storm system
- Eliminates or reduces the need to flush or clean inlets
- Reusable system
- Made to fit any size inlet
- Easy to install and economical
- U.S. patented
- Custom sizes available
- Undergrate design so it is not easily disturbed
- Optional overflow and curb filters available
- SiltSack Frame available in multiple sizes

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SILTSACK CURB

RESTRAINT CORD

SILTSACK

SILTSACK WITH FRAME

For more information about Inlet Protection, contact Inside Sales at **800.448.3636** or **infogeo@ferguson.com** or visit us at **fergusongss.com**

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## SPECIFICATIONS

Siltsack is manufactured from woven polypropylene geotextile and is made to fit the opening of a catch basin or drop inlet.

## SPECS FOR SILTSACK REGULAR FLOW

| PROPERTY | TEST METHOD | UNITS | TEST RESULTS |
|---|---|---|---|
| Grab tensile | ASTM D4632 | lbs | 250 × 230 |
| Grab elongation | ASTM D4632 | % | 15 × 12 |
| Puncture | ASTM D6241 | lbs | 930 |
| Trapezoid tear | ASTM D4533 | lbs | 65 × 75 |
| AOS | ASTM D4751 | U.S. Sieve | 30 |
| Flow rate | ASTM D4491 | gal/min/ft $^2$ | 40 |
| Permittivity | ASTM D4491 | sec -1 | 0.50 |

## SPECS FOR SILTSACK HIGH FLOW

| PROPERTY | TEST METHOD | UNITS | TEST RESULTS |
|---|---|---|---|
| Grab tensile | ASTM D4632 | lbs | 285 × 210 |
| Grab elongation | ASTM D4632 | % | 30 × 20 |
| Puncture | ASTM D6241 | lbs | 810 |
| Trapezoid tear | ASTM D4533 | lbs | 110 × 95 |
| AOS | ASTM D4751 | U.S. Sieve | 20 |
| Flow rate | ASTM D4491 | gal/min/ft $^2$ | 350 |
| Permittivity | ASTM D4491 | sec -1 | 4.85 |

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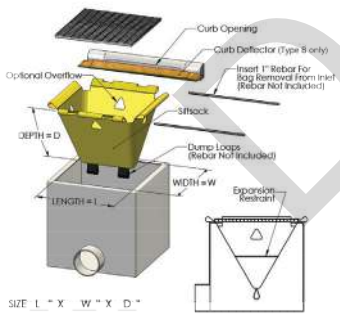
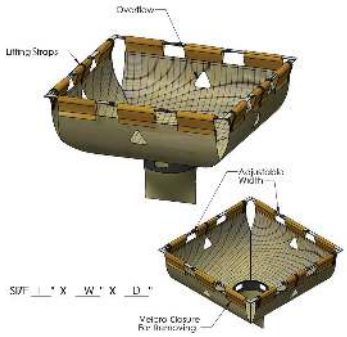
## SILTSACK WITH OR WITHOUT CURB DEFLECTOR




## SILTSACK WITH ADJUSTABLE FRAME




## SILTSACK ALT CODES/SIZING

| ACF ITEM CODE | WIDTH | LENGTH |
|---|---|---|
| ACFSSHF2X2Y | 2' | 2' |
| ACFSSHF2X3Y | 2' | 3' |
| ACFSSHF2X4Y | 2' | 4' |
| ACFESHF3X3Y | 3' | 3' |
| ACFSSHS28X50B | 28" | 50" |

| ACF ITEM CODE | WIDTH | LENGTH |
|---|---|---|
| ACFSSHS28X50B | 28" | 50" |
| ACFSSHF2RY | 2' Diameter | |
| ACFSSHF3RY | 3' Diameter | |
| ACFSSHF30X30Y | 30" | 30" |
| ACFESCCUSTY | Custom Sizing | |

For more information about Inlet Protection, contact Inside Sales at **800.448.3636** or **infogeo@ferguson.com** or visit us at **fergusongss.com**

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1.1

filtrexx®
SUSTAINABLE TECHNOLOGIES

## SECTION 1: CONSTRUCTION

# Filtrexx® Sediment/Perimeter Control (SiltSoxx™)

### PURPOSE & DESCRIPTION

**Filtrexx® SiltSoxx™** is a three-dimensional tubular sediment control and stormwater runoff filtration device typically used for **Sediment/Perimeter Control** of sediment and soluble pollutants (such as phosphorus and petroleum hydrocarbons), on and around construction activities. Perimeter control traps sediment and soluble pollutants by *filtering* runoff water as it passes through the matrix of the Soxx™ *and* by allowing water to temporarily pond behind the Soxx, allowing *deposition* of suspended solids. Perimeter control is also used to reduce runoff flow velocities on sloped surfaces.

### APPLICATION

Perimeter control is to be installed down slope of any disturbed area requiring erosion and sediment control and filtration of soluble pollutants from runoff. Perimeter control is effective when installed perpendicular to sheet or low concentrated flow, and in areas that silt fence is normally considered appropriate. Acceptable applications include:

- Site perimeters
- Above and below disturbed areas subject to sheet runoff, interrill and rill erosion
- Above and below exposed and erodable slopes
- Along the toe of stream and channel banks
- Around area drains or inlets located in a 'sump'
- On compacted soils where trenching of silt fence is difficult or impossible
- Around sensitive trees where trenching of silt fence is not beneficial for tree survival or may unnecessarily disturb established vegetation
- On frozen ground where trenching of silt fence is impossible
- On paved surfaces where trenching of silt fence is impossible

Perimeter control can be applied to areas of high sheet runoff and erosion, on slopes up to a 1:1 grade (should be used in conjunction with slope stabilization/erosion control technology on slopes

Installation Method – Perimeter Control

> 4:1), around inlets, and in other disturbed areas of construction sites requiring sediment control. Perimeter control may also be used in sensitive environmental areas, where migration of wildlife may be impeded by the use of fences or trenching may damage roots.

It is possible to drive over perimeter control during construction (although not recommended), however, these areas should be immediately repaired by manually moving perimeter control back into place, if disturbed. Continued heavy construction traffic may destroy the fabric mesh, reduce the dimensions, and reduce the effectiveness of the perimeter control.

### ADVANTAGES AND DISADVANTAGES

**Advantages**

- Tubular filtration matrix allows for better trapping and removal of sediment and soluble pollutants in stormwater runoff compared to planar constructed sediment control devices (i.e., silt fence).
- Greater surface area contact with soil than typical sediment control devices reduces potential for runoff to create rills under the device leading to unfiltered sediment.
- No trenching is required; therefore soil is not disturbed upon installation or removal.
- Perimeter control can be installed year-round in

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difficult soil conditions such as frozen or wet ground, and dense and compacted soils, as long as stakes can be driven.
- Perimeter control is easily implemented as a treatment in a greater treatment train approach to erosion and sediment control.
- Organic matter and humus colloids in FilterMedia™ (filler material in perimeter control) have the ability to bind and adsorb phosphorus, metals, and hydrocarbons that may be in stormwater runoff.
- Microorganisms in FilterMedia have the ability to degrade organic pollutants and cycle captured nutrients in stormwater runoff.
- Soxx (the mesh netting containment system) allows perimeter control to be placed in areas of high sheet flow and low concentrated flow.
- Perimeter control can be direct seeded at time of application to provide greater stability and filtration capability once vegetation is established.
- FilterMedia is organic and can be left on site after permanent stabilization is complete, to be used in landscape design and/or seeded and planted with permanent vegetation.
- FilterMedia improves existing soil structure if spread out and used as a soil amendment after construction activity is complete.
- Biodegradable or photodegradable perimeter control can be left on site after construction activity and may eliminate the need for removal and labor and disposal costs.
- Perimeter control can be used on slopes to slow down runoff velocity, disperse concentrated runoff, and reduce effective slope lengths, reducing the erosive potential of stormwater runoff.
- Perimeter control is less likely to obstruct wildlife movement and migration than planar/silt fence sediment control practices.
- Perimeter control is available in 5 in. (125mm), 8 in.(200mm), 12 in. (300mm), 18 in. (450mm), 24 in. (600mm), and 32 in (800mm) diameters for customized applications and challenging situations.
- Perimeter control is available in up to 200 ft (61m) continuous lengths to prevent weak sections and creation of concentrated flow situations typical to low points in runs of other sediment control devices. End points are sleeved together to form continuous runs of unlimited lengths without low or break points.
- Perimeter control may assist in qualification for LEED® Green Building Rating and Certification credits under LEED Building Design & Construction (BD+C), New Construction v4. Awarded credits may be possible from the categories of Sustainable Sites, Water Efficiency, Materials & Resources, and Innovation. *Note: LEED is an independent program offered through the U.S. Green Building Council. LEED credits are determined on a per project basis by an independent auditing committee. Filtrexx neither guarantees nor assures LEED credits from the use of its products. LEED is a trademark of the U.S. Green Building Council.*

**ADVANTAGES**

| | LOW | MED | HIGH |
|---|---|---|---|
| **Installation Difficulty** | ✓ | | |
| **Durability** | | | ✓ |
| **Sediment Control** | | | ✓ |
| **Soluble Pollutant Control** | | ✓ | |
| **Runoff Flow Control** | | ✓ | |
| **Life Cycle Cost** | ✓ | | |

**Disadvantages**
- If filler material of perimeter control is not Filtrexx® Certified℠ FilterMedia™, performance may be diminished.
- If not installed correctly, maintained or used for a purpose or intention that does not meet specifications performance may be diminished.
- If land surface is extremely bumpy, rocky, or changes elevation abruptly ground surface contact to perimeter control may be diminished thereby adversely effecting performance.

## MATERIAL SPECIFICATIONS

Perimeter control use only photodegradable or biodegradable Soxx netting materials available from Filtrexx International and are the only mesh materials accepted in creating perimeter control for any purpose. For Soxx tubular mesh material specifications see Table 1.1.

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## FILTERMEDIA™ CHARACTERISTICS

Specifications for perimeter control use only Filtrexx Certified FilterMedia which is a coarse composted material that is specifically designed for removal of solids and soluble pollutants from stormwater runoff. FilterMedia can be altered or customized to target specific pollutants in runoff as approved by the Engineer or Filtrexx International. All Filtrexx Certified FilterMedia has been third party tested and certified to meet minimum performance criteria defined by Filtrexx International. Performance parameters include; hydraulic flow through rate, total solids removal efficiency, total suspended solids removal efficiency, turbidity reduction, nutrient removal efficiency, metals removal efficiency, and motor oil removal efficiency. For information on the physical and chemical properties of Filtrexx Certified FilterMedia refer to the Filtrexx Design Manual, section 5.1. Look for the Filtrexx Certified FilterMedia Seal from our international network of Filtrexx Certified Installers and Manufacturers.

## PERFORMANCE

Performance testing and research on perimeter control has been extensive. Results from testing and research programs conducted on perimeter control include: hydraulic flow through rate, ponding rate and calculation (behind perimeter control), sediment storage capacity (inside + behind tool), total solids removal efficiency, suspended solids removal efficiency (with and w/out biopolymer and polymer flocculants), turbidity reduction (with and w/out biopolymer and polymer flocculants), nitrate-N removal efficiency, total P removal efficiency, soluble reactive P removal efficiency (with and w/out Nutrient Agent), petroleum hydrocarbon (motor oil) removal efficiency, and heavy metals (Cu, Fe, Mn, Zn) removal efficiency. For a summary of performance testing, research results, and design specifications see Table 1.1 and Table 1.2. For copies of full reports visit www.filtrexx.com.

Successful bidders will furnish adequate research support showing their manufactured product meets or exceeds performance and design criteria outlined in this standard specification. Research or performance testing will be accepted if it meets the following criteria: conducted by a neutral third party, utilizes standard test methods reported by ASTM or referenced in a peer reviewed scientific journal, product and control treatments are tested in triplicate, performance results are reported for product and control (control should be a bare soil under the same set of environmental and experimental conditions), results are peer reviewed, results indicate a minimum 60% TSS removal efficiency and a minimum hydraulic flow through rate of 5 gpm/ft$^2$. Bidders shall attach a copy of the research report indicating test methodologies utilized and results.

*Note: the Contractor is responsible for establishing a working erosion and sediment control system and may, with approval of the Engineer, work outside the minimum construction requirements as needed. Where the perimeter control deteriorates or fails, it shall be repaired or replaced with an effective alternative.*

## DESIGN CRITERIA

The sediment and pollutant removal process characteristic to perimeter control combines both filtering and deposition from settling solids. This is different than methods that rely on ponding for deposition of solids for perimeter control (i.e., silt fence). Ponding occurs when water flowing to the perimeter control accumulates faster than the hydraulic flow through rate of the perimeter control. Typically, hydraulic flow-through rates for perimeter control are 50% greater than geotextile filter fabric (silt fence). *Greater hydraulic flow-through rates reduce ponding, therefore reducing the need for taller sediment control structural design height.* Additionally, perimeter control does not blind as easily with small soil/sediment colloids, as do planar geotextile sediment control barriers (such as silt fence). However, installation and maintenance is especially important for proper function and performance. For engineering design details see Figure 1.1. For a summary of specifications for product/practice use, performance and design see Table 1.1 and Table 1.2.

Filtering Water

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For most standard perimeter control applications, a 12 in (300mm) diameter perimeter control can replace a 24 to 36 in (600 to 900mm) silt fence. See Table 1.3 and 1.4 and Figure 1.2 for standard design specifications for maximum allowable slope lengths. Note: In some low flow conditions, an 8 in (200mm) perimeter control may replace a 24 in (600mm) silt fence. Design consideration should be given to the duration of the project, total area of disturbance, rainfall/runoff potential, soil erosion potential, and sediment loading.

**Runoff Flow:**
Sheet runoff flow and ponding depth should not exceed the height of the perimeter control. If overflow of the device is a possibility, larger diameter perimeter control should be constructed, other sediment control devices may be used, or management practices to reduce runoff should be installed. Alternatively, a second perimeter control may be constructed or used in combination with compost erosion control blankets or rolled erosion control blankets to slow runoff and reduce erosion. The Filtrexx Design Tool can assist in planning and designing what diameter perimeter control should be used, correct spacing requirements, and what rainfall and site conditions can lead to runoff breaching of the perimeter control. For instructions and a copy of

**Figure 1.3** Filtrexx® Sediment Control Design Tool for Sediment Control Applications.

| | | | | | | |
|---|---|---|---|---|---|---|
| Step 1: Choose units. ft or m | | ft | | | | |
| Step 2: Choose input: Tr or I | | Tr | | | | |
| | total rainfall | inches | 1.5 | storm duration | hours: 24 | |
| Step 3: Choose input: A or W | | | W | | | |
| | width of area | ft | 400.00 | length of slope | ft: 250 | 43560 |
| Step 4: Input slope | | % | 10 | | | 452.588 |
| Step 5: Input reduction runoff percent | | % | 10 | | | |

| | | sediment control (8,12,16) | silt fence (24, 30) |
|---|---|---|---|
| Step 6: Input effective length of filter | ft | 400 | 400 |
| Step 7: Input diameter/height of filter | inches | 12 | 36 |

Step 8: Find time to overflow filter and total flow/ft the filter can handle

Step 9: On figure find for given flow expected time to overflow filter

Part A. Evaluation of $q_l$

| I<br>inches/hr | A<br>acres | s<br>percent | Q<br>gpm | $L_{ss}$<br>ft | $q_l$<br>gpm/ft |
|---|---|---|---|---|---|
| 0.063 | 2.2957 | 10 | 58.15 | 400 | 0.145 |

Part B. Predicted time and total flow to top filter.

| | $q_o$<br>gpm/hr | D<br>inches | Effective D<br>inches | Time Overflow<br>hr | Total Flow<br>gal/f | Filter OKAY<br>time > tr |
|---|---|---|---|---|---|---|
| Sediment control (Coarse Material) | 0.145 | 12 | 9.6 | **99.1** | **865** | OKAY |
| Silt Fence | 0.145 | 36 | 30.6 | **97.5** | **851** | OKAY |

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Use on Ecologically Sensitive Sites

the Filtrexx Design Tool, refer to the Filtrexx Design Manual, Section 5.4 and 5.4a.

**Level Contour:**
Perimeter control should be placed on level contours to assist in dissipating low concentrated flow into sheet flow and reducing runoff flow velocity. Do not construct perimeter control to concentrate runoff or channel water. Sheet flow of water should be perpendicular to the perimeter control at impact and relatively un-concentrated. Placing perimeter control on undisturbed soil will reduce the potential for undermining.

**Runoff and Sediment Accumulation:**
Where possible, perimeter control should be placed at a 5 ft (1.5m) or greater distance away from the toe of the slope to allow for proper runoff accumulation for sediment deposition and to allow for maximum sediment storage capacity behind the device. If a 5 ft (1.5m) distance is not available, due to construction restrictions, a second perimeter control may be installed to increase ponding and sediment accumulation capacity. Steeper slopes allow less sediment storage behind the perimeter control device and may require larger perimeter control or shorter slope lengths.

**End Around Flow:**
In order to prevent water flowing around the ends of perimeter control, the ends of the perimeter control must be constructed pointing upslope so the ends are at a higher elevation. A minimum of 10 linear ft (3m) per end each placed at a 30 degree angle is recommended.

**Vegetated Perimeter Control:**
For permanent areas perimeter control can be direct-seeded to allow vegetation established directly in the device, and may be expanded to 5 ft (1.5m) upslope and downslope from the device, for added performance. Vegetation on and around the perimeter control will assist in slowing runoff velocity for increased deposition and filtration of pollutants. The option of adding vegetation will be at the discretion of the Engineer. No additional soil amendments or fertilizer are required for vegetation establishment in the perimeter control.

**Slope Spacing & Drainage Area:**
Maximum drainage area to, and slope spacing between perimeter control is dependent on: rainfall intensity and duration used for specific design/plan, slope steepness, and width of area draining to the perimeter control. Refer to the Filtrexx Design Tool developed by The Ohio State University to accurately design a plan based on your site and climate conditions. See *Design Capacity Prediction Tool for SiltSoxx™ and Silt Fence* and *Flow-Through Rates and Evaluation of Solids Separation of Compost FilterMedia™ vs. Silt Fence in Sediment Control Applications* (http://www.filtrexx.com/research-library/) for more information on the Design Tool or the research project and results used to create the tool. Figure 1.3 provides an example of the user interface for the Design Tool. A specification for maximum slope lengths, based on a 1 in (25 mm)/24 hr rainfall event is provided in Table 1.3 and Figure 1.2; and for a 2 in (50 mm)/24 hr rainfall event is provided in Table 1.4.

## INSTALLATION

1. Perimeter control used for control of sediment and soluble pollutants in storm runoff shall meet Filtrexx Soxx Material Specifications and use Filtrexx Certified FilterMedia.
2. Contractor is required to be Filtrexx Certified or use pre-filled Filtrexx® SiltSoxx™ products manufactured by a Filtrexx Certified Manufacturer as determined by Filtrexx International (call Filtrexx at 877-542-7699 for a current list of installers). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application Look for the Filtrexx Certified Seal.
3. Perimeter control will be placed at locations indicated on plans and in a manner as directed by the Engineer or Manufacturer.
4. Perimeter control should be installed parallel to the base of the slope or other disturbed area.

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In challenging conditions (i.e., 2:1 slopes), a second perimeter control shall be constructed at the top of the slope, or staking may be increased.

5. Effective Soxx height in the field should be as follows: 5" diameter Soxx = 4" high; 8" diameter Soxx = 6.5" high; 12" diameter Soxx = 9.5" high; 18" diameter Soxx = 14.5" high; 24" diameter Soxx = 19" high.
6. Stakes should be installed through the middle of the perimeter control on 10 ft (3m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) wooden stakes. 5" diameter Soxx may use 1" (25 mm) x 1" (25 mm) x 18 " (0.5 m) wooden stakes. In the event staking is not possible, i.e., when perimeter control is used on pavement, heavy concrete blocks shall be used behind the perimeter control to help stabilize during rainfall/ runoff events.
7. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.
8. Loose compost may be backfilled along the upslope side of the perimeter control, filling the seam between the soil surface and the device, improving filtration and sediment retention.
9. If the perimeter control is to be left as a permanent filter or part of the natural landscape, it may be seeded at time of installation for establishment of permanent vegetation. The Engineer will specify seed requirements.
10. Perimeter control is not to be used in perennial, ephemeral, or intermittent streams.

See design drawing schematic for correct installation (Figure 1.1).

## INSPECTION

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Perimeter control should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional perimeter control may be required to reduce effective slope length or sediment removal may be necessary. Perimeter control shall be inspected until area above has been permanently stabilized and construction activity has ceased.

## MAINTENANCE

1. The Contractor shall maintain the perimeter control in a functional condition at all times and it shall be routinely inspected.
2. If the perimeter control has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the perimeter control when accumulation has reached 1/2 of the effective height of the Soxx, or as directed by the Engineer. Alternatively, a new perimeter control can be placed on top of and slightly behind the original one creating more sediment storage capacity without soil disturbance.
4. Perimeter control shall be maintained until disturbed area above the device has been permanently stabilized and construction activity has ceased.
5. The FilterMedia will be dispersed on site once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.
6. For long-term sediment and pollution control applications, perimeter control can be seeded at the time of installation to create a vegetative filtering system for prolonged and increased filtration of sediment and soluble pollutants (contained vegetative filter strip). The appropriate seed mix shall be determined by the Engineer.

## DISPOSAL/RECYCLING

FilterMedia is a composted organic product recycled and manufactured from locally generated organic, natural, and biologically based materials. Once all soil has been stabilized and construction activity has been completed, the FilterMedia may be dispersed with a loader, rake, bulldozer or similar device and may be incorporated into the soil as an amendment or left on the soil surface to aid in permanent seeding or landscaping. Leaving the FilterMedia on site reduces removal and disposal costs compared to other sediment control devices. The mesh netting material

Close Up of Sediment Control

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will be extracted from the FilterMedia and disposed of properly by the Contractor. The photodegradable mesh netting material (Soxx) may degrade if left on site. Biodegradable mesh netting material is available and may eliminate the need and cost of removal and disposal.

## METHOD OF MEASUREMENT

Bid items shall show measurement as 5 (125), 8 (200), 12 (300), 18 (450), 24 (600), 32 (800) inch (mm) diameter Filtrexx® Sediment/Perimeter Control or SiltSoxx™ per linear foot (or linear meter), installed.

Engineer shall notify Filtrexx of location, description, and details of project prior to the bidding process so that Filtrexx can provide design aid and technical support.

## ADDITIONAL INFORMATION

For other references on this topic, including additional research reports and trade magazine and press coverage, visit the Filtrexx website at www.filtrexx.com

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www.filtrexx.com | info@filtrexx.com
Call for complete list of international installers.

BactoLoxx, DuraSoxx, EarthBloxx, EnviroBloxx, EnviroSoxx, Filtrexx, GardenSoxx, GreenLoxx, GroSoxx, Let Nature Do It, MetalLoxx, NutriLoxx, PetroLoxx, and Trinity are Registered Trademarks of Filtrexx International.

BioSoxx, CECB [Compost Erosion Control Blanket], CSWB [Compost StormWater Blanket], DitchChexx, EdgeSaver, FilterCell, FilterMedia, FilterSoxx, GrowingMedia, InletSoxx, LivingWall, Lockdown, NitroLoxx, PhosLoxx, SiltSoxx, Soft Blocks, and Soxx are Trademarks of Filtrexx International.

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# TABLES & FIGURES:

**Table 1.1.** Filtrexx® Soxx™ Material Specifications.

| Material Type | Cotton BioSoxx™ | 5 mil High Density Polyethylene (HDPE) | 5 mil High Density Polyethylene (HDPE) | Multi-Filament Polypropylene (MFPP, previously HDPP) | Multi-Filament Polypropylene SafteySoxx™ | Multi-Filament Polypropylene DuraSoxx® | Multi-Filament Polypropylene DuraSoxx® (Heavy Duty) |
|---|---|---|---|---|---|---|---|
| Material Characteristic | Biodegradable | Oxo-degradable | Photodegradable | Photodegradable | Photodegradable | Photodegradable | Photodegradable |
| Design Diameters | 8 in (200mm), 12 in (300mm) | 8 in (200mm), 12 in (300mm), 18 in (400mm) | 5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm) | 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm) | 8 in (200mm), 12 in (300mm), 18 in (400mm) | 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm) | 5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm) |
| Mesh Opening | 1/8 in (3mm) | 3/8 in (10mm) | 3/8 in (10mm) | 3/8 in (10mm) | 1/8 in (3mm) | 1/8 in (3mm) | 1/8 in (3mm) |
| Tensile Strength | 44 psi (3.09 kg/cm$^2$) | 26 psi (1.83 kg/cm$^2$) | 26 psi (1.83 kg/cm$^2$) | 44 psi (3.09 kg/cm$^2$) | 202 psi (14.2 kg/cm$^2$)* | 202 psi (14.2 kg/cm$^2$) | 242 psi (16.99 kg/cm$^2$) |
| % Original Strength from Ultraviolet Exposure (ASTM G-155) | ND | ND | 23% at 1000 hr | 100% at 1000 hr | 100% at 1000 hr | 100% at 1000 hr | 100% at 1000 hr |
| Functional Longevity/ Project Duration*** | up to 12 months** | 6 mo-3.5 yr | 9 mo-4 yr | 1-4 yr | 2-5 yr | 2-5 yr | 2-5 yr |

* Tested at Texas Transportation Institute/Texas A&M University (ASTM 5035-95).
** Data based on Caltrans research and specifications
*** Functional longevity ranges are estimates only. Site specific environmental conditions may result in significantly shorter or longer time periods.

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**Table 1.2.** Filtrexx® Sediment Control Performance and Design Specifications Summary.

| Design Diameter / Design & Performance | 5 in (125mm) | 8 in (200mm) | 12 in (300mm) | 18 in (450mm) | 24 in (600mm) | 32 in (800mm) | Testing Lab/ Reference | Publication(s) |
|---|---|---|---|---|---|---|---|---|
| Effective Height | 4 in (100mm) | 6.5 in (160mm) | 9.5 in (240mm) | 14.5 in (360mm) | 19 in (480mm) | 26 in (650mm) | The Ohio State University, Ohio Agricultural Research and Development Center | Transactions of the American Society of Agricultural & Biological Engineers, 2006 |
| Effective Circumference | 15 in (380mm) | 25 in (630mm) | 38 in (960mm) | 57 in (1450mm) | 75 in (1900mm) | 100 in (2500mm) | | |
| Density (when filled) | 7.8 lbs (12 kg/m) | 13 lbs/ft (20 kg/m) | 32 lbs/ft (50 kg/m) | 67 lbs/ft (100 kg/m) | 133 lbs/ft (200 kg/m) | 200 lbs/ft (300 kg/m) | Soil Control Lab, Inc | |
| Air Space | 20% | 20% | 20% | 20% | 20% | 20% | Soil Control Lab, Inc | |
| Maximum continuous length | unlimited | unlimited | unlimited | unlimited | unlimited | unlimited | | |
| Staking Requirement | 10 ft (3m) | 10 ft (3m) | 10 ft (3m) | 10 ft (3m) | 10 ft (3m) | 10 ft (3m) | | |
| Maintenance Requirement (sediment accumulation removal at X height) | 2 in (50mm) | 3.25 in (80mm) | 4.75 in (120mm) | 7.25 in (180mm) | 9.5 in (240mm) | 13 in (325mm) | | |

(continued on next page)

**Table 1.2.** Filtrexx® Sediment Control Performance and Design Specifications Summary. (continued)

| Design Diameter / Design & Performance | 5 in (125mm) | 8 in (200mm) | 12 in (300mm) | 18 in (450mm) | 24 in (600mm) | 32 in (800mm) | Testing Lab/ Reference | Publication(s) |
|---|---|---|---|---|---|---|---|---|
| Initial Maintenance Requirement based on Rainfall-Runoff* | 13 in (33 cm); 665 L/linear m | 22 in (55 cm); 1109 L/linear m | 32 in (80 cm); 1388 L/linear m | 42 in (105 cm); 1825 L/linear m | 64 in (160 cm); 2776 L/linear m | 86 in (215 cm); 3885 L/linear m | The University of Georgia & Auburn University | |
| Functional Longevity** | 6 mo – 5 yr | 6 mo – 5 yr | 6 mo – 5 yr | 6 mo – 5 yr | 6 mo – 5 yr | 6 mo – 5 yr | | |
| Maximum Slope Length (<2%) | 360 ft (110m) | 600 ft (183m) | 750 ft (229m) | 1000 ft (305m) | 1300 ft (396m) | 1650 ft (500m) | The Ohio State University, Ohio Agricultural Research and Development Center | Filtrexx® Design Tool™, Filtrexx® Library #301, Filtrexx® Tech Link #3304 & #3311 |
| Hydraulic Flow Through Rate | 4.5 gpm/ft (56 L/min/m) | 7.5 gpm/ft (94 L/min/m) | 11.3 gpm/ft (141 L/min/m) | 15.0 gpm/ft (188 L/min/m) | 22.5 gpm/ft (281 L/min/m) | 30.0 gpm/ft (374 L/min/m) | The Ohio State University, Ohio Agricultural Research and Development Center; University of Guelph, School of Engineering/ Watershed Research Group | Filtrexx® Tech Link #3311 & #3313, #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006, Second Interagency Conference on Research in Watersheds, 2006 |
| P Factor (RUSLE) | 0.1-0.32 | 0.1-0.32 | 0.1-0.32 | 0.1-0.32 | 0.1-0.32 | 0.1-0.32 | USDA ARS Environmental Quality Lab/ University of Georgia | American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Sediment Storage Capacity*** | 104 cu. in (1710cc) | 174 cu. in (2850cc) | 396 cu. in (6490cc) | 857 cu. in (14040cc) | 1631 cu. in (26840cc) | 2647 cu. in (43377 cc) | | Filtrexx® Tech Link #3314 |
| Total Solids Removal | 98% | 98% | 98% | 98% | 98% | 98% | Soil Control Lab, Inc | International Erosion Control Association, 2006 |
| Total Suspended Solids Removal | 78% | 78% | 78% | 78% | 78% | 78% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |

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**Table 1.2.** Filtrexx® Sediment Control Performance and Design Specifications Summary. (continued)

| Design Diameter / Design & Performance | 5 in (125mm) | 8 in (200mm) | 12 in (300mm) | 18 in (450mm) | 24 in (600mm) | 32 in (800mm) | Testing Lab/ Reference | Publication(s) |
|---|---|---|---|---|---|---|---|---|
| Turbidity Reduction | 63% | 63% | 63% | 63% | 63% | 63% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Clay (<0.002mm) Removal | 65% | 65% | 65% | 65% | 65% | 65% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Silt (0.002-0.05mm) Removal | 64% | 64% | 64% | 64% | 64% | 64% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| TSS Removal w/PAM | 97% | 97% | 97% | 97% | 97% | 97% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| TSS Removal w/ Flocculent | 97% | 97% | 97% | 97% | 97% | 97% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Turbidity Reduction w/PAM | 98% | 98% | 98% | 98% | 98% | 98% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Turbidity Reduction w/ Flocculent | 94% | 94% | 94% | 94% | 94% | 94% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |

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**Table 1.2.** Filtrexx® Sediment Control Performance and Design Specifications Summary. (continued)

| Design Diameter / Design & Performance | 5 in (125mm) | 8 in (200mm) | 12 in (300mm) | 18 in (450mm) | 24 in (600mm) | 32 in (800mm) | Testing Lab/ Reference | Publication(s) |
|---|---|---|---|---|---|---|---|---|
| Total Phosphorus Removal | 34% | 34% | 34% | 34% | 34% | 34% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Reactive Phosphorus Removal | 38% | 38% | 38% | 38% | 38% | 38% | USDA ARS Environmental Quality Lab | American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Total Phosphorus Removal w/ Nutrient Agent | 60% | 60% | 60% | 60% | 60% | 60% | USDA ARS Environmental Quality Lab | American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Reactive Phosphorus Removal w/ Nutrient Agent | 99% | 99% | 99% | 99% | 99% | 99% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Nitrate-N Removal | 25% | 25% | 25% | 25% | 25% | 25% | USDA ARS Environmental Quality Lab | American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Ammonium-N Removal | 15% | 15% | 15% | 15% | 15% | 15% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Ammonium-N Removal w/ Nutrient Agent | 33% | 33% | 33% | 33% | 33% | 33% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Motor Oil Removal w/ Hydrocarbon Agent | 99% | 99% | 99% | 99% | 99% | 99% | USDA ARS Environmental Quality Lab | International Erosion Control Association, 2006 |
| Diesel Fuel Removal w/ Hydrocarbon Agent | 99% | 99% | 99% | 99% | 99% | 99% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Gasoline Removal w/ Hydrocarbon Agent | 54% | 54% | 54% | 54% | 54% | 54% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |

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**Table 1.2.** Filtrexx® Sediment Control Performance and Design Specifications Summary. (continued)

| Design Diameter / Design & Performance | 5 in (125mm) | 8 in (200mm) | 12 in (300mm) | 18 in (450mm) | 24 in (600mm) | 32 in (800mm) | Testing Lab/ Reference | Publication(s) |
|---|---|---|---|---|---|---|---|---|
| Cadmium (Cd) Removal w/ Heavy Metal Agent | 73% | 73% | 73% | 73% | 73% | 73% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Chromium (Cr) Removal w/ Heavy Metal Agent | 47% | 47% | 47% | 47% | 47% | 47% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Copper (Cu) Removal w/ Heavy Metal Agent | 70% | 70% | 70% | 70% | 70% | 70% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Nickel (Ni) Removal w/ Heavy Metal Agent | 69% | 69% | 69% | 69% | 69% | 69% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Lead (Pb) Removal w/ Heavy Metal Agent | 73% | 73% | 73% | 73% | 73% | 73% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Zinc (Zn) Removal w/ Heavy Metal Agent | 53% | 53% | 53% | 53% | 53% | 53% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Iron (Fe) Removal | 22% | 22% | 22% | 22% | 22% | 22% | Soil Control Lab, Inc | |
| Manganese (Mn) Removal | 8% | 8% | 8% | 8% | 8% | 8% | Soil Control Lab, Inc | |
| Total coliform Removal | 67% | 67% | 67% | 67% | 67% | 67% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| E. coli Removal | 67% | 67% | 67% | 67% | 67% | 67% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Enterococcus Removal | 47% | 47% | 47% | 47% | 47% | 47% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| E. coli Removal w/ Bacteria Agent | 98% | 98% | 98% | 98% | 98% | 98% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Fecal coliform Removal w/ Bacteria Agent | 98% | 98% | 98% | 98% | 98% | 98% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Enterococcus Removal w/ Bacteria Agent | 91% | 91% | 91% | 91% | 91% | 91% | USDA ARS Environmental Quality Lab | Filtrexx® Tech Link |
| Other Recommended Uses | Slope Interruption | Inlet Protection, Ditch Protection, Slope Interruption | Inlet protection, Ditch Protection, Concrete Washout, Filtration System, Slope Interruption | Ditch Protection, Concrete Washout, Filtration System | Ditch Protection, Concrete Washout, Filtration System | Ditch Protection, Concrete Washout, Filtration System | | |

* Based on rainfall intensity of 12.5 cm (5 in)/hr applied to a bare clay loam soil at a 10% slope; runoff flow rate of 108 ml/sec/linear m (0.52 gpm/linear ft); and mean runoff volume of 230 L/m2 (6.3 g/ft2).

** Functional Longevity is dependent on mesh material type, UV exposure, freeze/thaw frequency, region of US/Canada, runoff-sediment frequency/durtion/ loading, and adherence to specified maintenance requirement. Functional longevity ranges are estimates only. Site specific environmental conditions may result in significantly shorter or longer time periods.

*** Sediment Storage Capacity = sediment accumulation behind (directly upslope) + within the device.

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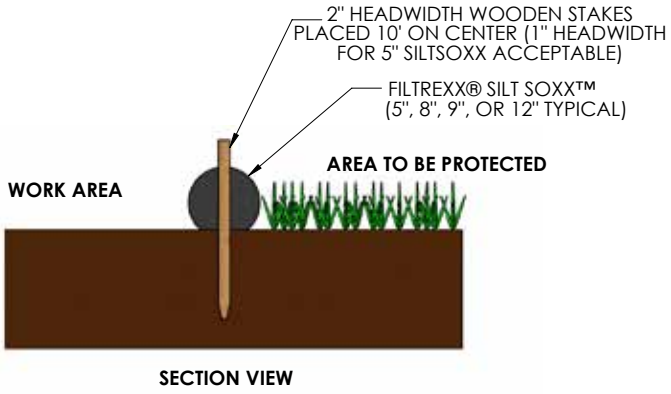
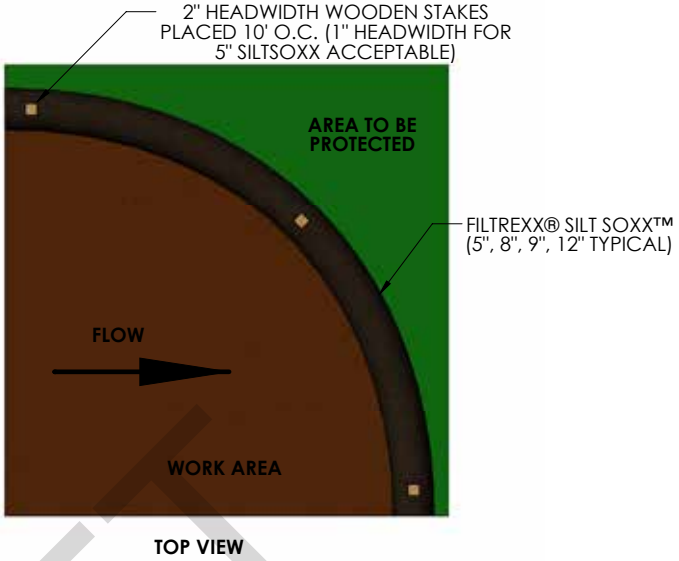
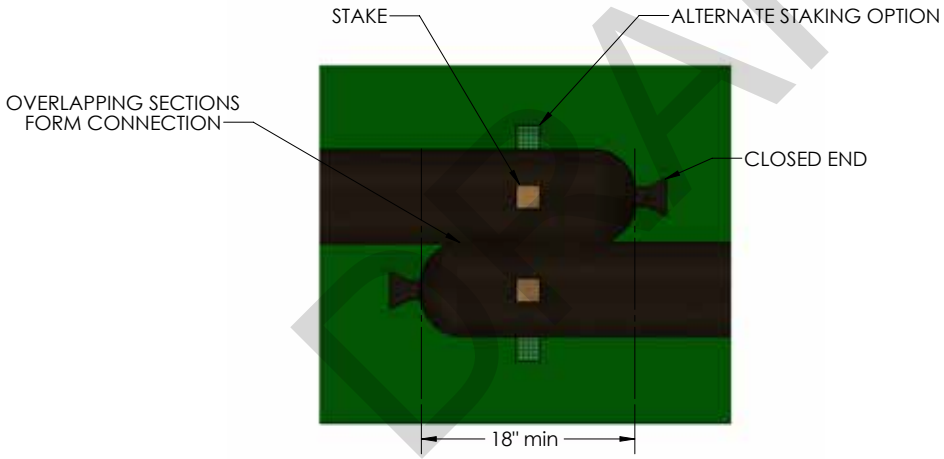
**Figure 1.1.** Engineering Design Drawing for Perimeter Control

## FILTREXX® SILT SOXX™

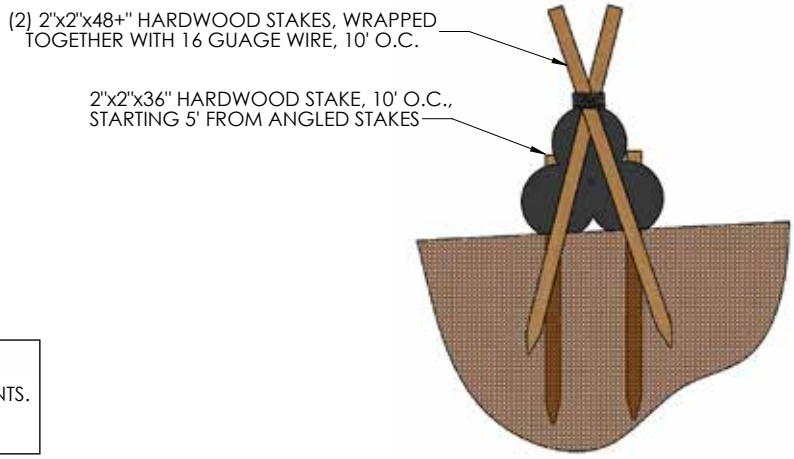



## COMPOST SOCK CONNECTION/ATTACHMENT DETAIL




## FILTREXX® PYRAMID STAKING DETAIL




NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. SILT SOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

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**Figure 1.2.** Maximum Slope Lengths of Filtrexx® Perimeter Control Based on a 1 in (25 mm)/24 hr Rainfall Event.

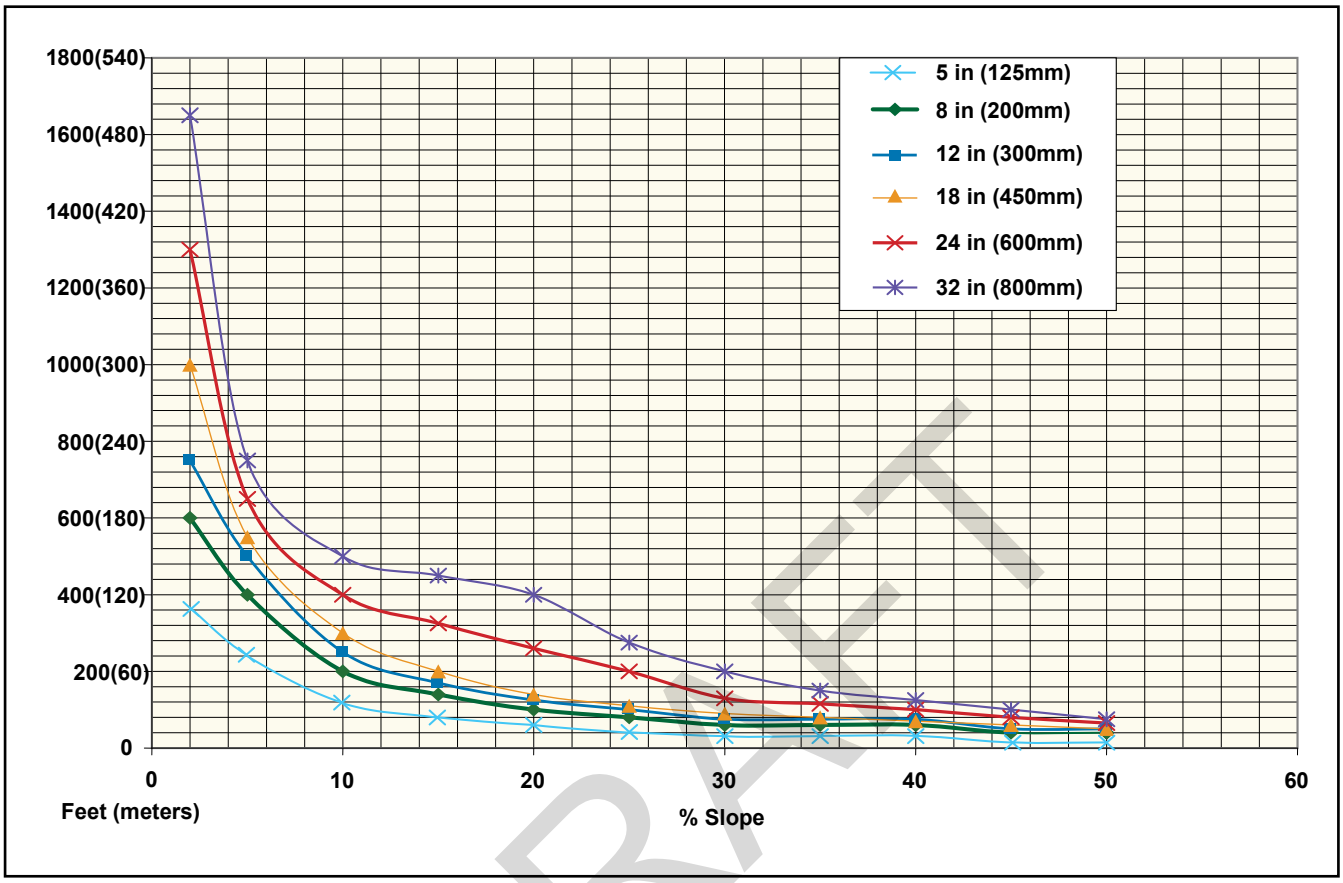


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**Table 1.3.** Maximum Slope Lengths for Filtrexx® Perimeter Control Based on a 1 in (25 mm)/24 hr Rainfall Event.

| Slope Percent | Maximum Slope Length Above Sediment Control in Feet (meters)* | | | | | |
|---|---|---|---|---|---|---|
| | 5 in (125 mm) Sediment control | 8 in (200 mm) Sediment control | 12 in (300 mm) Sediment control | 18 in (450 mm) Sediment control | 24 in (600mm) Sediment control | 32 in (800mm) Sediment control |
| | 4 in (100 mm)** | 6.5 in (160 mm)** | 9.5 in (240 mm) ** | 14.5 in (360 mm) ** | 19 in (480 mm) ** | 26 in (650 mm) ** |
| 2 (or less) | 360 (110) | 600 (180) | 750 (225) | 1000 (300) | 1300 (400) | 1650 (500) |
| 5 | 240 (73) | 400 (120) | 500 (150) | 550 (165) | 650 (200) | 750 (225) |
| 10 | 120 (37) | 200 (60) | 250 (75) | 300 (90) | 400 (120) | 500 (150) |
| 15 | 85 (26) | 140 (40) | 170 (50) | 200 (60) | 325 (100) | 450 (140) |
| 20 | 60 (18) | 100 (30) | 125 (38) | 140 (42) | 260 (80) | 400 (120) |
| 25 | 48 (15) | 80 (24) | 100 (30) | 110 (33) | 200 (60) | 275 (85) |
| 30 | 36 (11) | 60 (18) | 75 (23) | 90 (27) | 130 (40) | 200 (60) |
| 35 | 36 (11) | 60 (18) | 75 (23) | 80 (24) | 115 (35) | 150 (45) |
| 40 | 36 (11) | 60 (18) | 75 (23) | 80 (24) | 100 (30) | 125 (38) |
| 45 | 24 (7) | 40 (12) | 50 (15) | 60 (18) | 80 (24) | 100 (30) |
| 50 | 24 (7) | 40 (12) | 50 (15) | 55 (17) | 65 (20) | 75 (23) |

* Based on a failure point of 36 in (0.9 m) super silt fence (wire reinforced) at 1000 ft (303 m) of slope, watershed width equivalent to receiving length of sediment control device, 1 in/ 24 hr (25 mm/24 hr) rain event.

** Effective height of Sediment control after installation and with constant head from runoff as determined by Ohio State University.

**Table. 1.4.** Maximum Slope Lengths for Filtrexx® Perimeter Control Based on a 2 in (50 mm)/24 hr Rainfall Event.

| Slope Percent | Maximum Slope Length Above Sediment Control in Feet (meters)* | | | | | |
|---|---|---|---|---|---|---|
| | 5 in (125 mm) Sediment control | 8 in (200 mm) Sediment control | 12 in (300 mm) Sediment control | 18 in (450 mm) Sediment control | 24 in (600mm) Sediment control | 32 in (800mm) Sediment control |
| | 4 in (100 mm)** | 6.5 in (160 mm) ** | 9.5 in (240 mm) ** | 14.5 in (360 mm) ** | 19 in (480 mm) ** | 26 in (650 mm) ** |
| 2 (or less) | 180 (55) | 300 (90) | 375 (110) | 500 (150) | 650 (200) | 850 (260) |
| 5 | 120 (37) | 200 (60) | 250 (75) | 275 (85) | 325 (100) | 400 (120) |
| 10 | 60 (18) | 100 (30) | 125 (35) | 150 (45) | 200 (60) | 275 (85) |
| 15 | 42 (13) | 70 (20) | 85 (25) | 100 (30) | 160 (50) | 225 (70) |
| 20 | 30 (9) | 50 (15) | 65 (20) | 70 (20) | 130 (40) | 180 (55) |
| 25 | 24 (7) | 40 (12) | 50 (15) | 55 (16) | 100 (30) | 150 (45) |
| 30 | 18 (6) | 30 (9) | 40 (12) | 45 (13) | 65 (20) | 100 (30) |
| 35 | 18 (6) | 30 (9) | 40 (12) | 45 (13) | 55 (18) | 75 (23) |
| 40 | 18 (6) | 30 (9) | 40 (12) | 45 (13) | 50 (15) | 60 (38) |
| 45 | 12 (4) | 20 (6) | 25 (8) | 30 (9) | 40 (12) | 50 (15) |
| 50 | 12 (4) | 20 (6) | 25 (8) | 30 (9) | 35 (10) | 40 (12) |

* Based on a failure point of 36 in (0.9 m) super silt fence (wire reinforced) at 1000 ft (303 m) of slope, watershed width equivalent to receiving length of sediment control device, 2 in/ 24 hr (50 mm/24 hr) rain event.

** Effective height of Sediment control after installation and with constant head from runoff as determined by Ohio State University.

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# DESIGN SPECIFICATION

## 1.2 Inlet Protection - Compost Filter Sock

filtrexx® SUSTAINABLE TECHNOLOGIES

### PURPOSE & DESCRIPTION

**Filtrexx® SiltSoxx™ compost filter sock** is a three-dimensional tubular sediment control and stormwater runoff filtration device typically used for storm drain **Inlet Protection** of sediment on and around construction activities. Inlet Protection traps sediment by *filtering* runoff water as it passes through the matrix of the Soxx™ *and* by allowing water to temporarily pond behind the Soxx, allowing *deposition* of suspended solids.

### APPLICATION

Inlet protection has three distinct applications:

- around *drain inlets*,
- in front of *curb inlets*,
- as *curb sediment containment* systems

These applications are described in detail below and shown graphically in Figure 2.1 and 2.2.

**Drain inlets** are located in areas that receive runoff from surrounding lands, often exposed and disturbed soils, and are located at a low point, or in a sump. Inlet protection used around drain inlets (or *rain* inlet protection) should completely enclose the circumference of the drain and where possible should not be placed on a grade or slope. Inlet protection used around drain inlets should never be the only form of site sediment control and should be accompanied by erosion control/slope stabilization practices, such as compost erosion control blankets or rolled erosion control blankets. Inlet protection should never be placed where they divert runoff flow from the drain inlet, or on top of the inlet, which can cause flooding. Under high runoff and sediment loading conditions placement of 1-2 in (25-50 mm) diameter rock (AASHTO #2) may be placed around the outer circumference of the inlet protection up to ½ the height of the inlet protection. This will help slow runoff velocity as it contacts the inlet protection and will reduce sediment build-up and clogging of the inlet protection.

**Curb inlets** are generally located on paved surfaces and are designed to rapidly drain storm runoff from roadways to prevent flooding that poses a hazard to vehicular traffic. Inlet protection devices should be placed in a manner which intercepts runoff prior to entering the inlet, but does not block or divert runoff from the inlet. To prevent diversion of runoff, inlet protection used around curbs (or *curb* inlet protection) should be used in low points, or sumps, and minor slopes or grades. Inlet protection should never be placed in or on the curb inlet drain, or placed in a manner that obstructs vehicular traffic. Inlet protection height should be at least 1 in (25 mm) lower than top of curb inlet to allow for overflow into the drain and not over the curb. Maximum sediment removal efficiency occurs when minor ponding exists behind inlet protection but should never lead to flooding.

**Curb sediment containment systems** are used to reduce the sediment and pollutant load flowing to a curb inlet. They are generally placed on paved surfaces perpendicular to runoff flow and should be lower than the height of the curb. Curb sediment containment systems should never cause flooding or placed where they are a hazard to vehicular traffic. Inlet protection used for curb sediment containment (or *curb sediment containment* inlet protection) can be placed on a grade but should never be placed directly upslope from curb inlet where it may inadvertently divert runoff from entering curb inlet.

### ADVANTAGES AND DISADVANTAGES

**Advantages**

- Tubular filtration matrix allows for better trapping and removal of sediment in stormwater runoff compared to planar constructed sediment control devices, such as silt fences.
- Inlet protection can be installed on soil or paved surface conditions.
- Greater surface area contact with soil or pavement than typical sediment control devices, reducing potential for runoff to undercut the device leading to unfiltered sediment.
- No trenching is required; therefore soil is not disturbed upon installation.
- Drain inlet protection can be installed year-round in difficult soil conditions such as frozen or wet ground, and dense and compacted soils, as long as stakes can be driven.
- Inlet protection is easily implemented as a treatment in a greater treatment train approach to erosion and sediment control.
- Soxx (mesh netting containment system) allows inlet protection to be placed in areas of high sheet flow and low concentrated flow.
- Drain inlet protection can be direct seeded at time of application to provide greater stability and filtration capability once vegetation is established, if used on soil surface.
- FilterMedia is organic and can be left on site soil after permanent stabilization is complete, to be used in landscape design and/or seeded and planted with permanent vegetation.
- FilterMedia improves existing soil structure if spread out and used as a soil amendment after construction activity is complete.
- Biodegradable inlet protection can be left on site after construction activity and may eliminate the need for removal and labor and disposal costs.
- Inlet protection is available in 8 in (200mm), 12 in (300mm), 18 in (450mm), 24 in (600mm), and 32 in (800mm) diameters.
- Inlet protection may assist in qualification for LEED® Green Building Rating and Certification credits under LEED Building Design & Construction (BD+C), New Construction v4. Awarded credits may be possible from the categories of Sustainable Sites, Water Efficiency, Materials & Resources, and Innovation. *Note: LEED is an independent program offered through the U.S. Green Building Council. LEED credits are determined on a per project basis by an independent auditing committee. Filtrexx neither guarantees nor assures LEED credits from the use of its products. LEED is a trademark of the U.S. Green Building Council.*

| ADVANTAGES | | | |
|---|---|---|---|
| | LOW | MED | HIGH |
| Installation Difficulty | ✓ | | |
| Sediment Control | | | ✓ |
| Runoff Flow Control | | ✓ | |
| Life Cycle Cost | ✓ | | |

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**Disadvantages**
- If filler material of inlet protection is not Filtrexx® Certified℠ FilterMedia™, hydraulic flow rate and and/or sediment and pollutant removal performance may be diminished.
- If not installed correctly, maintained or used for a purpose or intention that does not meet specifications, performance may be diminished.
- If land surface is extremely bumpy or rocky ground surface contact to drain inlet protection may be diminished thereby adversely effecting performance.
- If inlet protection is installed on a grade or slope, runoff may be diverted from drain or inlet, causing flooding downstream.
- If runoff breaches inlet protection sediment retention will be minimal.
- Incorrect installation or application may cause flooding or pose a hazard to vehicular traffic.
- Inlet protection should never be the only form of site sediment control.
- Inlet protection should only be used in small drainage areas.

## MATERIAL SPECIFICATIONS

Inlet protection use only high wear heavy duty netting materials available from Filtrexx International and are the only mesh materials accepted in creating inlet protection for any application. For Soxx™ Material Specifications see Table 2.1.

## FILTERMEDIA™ CHARACTERISTICS

Inlet protection use only Filtrexx Certified FilterMedia which is a coarse composted material that is specifically designed for removal of solids from stormwater runoff. All Filtrexx Certified FilterMedia has been third party tested and certified to meet minimum performance criteria defined by Filtrexx International. Performance parameters include hydraulic flow through rate, total solids removal efficiency, total suspended solids removal efficiency, and turbidity reduction. For information on the physical and chemical properties of Certified FilterMedia refer to the Filtrexx Design Manual, Section 5.1. Look for the Filtrexx Certified FilterMedia Seal from our international network of Filtrexx Certified Installers and Manufacturers.

## PERFORMANCE

Performance testing and research on sediment control has been extensive. For a summary of performance testing, research results, and design specifications see Table 2.2. For copies of publications, full reports, or Tech Link summaries contact Filtrexx International.

Successful bidders will furnish adequate research support showing their manufactured product meets or exceeds performance and design criteria outlined in this standard specification. Research or performance testing will be accepted if it meets the following criteria: conducted by a neutral third party, utilizes standard test methods reported by ASTM or referenced in a peer reviewed scientific journal, product and control treatments are tested in triplicate, performance results are reported for product and control (control should be a bare soil under the same set of environmental and experimental conditions), results are peer reviewed, results indicate a minimum 60% TSS removal efficiency and a minimum hydraulic flow through rate of 5 gpm/ft$^2$. Bidders shall attach a copy of the research report indicating test methodologies utilized and results.
*Note: the Contractor is responsible for establishing a working erosion and sediment control system and may, with approval of the Engineer, work outside the minimum construction requirements as needed. Where the inlet protection deteriorates or fails, it shall be repaired or replaced with an effective alternative.*

## DESIGN CRITERIA

Inlet protection is used for curb inlet protection and curb sediment containment on paved surfaces by providing a physical barrier that reduces the rate at which sediment-laden runoff water can enter a storm drain. Inlet protection is also used around storm runoff drain inlets on soil surfaces where construction activities are ongoing and soil stabilization and erosion control measures are also employed. Inlet protection allows construction to continue while protecting storm systems from sediment overload. Inlets are normally protected until final vegetation and stabilization is complete, thereby reducing the amount of sediment reaching the storm inlets.

For most standard curb inlet protection applications, an 8 in (200mm) diameter inlet protection is recommended; for drainage inlets receiving runoff where soils are not stabilized a 12 in (300mm) or 18 in (450mm) drain inlet protection may be specified.

For engineering design details of inlet protection see Figure 2.1 and 2.2. For a summary of specifications for product/practice use, performance and design see Table 2.1 and Table 2.2.

**Planning:**
Inlet protection should not be considered the only form of site sediment control and should be used within an overall integrated Erosion and Sediment Control or StormWater Pollution Prevention Plan. The blocking of storm drains by the use of inlet protection should be considered in the overall site planning, especially where ponding water will create disturbances.

Preconstruction meetings should be conducted to educate construction site personnel about the E&SC devices used and acceptable traffic patterns that avoid running over inlet protection with heavy equipment.

It is possible to drive over inlet protection during construction (not recommended); however, these areas should be immediately repaired by manually moving inlet protection back into place, if disturbed. Continued heavy construction traffic may destroy the material fabric, reduce the dimensions, and reduce the effectiveness of the inlet protection.

**Device Function:**
The sediment removal process characteristic to inlet protection combines both filtering and deposition of solids. This is different than methods that rely solely on ponding for deposition of solids for sediment control. Ponding occurs when water flowing to the inlet protection accumulates faster than the hydraulic flow through rate of the inlet protection. Typically, hydraulic flow-through rates for inlet protection are **50% greater** than geotextile filter fabric (silt fence). *Greater hydraulic flow-through rates reduce ponding, therefore reducing the need for taller sediment control structural design height.* However, installation and maintenance is especially important for proper function and performance.

**Pollutant Removal:**
Unlike most inlet protection devices, inlet protection has been shown to remove pollutants other than total and suspended solids from stormwater. Inlet protection has the ability to remove soluble pollutants, such as phosphorus and petroleum hydrocarbons (e.g. motor oil) from entering storm drains. Additional Filtrexx products

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can be added to the inlet protection to increase removal efficiency of target pollutants such as turbidity, TSS, and soluble phosphorus (see Section 4.1 EnviroSoxx® Pollutant Removal).

It should be noted that sediment removal efficiency can be near 100% unless runoff breaches the inlet protection, at which point the effectiveness may be greatly diminished.

**Runoff Flow:**
Sheet and/or concentrated runoff flow should not exceed the hydraulic flow-through capacity, and ponding depth should not exceed the height, of the inlet protection. If overflow of the device is a possibility, larger diameter inlet protection should be specified, other sediment control devices may be used, or management practices to reduce runoff should be implemented. For curb inlets, inlet protection should not exceed the height of the intake opening. For curb sediment containment, inlet protection should not exceed the height of the curb.

**Level Contour:**
Place inlet protection on level contours to prevent diversion of runoff from storm inlets. Sheet flow of water should be perpendicular to the inlet protection at impact. If inlet protection is to be placed on a grade, care should be taken not to divert runoff from storm inlet.

**Runoff and Sediment Accumulation:**
Where possible, inlet protection used for drain inlets should be placed at a 5 ft (1.5m) or greater distance away from the toe of the slope to allow for proper runoff accumulation for sediment deposition and to allow for maximum sediment storage capacity behind the device. If a 5 ft (1.5m) distance is not available, due to construction restrictions, a second inlet protection may be installed to increase ponding and sediment accumulation capacity.

**Vegetated Filter:**
For permanent drain inlet applications inlet protection can be direct-seeded to allow vegetation establishment directly in the device. Vegetation on and around the inlet protection will assist in slowing runoff velocity which can increase deposition and filtration. The option of adding vegetation will be at the discretion of the Engineer. No additional soil amendments or fertilizer are required for vegetation establishment in the drain inlet protection. The appropriate seed mix shall be determined by the Engineer. This option is not normally available when using the tool on paved areas.

**Table 2.3** Spacing for Curb Sediment Containment Systems.

| Grade (%) | Spacing (ft) | Spacing (mm) |
|---|---|---|
| 0.5 | 100 | 30 |
| 1.0 | 50 | 15 |
| 2.0 | 25 | 8 |
| 3.0 | 16 | 5 |
| 4.0 | 13 | 4 |
| 5.0 | 10 | 3 |

Source: Fifield, 2001.

**Drainage Area and Spacing:**
Maximum drainage area contributing runoff to drain inlet protection should be no more than 3 acres (1.2 ha). Drainage areas greater than 3 acres (1.2 ha) should implement sediment traps, sediment basins, or runoff reduction practices (KY TC, 2006).

Spacing between inlet protection used for sediment containment along curbs is dependent on the grade of the roadway and can have an effect on the total sediment load reaching the curb inlet.

## INSTALLATION

1. Inlet protection used to reduce sediment entering storm drains shall meet Filtrexx Soxx Mesh Material and Filtrexx Certified FilterMedia specifications.
2. Call Filtrexx at 877-542-7699 or visit www.filtrexx.com for a current list of installers and distributors of Filtrexx products.
3. Inlet protection shall be placed at locations indicated on plans as directed by the Engineer. Inlet protection should be installed in a pattern that allows complete protection of the inlet area.
4. Installation of curb inlet protection will ensure a minimal overlap of at least 1 ft (300mm) on either side of the opening being protected. Inlet protection will be anchored to the soil behind the curb using staples, stakes or other devices capable of holding the inlet protection in place.
5. Standard inlet protection for curb inlet protection and curb sediment containment will use 8 in (200mm) diameter inlet protection, and drain inlets on soil will use 12 in (300mm) or 18 in (450mm) diameter inlet protection. In severe flow situations, larger inlet protection may be specified by the Engineer. During curb installation, inlet protection shall be compacted to be slightly shorter than curb height.
6. If inlet protection becomes clogged with debris and sediment, they shall be maintained so as to assure proper drainage and water flow into the storm drain. In severe storm events, overflow of the inlet protection may be acceptable in order to keep the area from flooding.
7. Curb and drain inlet protection shall be positioned so as to provide a permeable physical barrier to the drain itself, allowing sediment to collect on the outside of the inlet protection.
8. For drains and inlets that have only curb cuts, without street grates, a spacer is required in order to keep the inlet protection away from the drain opening. This spacer should be cinder blocks or a hog wire screen bent to overlap the grate opening and keep the sock from falling into the opening. Use at least one spacer for every 4 ft (1.2m) of curb drain opening. The wire grid also prevents other floatable waste from passing over the inlet protection.
9. Stakes shall be installed through the middle of the drain inlet protection on 5 ft (1.5m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) wooden stakes.
10. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.

## INSPECTION

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Inlet protection should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional inlet protection may be required or sediment removal may be necessary. Inlet protection shall be inspected until contributing drainage area has been permanently stabilized and construction activity has ceased.

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## MAINTENANCE

1. The Contractor shall maintain the inlet protection in a functional condition at all times and it shall be routinely inspected.
2. If the inlet protection has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the inlet protection when accumulation has reached 1/2 of the effective height of the inlet protection, or as directed by the Engineer. Alternatively, for drain inlet protection, a new Soxx may be placed on top of the original increasing the sediment storage capacity without soil distbance.
4. Inlet protection shall be maintained until disturbed area above or around the device has been permanently stabilized and construction activity has ceased.
5. Regular maintenance includes lifting the inlet protection and cleaning around and under them as sediment collects.
6. The FilterMedia will be removed from paved areas or dispersed on site soil or behind curb once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.
7. Permanent vegetated filter strips will be left intact.

## DISPOSAL/RECYCLING

FilterMedia is an organic, composted product manufactured from locally generated organic, natural, and biologically based materials. Once all soil has been stabilized and construction activity has been completed, the FilterMedia may be dispersed with a loader, rake, bulldozer or similar device and may be incorporated into the soil as an amendment or left on the soil surface to aid in permanent seeding or landscaping. Leaving the FilterMedia on site reduces removal and disposal costs compared to other sediment control devices. The mesh netting material will be extracted from the FilterMedia and disposed of properly by the Contractor. The photodegradable mesh netting material (Soxx) may degrade if left on site. Biodegradable mesh netting material is available and may eliminate the need and cost of removal and disposal.

## METHOD OF MEASUREMENT

Bid items shall show measurement as 'X in (X mm) Filtrexx® Inlet Protection/SiltSoxx™/InletSoxx™ per linear ft (linear meter) installed, per inlet, or as specified by the Engineer. Engineer shall notify Filtrexx of location, description, and details of project prior to the bidding process so that Filtrexx can provide design aid and technical support.

## FIELD APPLICATION PHOTO REFERENCES

Drain Inlet Protection

Curb Inlet Protection

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## ADDITIONAL INFORMATION

For other references on this topic, including additional research reports and trade magazine and press coverage, visit the Filtrexx website at filtrexx.com

Filtrexx International, Technical Support
877-542-7699 | www.filtrexx.com | info@filtrexx.com
Call for complete list of international installers and distributors.

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**Table 2.1.** Filtrexx® Soxx™ Mesh Material Specifications.

| **Material Type** | **NATURAL ORIGINAL** (Cotton Fiber) | **NATURAL PLUS** (Wood Fiber) | **BASIC** (5 mil High Density Polyethylene HDPE) | **BASIC PLUS** (Multi-Filament Polypropylene MFPP) | **DURABLE** (Multi-Filament Polypropylene MFPP) | **SILTSOXX ORIGINAL** (Multi-Filament Polypropylene MFPP) | **SILTSOXX EXTREME** (Multi-Filament Polypropylene MFPP) |
|---|---|---|---|---|---|---|---|
| Material Characteristic | Biodegradable | Biodegradable | Photodegradable | Photodegradable | Photodegradable | Photodegradable | Photodegradable |
| Design Diameters | 5 in (125mm), 8 in (200mm), 12 in (300mm) | 5 in (125mm), 8 in (200mm), 12 in (300mm) | 8 in (200mm), 12 in (300mm), 18 in (400mm) | 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm) | 5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm) | 5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm) | 8 in (200mm), 12 in (300mm) |
| Mesh Opening | 1/8 in (3mm) | 1/8 in (3mm) | 3/8 in (10mm) | 3/8 in (10mm) | 1/8 in (3mm) | 1/8 in (3mm) | 1/16 in (1.5mm) |
| Tensile Strength (ASTM 5035-95) | 44 psi (3.09 kg/cm2) | 76 psi (5.34 kg/cm2) | 26 psi (1.83 kg/cm$^2$) | 44 psi (3.09 kg/cm$^2$) | 202 psi (14.2 kg/cm$^2$) | 242 psi (16.99 kg/cm$^2$) | Under review |
| % Original Strength from Ultraviolet Exposure (ASTM G-155) | ND | ND | 23% at 1000 hr | 100% at 1000 hr | 100% at 1000 hr | 100% at 1000 hr | 100% at 1000 hr |
| Functional Longevity/ Project Duration* | up to 12 months** | up to 18 months*** | up to 4 yr | up to 4 yr | up to 5 yr | up to 5 yr | up to 5 yr |

* Functional longevity ranges are estimates only. Site specific environmental conditions may result in significantly shorter or longer time periods.
** Data based on Caltrans research and specifications
*** See TechLink #3339 for research & testing

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**Table 2.2.** Filtrexx® Inlet Protection Performance and Design Specifications Summary.

| Design Diameter / Design & Performance | 8 in (200mm) | 12 in (300mm) | 18 in (450mm) | 24 in (600mm) | 32 in (800mm) | Testing Lab/ Reference | Publication(s) |
|---|---|---|---|---|---|---|---|
| Effective Height | 6.5 in (160mm) | 9.5 in (240mm) | 14.5 in (360mm) | 19 in (480mm) | 26 in (650mm) | The Ohio State University, Ohio Agricultural Research and Development Center | Transactions of the American Society of Agricultural & Biological Engineers, 2006 |
| Effective Circumference | 25 in (630mm) | 38 in (960mm) | 57 in (1450mm) | 75 in (1900mm) | 100 in (2500mm) | | |
| Density (when filled) | 13 lbs/ft (20 kg/m) | 32 lbs/ft (50 kg/m) | 67 lbs/ft (100 kg/m) | 133 lbs/ft (200 kg/m) | 200 lbs/ft (300 kg/m) | Soil Control Lab, Inc | |
| Air Space | 20% | 20% | 20% | 20% | 20% | Soil Control Lab, Inc | |
| Maximum continuous length | unlimited | unlimited | unlimited | unlimited | unlimited | | |
| Staking Requirement | 5 ft (1.5m) | 5 ft (1.5m) | 5 ft (1.5m) | 5 ft (1.5m) | 5 ft (1.5m) | | |
| Maintenance Requirement (sediment accumulation removal at X height) | 3.25 in (80mm) | 4.75 in (120mm) | 7.25 in (180mm) | 9.5 in (240mm) | 13 in (325mm) | | |
| Initial Maintenance Requirement based on Rainfall-Runoff* | 22 in (55 cm); 1109 L/linear m | 32 in (80 cm); 1388 L/linear m | 42 in (105 cm); 1825 L/linear m | 64 in (160 cm); 2776 L/linear m | 86 in (215 cm); 3885 L/linear m | The University of Georgia & Auburn University | |
| Functional Longevity** | 6 mo – 5 yr | 6 mo – 5 yr | 6 mo – 5 yr | 6 mo – 5 yr | 6 mo – 5 yr | | |
| Maximum Slope Length (<2%) | 600 ft (183m) | 750 ft (229m) | 1000 ft (305m) | 1300 ft (396m) | 1650 ft (500m) | The Ohio State University, Ohio Agricultural Research and Development Center | Filtrexx Design Tool, Filtrexx Library #301, Filtrexx Tech Link #3304 & #3311 |
| Hydraulic Flow Through Rate | 7.5 gpm/ft (94 L/min/m) | 11.3 gpm/ft (141 L/min/m) | 15.0 gpm/ft (188 L/min/m) | 22.5 gpm/ft (281 L/min/m) | 30.0 gpm/ft (374 L/min/m) | The Ohio State University, Ohio Agricultural Research and Development Center; University of Guelph, School of Engineering/ Watershed Research Group | Filtrexx Tech Link #3311 & #3313, #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006, Second Interagency Conference on Research in Watersheds, 2006 |
| P Factor (RUSLE) | 0.1-0.32 | 0.1-0.32 | 0.1-0.32 | 0.1-0.32 | 0.1-0.32 | USDA ARS Environmental Quality Lab/ University of Georgia | American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006 |
| Sediment Storage Capacity*** | 174 cu. in (2850cc) | 396 cu. in (6490cc) | 857 cu. in (14040cc) | 1631 cu. in (26840cc) | 2647 cu. in (43377 cc) | | Filtrexx Tech Link #3314 |
| Total Solids Removal | 98% | 98% | 98% | 98% | 98% | Soil Control Lab, Inc | International Erosion Control Association, 2006 |
| Total Suspended Solids Removal | 78% | 78% | 78% | 78% | 78% | USDA ARS Environmental Quality Lab | Filtrexx Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Turbidity Reduction | 63% | 63% | 63% | 63% | 63% | USDA ARS Environmental Quality Lab | Filtrexx Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006 |
| Clay (<0.002mm) Removal | 65% | 65% | 65% | 65% | 65% | USDA ARS Environmental Quality Lab | Filtrexx Tech Link |
| Silt (0.002-0.05mm) Removal | 64% | 64% | 64% | 64% | 64% | USDA ARS Environmental Quality Lab | Filtrexx Tech Link |
| Other Recommended Uses | Inlet Protection, Ditch Protection, Slope Interruption | Inlet protection, Ditch Protection, Concrete Washout, Filtration System, Slope Interruption | Ditch Protection, Concrete Washout, Filtration System | Ditch Protection, Concrete Washout, Filtration System | Ditch Protection, Concrete Washout, Filtration System | | |

* Based on rainfall intensity of 12.5 cm (5 in)/hr applied to a bare clay loam soil at a 10% slope; runoff flow rate of 108 ml/sec/linear m (0.52 gpm/linear ft); and mean runoff volume of 230 L/m2 (6.3 g/ft2).

** Functional Longevity is dependent on mesh material type, UV exposure, freeze/thaw frequency, region of US/Canada, runoff-sediment frequency/durtion/loading, and adherence to specified maintenance requirement. Functional longevity ranges are estimates only. Site specific environmental conditions may result in significantly shorter or longer time periods.

*** Sediment Storage Capacity = sediment accumulation behind (directly upslope) + within the device.

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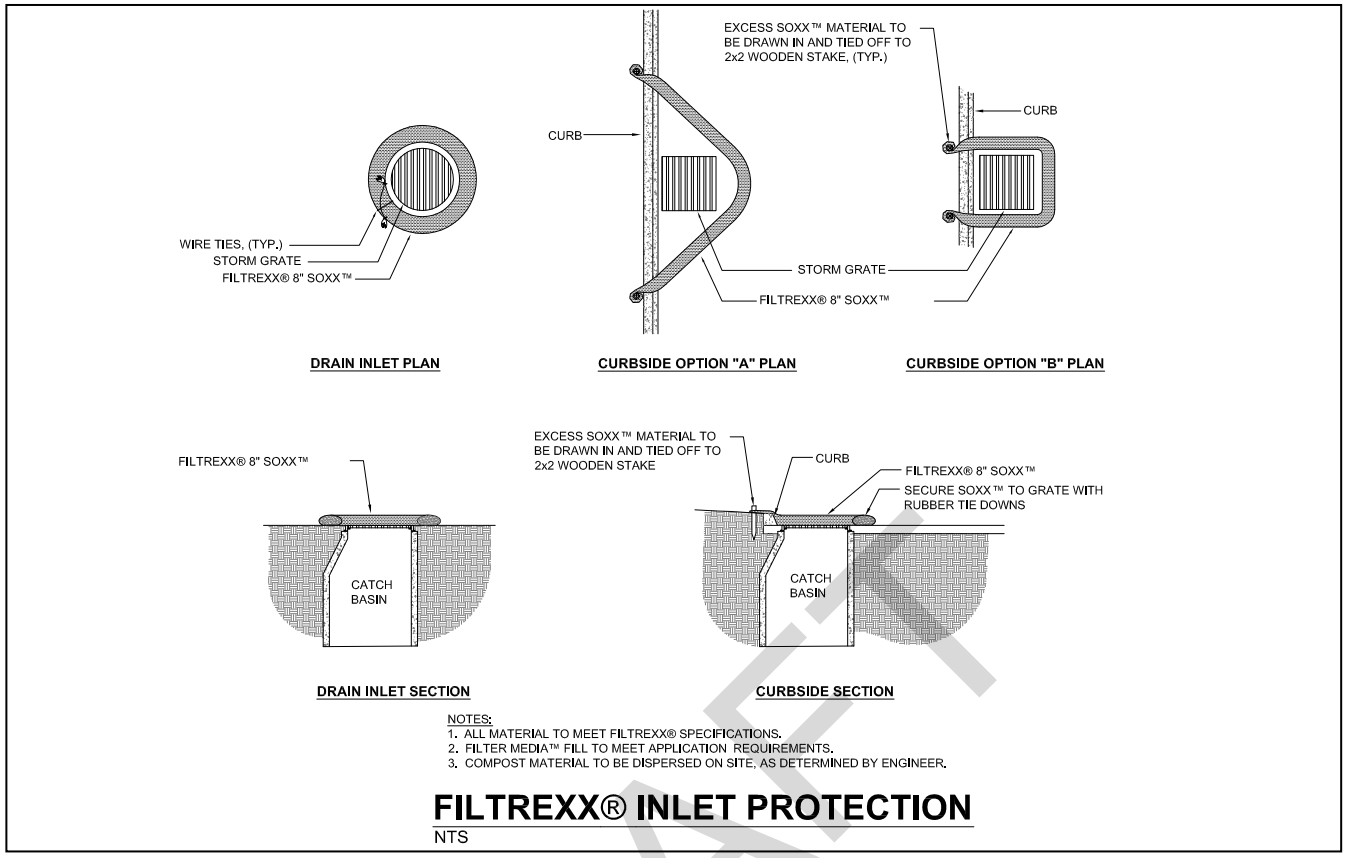
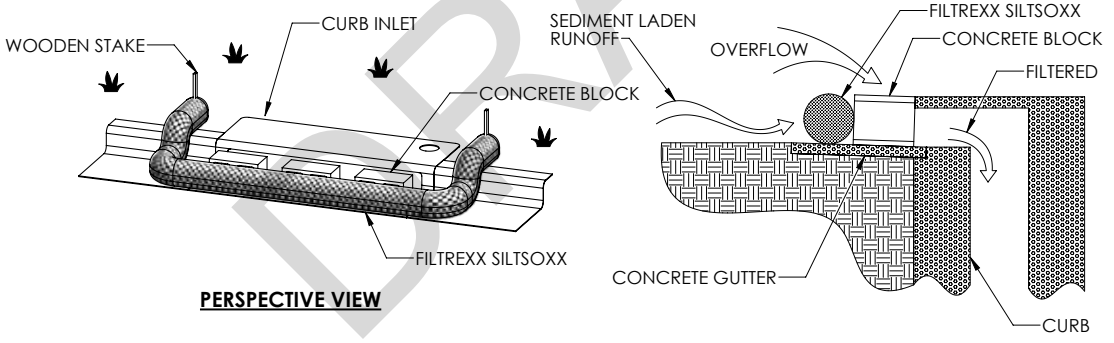
**Figure 2.1.** Engineering Design Drawing for Curb and Drain Inlet Protection




NOTES:

1. INSTALL FILTREXX SILTSOXX IN FRONT OF CURB OPENING TO A MINIMUM OF 12" BEYOND THE OPENING, EACH SIDE.
2. ANCHOR THE FILTREXX SILTSOXX BEHIND THE CURB WITH A WOODEN STAKE. STAKES SHALL BE ANCHORED A MINIMUM OF 12" INTO SOIL.
3. STANDARD INLET PROTECTION FOR CURB INLET PROTECTION AND CURB SEDIMENT CONTAINMENT WILL USE 8" DIAMETER INLET PROTECTION. DURING CURB INSTALLATION, INLET PROTECTION SHALL BE COMPACTED TO BE SLIGHTLY SHORTER THAN CURB HEIGHT.
4. IF INLET PROTECTION BECOMES CLOGGED WITH DEBRIS AND SEDIMENT, THEY SHALL BE MAINTAINED SO AS TO ASSURE PROPER DRAINAGE AND WATER FLOW INTO THE STORM DRAIN. IN SEVERE STORM EVENTS, OVERFLOW OF THE INLET PROTECTION MAY BE ACCEPTABLE TO KEEP THE AREA FROM FLOODING.
5. CURB AND DRAIN INLET PROTECTION SHALL BE POSITIONED SO AS TO PROVIDE A PERMEABLE PHYSICAL BARRIER TO THE DRAIN ITSELF, ALLOWING SEDIMENT TO COLLECT ON THE OUTSIDE OF THE INLET PROTECTION.
6. CONCRETE BLOCKS SHALL BE USED A SPACER TO KEEP THE FILTREXX SILTSOXX FROM BLOCKING THE CURB OPENING. CONCRETE BLOCKS SHALL BE USED AT BOTH ENDS OF THE OPENING AND EVERY 4'.

**FILTREXX SILTSOXX CURB INLET PROTECTION**

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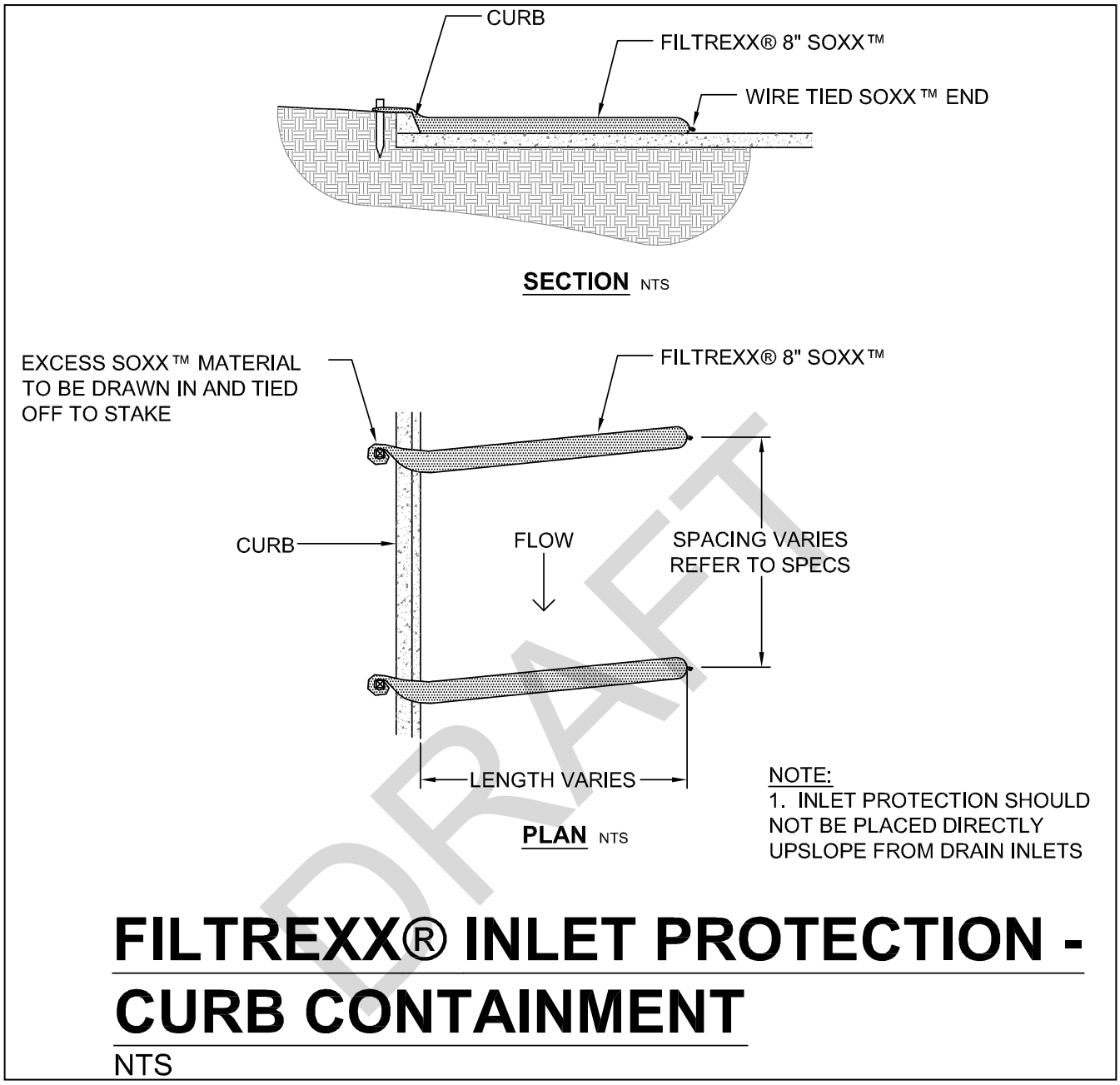
**Figure 2.2.** Engineering Design Drawing for Curb Sediment Containment Inlet Protection

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Kawasaki Greenhouses

# OUR 1'X2' SEDUM MAT IS AN EXCELLENT CHOICE FOR APPLICATIONS BIG AND SMALL! IT'S LIGHTWEIGHT AND VERY VERSATILE!

**Fully vegetated and adaptable to most roofing systems. Acclimated to zone 7a 0°-5°F. Used on green roofs and in the landscape on grade. Also used by homeowners in their gardens, on birdhouses, surrounding their mailboxes and planted poolside. Use it anywhere your creativity takes you! We stock a grower's mix that has been developed for maximum durability leading to long-term success. Custom mixes can be arranged upon request with sufficient lead time.**

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## SPECS:

- Size: 12"x24" (2 square feet)
- Growth Media: 1" thick organic material with natural peat-based media on a biodegradable, environmentally safe, open weave geotextile.
- Overall Vegetated Height: approx. 3"
- Dry Vegetated Weight: 4 lbs. (2 square feet)
- Saturated Vegetated Weight: 9 lbs (2 square feet)

Possible varieties used (not limited to this list): *Sedum acre 'Octoberfest',* Sedum album, Sedum ellacombianum, Sedum Floriferum, Sedum sexangulare, Sedum spurium 'Coccineum' (purple carpet), *Sedum spurium 'Summer Glory', Sedum spurium 'Summer Snow', Sedum reflexum*

## BENEFITS:

- Quick and easy to install! Can be bundled to bring up in a freight elevator to avoid renting a crane.
- Immediate full coverage. Year-round beauty with flowers during growing season and seasonal foliage color changes.
- Thin underlayment to allow for fast and optimal rooting into your growth media.
- Minimal maintenance once established

**SEDUM MAT CARE AND INSTALLATION GUIDELINES**

Whether your sedum mats arrived to you via UPS in a box or via truck on a pallet, you must always **UNPACK IMMEDIATELY!**

***Rooftop Installation:***

Sedum mats are the perfect vegetative answer to most green roof systems with industry standard growth media and excellent drainage.

- Install **IMMEDIATELY!**
- Saturate the green roof media. Level and roll media until compact. Continue to water the green roof media during the installation if it is starting to dry out.
- Lay each mat so the sides of each mat are touching. Avoid allowing the vegetation to drape between the mats. Mats can be staggered for a more "seamless" look.
- Sedum mats can be cut to work around obstacles such as roof vents and equipment.
- Utilize overhead watering to thoroughly water mats immediately after installation.
- Continue to utilize overhead watering until the roots have extended into the green roof media and the sedum mat has become well established. (Approximately 4-6 weeks.) During this time you will want to keep the soil in the sedum mat at an **evenly moist level**. Not soggy-wet. Not pale-dry. Do not overwater! Likewise, if the mats start to separate from each other and the sides are curling up, they are much too dry!

***Rooftop Maintenance:***

A certain level of maintenance will need to follow a green roof installation. Once established, irrigation can be administered overhead or by drip. During times of low rainfall/ excessive heat, a green roof should always be checked for proper water levels. Again, if the mats start to separate from each other and the sides are curling up, they are much too dry!

Weed seeds can be carried to a green roof via wind or birds. Occasionally check your green roof for weeds and hand pull any that are found. Dead flowers can be removed, but it is not necessary.

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***Landscape Installation:***

Sedum mats are an excellent choice for on-grade applications that require a low maintenance answer.

- Install **IMMEDIATELY!**
- Make sure you prepared your area in advance! Completely clear the area of grass, weeds, etc. before installation time. Do not use herbicides prior to installation.
- Rake and loosen-up the soil. Make sure it is thoroughly moist.
- Lay each mat so the sides of each mat are touching. Avoid allowing the vegetation to drape between the mats.
- Sedum mats can be cut to create curves or cut around obstacles.
- Utilize overhead watering to thoroughly water mats immediately after installation.
- Continue to utilize overhead watering until the roots have extended into the soil and the sedum mat has become well established. (Approximately 4-6 weeks.) During this time you will want to keep the soil in the sedum mat at an **evenly moist level**. Not soggy-wet. Not pale-dry. Do not overwater! Likewise, if the mats start to separate from each other and the sides are curling up, they are much too dry!

***Landscape Maintenance:***

A certain level of maintenance will need to follow a landscape installation. The most important thing to remember is to check that it is not being overwatered! During times of low rainfall/ excessive heat, your installation should always be checked for proper water levels. Again, if the mats start to separate from each other and the sides are curling up, they are much too dry!

Sedum mats work very much like mulch in keeping the weeds out. Pull any weeds by hand that do appear before they spread. Dead flowers can be removed, but it is not necessary.

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***Other Applications:***

Sedum mats can be used for endless applications, many of which are listed on our website. Whatever the use, sedum should always be unpacked immediately and kept at a moderate moisture level.

***Seasonal Color:***

With the onset of winter and cooler temperatures, sedum goes dormant. Some varieties will partially defoliate at the bottom of the stems. Most varieties will take on “winter” tones (ie dark red, orange, chartreuse). This is normal and it will fill-in and green-up when spring and warmer temperatures return. During the summer months sedum will take on its most vibrant range of colors.

# Appendix D: Geotechnical Investigation Reports

## Documents included:

☒ Custom Soils Report downloaded from USDA Web Soil Survey.

- Note: A geotechnical investigation report may be submitted in place of the Custom Soils Report but must include a site plan showing the location of soil types, delineated separately by lines to show boundaries, and supporting documentation to determine the hydrologic soil group.

☒ Geotechnical Investigation Report, including but not limited to:

- Summary of key findings, constraints, and impacts on projects
- Soil investigation data, including:
  - Sampling and analysis methods used
  - Site plan showing labeled soil sampling locations
  - Soil profile log, including all data required by NYS SWMDM Appendix D
  - Sieve analysis data and soil classification results
- Infiltration investigation data, including:
  - Test and analysis methods
  - Site plan showing labeled permeability testing locations
  - Permeability test log
- Soil remediation data summary, if applicable

☒ Geotechnical Investigation Data Summary, outlining in tabular format:

- Summary of soil investigation data for each boring/test pit
- Summary of infiltration testing data for each infiltration test

## If any of the above documents are not included, explain why below:

Click or tap here to enter text.

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Bronx County, New York

## 280 E 161st St, Bronx, NY 10451

DRAFT

January 16, 2025

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Map Scale: 1:1,130 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bronx County, New York
Survey Area Data: Version 14, Aug 25, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 12, 2020—May 11, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| UGA | Urban land-Greenbelt complex, 0 to 3 percent slopes | 2.9 | 100.0% |
| **Totals for Area of Interest** | | **2.9** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

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# Bronx County, New York

## UGA—Urban land-Greenbelt complex, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 2pbln
*Elevation:* 0 to 320 feet
*Mean annual precipitation:* 40 to 52 inches
*Mean annual air temperature:* 47 to 62 degrees F
*Frost-free period:* 216 to 234 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Urban land, till substratum:* 78 percent
*Greenbelt and similar soils:* 12 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Urban Land, Till Substratum

#### Setting

*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Asphalt over human-transported material

#### Typical profile

*M - 0 to 15 inches:* cemented material
*2^C - 15 to 79 inches:* gravelly sandy loam

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* 0 inches to manufactured layer
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Calcium carbonate, maximum content:* 10 percent
*Available water supply, 0 to 60 inches:* Very low (about 0.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8s
*Hydric soil rating:* Unranked

### Description of Greenbelt

#### Setting

*Landform position (two-dimensional):* Summit, backslope, footslope
*Landform position (three-dimensional):* Side slope, base slope, crest, talf
*Down-slope shape:* Convex, linear
*Across-slope shape:* Convex, linear
*Parent material:* Loamy human-transported material

#### Typical profile

*^A - 0 to 5 inches:* loam

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*^Bw1 - 5 to 16 inches:* loam
*^Bw2 - 16 to 30 inches:* loam
*^C - 30 to 79 inches:* sandy loam

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.43 to 1.42 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 30 percent
*Available water supply, 0 to 60 inches:* Moderate (about 8.4 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 1
*Hydrologic Soil Group:* B
*Ecological site:* F149BY100NY - Urban Site Complex
*Hydric soil rating:* No

**Minor Components**

**Laguardia**

*Percent of map unit:* 7 percent
*Landform position (two-dimensional):* Summit, shoulder, backslope, footslope, toeslope
*Landform position (three-dimensional):* Side slope, base slope, crest, dip, rise, talf
*Down-slope shape:* Concave, convex, linear
*Across-slope shape:* Concave, linear, convex
*Hydric soil rating:* No

**Centralpark**

*Percent of map unit:* 1 percent
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

**Ebbets**

*Percent of map unit:* 1 percent
*Landform position (two-dimensional):* Summit, backslope, footslope
*Landform position (three-dimensional):* Side slope, base slope, crest, talf
*Down-slope shape:* Convex, linear
*Across-slope shape:* Convex, linear
*Hydric soil rating:* No

**North meadow**

*Percent of map unit:* 1 percent
*Landform position (two-dimensional):* Backslope, footslope, toeslope
*Landform position (three-dimensional):* Side slope, base slope, talf
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave, linear

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*Hydric soil rating:* No

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# GEOTECHNICAL REPORT
# 280-330 East 161st Street
# BRONX, NEW YORK

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**Gilbane Development Company**
**88 Pine Street, 27th Floor**
**New York, New York 10005**

**June 27, 2022**

MRCE
built on firm foundations

MRCE

built on firm foundations

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June 27, 2022

Gilbane Development Company
88 Pine Street, 27th Floor
New York, New York 10005

Attn: Mr. Blaise Rastello

Re: Geotechnical Report
280-330 East 161st Street
Bronx, New York
MRCE File No. 14364

Dear Mr. Rastello:

Mueser Rutledge Consulting Engineers (MRCE) has completed a subsurface investigation for the proposed development at 280-330 East 161st Street in accordance with our proposal dated April 26, 2022. This report presents a summary of our investigation, our interpretation of subsurface conditions encountered, and recommendations for design and construction of foundations.

Please call if you have any questions regarding our report or require further assistance in design and construction of foundations and other below grade structures.

Very truly yours,

**MUESER RUTLEDGE CONSULTING ENGINEERS PLLC**

Gregory Lucking, PE

Walter Kaeck, Principal, PE

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## 1.0 LIST OF EXHIBITS

The following exhibits are attached to illustrate our Report:

| Exhibit | Description |
|---|---|
| Figure No. 1 | Site Location Map |
| Figure No. 2 | 1874 Viele Map |
| Figure No. 3 | 1904 Historic Land Map |
| Figure No. 4 | 1942 Historic Land Map |
| Figure No. 5 | Bedrock Geology Map |
| Drawing No. B-1 | Boring Location Plan |
| Drawing No. GS-1 | Geologic Section A-A |
| Drawing No. GS-2 | Geologic Section B-B |
| Drawing No. GS-R | Geotechnical Reference Standards |
| Drawing No. RC-1 | Rock Core Classification Criteria |

| Appendix | Description |
|---|---|
| Appendix A | MRCE Borings Logs |

## 2.0 DATUM AND REFERENCES

Elevations in this report refer to the North American Vertical Datum of 1988 (NAVD 88).

Our report is based on the proposed building construction depicted in the Zoning Study for 280-330 East 161st Street, prepared by Aufgang Architects, dated December 4, 2018. For ease in reference herein, project North is taken as parallel to Concourse Village East with direction toward East 161st Street.

## 3.0 SITE DESCRIPTION

The 280-330 East 161st Street project site is in the Concourse Village neighborhood of the Bronx, New York. The site is on Block 2420, bound by East 161st Street to the north, East 158th Street to the south, Concourse Village East (Morris Avenue) to the west, and Park Avenue to the east, as shown on Figure 1. The project site consists of a proposed subdivision of Lot 120, encompasses Lot 56, and includes the air rights to Lot 49. The proposed building is generally located on the south half of Lot 120 within the proposed lot subdivision.

An existing 8-story brick masonry building (280 East 161st Street) is located within the north half of Lot 120 outside of the proposed subdivision to the south. Public records indicate that the building was built in 1980, and does not include a cellar level. The south half of Lot 120 (proposed subdivision area) is generally used as an at grade parking lot for the existing 8-story building. Lot 49 includes a two-story brick masonry church belonging to the Epworth United Methodist Church. Public records indicate that the church was built in approximately 1904. The building is set back from the rear property line by about 15 feet. Observations made during our subsurface investigation indicate that the rear portion of the building includes a partial depth cellar. Lot 56 is currently used as an at grade parking lot for the Epworth United Methodist Church. We understand that the existing buildings on Lots 49 and 120 will remain in place.

Ground surface elevations within the at grade parking on Lot 120 are relatively flat and vary from about Elev. +50 to Elev. +52. Surrounding street grades are generally flat at about Elev. +50 to the north and west, and slope down to the south and east to about Elev. +42 at the intersection of Concourse Village East and East 158th Street, and about Elev. +44 at the intersection of Park Avenue and East 160th Steet. Historic topographic maps indicate that the site is located at a relative high point in the surrounding topography which has been altered during development of the area, as discussed below.

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**3.1 Adjacent Structures:** Adjacent lots border the site to the south and east and are described below.

- NYCHA Park (south): A New York City Housing Authority (NYCHA) park occupies Lot 174 to the south. The park includes recreational and landscaped areas, but does not include any significant structures. The park is separated from the project site by a metal fence on a concrete curb/knee wall.
- 3125 Park Avenue and MTA Metro-North (east): A 30-story residential building, part of the NYCHA Morrisania Air Rights development, is located east of the project site. The building is set back from its west property line by about 20 to 40 feet and constructed above existing MTA Metro-North (MNR) railroad tracks that run parallel to Park Avenue below the building. The building and MNR tracks cover Lots 78, 170, 171, and 172. Historic records indicate that the railroad was initially constructed as part of the New York and New Haven railroad line in approximately 1848. The building was subsequently built over the tracks in approximately 1980.

  We have requested available records of construction of the railroad, but have yet to receive any information from MNR. However, based on public records, the building is supported by a horizontal steel truss which spans over the MNR tracks below. We anticipate that the truss is supported by reinforced concrete piers outside of the MNR alignment. The piers are likely supported by shallow foundations bearing on decomposed rock or rock, and may include tiedowns to resist uplift forces. On the west side of the tracks (towards the project site), a concrete retaining wall was likely constructed as part of the original railroad construction to support the change in surface grades. The retaining wall may have been removed and replaced by new piers supporting the horizontal truss, or incorporated into the new piers. Prior to construction of the Morrisania Air Rights development, Park Avenue was located on both sides of the tracks with south bound traffic approximately located on Lots 170, 171, and 172, as indicated on Figures 1, 3 and 4. We anticipate that the original retaining wall and new piers are located below the former south bound Park Avenue alignment. We estimate that the MNR tracks are located at a depth of about 20 to 25 feet below existing grade, corresponding to about Elev. +25.

  Since the MNR railroad tracks below 3125 Park Avenue are within 200 feet of the proposed development, MNR review and approval of foundation and support of excavation (SOE) design drawings is required. Any differences in railroad construction from the information described herein should become clear as part of the MNR review process.

**3.2 East 160st Street:**

- The 1904 property map indicates an extension of East 160th Street crossed the proposed site. The drawing further indicates a sewer within the street. The de-mapping of the street should be verified and the presence of a sewer easement should be investigated.

## 4.0 SITE HISTORY AND GEOLOGY

The site is located along a ridge of higher topography which runs approximately north-south along the existing street grid. Pre-development ground surface elevations were lower along Courtland Street to the east, and Grant Avenue to the west. Additionally, a stream previously flowed from north to south between Grant and Sherman Avenues to the west, draining to a pond south of East 158th Street, as shown in Figure 2. Available information indicates that the project area was developed by the mid 1800's. By the 1900's, the site included numerous lots containing relatively small structures, as shown in Figures 3 and 4. Construction for the Morrisania Air Rights development began in the mid 1970's and was completed in 1980. Construction included removing East 160th Street which previously traversed the site.

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Bedrock at the site is mapped as the Inwood Marble Formation, as shown on Figure 5. The Paleozoic age Inwood Marble is typically a calcitic to dolomitic, sometimes micaceous, marble that tends to be soft and very prone to weathering. As indicated on Figure 5, an anti-form, or apex of a fold in the underlying rock formation, is mapped running north-south approximately at the intersection of Park Avenue and East 161st Street on the east side of the site. The anit-form indicates the original rock surface tended to slope down on either side of the line. Rock at the top of an anti-form may experience tension forces due to the bend in the rock formation, causing highly jointed or fractured rock. Once fractured, rock becomes more susceptible to weathering as water moves through the rock mass. The presence of the Inwood Marble formation and proximity to the anti-form indicates bedrock at the site may be weathered to considerable depth. This weathering tends to result in the upper portions of bedrock becoming completely weathered to a soil like consistency, creating a layer of decomposed rock and/or residual soil above the underlying more competent rock.

During the Pleistocene a series of glaciers flowed across the region. The advancing ice removed the existing overburden soils and deposited layers of glacial sand and till above the weathered rock. When the ice retreated, the meltwaters transported soils left behind by the glaciers. Over time the surficial sediments were reworked by local streams and surface water runoff, and more recently, by human development.

## 5.0 PROPOSED CONSTRUCTION

We understand that the conceptual building design is still under development and may change from that described herein. Based on the December, 2018, Zoning Study by Aufgang Architects, the proposed development consists of two adjoining 19-story residential buildings (Buildings “A” and “B”) with a total footprint area of about 21,000 square feet. The adjoining “L” shaped buildings will have one leg of the building approximately parallel to Concourse Village East and the adjoining leg approximately parallel to East 161st Street. Plans are expected to include a full-depth cellar (12-foot floor to floor height) beneath the building with elevator pits located approximately in the center of the building.

For the purposes of this report, we assume that the ground floor slab is planned near existing surface grade at about Elev. +50, with the cellar slab at about Elev. +38. Construction for foundations beneath the cellar level is expected to require excavation to approximately 4 feet below the top of cellar slab, or to about Elev. +34. Excavation for the elevator pit is expected to extend approximately 6 feet below the top of the cellar slab, or to about Elev. +32.

## 6.0 SUBSURFACE INVESTIGATION

**6.1 Investigation Scope:** The New York City Building Code (the Code) requires a geotechnical investigation comprised of a minimum number of soil borings based on the foundation system and built-over area of proposed developments. Based on available subsurface information in our files, we anticipated that shallow foundations would be suitable for building support. For the proposed footprint area of 21,000 square feet, the Code requires nine (9) borings for buildings supported on shallow foundations. On that basis, we planned a subsurface investigation consisting of nine (9) borings. Locations of the borings are shown on Drawing No. B-1.

**6.1.1 Planning, Layout, and Inspection:** We prepared a plan and specifications for the work and negotiated a contract with Craig Geotechnical Drilling Company, Inc. (Craig) of Mays Landing, New Jersey. Boring Nos. MR-1 through MR-9 were completed by Craig between June 2 and June 7, 2022, under the continuous observation of MRCE resident engineer Mr. Gregory Lucking who prepared a field log for each boring. A utility mark-out was arranged by Craig prior to the start of field work. Boring layout was planned to provide general site coverage beneath the proposed structure. Layout was adjusted in the field due to site access restrictions while staying as close to the proposed locations as possible.

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In addition to the geotechnical borings, MRCE assisted with implementation of the environmental subsurface investigation. MRCE coordinated with the project environmental engineer, Roux Associates, Inc. (Roux), to establish their requirements for soil and groundwater sampling. Roux's requirements were incorporated into subsurface investigation plan and specification. All work was performed by Craig under the contract negotiated by MRCE. Soil sampling for the environmental investigation was performed in separate boreholes on May 31, 2022, under the observation of Roux personnel. Environmental groundwater sampling utilized groundwater monitoring wells installed as part of the geotechnical investigation. Groundwater sampling was performed by Roux on June 7, 2022. Results of the environmental investigation will be summarized in an independent report prepared by Roux.

**6.1.2 Geotechnical Borings:** The borings were advanced with a truck mounted drill rig using wash-rotary methods and a combination of steel casing and drilling mud to stabilize borehole advancement. The borings were advanced to depths ranging from 30 to 55 feet, as shown on the boring logs in Appendix A. All borings penetrated at least 15 feet into competent material below the expected cellar depth.

**6.1.3 Soil Sampling:** Four (4) split-spoon samples were obtained in the first 10 feet with soil sampling continuing at intervals not exceeding 5 feet thereafter. Split-spoon soil samples were obtained in conformance with ASTM D1586 – "Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils" using a two-inch outer diameter split-spoon sampler driven with a 140-pound hammer free-falling 30 inches. Hammer blows were recorded for each of four six-inch drive intervals of the split-spoon sampler. The sum of the blows for the second and third six-inch drive intervals is defined as the Standard Penetration Test (SPT) Resistance, or N-value. The N-value is an index of the relative density of granular soils and a rough approximation of the consistency (strength) of cohesive soils at the sample interval. Where soils were too dense for the split-spoon sampler to penetrate a full 12 inches, or where gravel, cobbles or boulders, or top of rock were encountered, the sampler was driven until 50 to 100 blows were administered and the actual penetration of the sampler was measured and recorded. Recovered split-spoon soil samples were placed in glass, screw-top jars and delivered to our in-house laboratory for verification of field sample descriptions. Soil samples were classified in accordance with the Unified Soil Classification System (USCS) as summarized on Drawing GS-R, Geotechnical Reference Standards. Logs of the borings with complete soil descriptions are included in Appendix A.

N-values shown next to the borings on the graphical depictions of subsurface conditions on Drawing Nos. GS-1 and GS-2 are the uncorrected raw N-values as measured in the field. In order to account for differences in hammer energy transfer efficiency, the N-value is commonly corrected to a standard transferred energy efficiency of 60%. The corrected N-value is termed $N_{60}$ and allows comparative evaluation of soil properties between borings made with different equipment and is the common basis of some geotechnical analyses, such as liquefaction potential. The drill rig used by Craig was equipped with an automatic hammer. A correction value, $C_E$, of 1.4 (representing an efficiency of about 85%) was used in our analyses for the automatic hammer.

**6.1.4 Rock Coring:** Bedrock was generally penetrated and sampled in 5-foot runs using an NX-size double tube core barrel equipped with a diamond bit, recovering a nominal 2-inch diameter core. Rock core samples are described in accordance with the classification criteria shown on Drawing No. RC-1, Rock Core Classification Criteria. Our field engineer logged each core run, sketched the jointing patterns, measured recovery and calculated the Rock Quality Designation (RQD). Recovery is the length of core recovered expressed as a percentage of the total core run length. RQD is defined as the sum of the lengths of recovered core pieces greater than four inches in length between natural breaks expressed as a percentage of the total core run. RQD is an indication of the relative frequency of jointing or natural fracturing of the bedrock and is used in determining rock classification in accordance with the NYC Building Code. Rock cores were stored in wooden boxes for shipment to our laboratory for verification of field classifications. Core recoveries, RQD, rock descriptions and field sketches of the recovered rock cores are included on the boring logs in Appendix A.

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**6.1.5 Groundwater Monitoring:** Open standpipe piezometers were installed in completed boreholes MR-5P and MR-8P to monitor groundwater levels. The piezometers consist of a 2-inch I.D. PVC standpipe with the bottom 10 feet slotted. The slotted portion of the piezometer is surrounded by filter sand to allow free water flow into the standpipe without movement of soil particles. The piezometers were installed to depths of 40 and 30 feet below ground surface in Borings MR-5P and MR-6P respectively. Piezometer construction details and water level readings are provided on the Piezometer Records accompanying the boring logs in Appendix A.

**6.1.6 Backfilling, Restoration, and Final Survey:** Upon completion, the borings were backfilled with soil cuttings. Borings MR-5P and MR-6P were partially backfilled with soil cuttings to allow installation of the open standpipe piezometers. A flush-mount well cover was installed over the piezometers and concreted in place. Excess soil cuttings which could not be backfilled into the borings were containerized in 55-gallon steel drums. The containerized soil cuttings will be tested by Craig for contaminants and disposed of at an appropriate facility in accordance with applicable regulations. Final boring locations were measured from existing features and are shown on Drawing No. B-1. Ground surface elevations at boring locations were estimated from NYC Open Data.

## 7.0 LABORATORY TESTING AND REVIEW

Upon completion of the investigation, all soil and rock samples were transported to our in-house soils laboratory for laboratory testing and verification of soil descriptions in conformance with MRCE Geotechnical Reference Standards and Rock Core Classification Criteria described on Drawing Nos. GS-R and RC-1. The sample descriptions on the boring logs in Appendix A reflect the results of the MRCE laboratory review.

## 8.0 SUBSURFACE CONDITIONS

Our interpretation of subsurface conditions is illustrated on Geologic Sections A-A and B-B on Drawing Nos. GS-1 and GS-2, respectively. Information from the borings shown on the sections include sample number and position, SPT resistance (uncorrected N-value) in blows per foot, natural moisture content where determined, and the Unified Soil Classification System (USCS) soil group symbol for each soil sample. Core number and position, percent recovery, and RQD are shown for each rock core run.

### 8.1 Subsurface Stratigraphy

General descriptions of subsurface materials encountered, including material classification (NYC Class) in accordance with the Code, are summarized below in order of their occurrence with depth.

The uppermost material encountered in the borings and covering the ground surface consists of a surficial concrete slab about two to six inches thick (MR-3, MR-4, and MR-9) or asphalt pavement about four inches thick (MR-1, MR-2/A/B, MR-5P, MR-6, MR-7, MR-8P).

**Stratum F – Fill (NYC Class 7):** Man-made fill (Stratum F) is the uppermost soil stratum encountered below the surficial concrete slab or pavement. Stratum F generally consist of loose to very compact, brown, gray, red, and black fine to coarse sand, some silt, trace to some gravel, trace brick, concrete, asphalt, wood, cinders. Obstructions were encountered in Boring Nos. MR-2 and MR-2A at depths of about 3 and 4.5 feet respectively, which required boring termination and an offset location. Additionally, local accumulations of construction debris and remnants of prior foundations are also expected in Stratum F. N-values from the borings range from 7 to 62, averaging 21. Stratum F ranges in thickness from 2.5 to 9 feet, averaging 5 feet thick in the borings.

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**Stratum S1 – Sand (NYC Class 3b/6):** Natural sand (Stratum S1) underlies Stratum F in all borings except Boring Nos. MR-3 and MR-4. Stratum S1 generally consists of loose to compact brown fine to medium sand, trace to some silt, gravel, trace coarse sand, mica. Additionally, thin layers about two to four inches thick of stiff brown and orange mottled silty clay are present in Stratum S1 in Boring No. 5P at about Elev. +35. N-values from the borings range from 5 to 40, averaging 18. Stratum S1 ranges in thickness from approximately 3 to 11 feet in the borings, averaging 6 feet thick.

**Stratum S2 – Residual Soil (NYC Class 3a):** Underlying Stratum S1 in Boring No. MR-7 is residual soil, Stratum S2. Residual soil is soil which has been weathered from the parent bedrock formation and not undergone transportation. Stratum S2 is similar to Stratum DR, decomposed rock, but is generally more highly weathered with less remaining structure of the original rock formation and lower N-values. Stratum S2 in Boring MR-7 consists of compact to very compact, brown fine to coarse sand, some silt, trace gravel, mica. N-values range from 36 to 77, averaging 51. Stratum S2 is approximately 16.5 feet thick in Boring MR-7.

**Stratum DR – Decomposed Rock (NYC Class 3a):** Decomposed Rock (Stratum DR) underlies Strata S1 or S2 in all borings except Boring Nos. MR-3 and MR-4 where it is present directly below Stratum F. Similar to residual soil, decomposed rock consists of bedrock which has been chemically weathered in place to a soil like consistency. Stratum DR is differentiated from Stratum S2 by the occurrence of sampler refusal during SPT attempts, indicating denser more competent material. Stratum DR generally consists of very compact tan, brown and white fine to coarse sand, trace to some silt, trace gravel, and layers or zones of medium compact fine to medium sand, some silt, trace coarse sand, mica. Zones of more intact weathered rock (that was sampled with a core barrel) are also present in Stratum DR.

SPT N-values range from 16 to 117, averaging 53; however, 36 of 43 SPT attempts (84 percent) resulted in sampler refusal (greater than 50 to 100 blows per 6 inches) indicating that Stratum DR is generally very compact. Lower N-values (less than 50 blows per foot) were encountered in Boring MR-5P between approximately Elev. +20 and Elev. +5. These samples may correspond to a remnant solution hole in the parent rock which was subsequently filled with soil transported by groundwater. Notably, the samples are located below about 15 feet of material which exhibited N-values greater than 100. Additional zones of lower N-value material are likely present within Stratum DR, particularly below the groundwater table. However, these zones are likely infrequent, of limited lateral extent, and surrounded by more competent material. Core recoveries in Stratum DR range from 0 to 26 percent, and RQD was 0 percent for all core runs. The thickness of Stratum DR varies from 16.5 to 24 feet, averaging 21 feet in Boring Nos. MR-6, MR-7 and MR-8P where Stratum DR was fully penetrated. The top of Stratum DR ranges in elevation from Elev. +25 to Elev. +46.5, averaging Elev. +39.5, with the lowest elevation encountered in Boring MR-7 below Stratum S2 on the south side of the site.

**Stratum WR – Weathered Rock (NYC Class 1b/c/d):** Weathered Rock (Stratum WR) underlies Stratum DR in Boring Nos. MR-6, MR-7 and MR-8P. Stratum WR consists of weathered to medium hard, weathered to moderately weathered tan, white and brown marble, broken to moderately jointed, with weathered, and iron-stained joints. Core recoveries range from 53 to 94 percent, and average 75 percent. RQD ranges from 9 to 75 percent, and averages 35 percent. While rock core 1C in Boring No. MR-6 has an RQD of 75 percent and classifies as NYC Class 1b, medium hard rock, the rock fabric was moderately weathered to weathered. Based on our understanding of the Inwood Marble formation and conditions exposed by the borings, we anticipate a relatively thick layer of weathered rock below decomposed rock with significant variation in rock quality. Zones of weathered rock are also expected within Stratum DR as described above.

### 8.2 Groundwater

The piezometers installed in MRCE Boring Nos. MR-5P and MR-8P were installed by Friday, June 3, 2022, and allowed to stabilize over the following weekend. Groundwater was measured after stabilization on

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June 6 and June 7, 2022, at depths ranging from 25.4 to 26.0 feet, corresponding to Elev. +24.7 to +25.3. Groundwater levels are expected to vary seasonally throughout the year depending on precipitation levels and may differ from levels measured during our investigation.

## 9.0 RECOMMENDED DESIGN PARAMETERS

Recommended soil design parameters are provided in Table 1 below for use in the design of foundations and temporary construction works such as excavation shoring.

### 9.1 Table 1 – Soil Design Parameters

| Parameter | Stratum | | | | |
|---|---|---|---|---|---|
| | F | S1 | S2 | DR | WR |
| Total Unit Weight (pcf) | 120 | 120 | 125 | 135 | 150 |
| Effective Unit Weight (pcf) | 58 | 58 | 63 | 73 | 88 |
| Angle of Internal Friction (deg) | 30 | 32 | 34 | 36 | N/A |
| Cohesion (psf) | 0 | 0 | 0 | 0 | N/A |
| At-Rest Earth Pressure Coefficient, $K_o$ | 0.50 | 0.47 | 0.44 | 0.41 | N/A |
| Active Earth Pressure Coefficient, $K_a$ | 0.33 | 0.31 | 0.28 | 0.26 | N/A |
| Passive Earth Pressure Coefficient, $K_p$ | 3.00 | 3.25 | 3.54 | 3.85 | N/A |
| Ultimate Friction Factor, S – Soil to Concrete | 0.3 | 0.3 | 0.4 | 0.5 | 0.5 |
| Maximum Allowable Bearing Pressure (tsf) | N/A | 3.0 | 6.0 | 6.0 | 8.0 |

Table 1 Notes:

1. Effective unit weights should be used below the groundwater table and water pressure should be added.
2. Surcharge loads above the ground surface should be included in accordance with the NYC Building Code.
3. For basement walls restrained at the top and bottom (rigid walls), use at-rest pressures. For walls restrained at the bottom and free at the top (flexible), active earth pressures may be used.
4. Active and passive pressures may be computed using Rankine or Coulomb earth pressure theory.
5. Maximum Allowable Bearing Pressure for Stratum WR assumed NYCBC Class 1c rock, minimum.

### 9.2 Design Groundwater Levels

Stabilized groundwater is expected about 25 feet below existing grade within Stratum DR (decomposed rock). For design purposes, we recommend groundwater be assumed five feet above measured levels at about Elev. +30 to account for seasonal variations. Structural design of below grade elements should also account for groundwater in an extreme event at the ground surface due to localized flooding from utility breaks in the street or within the site, with overstress allowed in design of basement walls for these temporary loading conditions.

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### 9.3 Flood Levels

Preliminary Flood Insurance Rate Maps (FIRM), produced by the Federal Emergency Management Agency, dated January 30, 2015, indicate that the site lies in Zone X, which is outside the floodplain of a 0.2% annual chance flood event.

## 10.0 SEISMIC EVALUATION

Structural design of the building foundations and superstructure must comply with the Code. The Code requires an evaluation of the seismic Site Class to determine the seismic design parameters and an assessment of the potential hazard of soil liquefaction under the seismic event specified by the Code.

### 10.1 Liquefaction

Loose granular soils and low-plasticity fine-grained soils below the groundwater table and within 50 feet of the ground surface have the potential to liquefy during earthquake shaking. Liquefaction susceptibility was initially assessed using the Code's Liquefaction Assessment Diagram (Figure 1813.1), which compares field measured SPT N-values corrected to an equivalent transferred energy of 60%, termed $N_{60}$, with specified liquefaction "screening lines". Soils with $N_{60}$ values plotting to the left of the screening lines are considered potentially liquefiable requiring a liquefaction evaluation, while those with values plotting to the right of the liquefaction screening lines are considered unlikely to liquefy.

Using the design groundwater level of Elev. +30, the Code screening diagram indicates that the soils below groundwater are unlikely to liquefy in a seismic event. Therefore, consideration of liquefaction is not required in building design.

### 10.2 Site Class

Seismic Site Class is derived using the Code Guidelines based on the characteristics of the soils and/or rock below the anticipated foundation level as revealed by the subsurface investigation. Based on the conditions revealed by the borings and proposed development, building foundations are expected to be supported by shallow foundations bearing on decomposed rock (Stratum DR). Therefore, Site Class C (very dense soil) is appropriate with design spectral response acceleration parameters, $S_{DS}$ and $S_{D1}$, of 0.23g and 0.08g.

Assuming a Risk Category of I, II, or III, structures may be designed using Seismic Design Category B. Structural Occupancy Category of the structure should be confirmed by the Project Structural Engineer.

## 11.0 FOUNDATION DESIGN RECOMMENDATIONS

Foundation recommendations are based on the findings of the site investigation and the proposed building configuration depicted on the Zoning Study, Drawing No. Z-100, Schematic Plot Plan for 280-330 East 161st Street, prepared by Aufgang Architects. We understand the extents and depth of an anticipated cellar level are not finalized at this time. For the recommendations provided below, we assume a full depth (12-ft floor to floor) cellar under the entire building footprint. Foundation recommendations should be reviewed and revised if the scope of the proposed construction changes significantly from that described herein. A deeper cellar would encounter more favorable ground conditions and would not change these recommendations. A shallow cellar or elimination of the cellar would change these recommendations as the proposed foundations may not penetrate through the unsuitable fill soil stratum to encounter the underlying more favorable soil conditions.

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### 11.1 Building Foundations

Subsurface conditions revealed in the borings are shown relative to the assumed top of cellar slab (Elev. +38) on Geologic Sections A-A and B-B on Drawing Nos. GS-1 and GS-2. Foundations are expected to extend about 4 feet below the top of cellar slab to about Elev. +34. As shown on the geologic sections, soils at these depths consist of decomposed rock (Stratum DR) or residual soil (Stratum S2) for the vast majority of the proposed building limits. However, on the west side of Building B, Stratum S1, sand, is shown extending down to about Elev. +32.5 at Boring No. MR-5P, as shown on Drawing No. GS-1. On that basis, we recommend building support on spread footings bearing in decomposed rock (Stratum DR) or residual soil (Stratum S2). Foundations bearing on undisturbed subgrade in Strata DR and S2 can be designed for an allowable bearing pressure of 6 tsf for dense granular soil (Class 3a). If less competent soils of Stratum S1 are encountered, we recommend over excavation to the top of Stratum DR or Stratum S2 which is expected to be on the order of 2 to 3 feet or less below Elev. +34.

### 11.2 Settlement

For structures supported on spread footings bearing in Stratum DR, settlement will depend on footing sizes and applied loads. Total settlement is likely less than one inch with differential settlement between columns on the order of ¼ to ½ inch. Most settlement will occur with the application of load as the structure is constructed. Long term creep settlement of the structure is not anticipated.

### 11.3 Cellar Slab on Grade

The cellar floor slab is anticipated well above the groundwater level measured in the subsurface investigation. As such, the cellar slab can be designed as a slab-on-grade bearing on Stratum S1, S2 or DR. Underslab waterproofing, such as HDPE sheet membranes, is recommended if the below grade space is intended for use as high quality habitable space. If waterproofing is not applied, a vapor barrier over a 6-inch gravel layer is recommended on the slab underside to prevent moisture infiltration through the slab.

Although the cellar slab is above the measured groundwater level, we recommend the foundation design include an emergency relief underdrain system below the cellar slab to drain any water that may collect from surface water infiltration and become perched above the excavated rock surface. The underslab drainage system should consist of a gravel drainage/bedding layer a minimum of six inches thick with perforated collector pipes. The pipes should be installed level in interconnecting loops to provide redundancy, and discharge to one or more sumps for collection and discharge. Filter fabric should be installed on top of the rock subgrade to prevent fines from migrating into and potentially clogging the underdrain system.

### 11.4 Uplift

Columns may have net uplift forces due to wind or seismic loads that are greater than the gravity loading of the building. Uplift resistance should be calculated using only the dead weight of the structure in place. Live loads within the structure should not be taken as a resisting force to counter uplift pressures. If the dead weight of the structure is not sufficient, uplift forces can be resisted by installing double corrosion protected pre-tensioned and tested tiedown anchors installed into the underlying decomposed and weathered rock. The tiedowns should extend deep enough to engage sufficient soil/rock mass to prevent pullout of a soil/rock cone. Due to the highly weathered nature of the underlying decomposed and weathered rock, tiedown anchors should be designed with grout-to-ground bond values for dense soils, not intact rock. We can provide recommended bond stress values and tiedown design details if analysis shows tiedowns are required.

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### 11.5 Ground Floor Slabs

Slab on grade construction is viable at ground level for slabs which may be required around the proposed structure. Slab on grade construction should include placement of six inches of crushed stone, and if used below interior spaces, a vapor barrier on the slab underside to function as a capillary break and limit moisture infiltration through the slab.

### 11.6 Foundation Walls

Permanent foundation walls should be designed to withstand long-term, at-rest earth pressures and water pressure consistent with Code requirements. These pressures can be calculated using an equivalent fluid pressure of 60 psf per foot of depth above the groundwater table and 95 psf per foot below the design groundwater level.

Foundation walls must also accommodate temporary increases in lateral pressure such as may occur from a temporary stockpiling of materials or equipment adjacent to the structure or water pressure equivalent to groundwater at the ground surface such as may occur due to a water main break. For surcharge loading, we recommend foundation wall design include a temporary uniform vertical surcharge of 300 psf at the ground surface. Lateral pressure from this surcharge should be calculated using an at-rest earth pressure coefficient of 0.5 applied as a uniform lateral earth pressure of 150 psf over the upper 15 feet of the wall. The use of elevated stress levels is appropriate in the design of foundation walls for these temporary load conditions.

### 11.7 Damp/Waterproofing

We understand that proposed building design is still developing, and that the extents and intended use of a potential cellar level have not been finalized. Recommendations for damp/waterproofing cellar slabs and below grade foundations walls will vary based on the intended use.

The recommended design groundwater level is Elev. +30, or about 8 feet below the assumed top of cellar slab (Elev. +38). We recommend damp proofing of the cellar walls and slab as a minimum to mitigate moisture infiltration in below grade space. Membrane waterproofing of foundation walls and slabs is recommended to provide a dry cellar and limit dampness if the cellar will serve as high quality or habitable space.

If robust waterproofing is required, we recommend using a bonded membrane waterproofing system for the entire area of the cellar placed below the underside of the slab and on the exterior of foundation walls with a suitable protection board used to prevent damage to the waterproofing during installation. Construction joints in all below-grade structures including walls and slabs should be furnished with hydrophilic waterstops, such as Swellseal Joint Waterstop by GCP Technologies. The waterproofing system must be carefully designed and detailed, and construction inspection is vital to provide proper quality control. We can provide additional recommendations for cellar damp/waterproofing once building design has progressed.

Cellar slab construction should include an underdrain system below the cellar slab as described above.

## 12.0 CONSTRUCTION CONSIDERATIONS

Construction of the proposed building and cellar requires excavation to a depth of approximately 15 feet below ground surface for construction of spread footings. Locally deeper excavations may be required for construction of an elevator pit, or for over-excavation to suitable bearing material at footing locations. Temporary works including excavation support, construction dewatering, and monitoring systems are

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required to facilitate this below grade construction.

### 12.1 Special Inspection Requirements

In accordance with the Code, Special Inspection for the work discussed in this report will include but is not limited to subsurface conditions – subgrade inspection, fill placement & in-place density, and excavations – sheeting, shoring, and bracing.

### 12.2 General Excavation

Cellar construction requires excavation of Strata F, S1, S2 and DR soils. Excavation of site soils can be accomplished using conventional earth moving equipment. While the borings did not encounter significant obstructions in the fill, existing remnant foundations, slabs, and other obstructions may be present and will likely require removal using pneumatic hammers. Depending on the degree of weathering, some portions of Stratum DR soils may also require use of pneumatic hammers to break up and loosen the material.

### 12.3 Subgrade Preparation

Structures founded on spread footings require support on properly prepared subgrade. The final 2 feet of excavation to subgrade should be performed using equipment operating at least 2 feet above subgrade or by reach of equipment or using timber mats. The final six to twelve inches of excavation should be made with a smooth tool, such as a backhoe bucket with the teeth shielded using a metal plate. If a toothed bucket is used, a smooth bottom consisting of undisturbed soil must be provided by hand excavation and removal of loosened material. Subgrades must also be free of standing water. If the subgrade is loosened or disturbed during excavation, or unsuitable material is encountered, the disturbed soil must be over-excavated and replaced with compacted structural fill or lean concrete.

Immediately upon exposure, the subgrade should be inspected and approved by a qualified engineer licensed in the State of New York, in accordance with the Code. Foundations should either be cast the same day or subgrade promptly covered with a lean concrete working mat a minimum of 3 inches thick to protect subgrade materials from weather and construction traffic during subsequent construction.

### 12.4 Support of Excavation (SOE)

Temporary construction excavations in soil should be sloped as necessary for safety and stability or supported by sheeting and bracing in accordance with OSHA regulations. Open-cut excavation is permissible for shallow excavations, such as for footings or local pits within the general excavation, provided such excavation is stable and does not undermine or cause damage to adjacent structures. Where such conditions permit, the excavation sides should be sloped no steeper than 1V:1.5H in soil. While the soils Strata S2 and DR are derived from bedrock, they should be considered soil with respect to sloped excavations as they may experience strength loss if exposed to precipitation. Sloped excavations along public sidewalks should be protected using a thin concrete cover, minimum three inches thick, to prevent erosion and undermining of the sidewalk and/or street. For deeper excavations, or where conditions do not permit sloped excavations, vertical shoring is required.

The use of drilled-in soldier piles and timber lagging is a suitable and economical method of temporary excavation support for the project site. Lateral bracing using tiebacks or internal rakers may be required. SOE design must be performed by a New York State licensed Professional Engineer experienced in this work.

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### 12.5 Dewatering

We do not anticipate significant groundwater flows into the excavation for cellar construction. Groundwater is expected about 10 feet below excavation to foundation subgrades. At a minimum, the Contractor should plan to remove any water infiltration into the excavation (perched water, groundwater, precipitation, or surface run-off) by pumping from local sumps established at the base of the excavation.

### 12.6 Earthwork / Backfill

Structural Fill is recommended for use below slabs on grade and pavements and should conform to the Code requirements for structural fill: a well graded sand, gravel, crushed rock, recycled concrete aggregate, or a mixture of these containing no organic matter, wood, brick, or other deleterious material or equivalent materials with a maximum of 10 percent passing the No. 200 sieve, as determined from the percent passing the No. 4 sieve. Structural Fill should be placed and compacted in lifts, not exceeding 12 inches loose, at its optimum moisture content plus or minus 2 percent, and to a minimum of 95 percent of modified Proctor maximum dry density (ASTM D1557).

Granular soils of Stratum F, S1, S2 or DR may be suitable for reuse as fill provided that they meet the above gradation requirements; are free of organic or other deleterious materials; particles larger than three inches are removed; and moisture content is suitable for compaction. Grain size (gradation) and Proctor (density) testing is required to determine if the onsite soil is suitable for reuse as structural fill. Some processing may be needed including sieving and moisture conditioning. Otherwise, granular material can be imported for fill. On-site soils and sources of off-site borrow should be subjected to laboratory testing including grain size and moisture-density tests prior to use to determine if they meet the specified backfill requirements.

Soils with fines content greater than 10% or containing plastic fine-grained material are more sensitive to moisture changes and may require extensive moisture conditioning and drying to achieve proper compaction, particularly if work is performed during wetter and colder weather (i.e. winter and early spring). The Contractor should factor the costs of such processing and impacts on productivity in selection of backfill sources and scheduling of backfill placement.

Surfaces to receive backfill should be cleared of organic soil, clay, and debris prior to backfill placement. This should be followed by proof rolling of exposed subgrade with a heavy static roller to re-densify soils loosened during excavation, determine if any soft or weak soils exist below subgrade, and improve the density of existing fill soils at shallow depth prior to fill placement. Proof rolling should be performed after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade.

### 12.7 Protection of Adjacent Structures

The adjacent structure on Lot 49 (Epworth United Methodist Church) along the west side of the site is a two-story masonry building supported on shallow foundations with a partial depth cellar. The building is set back from the proposed building footprint by about 50 feet. The adjacent structure on the north half Lot 120 to the north (280 East 161st Street) is an eight-story masonry building with no cellar level, and is assumed to be supported on shallow foundations. The building is set back from the proposed building footprint by a minimum distance of about 18 feet to the west, and about 37 feet to the east. The adjacent Lot 174 to the south consists of a NYCHA park with recreational equipment and landscaped areas. The adjacent structures located on Lots 78, 170, 171, and 172 to the east include the 30-story 3125 Park Avenue Building and underlying MNR railroad tracks. The 3125 Park Avenue building is assumed to be supported on shallow foundations, and a reinforced concrete pier/retaining is assumed to be present on the west side of the MNR tracks. The support of excavation scheme as described in Section 12.4 above must provide sufficient rigidity to prevent movement of these structures during construction. In addition,

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foundations for the new building may need to extend below an influence line extending up from the bottom of the existing MNR retaining wall and/or building pier. Assuming the west edge of the retaining wall/pier is located along the lot line about 36 feet east of the proposed building footprint and the foundations are located about 25 feet below existing grade at about Elev. +25, a 1V:1H influence line extending up from Elev. +25 intersects the ground surface outside of the proposed building footprint. Therefore, building foundations bearing at about Elev. +34 should be safely below the influence line. However, due to the proximity of the proposed building to MNR structures, review and approval of building design by MNR will be required.

Additional protection measures during construction to limit nuisance disturbances at the adjacent properties and to protect the public along the sidewalks should also be considered. In particular, soldier pile drilling operations have the potential to spray drilling fluid and soil cuttings. The foundation contract documents should include provisions to protect adjacent properties and the public from such nuisances, such as the erection of temporary barriers when drilling near the adjacent buildings and sidewalks.

### 12.8 Construction Monitoring

A pre-construction condition survey of the adjacent buildings within 50 feet of construction should be made to document existing conditions. The survey should include photographs of existing conditions with written description of any defects observed. Crack gauges should be installed to monitor existing cracks (as permitted by owner). A post-construction survey is recommended to verify building and structure conditions.

A program to monitor vibration and movement of adjacent structures during construction is required by Code. The monitoring program should include seismographs and survey points on adjacent buildings to measure construction vibrations and vertical and lateral movements and should identify threshold criteria and limiting values for vibration and deformation based on the condition and movement tolerances of adjacent structures. Survey points should also be established at regular intervals along each side of the excavation support system for similar movement monitoring. Monitoring should occur on a regular basis during demolition, excavation, and foundation construction. Noise monitoring could be considered depending on community issues. Monitoring plans may be included as a component of other drawings such as support of excavation.

## 13.0 GEOTECHNICAL REVIEW OF FOUNDATION DESIGN AND CONSTRUCTION

Interaction between the geotechnical and structural engineer is essential as foundation design progresses to optimize building foundations, provide adequate building performance under the range of service loading conditions, and coordinate the design of support of excavation with the planned foundation construction. Geotechnical review and assistance in preparation of foundation plans and specifications for below grade work is also recommended so that foundation and construction recommendations provided herein are properly interpreted and implemented in the design and contract documents.

Recommendations for foundation design and construction in this report are based on the information obtained from the borings and associated field and laboratory testing. However, conditions on the site may vary between discrete boring locations observed at the time of our subsurface exploration. The nature and extent of variations between borings may not become evident until exposed in construction. Geotechnical observation of foundation construction and testing is recommended to provide an opportunity to observe soil conditions and behavior as exposed during construction, evaluate the applicability of the recommendations provided in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein. We recommend that all foundation construction be observed by qualified geotechnical engineer and special inspector in accordance with the requirements of the New York City Building Code

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## 14.0 CLOSURE

This report is prepared for the sole use of the client and is specific to the project design contemplated at the time of report issue. Foundation design and construction recommendations should be reviewed and modified as necessary if the location, depth or scope of the proposed construction changes from that described herein.

## 15.0 AVAILABLE INFORMATION

The following information was used to assist in our development of the subsurface investigation and preparation of this report:

1. Zoning Study, 280-330 East 161st Street, prepared by Aufgang Architects, dated December 4, 2018.
2. Map of Property Situated in The Bronx, Bronx, County, NY, Tax Section: 9, Tax Block: 2420, Lot(s): 120, prepared by Empire State Land Surveyor, P.C., dated October 9, 2018.

GJL:AP:WEK F:\143\14364\Task 10 - Sub Inv\Report\Report Text.docx

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# EXHIBITS

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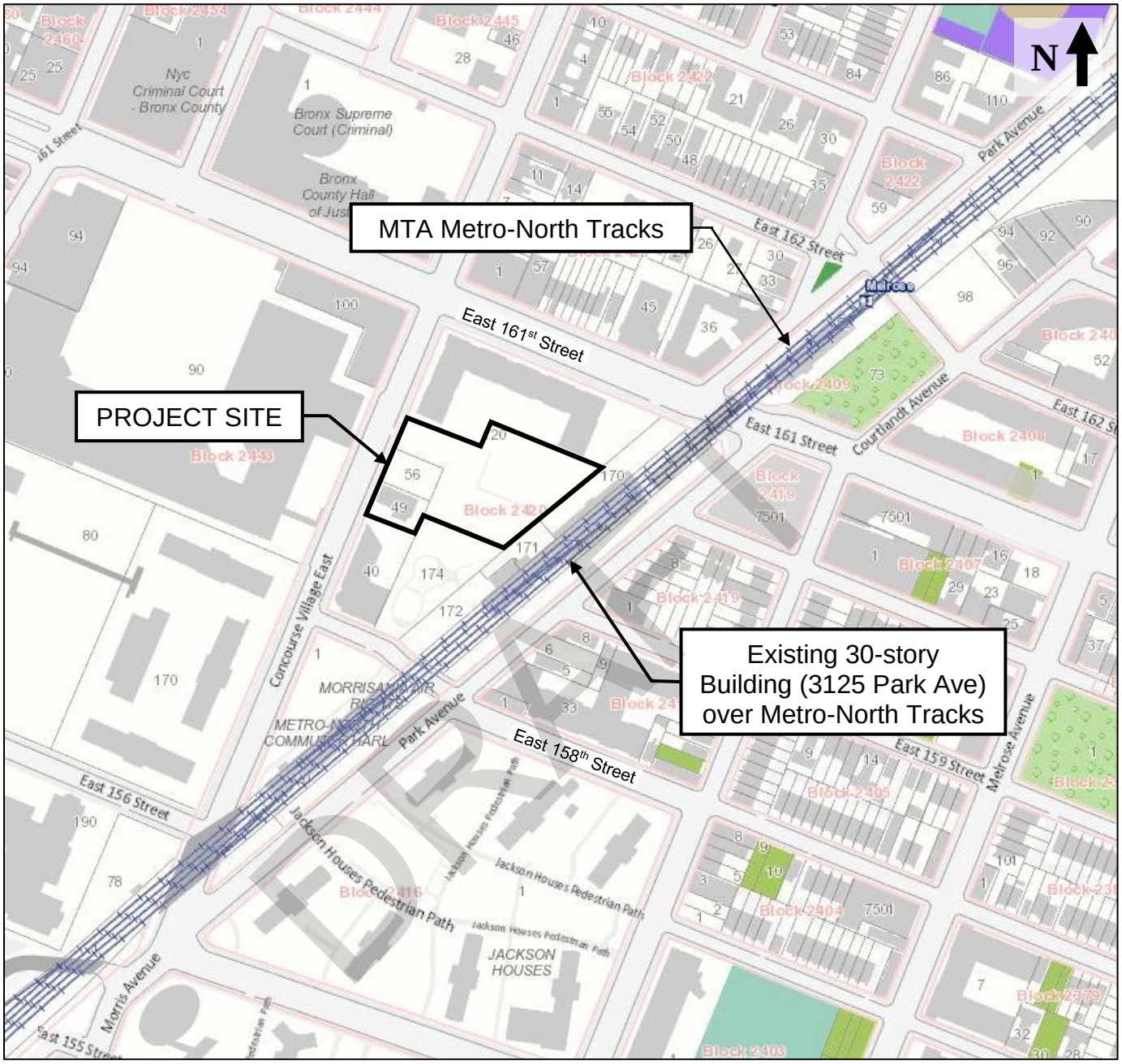
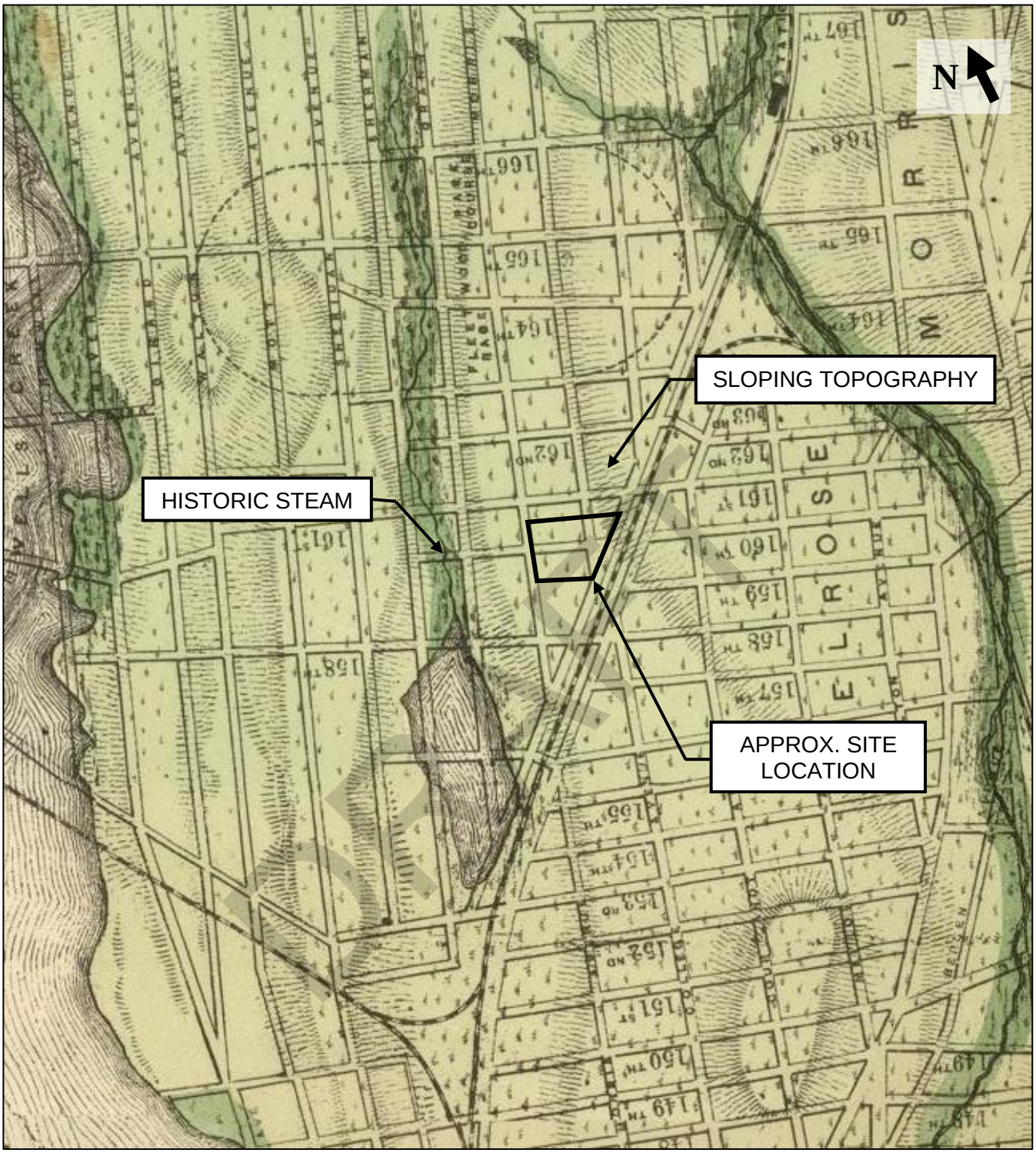



**NOTES:**

Source: Oasis.nyc.net, accessed 06-13-2022.

| 280-330 EAST 161ST STREET | | | |
|---|---|---|---|
| BRONX | | | NEW YORK |
| MUESER RUTLEDGE CONSULTING ENGINEERS | | | |
| 14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122 | | | |
| SCALE | MADE BY: GJL | DATE: 06-13-2022 | FILE No. |
| N/A | CH'KD BY: AP | DATE: 06-17-2022 | 14364 |
| SITE LOCATION MAP | | | FIGURE NO. 1 |




Source: Topographic Atlas of the City of New York, Egbert L. Viele, 1874

| | | | |
|---|---|---|---|
| **280-330 East 161st Street** | | | |
| BRONX | | | NEW YORK |
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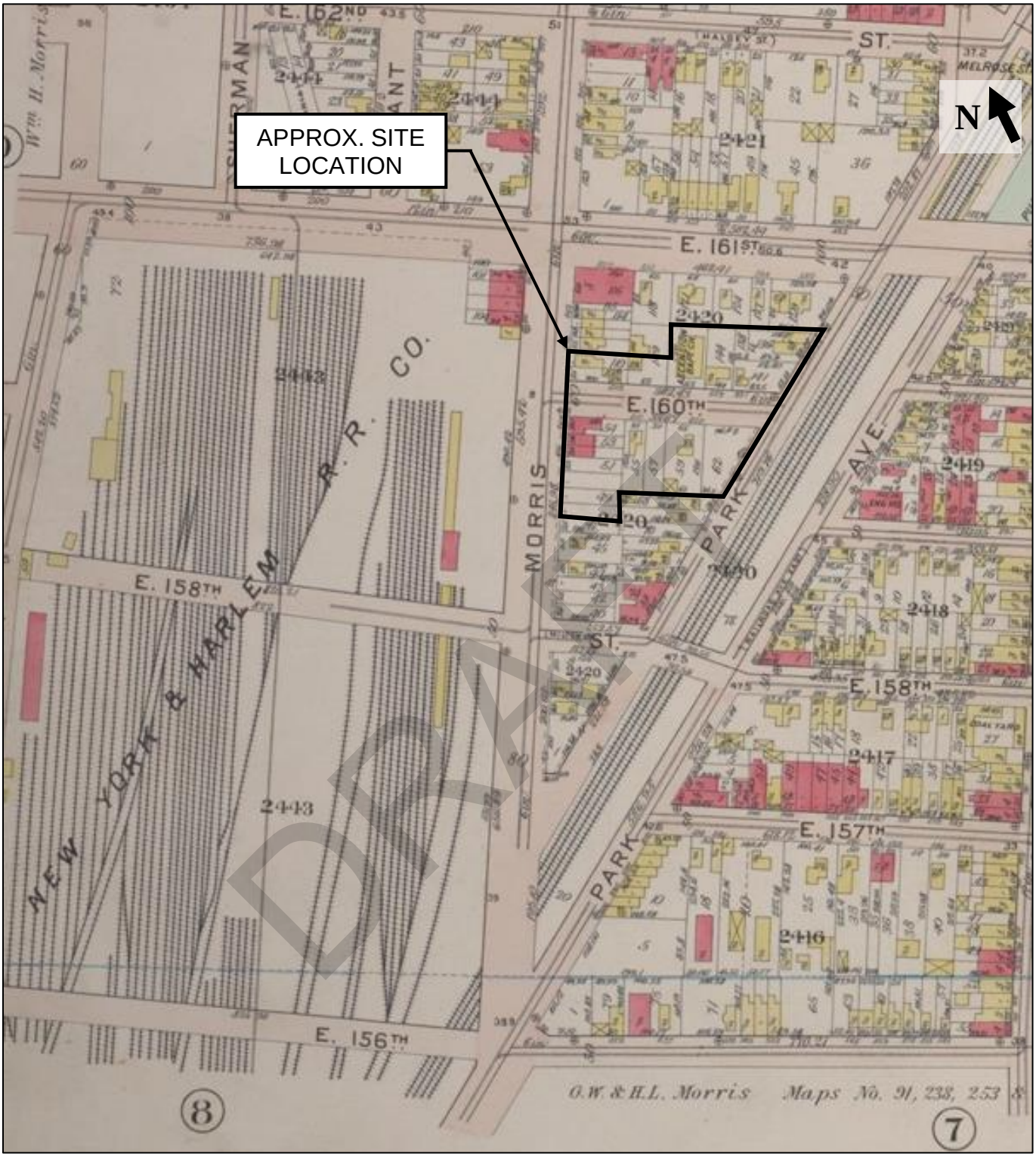
| 1874 VIELE MAP | | | FIGURE NO. 2 |

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**Source:**

Lionel Pincus and Princess Firyal Map Division, The New York Public Library. "Plate 12: Part of Sections 9&10, Borough of the Bronx. [Bounded by E. 164th Street, Park Avenue, E. 165th Street, Caldwell Avenue, E. 156th Street, Morris Avenue, E. 161st Street and Sheridan Avenue.]" New York Public Library Digital Collections. Accessed June 17, 2022. https://digitalcollections.nypl.org/items/510d47e2-553b-a3d9-e040-e00a18064a99

| 280-330 EAST 161ST STREET | | | |
|---|---|---|---|
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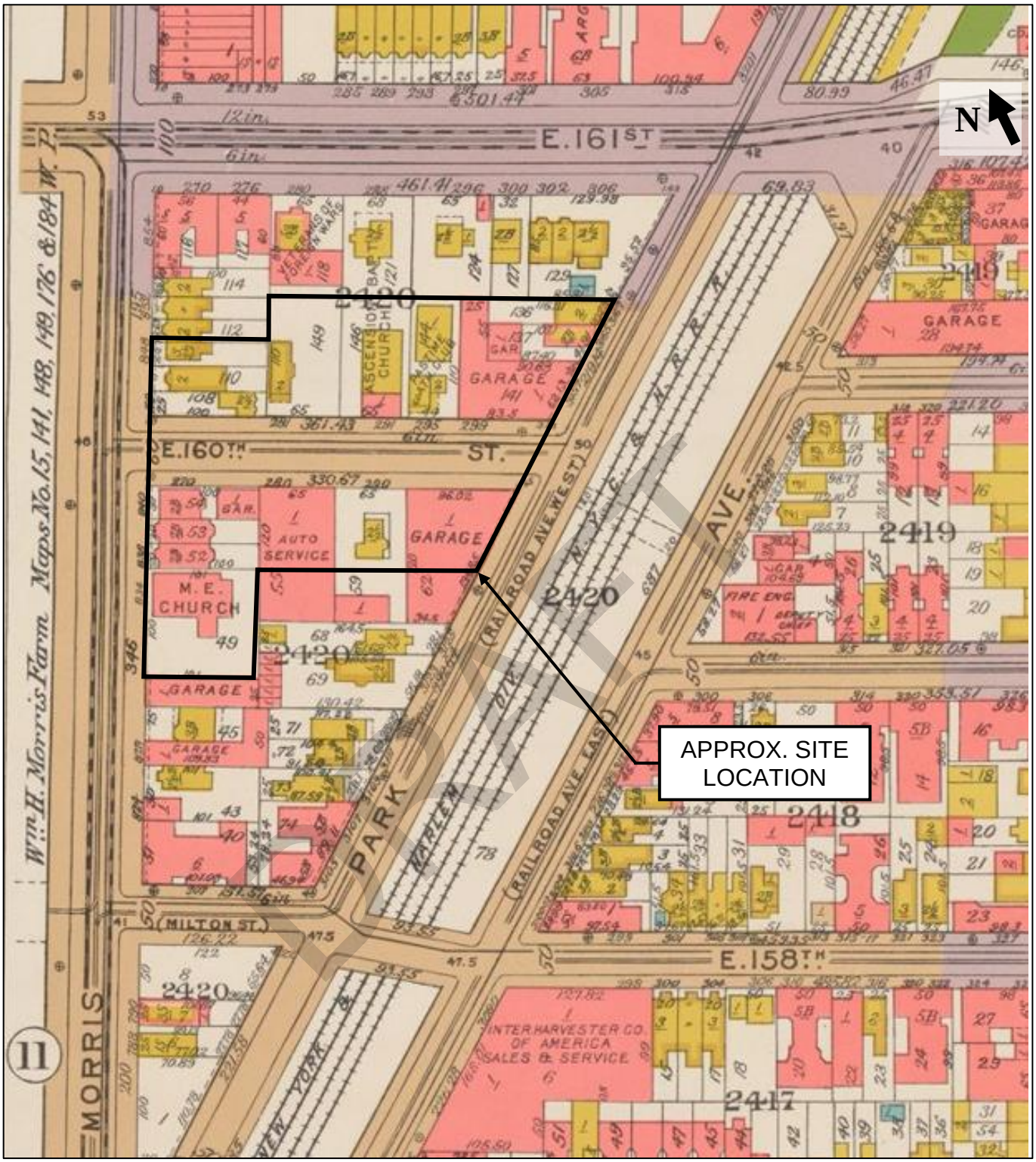
| SCALE | MADE BY: GJL | DATE: 06-17-2022 | FILE No. |
| N/A | CH'KD BY: | DATE: | 14364 |
| 1904 HISTORIC LAND MAP | | | FIGURE NO. 3 |




**Source:**

Lionel Pincus and Princess Firyal Map Division, The New York Public Library. "Double Page Plate No. 13, Part of Section 9, Borough of the Bronx" New York Public Library Digital Collections. Accessed June 17, 2022. https://digitalcollections.nypl.org/items/0dbb9040-306a-0132-6ccc-58d385a7bbd0

**280-330 EAST 161ST STREET**

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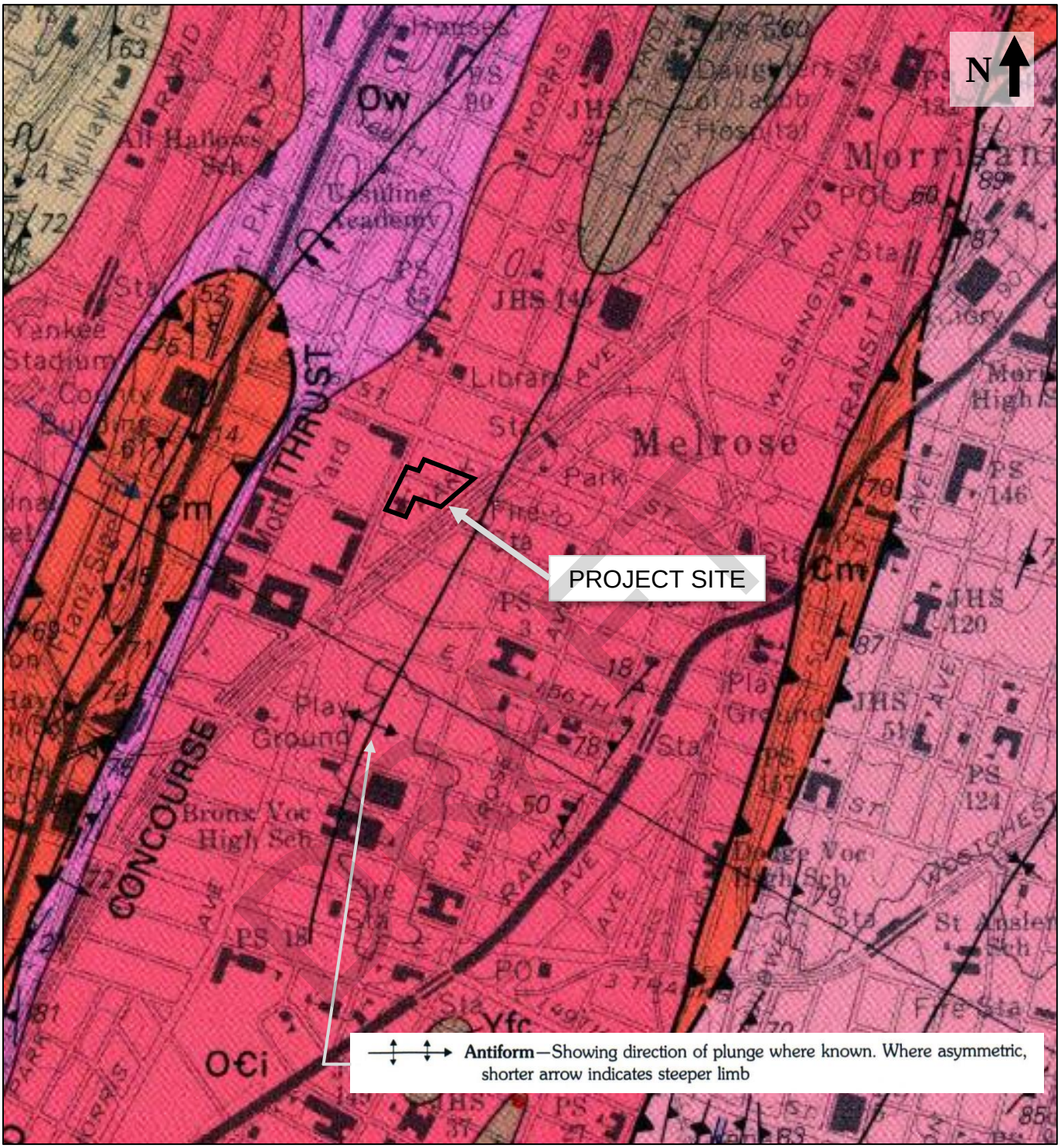
1942 HISTORIC LAND MAP

FIGURE NO. 4




O€i **Inwood Marble**

**Source:**
Source: Baskerville, C.A., 1992, Bedrock and Geologic Maps of Bronx County and Parts of New York and Queens Counties, New York, U.S. Geological Survey.

| | | | |
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| **280-330 EAST 161ST STREET** | | | |
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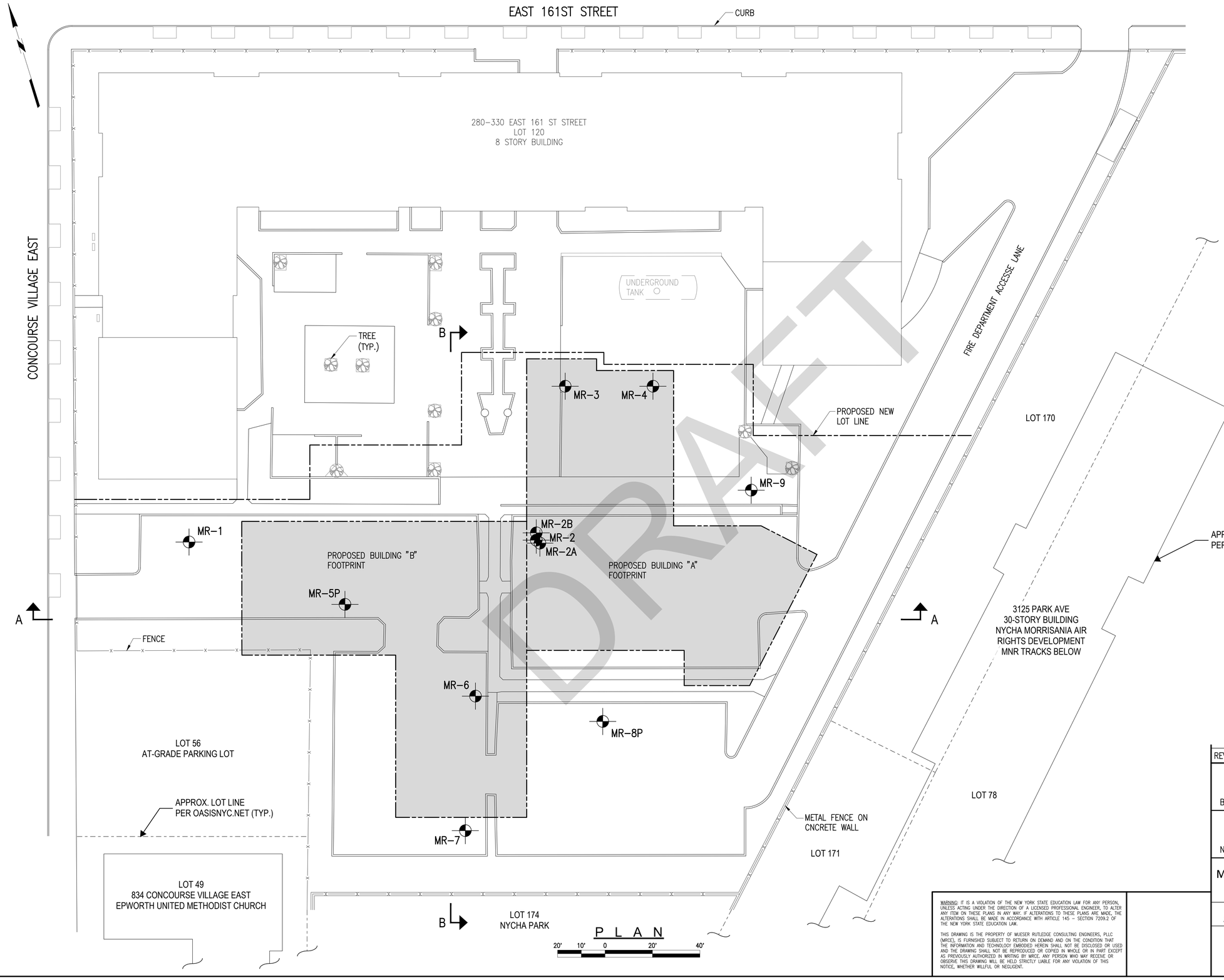
| SCALE | MADE BY: GJL | DATE: 06-17-2022 | FILE No. |
| N/A | CH'KD BY: | DATE: | 14364 |
| BEDROCK GEOLOGY MAP | | | FIGURE NO. 5 |

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## NOTES:

1. BASE PLAN OBTAINED FROM MAP OF PROPERTY SITUATED IN THE BRONX, BRONX, COUNTY, NY, TAX SECTION: 9, TAX BLOCK: 2420, LOT(S): 120, PREPARED BY EMPIRE STATE LAND SURVEYOR, P.C., DATED OCTOBER 9, 2018.
2. PROPOSED DEVELOPMENT PLAN OBTAINED FROM DRAWING NO. Z–100.00 – SCHEMATIC PLOT PLAN, PREPARED BY AUFGANG ARCHITECTS LLP., DATED DECEMBER 4, 2018.
3. ELEVATIONS ARE IN FEET AND REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
4. MR–SERIES BORINGS WERE MADE BY CRAIG GEOTECHNICAL DRILLING CO., INC., OF MAYS LANDING, NEW JERSEY BETWEEN JUNE 2, 2022, AND JUNE 7, 2022 UNDER THE CONTINUOUS INSPECTION OF MRCE.
5. AS DILLED LOCATIONS OF MR–SERIES BORINGS WERE MEASURED IN THE FIELD BY MRCE ENGINEERS AND ARE APPROXIMATE.
6. FOR GEOLOGIC SECTIONS A–A AND B–B, SEE DRAWING NOS. GS–1 AND GS–2.

## LEGEND:

MR–1P
– 2022 MRCE BORING
– "P" DENOTES PIEZOMETER

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280 – 330 EAST 161ST STREET

BRONX NEW YORK

GILBANE DEVELOPMENT COMPANY

NEW YORK NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS PLLC
14 PENN PLAZA – 225 WEST 34TH STREET, NEW YORK, NY 10122

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| AS NOTED | CH'KD BY: G.J.L. | DATE: 06–27–2022 | 14364 |

BORING LOCATION PLAN

DRAWING NUMBER B–1

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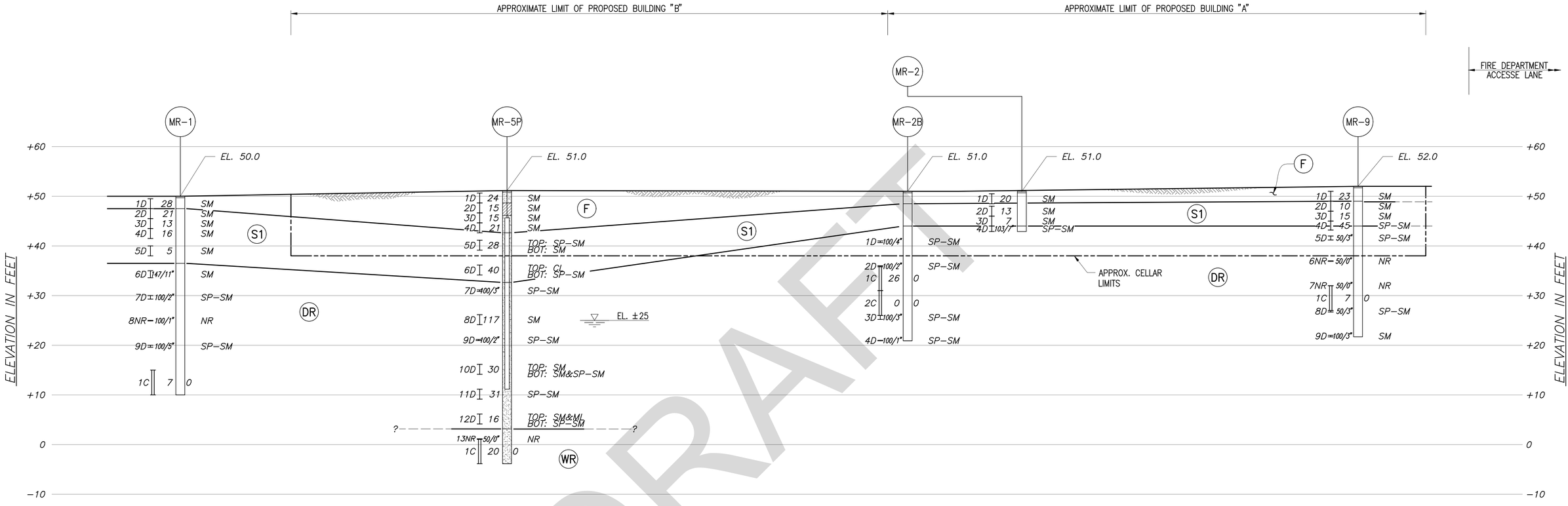


## SECTION A - A

10' 5' 0 10' 20'

## GENERAL STRATA DESCRIPTIONS:

(F) **FILL** – LOOSE TO VERY COMPACT FINE TO COARSE SAND, SOME SILT, TRACE TO SOME GRAVEL, TRACE BRICK, CONCRETE, ASPHALT, WOOD, CINDERS.

(S1) **SAND** – LOOSE TO COMPACT FINE TO MEDIUM SAND, TRACE TO SOME SILT, GRAVEL, TRACE COARSE SAND, MICA, SILTY CLAY LAYERS.

(S2) **RESIDUAL SOIL** – COMPACT TO VERY COMPACT FINE TO COARSE SAND, SOME SILT, TRACE GRAVEL, MICA.

(DR) **DECOMPOSED ROCK** – VERY COMPACT, FINE TO COARSE SAND, TRACE TO SOME SILT, TRACE GRAVEL, AND SOME MEDIUM COMPACT FINE TO MEDIUM SAND, SOME SILT, TRACE COARSE SAND, MICA.

(WR) **WEATHERED ROCK** – WEATHERED TO MEDIUM HARD, WEATHERED TO MODERATELY UNWEATHERED, TAN, WHITE AND BROWN MARBLE, BROKEN TO MODERATELY JOINTED, WITH WEATHERED, AND IRON-STAINED.

## NOTES:

1. FOR GENERAL NOTES, SEE DRAWING B-1.
2. STRATIFICATIONS AND GROUND SURFACE ELEVATIONS SHOWN ARE INTERPOLATIONS BETWEEN AND BEYOND BORINGS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.
3. REFER TO DRAWING GS-R FOR BORING LEGEND.

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GEOLOGIC SECTION A-A

DRAWING NUMBER GS-1

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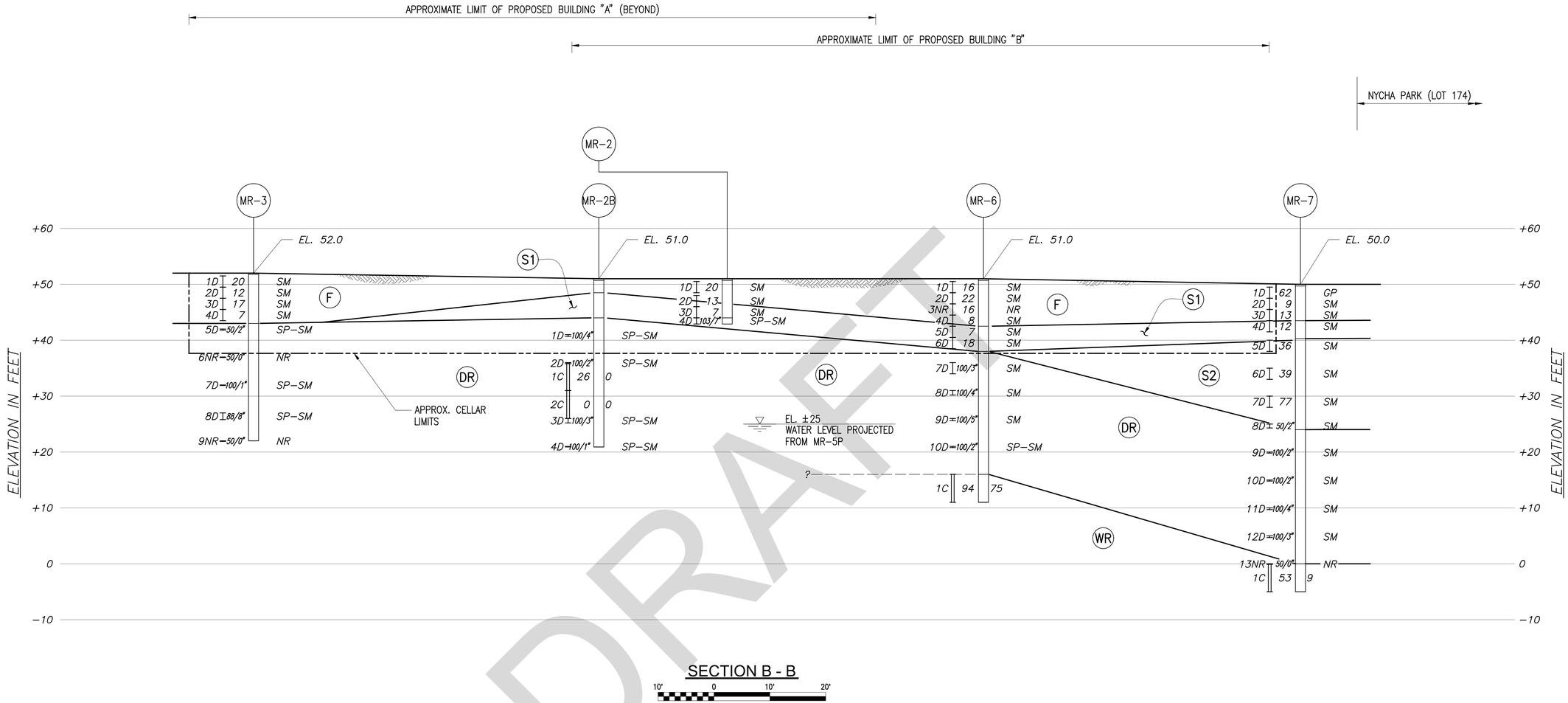


## SECTION B - B

10' 0 10' 20'

## GENERAL STRATA DESCRIPTIONS:

(F) **FILL** – LOOSE TO VERY COMPACT FINE TO COARSE SAND, SOME SILT, TRACE TO SOME GRAVEL, TRACE BRICK, CONCRETE, ASPHALT, WOOD, CINDERS.

(S1) **SAND** – LOOSE TO COMPACT FINE TO MEDIUM SAND, TRACE TO SOME SILT, GRAVEL, TRACE COARSE SAND, MICA, SILTY CLAY LAYERS.

(S2) **RESIDUAL SOIL** – COMPACT TO VERY COMPACT FINE TO COARSE SAND, SOME SILT, TRACE GRAVEL, MICA.

(DR) **DECOMPOSED ROCK** – VERY COMPACT, FINE TO COARSE SAND, TRACE TO SOME SILT, TRACE GRAVEL, AND SOME MEDIUM COMPACT FINE TO MEDIUM SAND, SOME SILT, TRACE COARSE SAND, MICA.

(WR) **WEATHERED ROCK** – WEATHERED TO MEDIUM HARD, WEATHERED TO MODERATELY UNWEATHERED, TAN, WHITE AND BROWN MARBLE, BROKEN TO MODERATELY JOINTED, WITH WEATHERED, AND IRON-STAINED.

## NOTES:

1. FOR GENERAL NOTES, SEE DRAWING B-1.
2. STRATIFICATIONS AND GROUND SURFACE ELEVATIONS SHOWN ARE INTERPOLATIONS BETWEEN AND BEYOND BORINGS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.
3. REFER TO DRAWING GS-R FOR BORING LEGEND.

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| REV. | DATE | BY | DESCRIPTION |
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14 PENN PLAZA – 225 WEST 34TH STREET, NEW YORK, NY 10122

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GEOLOGIC SECTION B-B

DRAWING NUMBER GS-2

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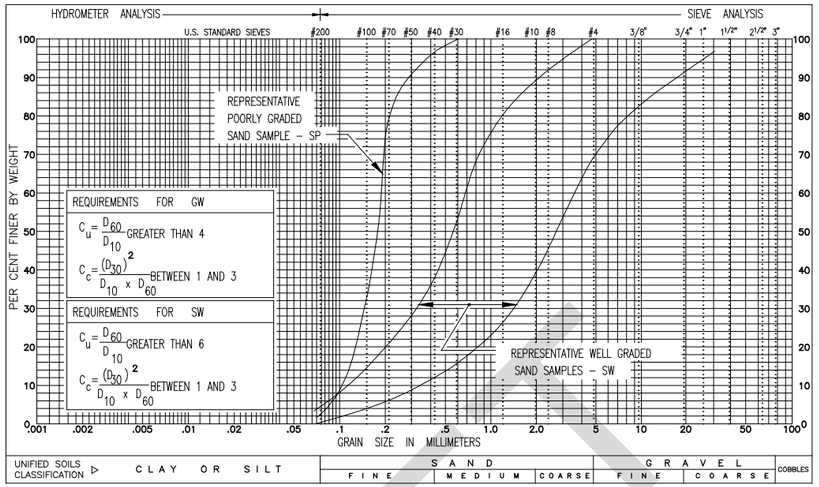
# UNIFIED SOIL CLASSIFICATION ( INCLUDING IDENTIFICATION AND DESCRIPTION )

| MAJOR DIVISIONS | | | GROUP SYMBOLS | TYPICAL NAMES | FIELD IDENTIFICATION PROCEDURES (EXCLUDING PARTICLES LARGER THAN 3 IN. AND BASING FRACTIONS ON ESTIMATED WEIGHTS) |
|---|---|---|---|---|---|
| 1 | 2 | | 3 | 4 | 5 |
| COARSE-GRAINED SOILS: MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE | GRAVELS: MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE. (FOR VISUAL CLASSIFICATION, THE 1/4 -IN. SIZE MAY BE USED AS EQUIVALENT TO THE NO. 4 SIEVE SIZE ) | CLEAN GRAVELS (LITTLE OR NO FINES) | GW | WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES. | WIDE RANGE IN GRAIN SIZES AND SUBSTANTIAL AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES. |
| | | | GP | POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES. | PREDOMINANTLY ONE SIZE OR A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING. |
| | | GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) | GM | SILTY GRAVELS, GRAVEL-SAND-SILT-MIXTURES. | NONPLASTIC FINES OR FINES WITH LOW PLASTICITY ( FOR IDENTIFICATION PROCEDURES SEE ML BELOW ) |
| | | | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES. | PLASTIC FINES ( FOR IDENTIFICATION PROCEDURES SEE CL BELOW ) |
| | SANDS: MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE. (FOR VISUAL CLASSIFICATION, THE 1/4 -IN. SIZE MAY BE USED AS EQUIVALENT TO THE NO. 4 SIEVE SIZE ) | CLEAN SANDS (LITTLE OR NO FINES) | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES. | WIDE RANGE IN GRAIN SIZES AND SUBSTANTIAL AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES. |
| | | | SP | POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES. | PREDOMINANTLY ONE SIZE OR A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING. |
| | | SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES) | SM | SILTY SANDS, SAND-SILT-MIXTURES. | NONPLASTIC FINES OR FINES WITH LOW PLASTICITY ( FOR IDENTIFICATION PROCEDURES SEE ML BELOW ) |
| | | | SC | CLAYEY SANDS, SAND-CLAY MIXTURES. | PLASTIC FINES ( FOR IDENTIFICATION PROCEDURES SEE CL BELOW ) |
| FINE-GRAINED SOILS: MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE THE NO. 200 SIEVE SIZE IS | | | | | IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN NO. 40 SIEVE SIZE |
| | | | | | DRY STRENGTH ( CRUSHING CHARACTERISTICS ) / DILATANCY ( REACTION TO SHAKING ) / TOUGHNESS ( CONSISTENCY NEAR PL ) |
| | SILTS AND CLAYS: LIQUID LIMIT IS LESS THAN 50 | | ML | INORGANIC SILTS, SANDY SILTS, ROCK FLOUR, OR CLAYEY SILTS WITH SLIGHT PLASTICITY. | NONE TO SLIGHT / QUICK TO SLOW / NONE |
| | | | CL | INORGANIC CLAYS, OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS. | MEDIUM TO HIGH / NONE TO VERY SLOW / MEDIUM |
| | | | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY. | SLIGHT TO MEDIUM / SLOW / SLIGHT |
| | SILTS AND CLAYS: LIQUID LIMIT IS GREATER THAN 50 | | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS. | SLIGHT TO MEDIUM / SLOW TO NONE / SLIGHT TO MEDIUM |
| | | | CH | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS. | HIGH TO VERY HIGH / NONE / HIGH |
| | | | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS. | MEDIUM TO HIGH / NONE TO VERY SLOW / SLIGHT TO MEDIUM |
| HIGHLY ORGANIC SOILS | | | Pt | PEAT AND OTHER HIGHLY ORGANIC SOILS. | READILY IDENTIFIED BY COLOR, ODOR, SPONGY FEEL AND FREQUENTLY BY FIBROUS TEXTURE. |

BOUNDARY CLASSIFICATIONS: SOILS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE DESIGNATED BY COMBINATIONS OF GROUP SYMBOLS, I.E.: SP-SC POORLY GRADED SAND WITH CLAY BINDER.

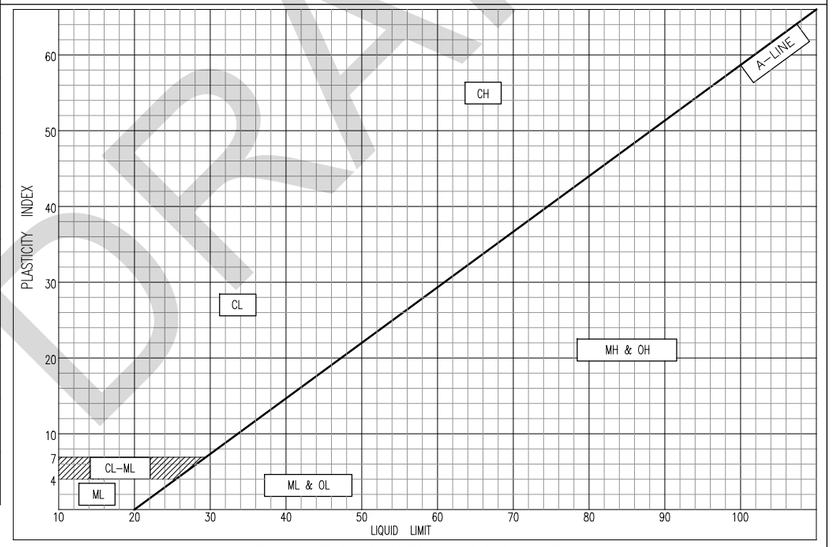
## LABORATORY CLASSIFICATION CRITERIA




### GRAIN SIZE PLOT

DEPENDING ON PERCENTAGE OF FINES (FRACTION SMALLER THAN NO. 200 SIEVE SIZE) COARSE GRAINED SOILS ARE CLASSIFIED AS FOLLOWS:

| | |
|---|---|
| LESS THAN 5% | GW, GP, SW, SP |
| MORE THAN 12% | GM, GC, SM, SC |
| 5% TO 12% | BORDERLINE CASES REQUIRING USE OF DUAL SYMBOLS, I.E.: SP-SM, GP-GM. |




### PLASTICITY CHART FOR CLASSIFICATION OF FINE GRAINED SOILS

## TERMINOLOGY USED IN MRCE SOIL DESCRIPTIONS

DEGREE OF COMPACTION FOR NON-PLASTIC SOIL

| DEGREE OF COMPACTION | BLOWS* PER FOOT |
|---|---|
| LOOSE | 0 TO 10 |
| MEDIUM COMPACT | 11 TO 29 |
| COMPACT | 30 TO 50 |
| VERY COMPACT | GREATER THAN 50 |

* STANDARD PENETRATION RESISTANCE USING 140 LB. HAMMER FREE FALLING 30 INCHES TO DRIVE A 2 INCH O.D. SPLIT-SPOON SAMPLER.

CONSISTENCY OF CLAY AND CLAYEY SILT+

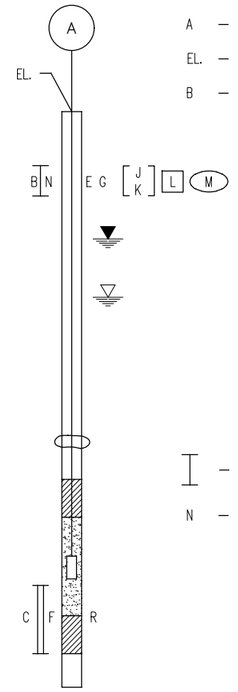
| CONSISTENCY | UNCONFINED COMPRESSIVE STRENGTH (TSF) | IDENTIFICATION CHARACTERISTICS |
|---|---|---|
| SOFT | LESS THAN 0.5 | EASILY REMOLDED WITH SLIGHT FINGER PRESSURE |
| MEDIUM | 0.5 TO 1.0 | REQUIRES SUBSTANTIAL PRESSURE FOR REMOLDING |
| STIFF | 1.0 TO 4.0 | DIFFICULT TO REMOLD WITH FINGERS |
| HARD | GREATER THAN 4.0 | CANNOT BE REMOLDED WITH FINGERS |

\+ NONPLASTIC SILTS ARE DESCRIBED USING DEGREE OF COMPACTION AS PRESENTED FOR NON-PLASTIC SOIL.

DESCRIPTION OF CONSTITUENT PERCENTAGES AS USED IN SOIL SAMPLE CLASSIFICATIONS

1% TO 12% - "TRACE"
13% TO 30% - "SOME"
31% TO 49% - ADJECTIVE FORM OF SOIL GROUP (EG. SANDY)
EQUAL AMOUNT - "AND" (EG. SAND AND GRAVEL)

## BORING LEGEND




A - NUMBER, TYPE AND LOCATION OF BORING

EL. - GROUND SURFACE ELEVATION AT BORING

B - NUMBER AND TYPE OF SAMPLE

HA - HAND AUGER SAMPLE

D - DRY SAMPLE TAKEN WITH 2 INCH O.D. SPLIT SPOON

U - UNDISTURBED SAMPLE TAKEN WITH 3 INCH O.D. FIXED PISTON TYPE SAMPLER

UD - UNDISTURBED SAMPLE EXTRUDED IN FIELD AND PLACED IN JAR DUE TO POOR RECOVERY OR DISTURBANCE

W - WASH SAMPLE

S - THIN TUBE SAMPLE TAKEN WITH SHELBY TUBE SAMPLER

N - THIN TUBE SAMPLE TAKEN WITH DENISON BARREL SAMPLER

P - THIN TUBE SAMPLE TAKEN WITH PITCHER BARREL SAMPLER

NR - NO RECOVERY

I - LENGTH OF SAMPLE ATTEMPT

N - STANDARD PENETRATION RESISTANCE. NUMBER OF BLOWS FROM 140 LB. HAMMER FREE FALLING 30 INCHES REQUIRED TO DRIVE 2 INCH O.D. SPLIT SPOON SAMPLER ONE FOOT AFTER INITIAL PENETRATION OF 6 INCHES, UNLESS A SPECIFIC PENETRATION IS INDICATED.

P - PRESSED OR PUSH SAMPLE

WH - SAMPLE TAKEN UNDER WEIGHT OF HAMMER AND RODS

WR - SAMPLE TAKEN UNDER WEIGHT OF RODS

E - AVERAGE NATURAL WATER CONTENT OF SAMPLE, IN PERCENT OF DRY WEIGHT

G - UNIFIED SOIL CLASSIFICATON GROUP SYMBOL OF SAMPLE

[J] = ATTERBERG LIQUID LIMIT VALUE
[K] = ATTERBERG PLASTIC LIMIT VALUE

[L] - COMPRESSIVE STRENGTH IN TSF DETERMINED FROM UNCONFINED COMPRESSION TEST

(M) - COMPRESSIVE STRENGTH IN TSF DETERMINED FROM UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

GROUNDWATER LEVEL OBSERVED IN BORING
* - MUD LEVEL

GROUNDWATER LEVEL OBSERVED IN PIEZOMETER

C - ROCK CORE NUMBER

LENGTH OF CORE RUN

F - LENGTH OF CORE RECOVERED EXPRESSED AS A PERCENT OF THE LENGTH OF CORE RUN

R - ROCK QUALITY DESIGNATION-THE SUM OF THE LENGTHS OF PIECES OF RECOVERED CORE WHICH ARE EQUAL TO OR GREATER THAN FOUR INCHES IN LENGTH, EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF CORE RUN. LENGTHS ARE MEASURED BETWEEN IN-SITU SEPARATIONS AND MECHANICAL BREAKS RESULTING FROM CORING ARE IGNORED.

IMPERVIOUS SEAL

SAND FILTER SURROUNDING PIEZOMETER INTAKE ELEMENT

INTAKE ELEMENT

COBBLE OR BOULDER

REVISED 5-12-2020

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MRCE built on firm foundations

MUESER RUTLEDGE CONSULTING ENGINEERS PLLC
14 PENN PLAZA - 225 WEST 34TH STREET, NEW YORK, NY 10122

GEOTECHNICAL REFERENCE STANDARDS

DRAWING NUMBER GS-R

## TABLE R–1 ROCK CORE CLASSIFICATION CRITERIA

| HARDNESS/SOUNDNESS CLASSIFICATION | TYPICAL GEOLOGIC CLASSIFICATION | IDENTIFICATION CHARACTERISTICS | GENERAL MINIMUM CORING CHARACTERISTICS | | | | INTACT SPECIMEN TYPICAL MINIMUM COMPRESSIVE STRENGTH |
|---|---|---|---|---|---|---|---|
| | | | NX OR LARGER | | BX OR SMALLER | | |
| | | | REC | RQD | REC | RQD | PSI |
| **HARD ROCK**<br><br>UNWEATHERED<br>MAY BE JOINTED | – CRYSTALLINE IGNEOUS, OR METAMORPHIC ROCKS<br>– HIGHLY SILICEOUS SEDIMENTARY ROCKS | – UNWEATHERED FABRIC<br>– RINGS WHEN STRUCK WITH BAR<br>– SHARP AND HARD FRACTURE SURFACE WHEN BROKEN MECHANICALLY<br>– MAY BE JOINTED, BUT JOINTS ARE GENERALLY TIGHT. JOINTS MAY BE IRON STAINED.<br>– DOES NOT DISINTEGRATE UPON EXPOSURE<br>– DOES NOT SLAKE IN WATER | 95 OR MORE | 85 OR MORE | 85 OR MORE | 75 OR MORE | 3000 |
| **MEDIUM HARD ROCK**<br><br>SLIGHTLY WEATHERED<br>MAY BE CLOSELY JOINED | AS FOR HARD ROCKS AND:<br><br>– MODERATELY SILICEOUS SEDIMENTARY ROCKS<br>– CERTAIN CALCAREOUS ROCKS | AS FOR HARD ROCK, EXCEPT:<br><br>– FABRIC MAY BE IRON STAINED<br>– MAY BE CLOSELY JOINTED, BUT JOINTS ARE GENERALLY TIGHT. JOINTS HAVE SLIGHT WEATHERING OR MAY BE IRON STAINED. | 70 | 50 | 50 | 40 | 1500 |
| **INTERMEDIATE ROCK**<br><br>MODERATELY WEATHERED<br>MAY BE CLOSELY JOINTED | AS FOR MEDIUM HARD ROCKS AND:<br><br>– MOST SEDIMENTARY ROCK OTHER THAN COMPACTION SHALES<br>– MOST CALCAREOUS ROCKS WHICH ARE NOT POROUS | AS FOR MEDIUM HARD ROCK, EXCEPT:<br><br>– MODERATELY WEATHERED FABRIC<br>– WEATHERED JOINTS<br>– THUDS WHEN STRUCK BY BAR<br>– CAN BE INDENTED WITH A STEEL NAIL<br>– BREAKS READILY WITH HAMMER<br>– PIECES OF WEATHERED SURFACE CAN BE BROKEN OFF BY HAND<br>– DOES NOT DISINTEGRATE UPON EXPOSURE<br>– UNWEATHERED PIECES DO NOT SLAKE | 50 | 35 | 35 | 25 | 500 |
| **WEATHERED ROCK**<br><br>HIGHLY WEATHERED<br>MAY BE BROKEN | AS FOR INTERMEDIATE ROCKS AND:<br><br>– COMPACTION SEDIMENTARIES<br>– CALCAREOUS ROCKS WITH SOIL–FILLED CAVITIES | AS FOR INTERMEDIATE ROCK, EXCEPT:<br><br>– HIGHLY WEATHERED FABRIC<br>– CAN BE BROKEN EASILY, CRUMBLES WITH DIFFICULTY BY HAND<br>– CAN BE SCRAPED BY KNIFE<br>– MAY SOFTEN UPON EXPOSURE<br>– MAY SLAKE IN WATER<br>– STANDARD PENETRATION RESISTANCE EXCEEDS 50 BLOWS/FOOT | LESS THAN 50 | LESS THAN 35 | LESS THAN 35 | LESS THAN 25 | 150 |
| **DECOMPOSED ROCK**<br><br>(RESIDUAL SOILS ) | ALL ROCK TYPES | – ROCK TEXTURE AND STRUCTURE OFTEN PRESERVED<br>– GENERALLY SOIL–LIKE IN CONSISTENCY<br>– CAN BE CRUMBLED BY SLIGHT HAND PRESSURE<br>– CAN BE PEELED WITH A KNIFE<br>– STANDARD PENETRATION RESISTANCE LESS THAN 50 BLOWS/FOOT | WHEN RECOVERED WITH SOIL SAMPLING TECHNIQUES AND DESCRIBED AS FOR SOILS INCLUDING USC GROUP SYMBOLS. (DEC ROCK) ADDED TO DESCRIPTION. | | | | |

NOTES:

1. ROCK CORE DESCRIPTIONS REPRESENT ONLY MATERIAL RECOVERED IN THE CORING OPERATIONS.
2. GENERAL MINIMUM CORING CHARACTERISTICS ASSUME ROCK CORING WITH DOUBLE TUBE SERIES "M" OR EQUIVALENT CORE BARREL USING GOOD CORING TECHNIQUES AND EQUIPMENT.
3. REC – RECOVERY IS THE LENGTH OF CORE RECOVERED, EXPRESSED AS A PERCENTAGE OF THE LENGTH OF CORE RUN.
4. RQD – ROCK QUALITY DESIGNATION IS THE SUM OF THE LENGTHS OF CORE PIECES FOUR INCHES OR LONGER EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF CORE RUN. LENGTHS ARE MEASURED BETWEEN IN–SITU SEPARATIONS; MECHANICAL BREAKS RESULTING FROM CORING AND VERTICAL JOINTS ARE IGNORED.

## TABLE R–2 WEATHERING AND JOINTING DEFINITIONS

### DEGREE OF FABRIC WEATHERING

| FABRIC WEATHERING | | CHARACTERISTIC |
|---|---|---|
| Unweathered | UnW | No decomposition or discoloration Rings when struck |
| Slightly Weathered | SlW | Iron Stained Rings when struck |
| Moderately Weathered | MdW | Deteriorated fabric Thuds when struck |
| Highly Weathered | HiW | Friable, easily broken by hand |
| Decomposed | Dec | Soil–like |

### DEGREE OF JOINT WEATHERING

| JOINT WEATHERING | | CHARACTERISTIC |
|---|---|---|
| Iron stained joints | FeJts | Indicates movement of water along joints |
| Weathered joints | WJts | Joints are not tight and do not match. Joints have friable edges. |

### DEGREE OF JOINTING

| JOINTING | | JOINT FREQUENCY |
|---|---|---|
| Massive | Mssv | Less than 1 joint in 4 feet |
| Blocky | Blky | 1 joint every 2 to 4 feet |
| Moderately Jointed | MdJtd | 1 joint every foot to 2 feet |
| Jointed | Jtd | 1 to 2 joints per foot |
| Closely Jointed | ClJtd | 2 to 4 joints per foot |
| Broken | Bkn | More than 4 joints per foot |

Vertical joints are ignored in RQD and joint frequency evaluations, but are noted in written descriptions and on core sketches.

## TABLE R–3 ABBREVIATIONS FOR ROCK CORECLASSIFICATION

| | | | |
|---|---|---|---|
| Blocky | Blky | Intermediate | Int |
| Broken | Bkn | Light | Lt |
| Brown | brn | Lignite | lign |
| Calcareous or Calcite | calc | Limestone | lms |
| Cavities | cvts | Jointed | Jtd |
| Chlorite | chl | Joints | Jts |
| Clay, Clayey | cl | Massive | Mssv |
| Closely Jointed | ClJtd | Medium Hard | MdHd |
| Coating on joint surface | coat | Mica, Micaceous | Mic |
| Crushed | crsh | Moderately Jointed | MdJtd |
| Dark | dk | Moderately Weathered | MdW |
| Decomposed | Dec | Pockets | pkts |
| Ditto | do | Quartz | qtz |
| Dolomite, Dolomitic | Dol | Recovery | Rec |
| Iron Stained Joints | FeJts | Rock Quality Designation | RQD |
| Iron Stained | FeStd | Sand | sa |
| Feldspar | feld | Sandstone | ss |
| Foliation | Fol | Schist, Schistose | sch |
| Fractured | frct | Shale | sh |
| Fragments | fgmts | Shear zone | Sz |
| Gneiss, Gneissic | gns | Siliceous | sil |
| Gouge | gog | Silt | si |
| Granite, Granitic | gr | Slickensided | slks |
| Gray | gry | Slightly Weathered | SlW |
| Hard | Hd | Unweathered | UnW |
| Highly Weathered | HiW | Weathered | Wthd |
| Hornblende | Hbl | Weathered Joints | WJts |
| Injected | inj | Vein | Vn |
| Interbedded | Intrbd | Vertical Joints | VJts |

## TABLE R–4 ROCK CORE SKETCH KEY

### SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand

### JOINT ORIENTATION AND CONDITION

| | | |
|---|---|---|
| Parallel | – | // |
| Crossing | – | X |
| Foliation | – | F |
| Stratification | – | S |
| Unfoliated or Unstratified | – | U |
| Mechanical Break | – | MB |

| SURFACE | – | CONDITION | – |
|---|---|---|---|
| Curved | C | Slick | 1 |
| Irregular | I | Straight | 2 |
| Smooth | S | Rough | 3 |

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ROCK CORE CLASSIFICATION CRITERIA

DRAWING NUMBER RC–1

G:\Standard References\RC–1.dwg

# APPENDIX A
# MRCE Boring Logs

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# BORING LOG

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Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-1
**SHEET 1 OF** 3
**FILE NO.** 14364
**SURFACE ELEV.** +50.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 07:30 | 1D | 0.5 | 9-12 | Black & gray & red fine to coarse sand, some | ** | 0.3 | DRILLED | **Asphalt from 0' to |
| 06-06-22 | | 2.5 | 16-20 | gravel, silt, trace brick, concrete, wood (Fill) (SM) | F | | AHEAD | 0.3'. |
| Monday | 2D | 2.5 | 23-11 | Brown silty fine to medium sand, trace gravel, | | 2.5 | 4" | |
| Sunny | | 4.5 | 10-15 | coarse sand (SM) | | | | |
| 65°F | 3D | 4.5 | 11-7 | Do 1D (Fill) (SM) | | 5 | | |
| | | 6.5 | 6-10 | | | | | |
| | 4D | 6.5 | 9-8 | Do 2D (Fill) (SM) | | | | |
| | | 8.5 | 8-8 | | S1 | | | |
| | | | | | | 10 | | |
| | 5D | 10.0 | 3-3 | Brown fine to medium sand, some silt, trace | | | | REC=5" |
| | | 12.0 | 2-3 | gravel, coarse sand (SM) | | | | |
| | | | | | | 13.5 | | Occasional light rig |
| | | | | | | 15 | | chatter from 15' to 20'. |
| | 6D | 15.0 | 53-47 | White fine to coarse sand, some silt, trace brown | | | | |
| | | 16.4 | 100/5" | fine to medium sand, some silt | | | | |
| | | | | (Decomposed Rock) (SM) | | | | |
| | | | | | | 20 | | |
| | 7D | 20.0 | 34-100/2" | White & light brown fine to coarse sand, some | | | | REC=6" |
| | | 20.7 | | silt (Decomposed Rock) (SM) | | | | |
| | | | | | | | | Relatively easy drilling |
| | | | | | | 25 | | from 25' to 30'. |
| | 8NR | 25.0 | 100/1" | No recovery | | | | |
| | | 25.1 | | | DR | | | |
| | | | | | | 30 | | |
| | 9D | 30.0 | 100/5" | Tan & black fine to coarse sand, trace silt | | | | REC=4" |
| | | 30.4 | | (Decomposed Rock) (SP-SM) | | | | Hard drilling from 32' to |
| | | | | | | | | 35'. |
| | | | | | | 35 | | |
| | 1C | 35.0 | REC=7% | Weathered highly weathered tan fine to coarse | | | 5* | Increase rpm at 36'. |
| | | 40.0 | REC=0% | grained marble, broken, iron stained & | | | 2.75* | Core barrel dropped |
| | | | | weathered joints | | | 1.25* | 4" at 37'. |
| | | | | | | | 1.25* | *Coring time in |
| 10:00 | | | | | | 40 | 2.5* | minutes per foot. |
| | | | | | | | | End of Boring at 40'. |
| | | | | | | 45 | | |
| | | | | | | 50 | | |

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# ROCK CORE SKETCH

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

built on firm foundations

BORING NO. MR-1
SHEET 2 OF 3
FILE NO. 11364
SURFACE ELEV. +50 +/-
RES ENGR. G. Luciano

PROJECT: 280-330 East 161st Street
LOCATION: Bronx, NY
TEST/INSP. EQUIPMENT 6' Ruler
REF. CODES/STANDARDS NYC BC Ch. 18

| Run No. | REC/RQD |
|---|---|
| 1C | 7/0 |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

TOP

MR-SP-1C

Top 1C - 35'
Hi Wtd Marble Rock Frag.
Bot 1C - 40'

0.5
1
1.5
2
2.5
3
3.5
4
4.5

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Ð - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

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NOTES

M|R|C|E
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-1
**SHEET** 3 **OF** 3

| | | | |
|---|---|---|---|
| **PROJECT** | 280-330 EAST 161 STREET | **FILE NO.** | 14364 |
| **LOCATION** | BRONX, NEW YORK | **SURFACE ELEV.** | +50.0± |
| **BORING LOCATION** | SEE BORING LOCATION PLAN | **DATUM** | NAVD 88 |

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

**TYPE OF BORING RIG MAKE AND MODEL:**

| | |
|---|---|
| TRUCK | CME-75 |
| SKID | |
| BARGE | |
| OTHER | |

**TYPE OF FEED DURING CORING**

| | |
|---|---|
| MECHANICAL | |
| HYDRAULIC | X |
| OTHER | |

**CASING USED** [X] YES [ ] NO

| | | | | | |
|---|---|---|---|---|---|
| DIA., IN. | 4 | DEPTH, FT. FROM | 0 | TO | 14 |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| | |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | NX DOUBLE BARREL |
| CORE BIT | NX DIAMOND |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [X] YES [ ] NO

| | |
|---|---|
| DIAMETER OF ROTARY BIT, IN. | 3-7/8 |
| TYPE OF DRILLING MUD | EZ MUD |

**AUGER USED** [ ] YES [X] NO

TYPE AND DIAMETER, IN.

| | | | |
|---|---|---|---|
| *CASING HAMMER, LBS. | 140 | AVERAGE FALL, IN. | 30 |
| *SAMPLER HAMMER, LBS. | 140 | AVERAGE FALL, IN. | 30 |

*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | | ID, IN. | | LENGTH, FT. | TOP ELEV. | |
| INTAKE ELEMENT: | TYPE | | OD, IN. | | LENGTH, FT. | TIP ELEV. | |
| FILTER: | MATERIAL | | OD, IN. | | LENGTH, FT. | BOT. ELEV. | |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 35 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | 5 | OTHER: | |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-06-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING

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# BORING LOG

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Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-2
**SHEET 1 OF** 2
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10:00 | 1D | 0.5 | 8-7 | Dark brown & black & red fine to coarse sand, | ** | 0.3 | | **Asphalt from 0' to |
| 06-06-22 | | 2.5 | 17-33 | some silt, gravel, trace brick, asphalt (SM) | F | | | 0.3'. |
| Monday | | | | | | 2.5 | | Spoon driven out of |
| Sunny | 2D | 3.0 | 9-8 | Brown fine to medium sand, some silt, trace | | | | plumb due to obs- |
| 70°F | | 5.0 | 5-5 | coarse sand, gravel (SM) | S1 | 5 | | truction; drilled out to |
| | 3D | 5.0 | 7-5 | Brown fine to coarse sand, some silt, gravel | | | | 3'; hard drilling & rig |
| | | 7.0 | 2-3 | (SM) | | 7 | | chatter. |
| | 4D | 7.0 | 26-53 | Light brown fine to coarse sand, trace silt | DR | | | 2D: REC=3" |
| 10:45 | | 8.1 | 50/1" | (Decomposed Rock) (SP-SM) | | 8.1 | | Attempted to install |
| | | | | | | 10 | | casing after sample 4D; |
| | | | | | | | | not plumb due to |
| | | | | | | | | shallow obstruction. |
| | | | | | | | | Terminated boring & |
| | | | | | | | | offset location. |
| | | | | | | 15 | | End of Boring at 8.1'. |
| | | | | | | 20 | | |
| | | | | | | 25 | | |
| | | | | | | 30 | | |
| | | | | | | 35 | | |
| | | | | | | 40 | | |
| | | | | | | 45 | | |
| | | | | | | 50 | | |

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MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-2
**SHEET** 2 **OF** 2

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN

**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

**TYPE OF BORING RIG MAKE AND MODEL:**

TRUCK CME-75
SKID
BARGE
OTHER

**TYPE OF FEED DURING CORING**

MECHANICAL
HYDRAULIC X
OTHER

**CASING USED** [ ] YES [X] NO

DIA., IN. DEPTH, FT. FROM TO
DIA., IN. DEPTH, FT. FROM TO
DIA., IN. DEPTH, FT. FROM TO

**TYPE AND SIZE OF**

D-SAMPLER 2" O. D. SPLIT SPOON
U-SAMPLER
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

**DRILLING MUD USED** [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

## PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. 8 NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-06-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



DRAFT

# BORING LOG

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-2A
**SHEET 1 OF** 2
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10:45<br>06-06-22<br>Mon., Sun.<br>75°F, 11:00 | | | | | ** | 0.3 | | **Asphalt from 0' to 0.3'. |
| | | | | | F | | | No samples taken. Obstruction at 4.5'. Roller bit could not advance. End of Boring at 4.5'. |
| | | | | | | 4.5 | | |
| | | | | | | 10 | | |
| | | | | | | 15 | | |
| | | | | | | 20 | | |
| | | | | | | 25 | | |
| | | | | | | 30 | | |
| | | | | | | 35 | | |
| | | | | | | 40 | | |
| | | | | | | 45 | | |
| | | | | | | 50 | | |

DRAFT

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-2A
**SHEET** 2 **OF** 2

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

**TYPE OF BORING RIG MAKE AND MODEL:**

| | | | |
|---|---|---|---|
| TRUCK | CME-75 | MECHANICAL | |
| SKID | | HYDRAULIC | X |
| BARGE | | OTHER | |
| OTHER | | | |

**TYPE OF FEED DURING CORING**

**CASING USED** [ ] YES [X] NO

| | | | | | |
|---|---|---|---|---|---|
| DIA., IN. | | DEPTH, FT. FROM | | TO | |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |

**TYPE AND SIZE OF**

D-SAMPLER
U-SAMPLER
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

**DRILLING MUD USED** [ ] YES [X] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. AVERAGE FALL, IN.
*SAMPLER HAMMER, LBS. AVERAGE FALL, IN.
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC):
*HAMMER RATE, BLOWS PER MINUTE (BPM):

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | | ID, IN. | | LENGTH, FT. | | TOP ELEV. |
| INTAKE ELEMENT: | TYPE | | OD, IN. | | LENGTH, FT. | | TIP ELEV. |
| FILTER: | MATERIAL | | OD, IN. | | LENGTH, FT. | | BOT. ELEV. |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 4.5 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | | OTHER: | |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-06-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



DRAFT

# BORING LOG

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-2B
**SHEET 1 OF** 3
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 11:00 | | | | | ** | 0.3 | DRILLED | **Asphalt from 0' to |
| 06-06-22 | | | | | F | | AHEAD | 0.3'. |
| Monday | | | | | | 2.5 | 4" | Drilled ahead to 10'. |
| Sunny | | | | | | | | See Boring log MR-2 |
| 75°F | | | | | S1 | 5 | | for sample |
| | | | | | | | | descriptions from 0.5' |
| | | | | | | 7 | | to 8'. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 10 | | |
| | 1D | 10.0 | 100/4" | Tan fine to coarse sand, trace silt | | | | REC=2" |
| | | 10.3 | | (Decomposed Rock) (SP-SM) | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 15 | | |
| | 2D | 15.0 | 100/2" | Do 1D (Decomposed Rock) (SP-SM) | | | 2.5* | REC=1" |
| | | 15.2 | | | | | 1.25* | *Coring time in |
| | 1C | 15.0 | REC=26% | Weathered highly weathered to moderately | | | 0.5* | minutes per foot. |
| | | 20.0 | RQD=0% | weathered tan fine to coarse grained marble, | DR | | 2.25* | |
| | | | | broken, iron stained & weathered joints | | 20 | 2.25* | |
| | 2CNR | 20.0 | REC=0% | No recovery | | | 1.5* | |
| | | 25.0 | RQD=0% | | | | 0.75* | |
| | | | | | | | 0.5* | |
| | | | | | | | 0.5* | |
| | | | | | | 25 | 0.75* | |
| | 3D | 25.0 | 40-100/3" | Tan fine to coarse sand, trace silt | | | | |
| | | 25.8 | | (Decomposed Rock) (SP-SM) | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 30 | | |
| 12:30 | 4D | 30.0 | 100/1" | Do 3D (Decomposed Rock) (SP-SM) | | 30.1 | | REC=4" |
| | | 30.1 | | | | | | Wash sample. |
| | | | | | | | | End of Boring at 30.1'. |
| | | | | | | | | |
| | | | | | | 35 | | |
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| | | | | | | 50 | | |
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DRAFT

# ROCK CORE SKETCH

MRCE
built on firm foundations

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

PROJECT: 280 - 330 East 161st Street
LOCATION: Bronx, NY
TEST/INSP. EQUIPMENT: 6' Ruler
REF. CODES/STANDARDS: NYC BC Ch. 18

BORING NO. MR-2B
SHEET 2 OF 3
FILE NO. 14364
SURFACE ELEV. +51 +/-
RES ENGR. G. Luckabaugh

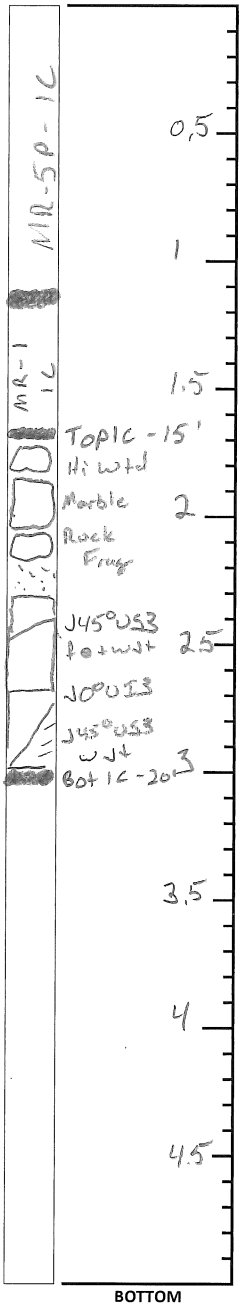
| Run No. | REC/RQD |
|---|---|
| 1C | 26/0 |
| 2C | 0/0 |

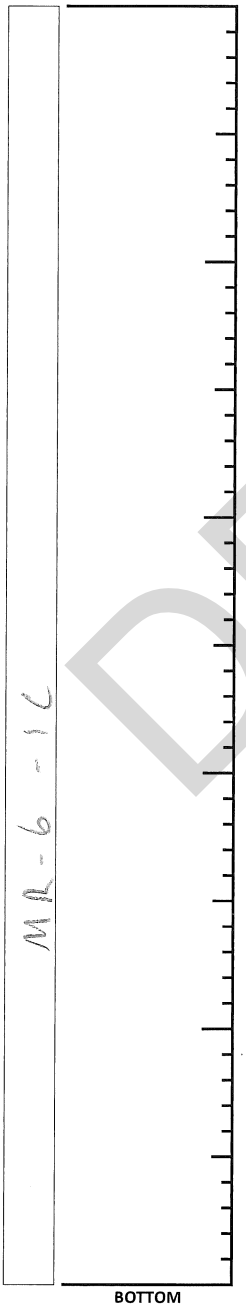
| Run No. | REC/RQD |
|---|---|
| | |

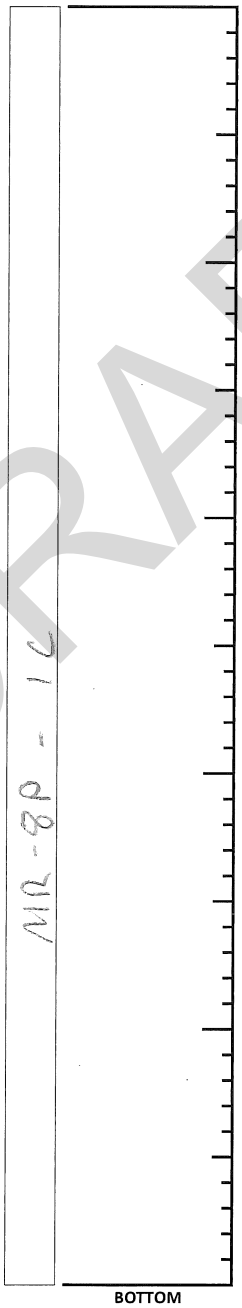
| Run No. | REC/RQD |
|---|---|
| | |

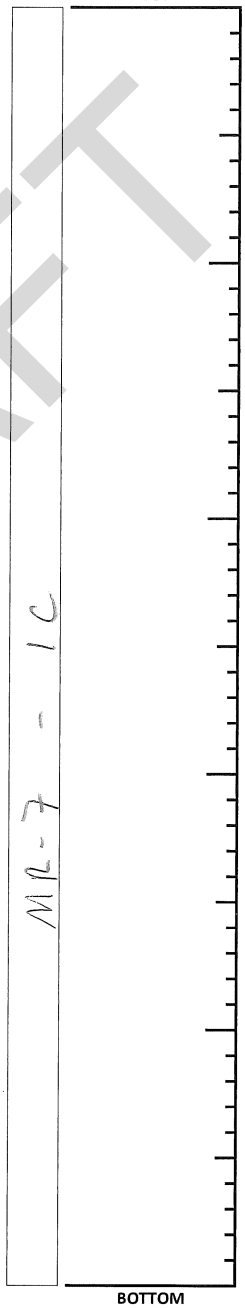
| Run No. | REC/RQD |
|---|---|
| | |

TOP




BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
D - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

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NOTES

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-2B
**SHEET** 3 **OF** 3

| | | | |
|---|---|---|---|
| **PROJECT** | 280-330 EAST 161 STREET | **FILE NO.** | 14364 |
| **LOCATION** | BRONX, NEW YORK | **SURFACE ELEV.** | +51.0± |
| **BORING LOCATION** | SEE BORING LOCATION PLAN | **DATUM** | NAVD 88 |

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

| **TYPE OF BORING RIG MAKE AND MODEL:** | | **TYPE OF FEED DURING CORING** | | **CASING USED** | [X] YES [ ] NO | | | |
|---|---|---|---|---|---|---|---|---|
| TRUCK | CME-75 | MECHANICAL | | DIA., IN. | 4 | DEPTH, FT. FROM | 0 | TO 9 |
| SKID | | HYDRAULIC | X | DIA., IN. | | DEPTH, FT. FROM | | TO |
| BARGE | | OTHER | | DIA., IN. | | DEPTH, FT. FROM | | TO |
| OTHER | | | | | | | | |

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| | |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | NX DOUBLE BARREL |
| CORE BIT | NX DIAMOND |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | | ID, IN. | | LENGTH, FT. | | TOP ELEV. |
| INTAKE ELEMENT: | TYPE | | OD, IN. | | LENGTH, FT. | | TIP ELEV. |
| FILTER: | MATERIAL | | OD, IN. | | LENGTH, FT. | | BOT. ELEV. |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 20 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | 10 | OTHER: | |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-06-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



DRAFT

# BORING LOG

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-3
**SHEET 1 OF** 2
**FILE NO.** 14364
**SURFACE ELEV.** +52.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10:00 | 1D | 0.5 | 4-6 | Gray & brown fine to coarse sand, some silt, | ** | 0.2 | DRILLED | **Concrete from 0' to |
| 06-07-22 | | 2.5 | 14-42 | trace gravel, brick, asphalt (Fill) (SM) | | | AHEAD | 0.2'. |
| Tuesday | 2D | 2.5 | 19-10 | Gray brown & black fine to coarse sand, some | | | 4" | |
| Partly Sunny | | 4.5 | 7-7 | silt, gravel, trace brick, wood (Fill) (SM) | | | | |
| Sunny | 3D | 4.5 | 15-6 | Black fine to coarse sand, some silt, gravel, | F | 5 | | |
| 70°F | | 6.5 | 6-6 | trace wood, brick, cinder (Fill) (SM) | | | | |
| | 4D | 6.5 | 5-3 | Black fine to medium sand, some silt, trace | | | | |
| | | 8.5 | 4-5 | coarse sand, gravel, brick, wood, cinder | | | | Loss of circulation at |
| | | | | (Fill) (SM) | | 9 | | 9'. |
| | | | | | | 10 | | Advanced casing to 10'. |
| | 5D | 10.0 | 50/2" | Tan fine to coarse sand, trace silt (SP-SM) | | | | REC=1" |
| | | 10.2 | | | | | | |
| | | | | | | 15 | | |
| | 6NR | 15.0 | 50/0" | No recovery | | | | Spoon bouncing. |
| | | | | | DR | 20 | | |
| | 7D | 20.0 | 100/1" | Do 5D (SP-SM) | | | | REC=0.5" |
| | | 20.1 | | | | | | |
| | | | | | | 25 | | |
| | 8D | 25.0 | 82-38 | Orange brown & yellow & green fine to | | | | |
| | | 26.2 | 50/2" | medium sand, trace silt, mica | | | | |
| | | | | (Decomposed Rock) (SP-SM) | | | | |
| 11:30 | | | | | | 30 | | |
| | 9NR | 30.0 | 50/0" | No recovery | | | | Spoon bouncing. |
| | | | | | | | | End of Boring at 30'. |
| | | | | | | 35 | | |
| | | | | | | 40 | | |
| | | | | | | 45 | | |
| | | | | | | 50 | | |

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MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-3
**SHEET** 2 **OF** 2

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN
**FILE NO.** 14364
**SURFACE ELEV.** +52.0±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

**TYPE OF BORING RIG MAKE AND MODEL:**

| | | | |
|---|---|---|---|
| TRUCK | CME-75 | | |
| SKID | | | |
| BARGE | | | |
| OTHER | | | |

**TYPE OF FEED DURING CORING**

| | |
|---|---|
| MECHANICAL | |
| HYDRAULIC | X |
| OTHER | |

**CASING USED** [X] YES [ ] NO

| | | | | | |
|---|---|---|---|---|---|
| DIA., IN. | 4 | DEPTH, FT. FROM | 0 | TO | 10 |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | |
| CORE BIT | |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
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**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | | ID, IN. | | LENGTH, FT. | | TOP ELEV. |
| INTAKE ELEMENT: | TYPE | | OD, IN. | | LENGTH, FT. | | TIP ELEV. |
| FILTER: | MATERIAL | | OD, IN. | | LENGTH, FT. | | BOT. ELEV. |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 30 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | | OTHER: | |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-07-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



DRAFT

# BORING LOG

MRCE built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-4
**SHEET 1 OF** 2
**FILE NO.** 14364
**SURFACE ELEV.** +51.5±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 08:45 | 1D | 0.5 | 6-11 | Gray fine to coarse sand, some silt, gravel, | ** | 0.2 | DRILLED | **Concrete from 0' to |
| 06-07-22 | | 2.5 | 15-20 | trace brick, wood (Fill) (SM) | | | AHEAD | 0.2'. |
| Tuesday | 2D | 2.5 | 19-19 | Gray brown fine to medium sand, some silt, | F | | 4" | |
| Mostly Sunny | | 4.5 | 35-20 | tr gravel, coarse sand, brick fragments (Fill) (SM) | | | ↓ | |
| 70°F | 3D | 4.5 | 17-44 | Light brown fine to coarse sand, some silt, trace | | 5 | | |
| | | 6.5 | 40-30 | rock fragments (Decomposed Rock) (SM) | | | | |
| | 4D | 8.0 | 61-100/5" | Brown fine to coarse sand, trace silt | | | | REC=6" |
| | | 8.9 | | (Decomposed Rock) (SP-SM) | | 10 | | Rig chatter from 10' to 15'. |
| | | | | | | | | Relatively easy drilling from 15' to 20'. |
| | | | | | | 15 | | |
| | 5D | 15.0 | 41-24 | Do 4D (Decomposed Rock) (SP-SM) | | | | |
| | | 17.0 | 26-21 | | DR | | | |
| | | | | | | 20 | | |
| | 6NR | 20.0 | 50/0" | No recovery | | | | Spoon bouncing. Occasional hard drilling & light rig chatter from 20' to 30'. |
| | | | | | | 25 | | |
| | 7D | 25.0 | 100/2" | Brown trace green gray fine to medium sand, | | | | REC=1.5" |
| | | 25.2 | | some silt, trace mica, coarse sand | | | | |
| | | | | (Decomposed Rock) (SM) | | | | |
| 10:00 | | | | | | 30 | | |
| | 8NR | 30.0 | 50/0" | No recovery | | | | Spoon bouncing. End of Boring at 30'. |
| | | | | | | 35 | | |
| | | | | | | 40 | | |
| | | | | | | 45 | | |
| | | | | | | 50 | | |

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MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-4
**SHEET** 2 **OF** 2

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN

**FILE NO.** 14364
**SURFACE ELEV.** +51.5±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

**TYPE OF BORING RIG MAKE AND MODEL:**

TRUCK CME-75
SKID
BARGE
OTHER

**TYPE OF FEED DURING CORING**

MECHANICAL
HYDRAULIC X
OTHER

**CASING USED** [X] YES [ ] NO

DIA., IN. 4 DEPTH, FT. FROM 0 TO 5
DIA., IN. DEPTH, FT. FROM TO
DIA., IN. DEPTH, FT. FROM TO

**TYPE AND SIZE OF**

D-SAMPLER 2" O. D. SPLIT SPOON
U-SAMPLER
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

**DRILLING MUD USED** [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

## PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. 30
3.5" DIA. U-SAMPLE BORING LIN. FT.
CORE DRILLING IN ROCK LIN. FT.

NO. OF 3" SHELBY TUBE SAMPLES
NO. OF 3" UNDISTURBED SAMPLES
OTHER:

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-07-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING

# BORING LOG

MRCE built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-5P
**SHEET 1 OF** 5
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10:00 | 1D | 0.5 | 8-8 | Brown & gray & black fine to coarse sand, some | ** | 0.3 | DRILLED | **Asphalt from 0' to |
| 06-03-22 | | 2.5 | 16-17 | silt, gravel, trace concrete, brick, wood (Fill) (SM) | | | AHEAD | 0.3'. |
| Friday | 2D | 2.5 | 6-8 | Brown fine to medium sand, some silt, trace | | | 4" | |
| Overcast | | 4.5 | 7-8 | gravel, coarse sand (Fill) (SM) | | | | |
| 70°F | 3D | 4.5 | 8-10 | Brown & gray fine to coarse sand, some silt, | F | 5 | | |
| | | 6.5 | 5-4 | gravel (Fill) (SM) | | | | |
| | 4D | 6.5 | 5-8 | Brown & dark gray fine to coarse sand, some | | | | REC=4" |
| | | 8.5 | 13-18 | silt, gravel, trace brick (Fill) (SM) | | | | |
| | | | | | | 8.5 | | |
| | | | | | | 10 | | |
| | 5D | 10.0 | 19-18 | Top 6": Brown fine to coarse sand, trace gravel, | | | | Not distict top & bottom; |
| | | 12.0 | 10-10 | silt (SP-SM) | | | | some interlayering. |
| | | | | Bot 6": Brown fine to medium sand, some silt, | | | | |
| | | | | trace coarse sand, gravel (SM) | S1 | | | |
| | | | | | | 15 | | |
| | 6D | 15.0 | 13-16 | Top 2 & Bot. Mid 4": Stiff brn & orange mottled | | | | |
| | | 17.0 | 24-32 | silty clay (CL) | | | | |
| | | | | Top Mid. 4" & Bot.4": Brown & orange fine to | | | | |
| | | | | medium sand, trace silt (SP-SM) | | 18.5 | | No clear change in |
| | | | | | | 20 | | drilling. |
| | 7D | 20.0 | 100/3" | Brown fine to coarse sand, trace silt | | | | REC=3" |
| | | 20.3 | | (Decomposed Rock) (SP-SM) | | | | |
| | | | | | | | | Slower drilling from |
| | | | | | | | | 20' to 30'. |
| | | | | | | 25 | | |
| | 8D | 25.0 | 27-33 | Brown fine to medium sand, some silt, trace | | | | Occasional light |
| | | 27.0 | 84-70 | coarse sand (Decomposed Rock) (SM) | | | | chatter from 25' to 30'. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 30 | | |
| | 9D | 30.0 | 100/2" | Brown trace gray green fine to medium sand, | | | | Driller noted softer |
| | | 30.2 | | trace silt, mica (Decomposed Rock) (SP-SM) | | | | drilling from 32' to 35'. |
| | | | | | DR | | | |
| | | | | | | 35 | | |
| | 10D | 35.0 | 3-7 | Top 8": Dark brown silty fine to medium sand, | | | | |
| | | 37.0 | 23-43 | trace mica, clayey silt seam (SM) | | | | |
| | | | | Bot 8": Brown & gray green fine to medium sand, | | | | |
| | | | | some silt, trace mica, coarse sand, some tan | | | | |
| | | | | fine to coarse sand, trace silt (SM&SP-SM) | | 40 | | |
| | 11D | 40.0 | 68-13 | Brown fine to coarse sand, trace silt (SP-SM) | | | | Harder drilling at 39'. |
| | | 42.0 | 18-39 | | | | | |
| | | | | | | | | Soft drilling at 44'. |
| | | | | | | 45 | | |
| | 12D | 45.0 | 1-5 | Top 15": Brown & gray fine to medium sand, | | | | |
| | | 47.0 | 11-23 | some silt & fine sandy silt (SM&ML) | | | | Hard drilling & rig |
| | | | | Bot 5": Tan fine to coarse sand, some rock | | 48 | | chatter at 48'. |
| | | | | fragments, trace silt (SP-SM) | | | | |
| | | | | | WR | 50 | | |
| | 13NR | 50.0 | 50/0" | No recovery | | | | Spoon bouncing. |

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14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

# BORING LOG

**BORING NO.** MR-5P
**SHEET 2 OF** 5
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Cont'd | 1C | 50.0 | REC=20% | Weathered highly weathered to moderately | | | 1.5* | *Coring time in |
| 06-03-22 | | 55.0 | RQD=0% | weathered brown fine to coarse grained marble, | | | 1.25* | minutes per foot. |
| Friday | | | | broken to closely jointed, iron stained & | **WR** | | 1.5* | |
| Overcast | | | | weathered joints | | | 2.75* | |
| 70°F, 12:15 | | | | | | **55** | 4* | End of Boring at 55'. |
| | | | | | | **60** | | |
| | | | | | | **65** | | |
| | | | | | | **70** | | |
| | | | | | | **75** | | |
| | | | | | | **80** | | |
| | | | | | | **85** | | |
| | | | | | | **90** | | |
| | | | | | | **95** | | |
| | | | | | | **100** | | |

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# ROCK CORE SKETCH

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

built on firm foundations

PROJECT: 280-330 East 161st Street

LOCATION: Bronx, NY

TEST/INSP. EQUIPMENT 6' Ruler

REF. CODES/STANDARDS NYC BC Ch. 18

BORING NO. MR-5P

SHEET 3 OF 5

FILE NO. 14364

SURFACE ELEV. +514±

RES ENGR. G. Luckey

| Run No. | REC/RQD |
|---|---|
| 1C | 20/0 |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

50

TOP

H: wtd

J30°US3

J0°US3

J20°US3

Bot 1C - 55'

BOTTOM

MR-6 - 1C

TOP

BOTTOM

MR-8P-1C

TOP

BOTTOM

MR-7 - 1C

TOP

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

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NOTES

MRCE
built on firm foundations

# PIEZOMETER RECORD

PIEZOMETER OR BORING NO. MR-5P

PROJECT: 280-330 East 161st Street

SHEET 4 OF 5

LOCATION: Bronx, NY

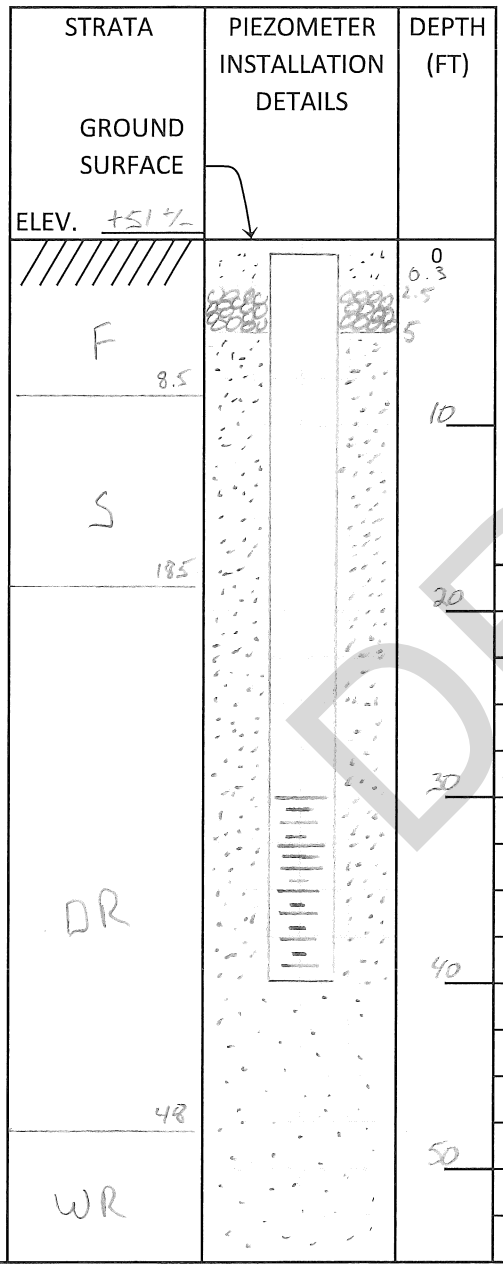
FILE NO. 14364

PIEZOMETER LOCATION: See Boring Location Plan

INSTALLATION DATE 6-3-22

☐ SEE SKETCH ON BACK

RES ENGR. G. Lucking




PIEZOMETER TYPE Slotted PVC

INTAKE POINT

depth to bottom, ft = 40

depth to top, ft = 5

length, ft = 35 = L

diameter, in = 4, ft = 0.33 = 2R

STANDPIPE/RISER

elevation of rim, ft = +50.7 +/-

diameter, in = 2, ft = 0.17 = 2r

| READING TIME | | DEPTH – RIM TO WATER | ELEVATION OF WATER | REMARKS |
|---|---|---|---|---|
| DATE | CLOCK | | | |
| 6-3-22 | 1250 | 23.0 | +27.7 | 0.5hr after completion |
| 6-6-22 | 0705 | 26.0 | +24.7 | |
| 6-6-22 | 1254 | 26.0 | +24.7 | |
| 6-7-22 | 1050 | 26.0 | +24.7 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

SAND BENTONITE

GRAVEL GROUT

GROUND SURFACE ELEV. +51 +/-

PIEZOMETER NO. MR-5P

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14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-5P
**SHEET** 5 **OF** 5

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

| TYPE OF BORING RIG MAKE AND MODEL: | | TYPE OF FEED DURING CORING | | CASING USED | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TRUCK | CME-75 | MECHANICAL | | DIA., IN. | 4 | DEPTH, FT. FROM | 0 | TO | 9 |
| SKID | | HYDRAULIC | X | DIA., IN. | | DEPTH, FT. FROM | | TO | |
| BARGE | | OTHER | | DIA., IN. | | DEPTH, FT. FROM | | TO | |
| OTHER | | | | | | | | | |

**CASING USED** [X] YES [ ] NO

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| | |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | NX DOUBLE BARREL |
| CORE BIT | NX DIAMOND |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [X] YES [ ] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

**AUGER USED** [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | SEE PIEZOMETER SHEET NO. 4. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [X] YES [ ] NO **SKETCH SHOWN ON** SEE SHEET NO. 4

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | PVC | ID, IN. | 2 | LENGTH, FT. | 30 | TOP ELEV. | +50.7 |
| INTAKE ELEMENT: | TYPE | SLOTTED PVC | OD, IN. | 2.5 | LENGTH, FT. | 10 | TIP ELEV. | +11 |
| FILTER: | MATERIAL | SAND | OD, IN. | 4 | LENGTH, FT. | 35 | BOT. ELEV. | +11 |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 50 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | 5 | OTHER: PEIZOMETER | 40-FT |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** PIEZOMETER INSTALLED.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-03-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



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# BORING LOG

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-6
**SHEET 1 OF** 3
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 07:30 | 1D | 0.5 | 6-5 | Brown & gray & red fine to coarse sand, some | ** | **0.3** | DRILLED | **Asphalt from 0' to |
| 06-03-22 | | 2.5 | 11-20 | silt, gravel, trace brick, concrete (Fill) (SM) | | | AHEAD | 0.3'. |
| Friday | 2D | 2.5 | 15-12 | Black fine to coarse sand, some silt (Fill) (SM) | | | 4" | Asphalt cuttings. |
| Overcast | | 4.5 | 10-10 | | | | | REC=0.5" |
| 65°F | 3NR | 4.5 | 11-8 | No recovery | **F** | **5** | | |
| | | 6.5 | 8-10 | | | | | |
| | 4D | 6.5 | 8-4 | Brown silty fine to medium sand, trace gravel, | | | | Recovery with 3" split- |
| | | 8.5 | 4-5 | coarse sand (Fill) (SM) | | | | spoon on 2nd attempt |
| | 5D | 8.5 | 4-3 | Brown fine to medium sand, some silt, trace | | **8.5** | | Rig chatter from 5' to |
| | | 10.5 | 4-4 | gravel, coarse sand (SM) | | **10** | | 6'. |
| | 6D | 10.5 | 9-7 | Brown & tan fine to medium sand, some silt, | **S1** | | | |
| | | 12.5 | 11-22 | trace gravel, coarse sand (SM) | | | | |
| | | | | | | **13** | | |
| | | | | | | | | Light rig chatter from |
| | | | | | | **15** | | to 13' to 15'. |
| | 7D | 15.0 | 100/3" | Brown fine to coarse sand, some silt | | | | REC=1" |
| | | 15.3 | | (Decomposed Rock) (SM) | | | | Hard drilling from 15' |
| | | | | | | | | to 30'. |
| | | | | | | **20** | | |
| | 8D | 20.0 | 43-100/4" | Brown & tan & green fine to coarse sand, some | | | | |
| | | 20.8 | | silt, trace rock fragments | | | | |
| | | | | (Decomposed Rock) (SM) | | | | |
| | | | | | **DR** | | | |
| | | | | | | **25** | | |
| | 9D | 25.0 | 100/5" | Brown trace green fine to medium sand, some | | | | REC=5" |
| | | 25.4 | | silt, trace coarse sand (Decomposed Rock) (SM) | | | | |
| | | | | | | | | |
| | | | | | | **30** | | |
| | 10D | 30.0 | 100/2" | Brown fine to coarse sand, trace silt | | | | REC=2" |
| | | 30.2 | | (Decomposed Rock) (SP-SM) | | | | Hard drilling; occa- |
| | | | | | | | | sional light rig chatter |
| | | | | | | | | from 30' to 35'. |
| | | | | | | **35** | | |
| | 1C | 35.0 | REC=94% | Intermediate moderately weathered to highly | | | 2.5* | *Coring time in |
| | | 40.0 | RQD=75% | weathered tan & brown fine to coarse grained | | | 3.25* | minutes per foot. |
| | | | | marble, jointed to moderately jointed, iron | **R** | | 3* | |
| | | | | stained & weathered joints | | | 2* | |
| 09:30 | | | | | | **40** | 2.5* | End of Boring at 40'. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | **45** | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | **50** | | |
| | | | | | | | | |
| | | | | | | | | |

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# ROCK CORE SKETCH

BORING NO. MR-6
SHEET 2 OF 3
FILE NO. 14364
SURFACE ELEV. +51+/-
RES ENGR. G. Lucking

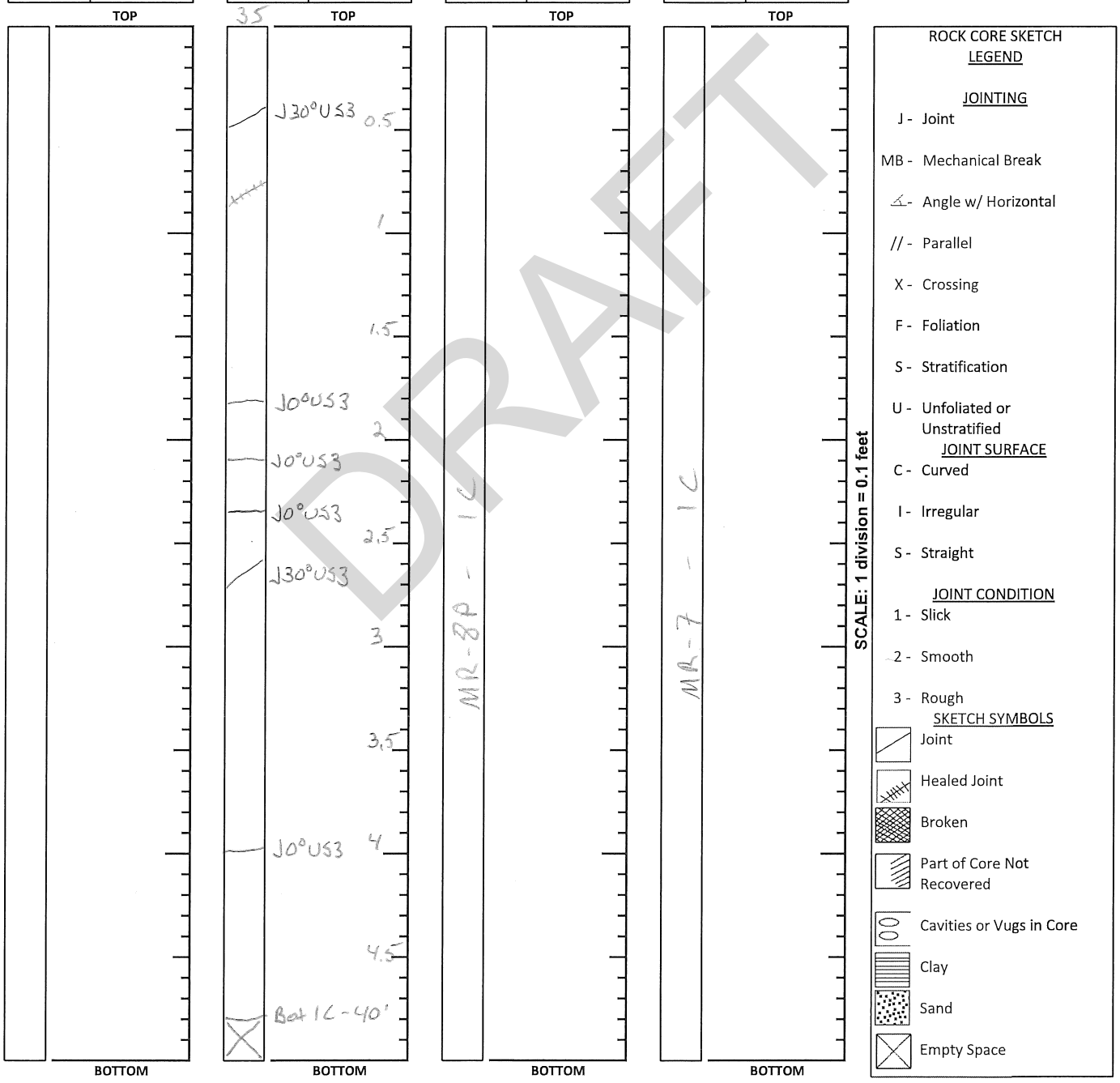
PROJECT: 280-330 East 161st Street
LOCATION: Bronx, NY
TEST/INSP. EQUIPMENT 6' Ruler
REF. CODES/STANDARDS NYC BC Ch. 18

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| 1C | 94/75 |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |




ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
∠ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

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NOTES

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built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-6
**SHEET** 3 **OF** 3

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN
**FILE NO.** 14364
**SURFACE ELEV.** +51.0±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

**TYPE OF BORING RIG MAKE AND MODEL:**

| | | | |
|---|---|---|---|
| TRUCK | CME-75 | | |
| SKID | | | |
| BARGE | | | |
| OTHER | | | |

**TYPE OF FEED DURING CORING**

| | |
|---|---|
| MECHANICAL | |
| HYDRAULIC | X |
| OTHER | |

**CASING USED** [X] YES [ ] NO

| | | | | | |
|---|---|---|---|---|---|
| DIA., IN. | 4 | DEPTH, FT. FROM | 0 | TO | 9 |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| | |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | NX DOUBLE BARREL |
| CORE BIT | NX DIAMOND |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [X] YES [ ] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

**AUGER USED** [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | | ID, IN. | | LENGTH, FT. | | TOP ELEV. |
| INTAKE ELEMENT: | TYPE | | OD, IN. | | LENGTH, FT. | | TIP ELEV. |
| FILTER: | MATERIAL | | OD, IN. | | LENGTH, FT. | | BOT. ELEV. |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 35 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | 5 | OTHER: | |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-03-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



DRAFT

# BORING LOG

MRCE built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-7
**SHEET 1 OF** 4
**FILE NO.** 14364
**SURFACE ELEV.** +50.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 07:00 | 1D | 0.5 | 6-17 | Brown & gray & white fine to medium gravel, | ** | 0.3 | DRILLED | **Asphalt from 0' to |
| 06-02-22 | | 2.5 | 45-20 | sm fine to coarse sand, tr silt, brick, root(Fill)(GP) | | | AHEAD | 0.3'. |
| Thursday | 2D | 2.5 | 9-5 | Brown silty fine to medium sand, trace gravel, | | | 4" | |
| Mostly Cloudy | | 4.5 | 4-6 | coarse sand, clay (Fill) (SM) | F | | | |
| 65°F | 3D | 4.5 | 8-6 | Do 2D, trace root (Fill) (SM) | | 5 | | |
| | | 6.5 | 7-8 | | | | | |
| | 4D | 6.5 | 10-6 | Brown fine to medium sand, some silt, trace | | 6.5 | | |
| | | 8.5 | 6-9 | coarse sand, gravel (SM) | S1 | | | Light rig chatter from |
| | | | | | | 9.5 | | 9' to 10'. |
| | | | | | | 10 | | |
| | 5D | 10.0 | 18-18 | Brown fine to coarse sand, some silt, rock | | | | |
| | | 12.0 | 18-21 | fragments (SM) | | | | |
| | | | | | | 15 | | |
| | 6D | 15.0 | 18-16 | Do 5D (SM) | | | | |
| | | 17.0 | 23-29 | | | | | |
| | | | | | S2 | | | |
| | | | | | | 20 | | |
| | 7D | 20.0 | 30-40 | Do 5D (SM) | | | | |
| | | 22.0 | 37-39 | | | | | |
| | | | | | | | | Light rig chatter from |
| | | | | | | | | 23.5' to 25'. |
| | | | | | | 25 | | |
| | 8D | 25.0 | 30-50/2" | Do 5D (SM) | | 26 | | REC=6" |
| | | 25.7 | | | | | | Spoon bouncing. |
| | | | | | | | | Rig chatter from 25' to |
| | | | | | | | | 26'. |
| | | | | | | 30 | | Hard drilling from 26' |
| | 9D | 30.0 | 100/2" | Brown & gray fine to medium sand, some silt, | | | | to 30'. |
| | | 30.2 | | rock fragments, trace mica | | | | REC=2" |
| | | | | (Decomposed Rock) (SM) | | | | Hard drilling & Light rig |
| | | | | | | | | chatter from 30' to 35'. |
| | | | | | | 35 | | |
| | 10D | 35.0 | 100/2" | Brown & gray fine to medium sand, some silt, | | | | REC=2" |
| | | 35.2 | | trace mica (Decomposed Rock) (SM) | | | | Slow drilling with little |
| | | | | | DR | | | down pressure from |
| | | | | | | | | 35' to 40'. |
| | | | | | | 40 | | Light rig chatter from |
| | 11D | 40.0 | 100/4" | Do 10D (Decomposed Rock) (SM) | | | | 38.5' to 40'. |
| | | 40.3 | | | | | | REC=4" |
| | | | | | | | | Rig chatter & slow |
| | | | | | | | | drilling from 40' to 45'. |
| | | | | | | 45 | | |
| | 12D | 45.0 | 100/3" | Brown trace gray fine to medium sand, some | | | | REC=2" |
| | | 45.3 | | silt (Decomposed Rock) (SM) | | | | Rig chatter & slow |
| | | | | | | | | drilling from 45' to 50'. |
| | | | | | | 50 | | |
| | 13NR | 50.0 | 50/0" | No recovery | WR | | | |

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MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

# BORING LOG

**BORING NO.** MR-7
**SHEET 2 OF** 4
**FILE NO.** 14364
**SURFACE ELEV.** +50.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Cont'd | 1C | 50.0 | REC=53% | Weathered highly weathered to slightly weathered | | | 3.25* | Occasional rig chatter; |
| 06-02-22 | | 55.0 | RQD=9% | tan fine to coarse grained marble, closely jointed | | | 5* | core at low rpm. |
| Thursday | | | | to broken, iron stained & weathered joints | **WR** | | 1.75* | *Coring time in |
| Mostly Cloudy | | | | | | | 1.75* | minutes per foot. |
| 65°F, 10:30 | | | | | | **55** | 2.25* | End of Boring at 55'. |
| | | | | | | **60** | | |
| | | | | | | **65** | | |
| | | | | | | **70** | | |
| | | | | | | **75** | | |
| | | | | | | **80** | | |
| | | | | | | **85** | | |
| | | | | | | **90** | | |
| | | | | | | **95** | | |
| | | | | | | **100** | | |

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# ROCK CORE SKETCH

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

built on firm foundations

PROJECT: 280-330 East 161st St.

LOCATION: Bronx, NY

TEST/INSP. EQUIPMENT: 6' Ruler

REF. CODES/STANDARDS: NYC BC Ch. 18

BORING NO. MR-7

SHEET 3 OF 4

FILE NO. 14364

SURFACE ELEV. +50 +/-

RES ENGR. G. Lucking

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| 1C | 53/9 |

TOP

BOTTOM

50

J0°U I 3
J0°U I 3
J0°U S 3
J10°U S 3
J0°U S 3
J0°U S 3
J0°U S 3
J0°U S 3
J0°U S 3
Bot 1C - 55'

0.5
1
1.5
2
2.5
3
3.5
4
4.5

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
D - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

DRAFT

NOTES

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-7
**SHEET** 4 **OF** 4

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN

**FILE NO.** 14364
**SURFACE ELEV.** +50.0±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

**TYPE OF BORING RIG MAKE AND MODEL:**

| | | | |
|---|---|---|---|
| TRUCK | CME-75 | | |
| SKID | | | |
| BARGE | | | |
| OTHER | | | |

**TYPE OF FEED DURING CORING**

| | |
|---|---|
| MECHANICAL | |
| HYDRAULIC | X |
| OTHER | |

**CASING USED** [X] YES [ ] NO

| | | | | | |
|---|---|---|---|---|---|
| DIA., IN. | 4 | DEPTH, FT. FROM | 0 | TO | 10 |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |
| DIA., IN. | | DEPTH, FT. FROM | | TO | |

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| | |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | NX DOUBLE BARREL |
| CORE BIT | NX DIAMOND |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | | ID, IN. | | LENGTH, FT. | | TOP ELEV. |
| INTAKE ELEMENT: | TYPE | | OD, IN. | | LENGTH, FT. | | TIP ELEV. |
| FILTER: | MATERIAL | | OD, IN. | | LENGTH, FT. | | BOT. ELEV. |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 50 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | 5 | OTHER: | |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-02-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



DRAFT

# BORING LOG

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-8P
**SHEET 1 OF** 4
PROJECT: 280-330 EAST 161 STREET **FILE NO.** 14364
LOCATION: BRONX, NEW YORK **SURFACE ELEV.** +50.0±
**RES. ENGR.** GREGORY LUCKING

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10:30 | 1D | 0.5 | 5-6 | Brown fine to coarse sand, some silt, trace | ** | 0.3 | DRILLED | **Asphalt from 0' to |
| 06-02-22 | | 2.5 | 6-9 | gravel, brick (Fill) (SM) | F | | AHEAD | 0.3'. |
| Thursday | 2D | 2.5 | 13-24 | White fine to coarse sand, some gravel, trace | | 2.5 | 4" | |
| Partly Cloudy | | 4.5 | 13-14 | silt & brown f-m sand, sm silt (SP-SM&SM) | | | | |
| 70°F | 3D | 4.5 | 10-9 | Do 2D (SP-SM&SM) | S1 | 5 | | |
| | | 6.5 | 10-12 | | | | | |
| | 4D | 6.5 | 11-10 | Brown fine to coarse sand, trace silt (SP-SM) | | | | Hard driving last 2". |
| | | 8.5 | 13-38 | | | 8.5 | | |
| | | | | | | 10 | | |
| | 5D | 10.0 | 100/5" | Tan fine to coarse sand, trace silt | | | | REC=4" |
| | | 10.4 | | (Decomposed Rock) (SP-SM) | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 15 | | |
| | 6D | 15.0 | 100/3" | Tan & white fine to coarse sand, trace silt | | | | REC=1" |
| | | 15.3 | | (Decomposed Rock) (SP-SM) | DR | | | Hard drilling from 15' |
| | | | | | | | | to 25'; moderate down |
| | | | | | | | | pressure. |
| | | | | | | 20 | | Light rig chatter at 19'. |
| | 7NR | 20.0 | 100/2" | No recovery | | | | |
| | | 20.2 | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 25 | | |
| | 8NR | 25.0 | 50/0" | No recovery | | | 3.75* | *Coring time in |
| | 1C | 25.0 | REC=78% | Weathered highly weathered to moderately | | | 3.5* | minutes per foot. |
| | | 30.0 | RQD=21% | weathered tan fine to coarse grained marble, | WR | | 1.75* | Increase rpm from 27' |
| | | | | broken to jointed, iron stained & weathered | | | 1.25* | to 30'. |
| 12:15 | | | | joints | | 30 | 1.25* | End of Boring at 30'. |
| | | | | | | | | |
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| | | | | | | 35 | | |
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| | | | | | | 50 | | |
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# ROCK CORE SKETCH

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

built on firm foundations

PROJECT: 280 - 330 East 161st St.
LOCATION: Bronx, NY
TEST/INSP. EQUIPMENT: 6' Ruler
REF. CODES/STANDARDS: NYC BC Ch. 18

BORING NO. MR-8P
SHEET 2 OF 4
FILE NO. 14364
SURFACE ELEV. +50 +/-
RES ENGR. G. Lucking

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| 1C | 78/21 |

| Run No. | REC/RQD |
|---|---|
| | |

TOP

25

J10°US3
J15°US3 wJt
J20°US2 wJt
J20°US2 wJt
J20°US2 wJt
J20°US2 wJt
J20°11FS2 fe wJt
J10°11FS2
J20°11FS2
J0°US2 fe+wJt
J30°US2 fe+wJt
J20°US3
J30°US2 wJt
J0°US2
J0°US2
Bot 1C-30

0.5 1 1.5 2 2.5 3 3.5 4 4.5

MR-7 - 1C

SCALE: 1 division = 0.1 feet

BOTTOM

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

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NOTES

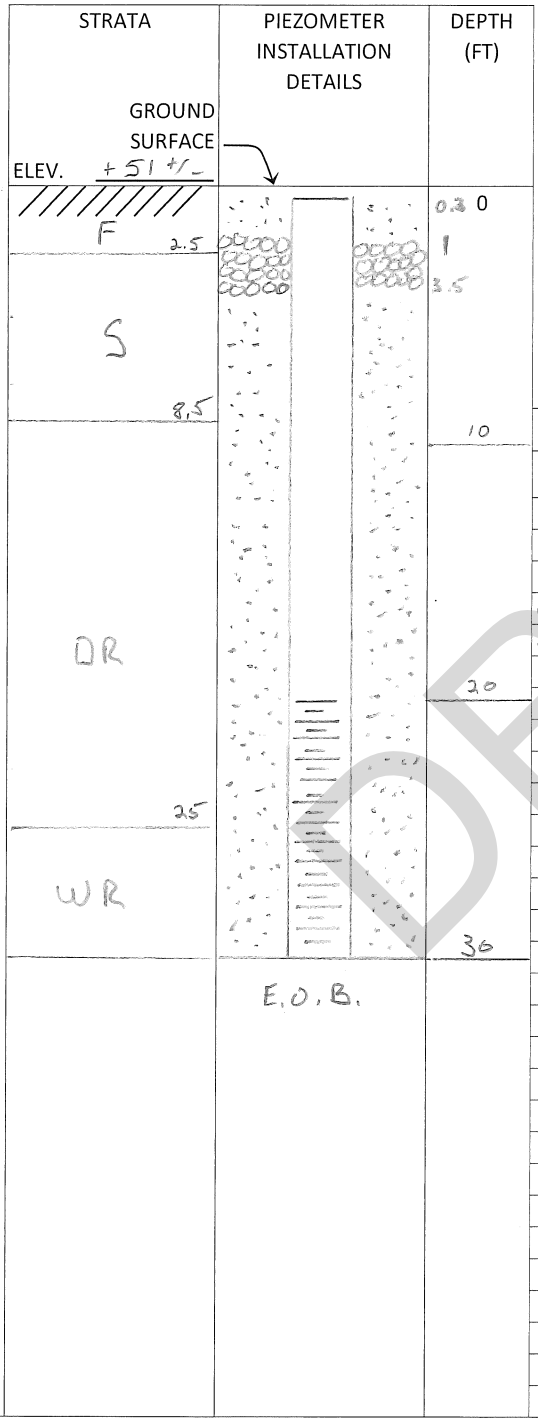
# PIEZOMETER RECORD

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

PIEZOMETER OR BORING NO. MR-8P
SHEET 3 OF 4
FILE NO. 14364
INSTALLATION DATE 6-2-22
RES ENGR. G. Luckey

PROJECT: 280-330 East 161st Street
LOCATION: Bronx, NY
PIEZOMETER LOCATION: See Boring Location Plan

☐ SEE SKETCH ON BACK




PIEZOMETER TYPE Slotted PVC

INTAKE POINT
depth to bottom, ft = 30
depth to top, ft = 3.5
length, ft = 26.5 = L
diameter, in = 4, ft = 0.33 = 2R

STANDPIPE/RISER
elevation of rim, ft = +50.7 +/-
diameter, in = 2, ft = 0.17 = 2r

| READING TIME | | DEPTH – RIM TO WATER | ELEVATION OF WATER | REMARKS |
|---|---|---|---|---|
| DATE | CLOCK | | | |
| 6-3-22 | 0713 | 24.1 | +26.6 | |
| 6-3-22 | 0930 | 24.7 | +26 | |
| 6-6-22 | 0648 | 25.4 | +25.3 | |
| 6-6-22 | 1249 | 25.4 | +25.3 | |
| 6-7-22 | 0915 | 25.4 | +25.3 | |

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SAND
GRAVEL
BENTONITE
GROUT

GROUND SURFACE ELEV. +51 +/-
PIEZOMETER NO. MR-8P

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-8P
**SHEET** 4 **OF** 4

**PROJECT** 280-330 EAST 161 STREET
**LOCATION** BRONX, NEW YORK
**BORING LOCATION** SEE BORING LOCATION PLAN
**FILE NO.** 14364
**SURFACE ELEV.** +50.0±
**DATUM** NAVD 88

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

| TYPE OF BORING RIG MAKE AND MODEL: | | TYPE OF FEED DURING CORING | | CASING USED | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TRUCK | CME-75 | MECHANICAL | | DIA., IN. | 4 | DEPTH, FT. FROM | 0 | TO | 8 |
| SKID | | HYDRAULIC | X | DIA., IN. | | DEPTH, FT. FROM | | TO | |
| BARGE | | OTHER | | DIA., IN. | | DEPTH, FT. FROM | | TO | |
| OTHER | | | | | | | | | |

[X] YES [ ] NO

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | NX DOUBLE BARREL |
| CORE BIT | NX DIAMOND |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM): 45±

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | SEE PIEZOMETER SHEET NO. 3. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [X] YES [ ] NO **SKETCH SHOWN ON** SEE SHEET NO. 3

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | PVC | ID, IN. | 2 | LENGTH, FT. | 20 | TOP ELEV. | +50.7 |
| INTAKE ELEMENT: | TYPE | SLOTTED PVC | OD, IN. | 2.5 | LENGTH, FT. | 10 | TIP ELEV. | +20 |
| FILTER: | MATERIAL | SAND | OD, IN. | 4 | LENGTH, FT. | 26.5 | BOT. ELEV. | +20 |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 25 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | 5 | OTHER:PIEZOMETER | 30-FT |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** PIEZOMETER INSTALLED.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-02-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



DRAFT

# BORING LOG

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-9
**SHEET 1 OF** 3
**FILE NO.** 14364
**SURFACE ELEV.** +52.0±
**RES. ENGR.** GREGORY LUCKING

PROJECT: 280-330 EAST 161 STREET
LOCATION: BRONX, NEW YORK

| DAILY PROGRESS | SAMPLE NO. | SAMPLE DEPTH | SAMPLE BLOWS/6" | SAMPLE DESCRIPTION | STRATA | DEPTH | CASING BLOWS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 07:00 | | | | | ** | 0.8 | DRILLED | **Concrete sidewalk |
| 06-07-22 | 1D | 1.0 | 8-13 | Brown & gray fine to coarse sand, some silt, | F | | AHEAD | at 0.8'. |
| Tuesday | | 3.0 | 10-9 | gravel, trace concrete (Fill) (SM) | | 3 | 4" | |
| Sunny | 2D | 3.0 | 6-6 | Brown fine to coarse sand, some silt, gravel | | | | |
| 65°F | | 5.0 | 4-8 | (SM) | | 5 | | |
| | 3D | 5.0 | 10-7 | Brown fine to medium sand, some silt, trace | S1 | | | |
| | | 7.0 | 8-6 | coarse sand, gravel (SM) | | | | |
| | 4D | 7.0 | 4-10 | Light brown fine to coarse sand, trace silt | | 8 | | |
| | | 8.8 | 35-50/4" | (Decomposed Rock) (SP-SM) | | | | |
| | | | | | | 10 | | Hard drilling from 10' |
| | 5D | 10.0 | 24-50/3" | Tan fine to coarse sand, trace silt | | | | to 15'. |
| | | 10.8 | | (Decomposed Rock) (SP-SM) | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 15 | | Hard drilling from 15' |
| | 6NR | 15.0 | 50/0" | No recovery | | | | to 20'. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | DR | 20 | | |
| | 7NR | 20.0 | 50/0" | No recovery | | | 1* | *Coring time in |
| | 1C | 20.0 | REC=7% | Weathered highly weathered brown fine to | | | 0.5* | minutes per foot. |
| | | 25.0 | RQD=0% | coarse grained marble, broken, iron stained | | | 1* | Brief loss of circulation |
| | | | | & weathered joints | | | 0.75* | at 22.5'. |
| | | | | | | 25 | 0.75* | |
| | 8D | 25.0 | 50/3" | Brown fine to coarse sand, trace silt | | | | REC=0.5" |
| | | 25.3 | | (Decomposed Rock) (SP-SM) | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | 30 | | |
| 08:45 | 9D | 30.0 | 100/3" | Brown & green & gray fine to medium sand, | | 30.3 | | REC=3" |
| | | 30.3 | | some silt, trace mica, coarse sand | | | | End of Boring at 30.3'. |
| | | | | (Decomposed Rock) (SM) | | | | |
| | | | | | | | | |
| | | | | | | 35 | | |
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DRAFT

# ROCK CORE SKETCH

MRCE
built on firm foundations

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

PROJECT: 280-330 East 161st Street
LOCATION: Bronx, NY
TEST/INSP. EQUIPMENT: 6' Ruler
REF. CODES/STANDARDS: NYC BC ch. 18

BORING NO. MR-9
SHEET 2 OF 3
FILE NO. 14364
SURFACE ELEV. +52 ±
RES ENGR. G. Lucking

| Run No. | REC/RQD |
|---|---|
| 1C | 7/0 |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

| Run No. | REC/RQD |
|---|---|
| | |

TOP

MR-2B 1C-2C | MR-1 1C | MR-5P-1C

0.5
1
1.5
2
2.5
3
Top 1C - 20'
H: wtd Marble Rock Frag
3.5
Bot 1C - 25'
4
4.5

BOTTOM

TOP

MR-6-1C

BOTTOM

TOP

MR-8P-1C

BOTTOM

TOP

MR-7-1C

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

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NOTES

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

**BORING NO.** MR-9
**SHEET** 3 **OF** 3

| | | | |
|---|---|---|---|
| **PROJECT** | 280-330 EAST 161 STREET | **FILE NO.** | 14364 |
| **LOCATION** | BRONX, NEW YORK | **SURFACE ELEV.** | +52.0± |
| **BORING LOCATION** | SEE BORING LOCATION PLAN | **DATUM** | NAVD 88 |

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

| **TYPE OF BORING RIG MAKE AND MODEL:** | | **TYPE OF FEED DURING CORING** | | **CASING USED** | [X] YES | [ ] NO | | |
|---|---|---|---|---|---|---|---|---|
| TRUCK | CME-75 | MECHANICAL | | DIA., IN. 4 | DEPTH, FT. FROM 0 | TO 8 | | |
| SKID | | HYDRAULIC | X | DIA., IN. | DEPTH, FT. FROM | TO | | |
| BARGE | | OTHER | | DIA., IN. | DEPTH, FT. FROM | TO | | |
| OTHER | | | | | | | | |

**TYPE AND SIZE OF**

| | |
|---|---|
| D-SAMPLER | 2" O. D. SPLIT SPOON |
| U-SAMPLER | |
| S-SAMPLER | |
| CORE BARREL | NX DOUBLE BARREL |
| CORE BIT | NX DIAMOND |
| DRILL RODS | NWJ |

**DRILLING MUD USED** [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8

TYPE OF DRILLING MUD

**AUGER USED** [ ] YES [X] NO

TYPE AND DIAMETER, IN.

| | | | |
|---|---|---|---|
| *CASING HAMMER, LBS. | 140 | AVERAGE FALL, IN. | 30 |
| *SAMPLER HAMMER, LBS. | 140 | AVERAGE FALL, IN. | 30 |
| *HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): | AUTOMATIC | | |
| *HAMMER RATE, BLOWS PER MINUTE (BPM): | 45± | | |

## WATER LEVEL OBSERVATIONS IN BOREHOLE

| DATE | TIME | DEPTH OF HOLE | DEPTH OF CASING | DEPTH TO WATER | CONDITIONS OF OBSERVATION |
|---|---|---|---|---|---|
| | | | | | NO WATER LEVEL OBSERVATIONS MADE. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**PIEZOMETER INSTALLED** [ ] YES [X] NO **SKETCH SHOWN ON**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STANDPIPE: | TYPE | | ID, IN. | | LENGTH, FT. | | TOP ELEV. |
| INTAKE ELEMENT: | TYPE | | OD, IN. | | LENGTH, FT. | | TIP ELEV. |
| FILTER: | MATERIAL | | OD, IN. | | LENGTH, FT. | | BOT. ELEV. |

## PAY QUANTITIES

| | | | | |
|---|---|---|---|---|
| 3.5" DIA. DRY SAMPLE BORING | LIN. FT. | 25 | NO. OF 3" SHELBY TUBE SAMPLES | |
| 3.5" DIA. U-SAMPLE BORING | LIN. FT. | | NO. OF 3" UNDISTURBED SAMPLES | |
| CORE DRILLING IN ROCK | LIN. FT. | 5 | OTHER: | |

**BORING CONTRACTOR** CRAIG GEOTECHNICAL DRILLING CO., INC.
**DRILLER** MIKE GORSKI **HELPERS** SHANE FRICK
**REMARKS** BOREHOLE BACKFILLED WITH SOIL CUTTINGS.
**RESIDENT ENGINEER** GREGORY LUCKING **DATE** 06-07-22
**CLASSIFICATION CHECK:** CHERYL J. MOSS **TYPING CHECK:** GREGORY LUCKING



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# Appendix E: Certifications

☒ **Error! Reference source not found. (must be completed, signed and submitted with the SWPPP in the SWPTS Application)**

- Owner
- Developer
- SWPPP Preparer

☒ Contractor's Certification **(must be submitted with the SWPPP in the SWPTS Application. To be completed, signed and attached to the SWPPP on-site after SWPPP Approval, but before the start of construction)**

☒ Sub-Contractor's Certification **(must be submitted with the SWPPP in the SWPTS Application. To be completed, signed and attached to the SWPPP on-site after SWPPP Approval, but before the start of construction)**

**If any of the above documents are not included, explain why below:**

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## Certifications

**Owner's Certification**

I certify that I am the Owner of this property and have read or been advised of the applicable sections of the Rules of the City of New York (RCNY) Title 15, Chapter 19.1 and I believe that I understand them. I also understand that, under RCNY, I am responsible for submitting a fee to initiate review of the stormwater pollution prevention plan (SWPPP). I hereby certify that this SWPPP and all associated documentation provided were prepared under my direction or supervision. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings. I also understand that, by submitting this application, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction.

Name: Matthew Lawrence Title: Authorized Signatory

Signature: Date: 12/12/24

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**Developer's Certification**

I have read or been advised of the applicable sections of RCNY Title 15 Chapter 19.1 and believe that I understand them. I also understand that, under the RCNY I am responsible for submitting a fee to initiate review of this application. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings. I also understand that, by submitting this application, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction.

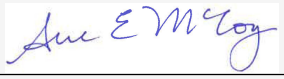
Name: Matthew Lawrence Title: Authorized Signatory

Signature: Date: 12/12/24

**SWPPP Preparer Certification**

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project was prepared by me or under my direct supervision in accordance with the RCNY Title 15 Chapter 19.1 and terms and conditions of the most recent NYSDEC SPDES General Permit for Stormwater Discharges from Construction Sites. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the City New York and could subject me to criminal, civil and/or administrative proceedings.

Name: Sue McCoy Title: Senior Vice President

Signature:  Date: 12/12/2024

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# E.2 – Contractor's Certification

**PROJECT**
280 East 161st Street

**SWPTS Application ID**

**CONTRACTING FIRM NAME**
_____

**CONTRACTING FIRM ADDRESS**
_____

**SITE CONTRACTOR**

**Name and Title:** _____
**Contact Information:** _____

**TRAINED CONTRACTOR(S) WITH SWPPP RESPONSIBILITIES**

1) **Name and Title:** _____
   **Contact Information:** _____
   **NYS DEC ESC Training Certificate Number and Expiration Date**: _____
2) **Name and Title:** _____
   **Contact Information:** _____
   **NYS DEC ESC Training Certificate Number and Expiration Date**: _____

**STORMWATER MEASURES**

Contractor is responsible for all stormwater pollution prevention measures described withing the SWPPP, and relisted below:

1) **Pollution Prevention Measures and Spill Reporting:**
   a. Paving Operations
   b. Paint Washout
   c. Chemical Storage
   d. Construction/Domestic Waste
   e. Hazardous & Toxic Materials
   f. _____
2) **Erosion and Sediment Control Practice:**
   a. Stabilized Construction Entrance
   b. Concrete Truck Washout
   c. Compost Filter Sock
   d. Storm Drain Inlet Protection
   e. Dust Control
   f. _____
3) **Stormwater Management Practices:**
   a. Stormwater Planter
   b. Green Roof
   c. Detention Tank
   d. _____

**CERTIFICATION**

*"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the developer must comply with the terms and conditions of the NYC Stormwater Construction Permit, the most current version of the New York State Pollutant Discharge Elimination System (SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any*

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## E.2 – Contractor's Certification

*person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."*

| | |
|---|---|
| **X** | **X** |
| *Site Contractor*<br>*Print Name, Title, and Company* | *Site Contractor*<br>*Sign and Date* |
| **X** | **X** |
| *Trained Contractor*<br>*Print Name, Title, and Company* | *Trained Contractor*<br>*Sign and Date* |

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# E.3 – Sub-Contractor's Certification

**PROJECT**
280 East 161st Street

**SWPTS Application ID**

**CONTRACTING FIRM NAME**
_____

**CONTRACTING FIRM ADDRESS**
_____

**SUB-CONTRACTOR REPRESENTATIVE**

**Name and Title:** _____
**Contact Information:** _____

**TRAINED CONTRACTOR(S) WITH SWPPP RESPONSIBILITIES**

1) **Name and Title:** _____
   **Contact Information:** _____
   **NYS DEC ESC Training Certificate Number and Expiration Date**: _____
2) **Name and Title:** _____
   **Contact Information:** _____
   **NYS DEC ESC Training Certificate Number and Expiration Date**: _____

**STORMWATER MEASURES**

Contractor is responsible for all stormwater pollution prevention measures described withing the SWPPP, and relisted below:

1) **Pollution Prevention Measures and Spill Reporting:**
   a. Paving Operations
   b. Paint Washout
   c. Chemical Storage
   d. Construction/Domestic Waste
   e. Hazardous & Toxic Materials
   f. _____
2) **Erosion and Sediment Control Practice:**
   a. Stabilized Construction Entrance
   b. Concrete Truck Washout
   c. Compost Filter Sock
   d. Storm Drain Inlet Protection
   e. Dust Control
   f. _____
3) **Stormwater Management Practices:**
   a. Stormwater Planter
   b. Green Roof
   c. Detention Tank
   d. _____

**CERTIFICATION**

*"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the developer must comply with the terms and conditions of the NYC Stormwater Construction Permit, the most current version of the New York State Pollutant Discharge Elimination System (SPDES") general*

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## E.3 – Sub-Contractor's Certification

*permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."*

| | |
|---|---|
| **X** | **X** |
| *Sub-Contractor Representative*<br>*Print Name, Title, and Company* | *Sub-Contractor Representative*<br>*Sign and Date* |
| **X** | **X** |
| *Trained Contractor*<br>*Print Name, Title, and Company* | *Trained Contractor*<br>*Sign and Date* |

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# Appendix F: Inspections

## Documents included:

☒ Site-Specific Template for **Error! Reference source not found.**, including:

- Project information, including project name, site address, SWPTS application ID, and other SPDES permit IDs.
- Space to enter trained contractor name and signed certification, date of inspections, weather and site conditions at the time of inspections, and any other general notes
- A predetermined list of installation and maintenance checks for all proposed erosion and sediment control practices and pollution prevention measures, including:
    - Name of practice
    - Location of practice and any relevant reference drawings
    - Specific installation and maintenance checks that must be verified daily and corrected if not compliant

☒ Site-Specific Template for Qualified Inspector Report, including

- Project information, including project name, site address, SWPTS application ID, SPDES CGP ID, other SPDES permit IDs, required inspection frequency, and names and titles of the qualified inspector(s) and contractor point of contact for the project.
- Space to enter date of inspections, weather and site conditions at the time of inspections, and any other general notes
- Predetermined lists of:
    - Drainage areas/sub-areas throughout the entire site
    - Points of discharge
    - Receiving waterbodies and waterbodies on/near the site
    - ESC practices, including
        - Name of practice
        - Location of practice and any relevant reference drawings
        - Specific installation and maintenance checks that must be inspected
        - Space for inspection notes and identification of corrective actions
    - Pollution prevention measures, including
        - Name of measure
        - Location of measure and any relevant reference drawings
        - Specific installation and maintenance checks that must be inspected
        - Space for inspection notes and identification of corrective actions
    - Post-Construction Stormwater Management Practices, included
        - Practice ID and name
        - Practice location
        - Construction status & SWPPP compliance
        - Space for inspection notes and identification of corrective actions
- An acknowledgement that the report will be issued to the Developer and Contractor, and kept on site in the log book
- The signature of the licensed and unlicensed Qualified Inspectors.

☒ Template of Monthly Inspection Summary Report by the Qualified Inspector, including:

- Project name and site address
- Names and contact information for Qualified Inspectors who performed inspections during the reporting month

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- Reporting month and date of submission
- List of all inspections that occurred on the month in question, including date of inspection, QI, Stage of construction and corrective actions that were identified or resolved
- Qualified Professional's Certification and signature
- Note: This document should be submitted to DEP on a monthly basis. Submission shall be via email to *StormwaterPermits@dep.nyc.gov*, with SWPTS Application ID in Subject Line.

☐ Certificates of Completion of NYSDEC 4-Hour Erosion and Sediment Control Training in the last 3 years for all listed Trained Contractors, Qualified Inspectors, and Qualified Professionals.

## If any of the above documents are not included, explain why below:

Click or tap here to enter text.

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# F.1 – Daily Inspection Report by Trained Contractor

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**
_____

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
NA

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**
_____

**SUB-CONTRACTOR**
_____

**TRAINED CONTRACTOR INFORMATION**
*(Name, Company, NYS DEC ESC Training Certification Number and Expiration Date)*

**DATE AND TIME OF INSPECTION**
*(Date, day of week, and time of day)*

**SITE CONDITIONS**
*(Temperature, weather, and soil conditions)*

**General Inspection Notes:**

**Certification and acknowledgement of Trained Contractor**

*By signing below, I acknowledge that all information provided in this report is accurate and complete. The report shall be kept in a logbook on site and be made available to DEP at any time upon request. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete corrective actions in a reasonable timeframe.*

**X** _____
*Trained Contractor Name and Title*

**X** _____
*Trained Contractor Signature and Date*

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# F.1 – Daily Inspection Report by Trained Contractor

| Table I: Erosion and Sediment Control Practices | | |
|---|---|---|
| **Practice:** Stabilized Construction Entrance<br>**Location:** Concourse Village East and East 161st Street: Appendix A<br>**Type:** Sediment Control | | |
| **Inspection Checklist** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Stone is clean enough to effectively remove mud from vehicle tires? | | |
| Installed per standards and specifications? | | |
| Does all traffic use the stabilized entrance to enter and leave site? | | |
| Is adequate drainage provided to prevent ponding at entrance? | | |
| Is there any sediment on the public streets that needs to be cleaned? | | |
| Click or tap here to enter text. | | |
| **Practice:** Concrete Truck Washout Container<br>**Location:** Near Stabilized Construction Entrances: Appendix A<br>**Type:** Sediment Control | | |
| **Inspection Checklist** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Plastic sheeting liner in good condition without holes or tears? | | |
| Is accumulated hardened concrete less than 75% of storage capacity? | | |
| Is container damaged and in need of repair or replacement? | | |

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# F.1 – Daily Inspection Report by Trained Contractor

| | | |
|---|---|---|
| Is excess wash water being pumped into a containment vessel for offsite disposal? | | |
| Click or tap here to enter text. | | |
| **Practice:** Compost Filter Sock<br>**Location:** Along Work Area and Street Catch Basins: Appendix A<br>**Type:** Sediment Control | | |
| **Inspection Checklist** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Properly anchored to ground surface or installed adjacent to construction fence/barrier? | | |
| Sediment level is less than 50% of height? | | |
| Filter sock is not torn or flattened? | | |
| Fill material is contained within the mesh sock? | | |
| Requires replacement due to damage/deterioration? | | |
| Is filter sock more than 6 months old requiring replacement? | | |
| **Practice:** Type V Storm Drain Inlet Protection<br>**Location:** Street Catch Basins: Appendix A<br>**Type:** Sediment Control | | |
| **Inspection Checklist** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Siltsack is properly anchored so that water passes through it before draining? | | |
| Sediment accumulated around the inlet is removed on a regular basis? | | |
| Siltsack is in good condition with no tears or fraying? | | |

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# F.1 – Daily Inspection Report by Trained Contractor

| | | |
|---|---|---|
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| **Practice:** Dust Control<br>**Location:** Onsite: Appendix A<br>**Type:** Sediment Control | | |
| **Inspection Checklist** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Is dust adequately controlled? | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |

*[Add rows as needed to list all Pollution Prevention Measures and their associated Installation/Maintenance checklists]*

[1]*For any items marked "N/A", include a note describing why the checklist item could not be inspected.*

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# F.1 – Daily Inspection Report by Trained Contractor

| Table II: Pollution Prevention Measures | | |
|---|---|---|
| **Material or Activity to be Mitigated:** Paving Operations<br>**Location:** Concourse Village East and East 161st Street, and Private Road | | |
| **Pollution Prevention Measures** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Are petroleum products stored onsite placed in curbed/diked areas? | | |
| Was NYSDEC Spill Hotline called for a petroleum spill more than 5 gallons? | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| | | |
| | | |
| | | |
| **Material or Activity to be Mitigated:** Paint Washout<br>**Location:** NA | | |
| **Pollution Prevention Measures** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Has a leak-proof paint washout container been provided? | | |
| Are there any visible spills or leaks from the container? | | |
| Are there any damages to the container requiring repair or replacement? | | |
| Is the container more than 75% full? | | |
| Click or tap here to enter text. | | |
| | | |
| | | |
| | | |

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# F.1 – Daily Inspection Report by Trained Contractor

| | | |
|---|---|---|
| **Material or Activity to be Mitigated:** Chemical Storage<br>**Location:** NA | | |
| **Pollution Prevention Measures** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Are chemical products stored onsite placed in curbed/diked areas? | | |
| Are appropriate materials (spill kits) to control spills onsite? Where? | | |
| Click or tap here to enter text. | | |
| Click or tap here to enter text. | | |
| **Material or Activity to be Mitigated:** Construction/Domestic Waste<br>**Location:** NA | | |
| **Pollution Prevention Measures** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Is construction site litter, debris, and spoils appropriately managed? | | |
| Are there designated waste collection areas? | | |
| Are waste containers covered? | | |
| Are waste containers consistently overfilled? | | |
| **Material or Activity to be Mitigated:** Hazardous & Toxic Materials<br>**Location:** NA | | |
| **Pollution Prevention Measures** | **Compliant?** *(Yes, No, N/A[1])* | **Corrective Actions / Maintenance Needs** |
| Has an operator or designated representative been assigned to implement the spill prevention avoidance and response plan? | | |
| Are appropriate materials (spill kits) to control spills onsite? Where? | | |
| Are hazardous containers stored in a dry, curbed/diked area? | | |

*[Add rows as needed to list all Pollution Prevention Measures and their associated Installation/Maintenance checklists]*

*[1]For any items marked "N/A", include a note describing why the checklist item could not be inspected.*

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# F.2 – Qualified Inspector (QI) Report

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**REQUIRED INSPECTION FREQUENCY**
Once Every 7 Calendar Days

**SWPTS APPLICATION ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
NA

**STORMWATER CONSTRUCTION PERMIT ID**
_____

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**
_____

**QUALIFIED INSPECTOR**
*(Name and company)*

**SUPERVISED QUALIFIED INSPECTOR**
*(Name and company, if applicable)*

**CONTRACTOR SITE CONTACT**
*(Name, title, phone number, email)*

**DATE AND TIME OF INSPECTION**
*(Date, day of week, and time of day)*

**WEATHER AT TIME OF INSPECTION**
*(Temperature and weather conditions)*

**SOILS AT TIME OF INSPECTION**
*(Area disturbed [in acres] and condition [i.e. wet, dry, saturated, or frozen])*

**General Inspection Notes:**

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# F.2 – Qualified Inspector (QI) Report

| Table I: Points of Discharge | | |
|---|---|---|
| **Point of Discharge**<br>*Include all points of discharge from the site, including conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow.* | **Inspected?**<br>*(Yes, No)* | **Condition Observed**<br>*Include description and photo ID, if applicable* |
| ID Number: #1<br>Type: 8" DIP Sanitary Connection<br>Location: 15" Combined Sewer in Concourse Village East | | |
| ID Number: #2<br>Type: 8" DIP Combined Connection<br>Location: 15" Combined Sewer in Concourse Village East | | |
| ID Number: #3<br>Type: 8" XHCI Sanitary Connection<br>Location: 12" Combined Sewer in East 161st Street | | |
| ID Number: #4<br>Type: 8" XHCI Sanitary Connection<br>Location: 12" Combined Sewer in East 161st Street | | |
| ID Number: #5<br>Type: 8" XHCI Storm Connection<br>Location: 12" Combined Sewer in East 161st Street | | |

*[Add or delete rows as needed to list all points of discharge for the project]*

| Table II: Waterbodies | | |
|---|---|---|
| **Waterbody Name and Location**<br>*Include name and location of receiving waterbodies, and all waterbodies located on-site or adjacent to the site.* | **Inspected?**<br>*(Yes, No)* | **Condition Observed**<br>*Include description and photo ID, if applicable* |
| Waterbody Name: Click or tap here to enter text.<br>Location: Click or tap here to enter text. | | |
| Waterbody Name: Click or tap here to enter text.<br>Location: Click or tap here to enter text. | | |

*[Add or delete rows as needed to list all receiving waterbodies and waterbodies on or near the site]*

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# F.2 – Qualified Inspector (QI) Report

| Table III: Erosion and Sediment Control Practices[1] | | | |
|---|---|---|---|
| **Practice:** Stabilized Construction Entrance<br>**Location:** Concourse Village East and East 161st Street: Appendix A<br>**Type:** Sediment Control | | | |
| **Inspection Checklist** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Stone is clean enough to effectively remove mud from vehicle tires? | | | |
| Installed per standards and specifications? | | | |
| Does all traffic use the stabilized entrance to enter and leave site? | | | |
| Is adequate drainage provided to prevent ponding at entrance? | | | |
| Is there any sediment on the public streets that needs to be cleaned? | | | |
| **Practice:** Concrete Truck Washout Container<br>**Location:** Near Stabilized Construction Entrances: Appendix A<br>**Type:** Sediment Control | | | |
| **Inspection Checklist** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Plastic sheeting liner in good condition without holes or tears? | | | |
| Is accumulated hardened concrete less than 75% of storage capacity? | | | |
| Is container damaged and in need of repair or replacement? | | | |

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# F.2 – Qualified Inspector (QI) Report

| | | | |
|---|---|---|---|
| Is excess wash water being pumped into a containment vessel for offsite disposal? | | | |
| **Practice:** Compost Filter Sock<br>**Location:** Along Work Area and Street Catch Basins: Appendix A<br>**Type:** Sediment Control | | | |
| **Inspection Checklist** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Properly anchored to ground surface or installed adjacent to construction fence/barrier? | | | |
| Sediment level is less than 50% of height? | | | |
| Filter sock is not torn or flattened? | | | |
| Fill material is contained within the mesh sock? | | | |
| Requires replacement due to damage/deterioration? | | | |
| Is filter sock more than 6 months old requiring replacement? | | | |
| **Practice:** Type V Storm Drain Inlet Protection<br>**Location:** Street Catch Basins: Appendix A<br>**Type:** Sediment Control | | | |
| **Inspection Checklist** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Siltsack is properly anchored so that water passes through it before draining? | | | |
| Sediment accumulated around the inlet is removed on a regular basis? | | | |

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# F.2 – Qualified Inspector (QI) Report

| | | | |
|---|---|---|---|
| Siltsack is in good condition with no tears or fraying? | | | |
| Click or tap here to enter text. | | | |
| **Practice:** Dust Control<br>**Location:** Onsite: Appendix A<br>**Type:** Sediment Control | | | |
| **Inspection Checklist** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Is dust adequately controlled? | | | |
| Click or tap here to enter text. | | | |
| Click or tap here to enter text. | | | |
| Click or tap here to enter text. | | | |

*[Add rows as needed to list all Pollution Prevention Measures and their associated Installation/Maintenance checklists]*

*[1]For any items marked "N/A", include a note describing why the checklist item could not be inspected.*

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# F.2 – Qualified Inspector (QI) Report

| Table IV: Pollution Prevention Measures[1] | | | |
|---|---|---|---|
| **Material or Activity to be Mitigated:** Paving Operations<br>**Location:** Concourse Village East and East 161st Street, and Private Road | | | |
| **Pollution Prevention Measures** | **Compliant?** *(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status** *Include description, date identified, status, and photo ID.* | **New Corrective Action Identified** *Include description and photo ID.* |
| Are petroleum products stored onsite placed in curbed/diked areas? | | | |
| Was NYSDEC Spill Hotline called for a petroleum spill more than 5 gallons? | | | |
| Click or tap here to enter text. | | | |
| Click or tap here to enter text. | | | |
| | | | |
| | | | |
| | | | |
| **Material or Activity to be Mitigated:** Paint Washout<br>**Location:** NA | | | |
| **Pollution Prevention Measures** | **Compliant?** *(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status** *Include description, date identified, status, and photo ID.* | **New Corrective Action Identified** *Include description and photo ID.* |
| Has a leak-proof paint washout container been provided? | | | |
| Are there any visible spills or leaks from the container? | | | |
| Are there any damages to the container requiring repair or replacement? | | | |
| Is the container more than 75% full? | | | |
| | | | |
| | | | |

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# F.2 – Qualified Inspector (QI) Report

| **Material or Activity to be Mitigated:** Chemical Storage<br>**Location:** NA | | | |
|---|---|---|---|
| **Pollution Prevention Measures** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Are chemical products stored onsite placed in curbed/diked areas? | | | |
| Are appropriate materials (spill kits) to control spills onsite? Where? | | | |
| Click or tap here to enter text. | | | |
| Click or tap here to enter text. | | | |
| | | | |
| | | | |
| | | | |
| **Material or Activity to be Mitigated:** Construction/Domestic Waste<br>**Location:** NA | | | |
| **Pollution Prevention Measures** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Is construction site litter, debris, and spoils appropriately managed? | | | |
| Are there designated waste collection areas? | | | |
| Are waste containers covered? | | | |
| Are waste containers consistently overfilled? | | | |
| | | | |
| | | | |
| | | | |
| | | | |

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# F.2 – Qualified Inspector (QI) Report

| **Material or Activity to be Mitigated:** Hazardous & Toxic Materials<br>**Location:** NA | | | |
|---|---|---|---|
| **Pollution Prevention Measures** | **Compliant?**<br>*(Yes, No, N/A[1])* | **Previously Identified Corrective Action and Status**<br>*Include description, date identified, status, and photo ID.* | **New Corrective Action Identified**<br>*Include description and photo ID.* |
| Has an operator or designated representative been assigned to implement the spill prevention avoidance and response plan? | | | |
| Are appropriate materials (spill kits) to control spills onsite? Where? | | | |
| Are hazardous containers stored in a dry, curbed/diked area? | | | |
| | | | |
| | | | |
| | | | |

*[Add rows as needed to list all Pollution Prevention Measures and their associated Installation/Maintenance checklists]*

[1]*For any items marked "N/A", include a note describing why the checklist item could not be inspected.*

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# F.2 – Qualified Inspector (QI) Report

| Table V: Stormwater Management Practices[1] | | | | |
|---|---|---|---|---|
| **Practice ID and Name** | **Practice Location** | **Construction Status & SWPPP Compliance[1]** | **Previously Identified Corrective Action and Status** *Include description, date identified, status, and Photo ID.* | **New Corrective Action Identified** *Include description and photo ID.* |
| SMP ID#1 Stormwater Planter #1 | Landscaped Courtyard | | | |
| SMP ID#2 Stormwater Planter #2 | Landscaped Courtyard | | | |
| SMP ID#3 Green Roof #1 | West Tower Roof | | | |
| SMP ID#4 Green Roof #2 | East Tower Roof | | | |
| SMP ID#5 Green Roof #3 | East Tower Roof | | | |
| SMP ID#6 Green Roof #4 | East Tower Roof | | | |
| SMP ID#7 Detention Tank | West Tower Cellar | | | |
| SMP ID#8 Detention Tank | Underneath Private Road | | | |
| | | | | |

*[Add rows as needed to list all Post-Construction Stormwater Management Practices and their associated Installation/Maintenance items]*

*[1]During each inspection, indicate whether the practice construction is (0) Not Started, (1) In Progress, Compliant, (2) In Progress, Non-Compliant, (3) Completed, Compliant, (4) Completed, Non-Compliant.*

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# F.2 – Qualified Inspector (QI) Report

**Table VI: Site Plan(s)**

*Show areas with active soil disturbance activity, areas that have been disturbed but are inactive at time of inspection, and areas that have been stabilized since the last inspection (CGP Part IV.C.4.h). Provide a legend and additional inspection information as needed.*

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**Drawing ID:**

**Other notes and references:**

*[Duplicate table as needed]*

# F.2 – Qualified Inspector (QI) Report

| **Table VII: Photos**<br>*Include colored digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions (CGP Part IV.C.4.I).* | |
|---|---|
| | |
| **Photo ID:**<br>**Other Notes and References:** | **Photo ID:**<br>**Other Notes and References:** |

*[Duplicate table as needed]*

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# F.2 – Qualified Inspector (QI) Report

**Certification and acknowledgement of Qualified Inspector who conducted the inspection and completed the report.**
**Note: This may be a Supervised QI, or a certified/licensed QI, as required by project type.**

*By signing below, I certify that all information provided in this report is accurate and complete. The report, along with all attachments, is in compliance with the NYS DEC Construction General Permit and the applicable sections of the Rules of the City of New York (RCNY) Title 15, Chapter 19.1. I acknowledge that I must notify the Owner and appropriate Contractors or Subcontractors of any corrective actions that need to be taken, within one business day of the date of the inspection.*

| | |
|---|---|
| **X** | **X** |
| *Qualified Inspector*<br>*Name and Title* | *Qualified Inspector*<br>*Signature and Date* |

**Certification and acknowledgement of Qualified Inspector who oversaw the inspection and report development.**
**Note: This must be a certified/licensed QI, as required by project type. If this is the same person as the signatory above, they must provide a second certification below. If the QI who signed above was a Supervised QI, the QI signing this certification must be the person who oversaw the inspection and report development.**

*By signing below, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings.*

| | |
|---|---|
| **X** | **X** |
| *Qualified Inspector*<br>*Name, Title, Qualifying License/Certification* | *Qualified Inspector*<br>*Signature and Date* |

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# F.3 – Monthly Summary of QI Inspections

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**REQUIRED INSPECTION FREQUENCY**
Once every 7 calendar days

**SWPTS APPLICATION ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
NA

**STORMWATER CONSTRUCTION PERMIT ID**
_____

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**
_____

**QUALIFIED INSPECTOR**
*(Name and company)*

**REPORTING MONTH**
*(Month during which inspections took place)*

**SUBMISSION DATE**
*(Date summary is emailed to DEP)*

**QUALIFIED INSPECTOR'S CERTIFICATION:**

*"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings."*

**X** _____

*Qualified Inspector*
*Name and Title*

**X** _____

*Qualified Inspector*
*Signature and Date*

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# F.3 – Monthly Summary of QI Inspections

| Summary of QI Inspections | | | | |
|---|---|---|---|---|
| **Date of Inspection** | **Name of Inspector** | **Area of Disturbance on Site (acres)** | **Construction Completion (%)** | **Corrective Items Identified or Resolved** |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

DRAFT

## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**

DRAFT

| Inspected SMP Component | Date & Time of Inspection | Name of Qualified Inspector | Certifies Conformance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Geotextile Fabric | | | | |
| Location & Placement | | | | |
| Engineered Soil | | | | |
| Top/Bottom Stone Elevations | | | | |
| Dimensions (LxWxD) | | | | |
| Inlet Pipe | | | | |
| Invert Elevations | | | | |
| Pipe Diameter | | | | |
| Outlet Pipe | | | | |
| Invert Elevations | | | | |
| Pipe Diameter | | | | |
| Internal Structural | | | | |
| Invert Elevations | | | | |
| Pipe Diameter/Chamber Depth | | | | |
| Quantity | | | | |

SMP Installation
Rev. 1 [3/2025]

Stormwater Planter

SMP ID: _1____
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

| | | | | |
|---|---|---|---|---|
| Stone Base | | | | |
| Top/Bottom Stone Elevations | | | | |
| Dimensions (LxWxD) | | | | |
| Surface Grading | | | | |
| FG Elevations | | | | |
| Ponding Depth | | | | |
| Inspection Port | | | | |
| Quantity & Location | | | | |
| Observation Well | | | | |
| Quantity & Location | | | | |
| Overflow Drain Basin | | | | |
| Grate Elevation | | | | |
| Dimensions (LxWxD) | | | | |
| Pipe Invert Elevation | | | | |
| Sump Depth | | | | |
| Outlet Control Structure | | | | |
| Grate Elevation | | | | |
| Dimensions (LxWxD) | | | | |
| Pipe Invert Elevation | | | | |
| Sump Depth | | | | |
| Weir Length & Elevation | | | | |
| Orifice Diameter & Elevation | | | | |

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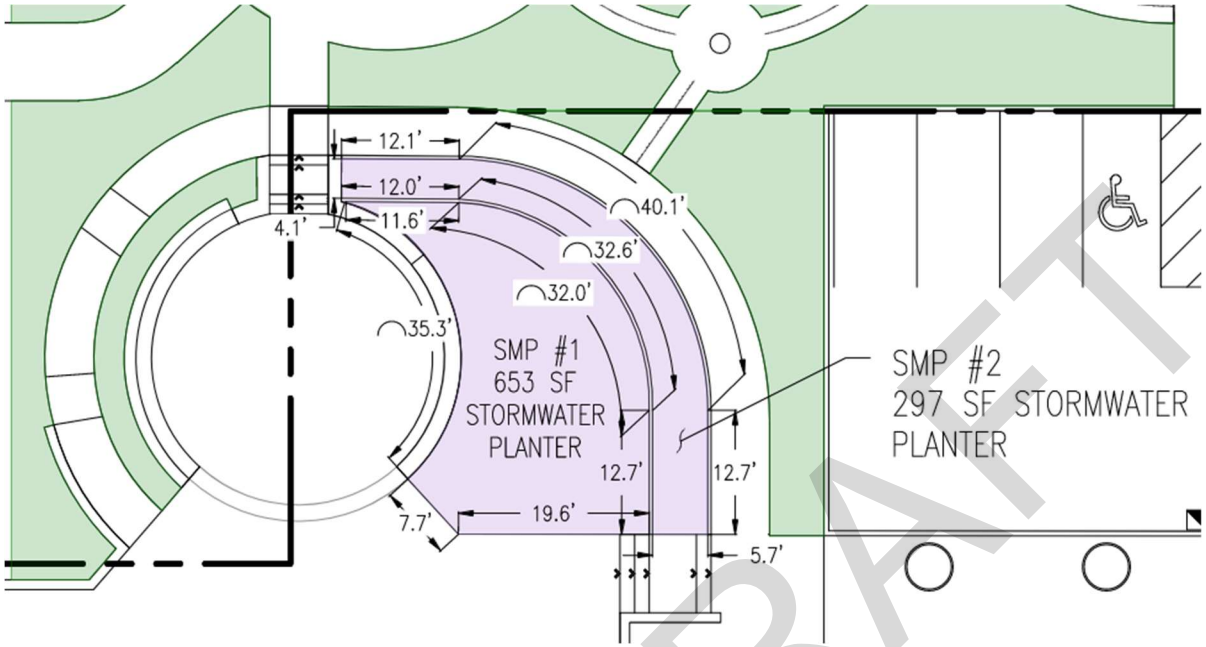
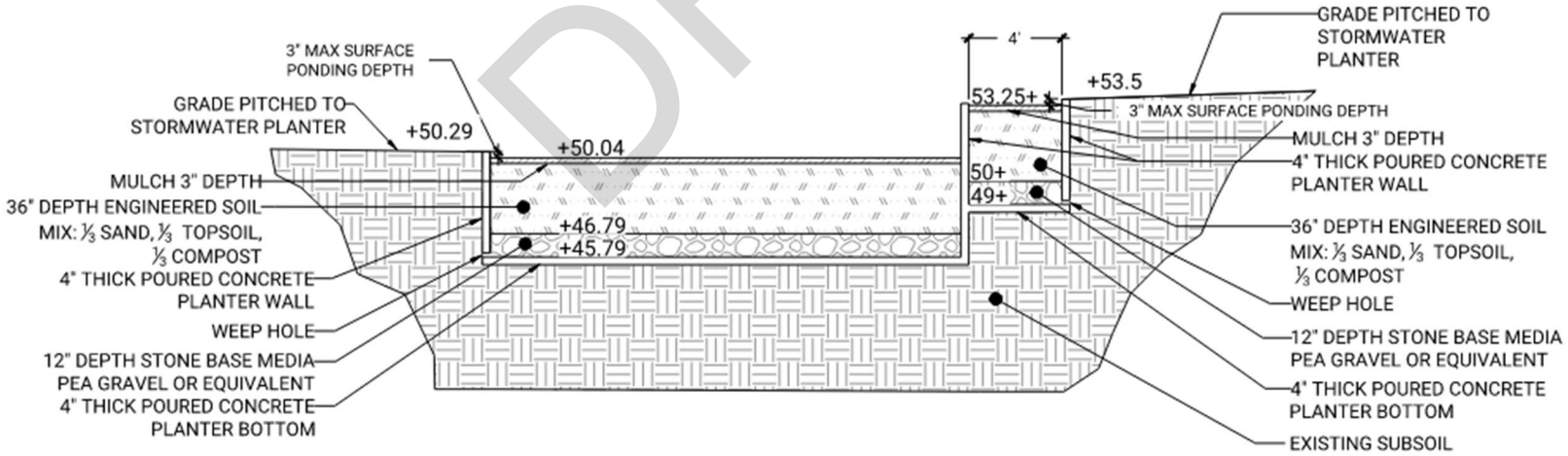
## Section B. SMP Cross-Sections and/or Profiles




DRAFT

## Section C. SMP Photograph Log

| **SMP Installation Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been constructed in accordance with the most recent approved SWPPP.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date of Inspection:** | **SMP Component:**<br>**Date of Inspection:** |

*[Duplicate table rows as needed]*

DRAFT

## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**

DRAFT

| Inspected SMP Component | Date & Time of Inspection | Name of Qualified Inspector | Certifies Conformance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Geotextile Fabric | | | | |
| Location & Placement | | | | |
| Engineered Soil | | | | |
| Top/Bottom Stone Elevations | | | | |
| Dimensions (LxWxD) | | | | |
| Inlet Pipe | | | | |
| Invert Elevations | | | | |
| Pipe Diameter | | | | |
| Outlet Pipe | | | | |
| Invert Elevations | | | | |
| Pipe Diameter | | | | |
| Internal Structural | | | | |
| Invert Elevations | | | | |
| Pipe Diameter/Chamber Depth | | | | |
| Quantity | | | | |

SMP Installation
Rev. 1 [3/2025]

Stormwater Planter

SMP ID: _2____
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

| | | | | |
|---|---|---|---|---|
| Stone Base | | | | |
| Top/Bottom Stone Elevations | | | | |
| Dimensions (LxWxD) | | | | |
| Surface Grading | | | | |
| FG Elevations | | | | |
| Ponding Depth | | | | |
| Inspection Port | | | | |
| Quantity & Location | | | | |
| Observation Well | | | | |
| Quantity & Location | | | | |
| Overflow Drain Basin | | | | |
| Grate Elevation | | | | |
| Dimensions (LxWxD) | | | | |
| Pipe Invert Elevation | | | | |
| Sump Depth | | | | |
| Outlet Control Structure | | | | |
| Grate Elevation | | | | |
| Dimensions (LxWxD) | | | | |
| Pipe Invert Elevation | | | | |
| Sump Depth | | | | |
| Weir Length & Elevation | | | | |
| Orifice Diameter & Elevation | | | | |

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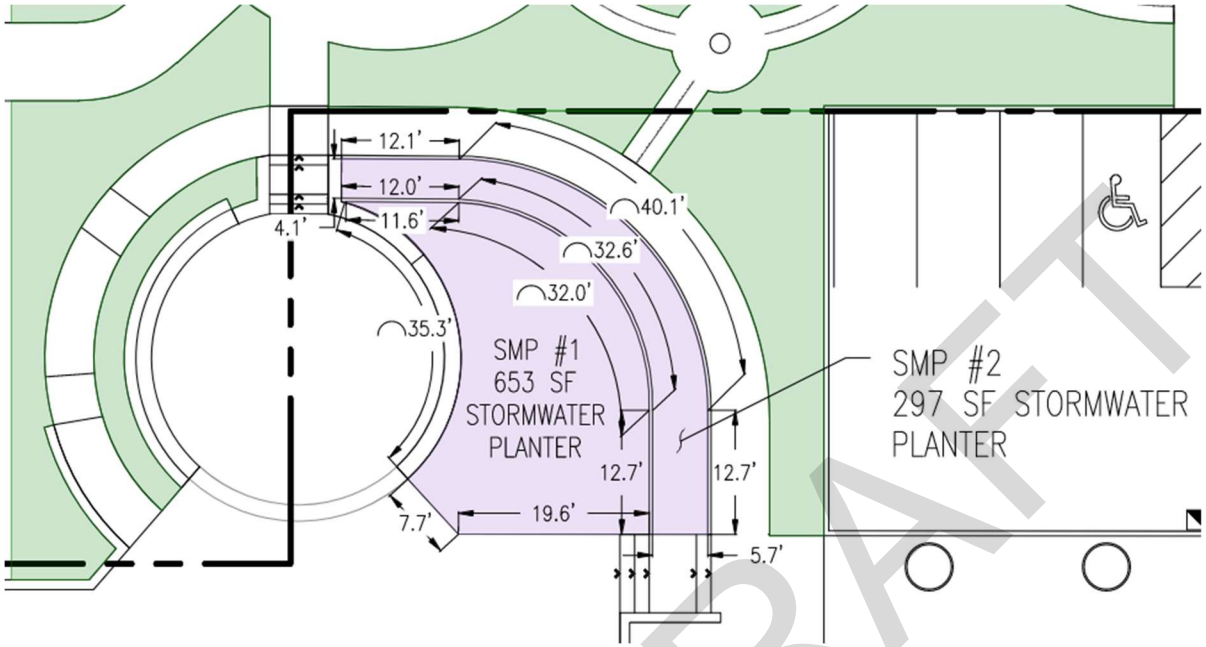
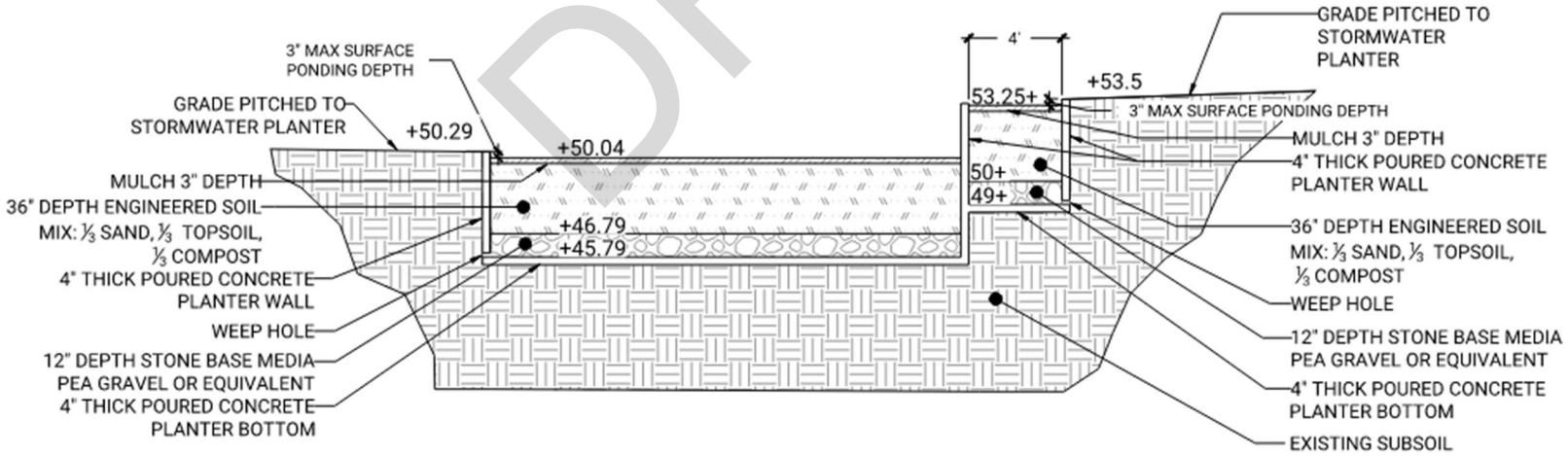
## Section B. SMP Cross-Sections and/or Profiles

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## Section C. SMP Photograph Log

| **SMP Installation Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been constructed in accordance with the most recent approved SWPPP.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date of Inspection:** | **SMP Component:**<br>**Date of Inspection:** |

*[Duplicate table rows as needed]*

DRAFT

SMP Installation
Rev. 1 [3/2025]

Green Roof

SMP ID: 3
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

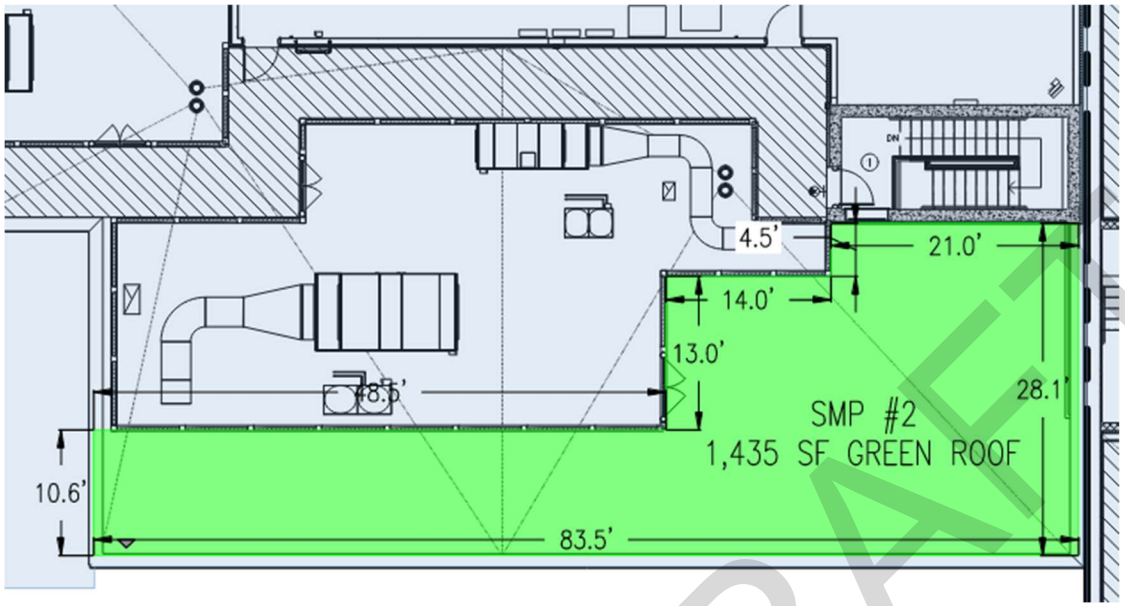
**DEVELOPER**
TEG Morrisania Development LLC

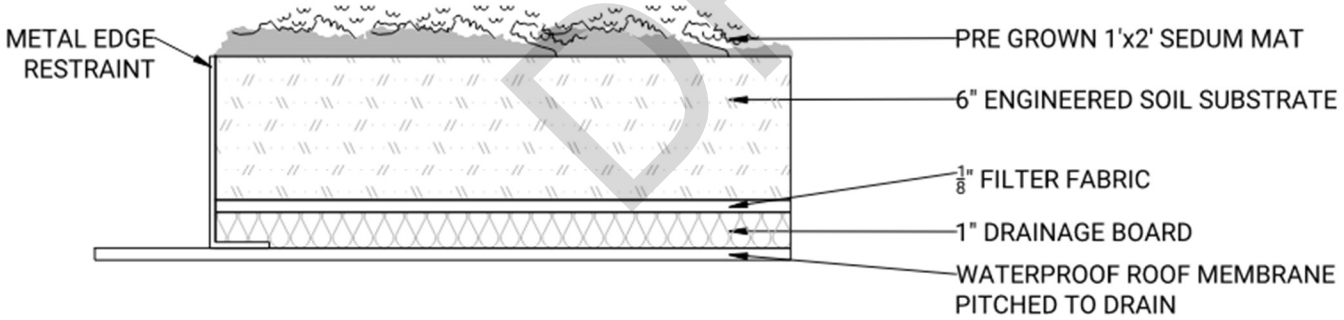
**CONTRACTOR**

DRAFT

| Inspected SMP Component | Date & Time of Inspection | Name of Qualified Inspector | Certifies Conformance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Lightweight Growing Media | | | | |
| Dimensions (LxWxD) | | | | |
| Separation Layer | | | | |
| Location & Placement | | | | |
| Outlet Pipe | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Drainage Layer | | | | |
| Dimensions (LxWxD) | | | | |
| Other: | | | | |
| | | | | |
| | | | | |
| | | | | |

## Section B. SMP Cross-Sections and/or Profiles




DRAFT

Green Roof

SMP ID: 3
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

## Section C. SMP Photograph Log

| **SMP Installation Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been constructed in accordance with the most recent approved SWPPP.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date of Inspection:** | **SMP Component:**<br>**Date of Inspection:** |

*[Duplicate table rows as needed]*

DRAFT

## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

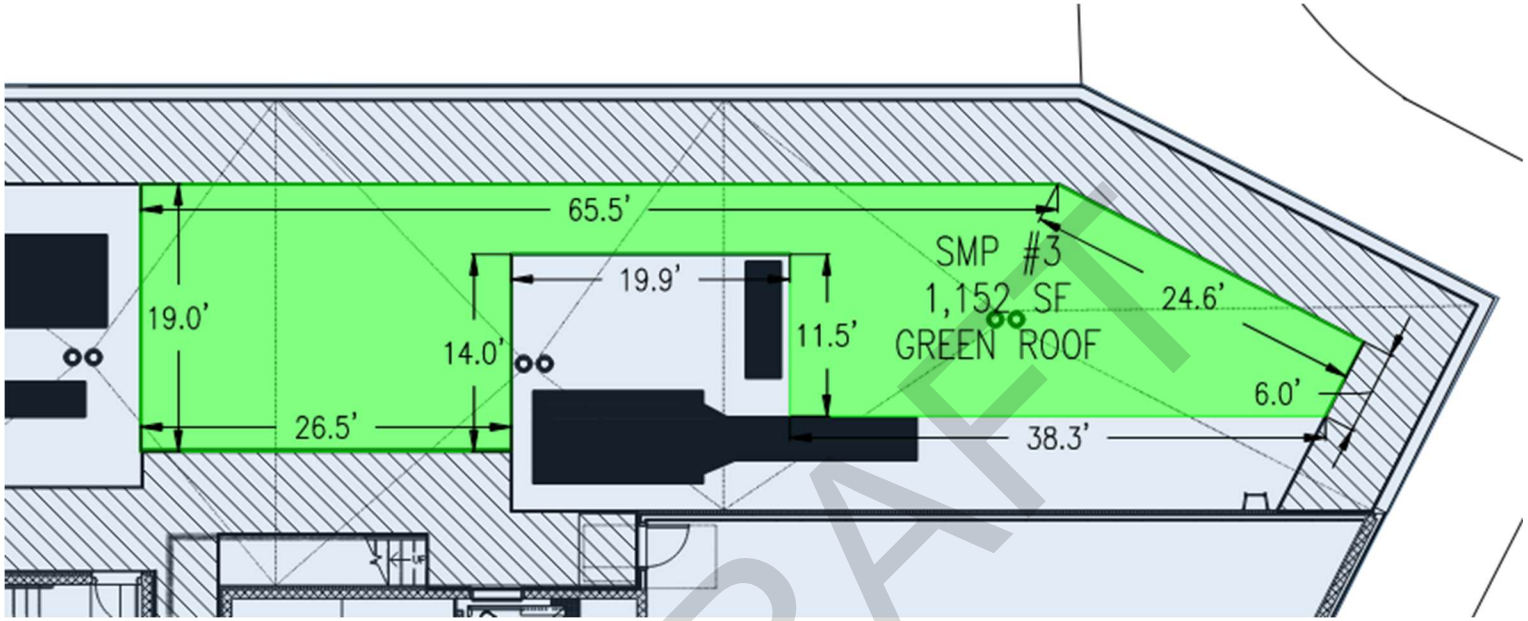
**DEVELOPER**
TEG Morrisania Development LLC

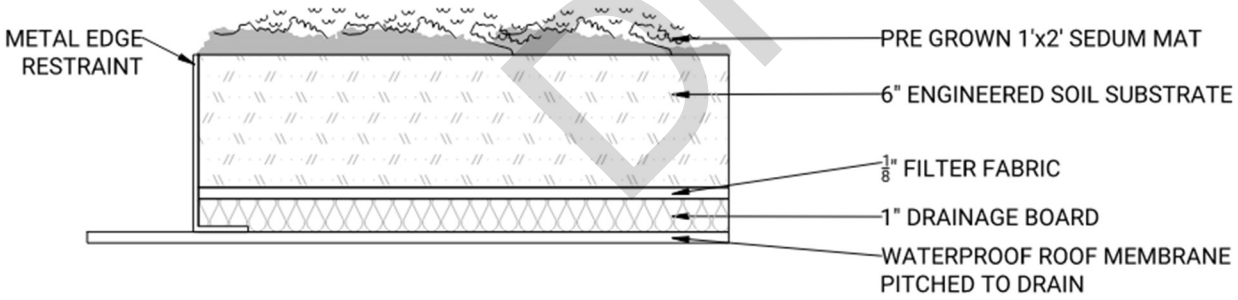
**CONTRACTOR**

DRAFT

| Inspected SMP Component | Date & Time of Inspection | Name of Qualified Inspector | Certifies Conformance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Lightweight Growing Media | | | | |
| Dimensions (LxWxD) | | | | |
| Separation Layer | | | | |
| Location & Placement | | | | |
| Outlet Pipe | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Drainage Layer | | | | |
| Dimensions (LxWxD) | | | | |
| Other: | | | | |
| | | | | |
| | | | | |
| | | | | |

## Section B. SMP Cross-Sections and/or Profiles




DRAFT

Green Roof

SMP ID: 4
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

## Section C. SMP Photograph Log

| **SMP Installation Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been constructed in accordance with the most recent approved SWPPP.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date of Inspection:** | **SMP Component:**<br>**Date of Inspection:** |

*[Duplicate table rows as needed]*

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SMP Installation
Rev. 1 [3/2025]

Green Roof

SMP ID: 5
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**

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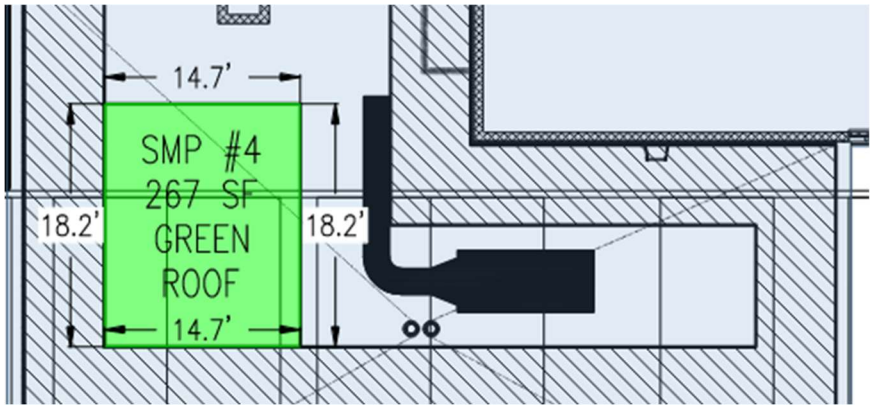
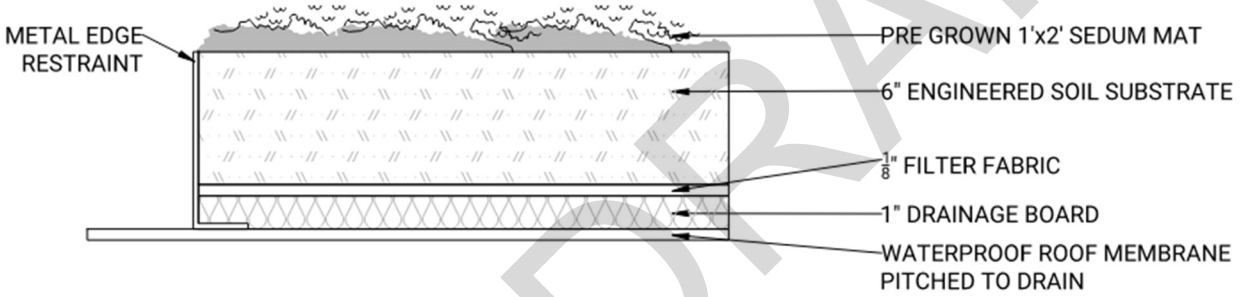
| Inspected SMP Component | Date & Time of Inspection | Name of Qualified Inspector | Certifies Conformance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Lightweight Growing Media | | | | |
| Dimensions (LxWxD) | | | | |
| Separation Layer | | | | |
| Location & Placement | | | | |
| Outlet Pipe | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Drainage Layer | | | | |
| Dimensions (LxWxD) | | | | |
| Other: | | | | |
| | | | | |
| | | | | |
| | | | | |

## Section B. SMP Cross-Sections and/or Profiles

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Green Roof

SMP ID: 5
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

## Section C. SMP Photograph Log

| **SMP Installation Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been constructed in accordance with the most recent approved SWPPP.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date of Inspection:** | **SMP Component:**<br>**Date of Inspection:** |

*[Duplicate table rows as needed]*

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## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

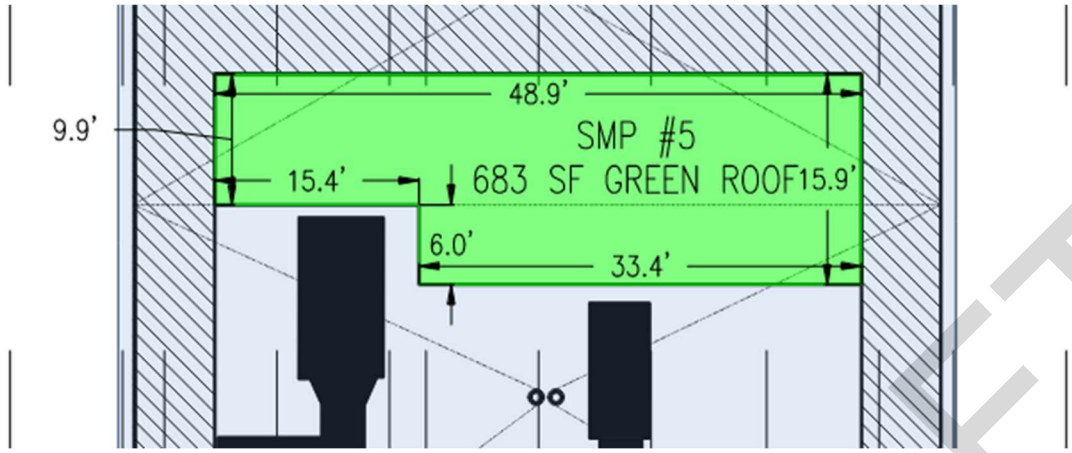
**DEVELOPER**
TEG Morrisania Development LLC

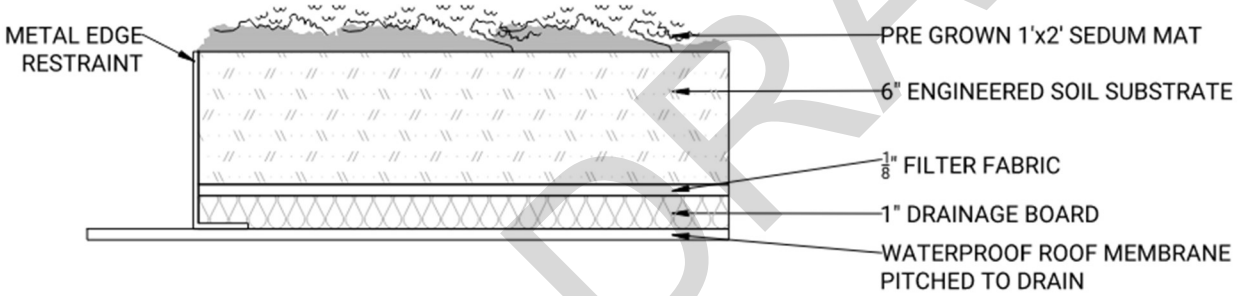
**CONTRACTOR**

DRAFT

| Inspected SMP Component | Date & Time of Inspection | Name of Qualified Inspector | Certifies Conformance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Lightweight Growing Media | | | | |
| Dimensions (LxWxD) | | | | |
| Separation Layer | | | | |
| Location & Placement | | | | |
| Outlet Pipe | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Drainage Layer | | | | |
| Dimensions (LxWxD) | | | | |
| Other: | | | | |
| | | | | |
| | | | | |
| | | | | |

## Section B. SMP Cross-Sections and/or Profiles

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P

Green Roof

SMP ID: 6
SMP Primary Function: Evapotranspiration
SMP Secondary Function: Filtration

## Section C. SMP Photograph Log

| **SMP Installation Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been constructed in accordance with the most recent approved SWPPP.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date of Inspection:** | **SMP Component:**<br>**Date of Inspection:** |

*[Duplicate table rows as needed]*

DRAFT

SMP Installation | Detention Tank | SMP ID: _7_____

SMP Primary Function: Detention_____

SMP Secondary Function: _____

## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**
_____

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| Inspected SMP Component | Date & Time of Certification | Name of Qualified Professional | Certifies Compliance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Tank | | | | |
| Dimensions (LxWxD) | | | | |
| Tank Material | | | | |
| Sump Depth | | | | |
| Orifice & Outlet Pipe | | | | |
| Invert Elevation | | | | |
| Orifice Diameter | | | | |
| Re-entrant or Flush Orifice | | | | |
| Outlet Pipe Diameter | | | | |
| Overflow Pipe | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Overflow Connects to Outlet Pipe Upstream of House Trap? | | | | |
| Overflow Pipe to Facade @ 2' Max Above Sidewalk? | | | | |

SMP Installation | Detention Tank | SMP ID: _7_____

SMP Primary Function: Detention_____

SMP Secondary Function: _____

| | | | | |
|---|---|---|---|---|
| Inlet Pipe(s) | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Maintenance Access Hatch | | | | |
| Dimensions (LxW) | | | | |
| Location | | | | |
| | | | | |

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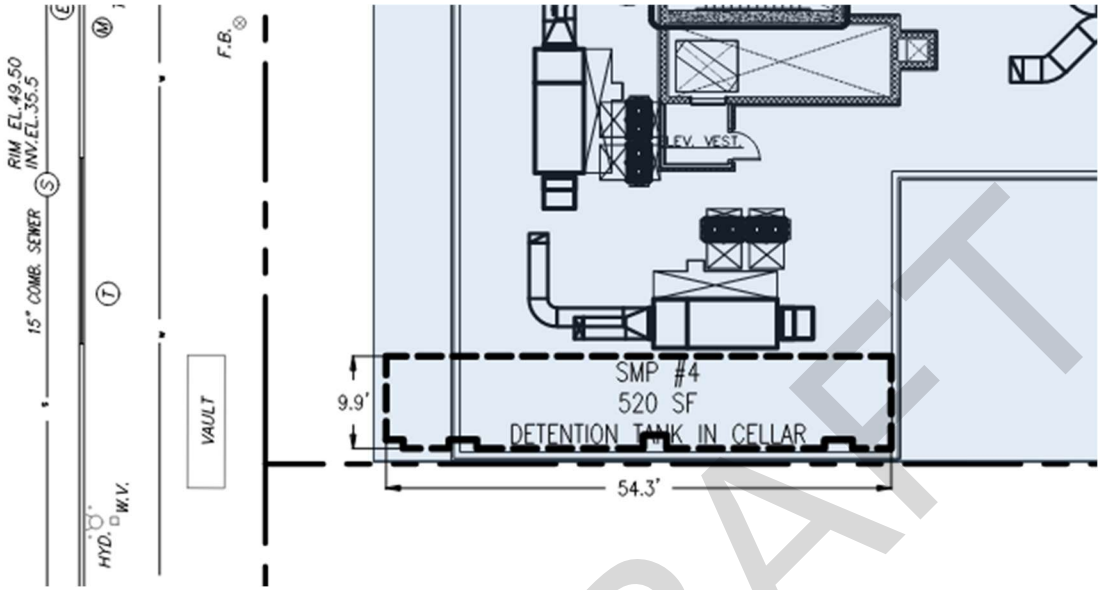
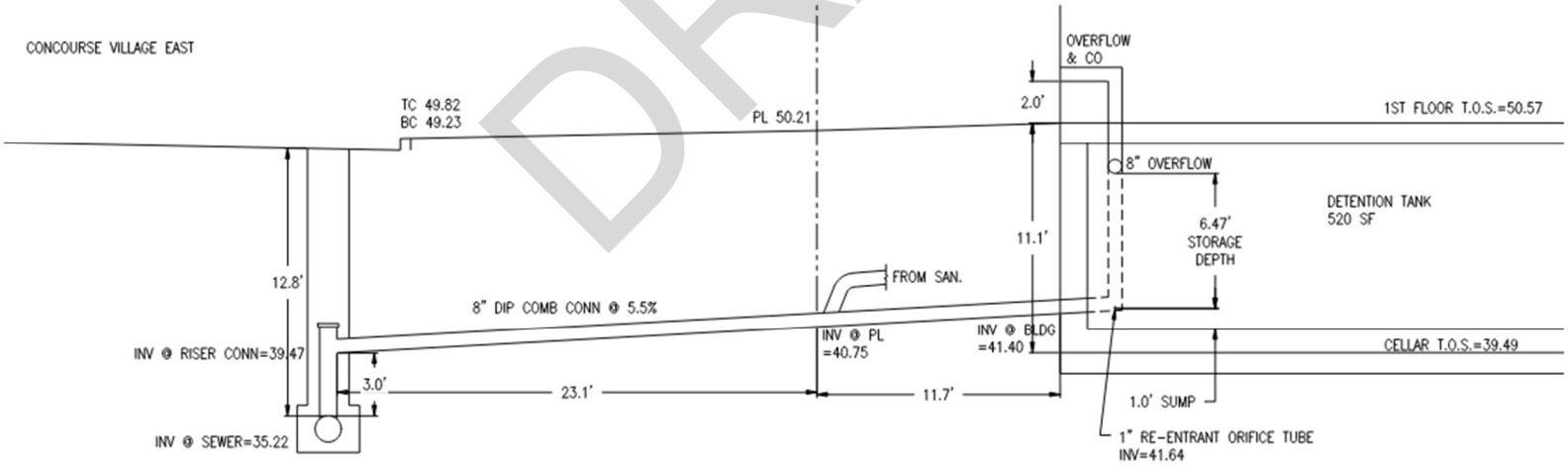
SMP Installation Detention Tank SMP ID: 7

SMP Primary Function: Detention

SMP Secondary Function: _____

## Section B. SMP Cross-Sections and/or Profiles

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SMP Installation Detention Tank SMP ID: _7_____

SMP Primary Function: Detention_____

SMP Secondary Function: _____

## Section C. SMP Photograph Log

| **SMP Certification Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been certified.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date & Time of Certification:** | **SMP Component:**<br>**Date & Time of Certification:** |

*[Duplicate table rows as needed]*

DRAFT

SMP Installation | Detention Tank | SMP ID: 8

SMP Primary Function: Detention

SMP Secondary Function: _____

## Section A. SMP Installation Table

**PROJECT NAME**
280 East 161st Street

**SITE ADDRESS**
280 East 161st Street, Bronx, NY 10451

**SWPTS APPLICATION ID**

**STORMWATER CONSTRUCTION PERMIT ID**

**SPDES CGP ID**

**OTHER SPDES PERMIT IDS**
N/A

**OWNER**
TEG Morrisania Development LLC

**DEVELOPER**
TEG Morrisania Development LLC

**CONTRACTOR**
_____

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| Inspected SMP Component | Date & Time of Certification | Name of Qualified Professional | Certifies Compliance with Approved SWPPP [✓] | General Notes |
|---|---|---|---|---|
| Tank | | | | |
| Dimensions (LxWxD) | | | | |
| Tank Material | | | | |
| Sump Depth | | | | |
| Orifice & Outlet Pipe | | | | |
| Invert Elevation | | | | |
| Orifice Diameter | | | | |
| Re-entrant or Flush Orifice | | | | |
| Outlet Pipe Diameter | | | | |
| Overflow Pipe | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Overflow Connects to Outlet Pipe Upstream of House Trap? | | | | |
| Overflow Pipe to Facade @ 2' Max Above Sidewalk? | | | | |

SMP Installation | Detention Tank | SMP ID: 8

SMP Primary Function: Detention

SMP Secondary Function: _____

| | | | | |
|---|---|---|---|---|
| Inlet Pipe(s) | | | | |
| Invert Elevation | | | | |
| Pipe Diameter | | | | |
| Maintenance Access Hatch | | | | |
| Dimensions (LxW) | | | | |
| Location | | | | |
| | | | | |

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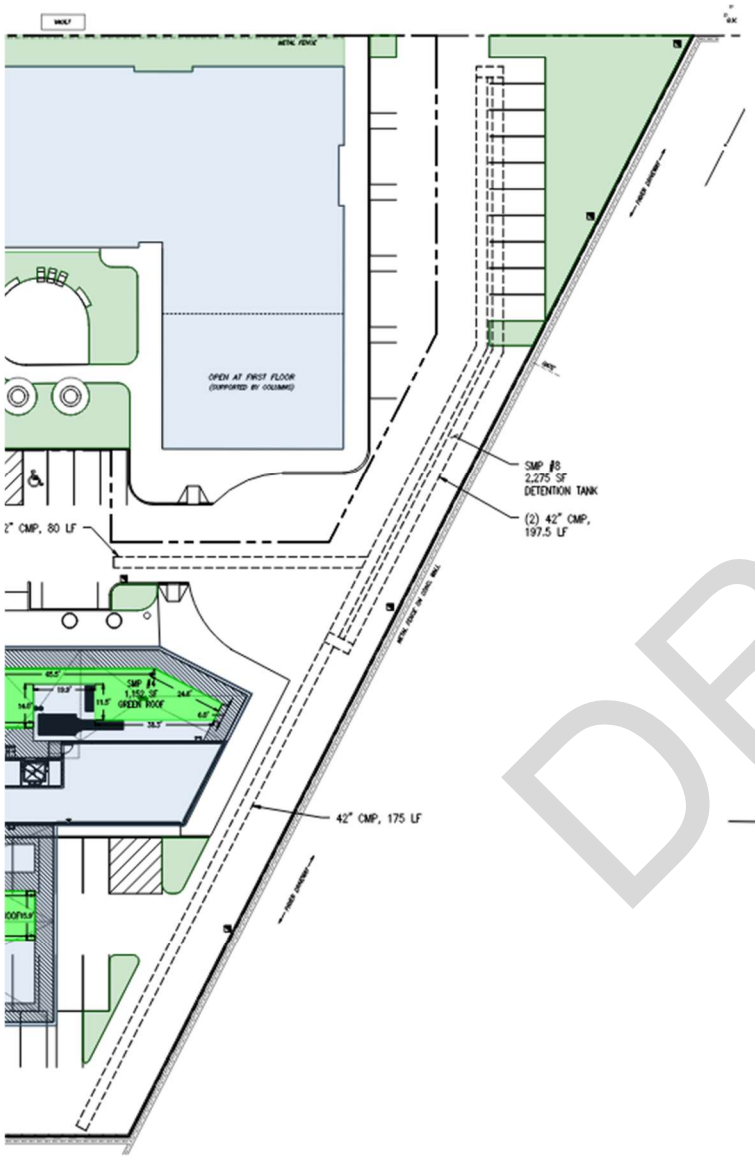
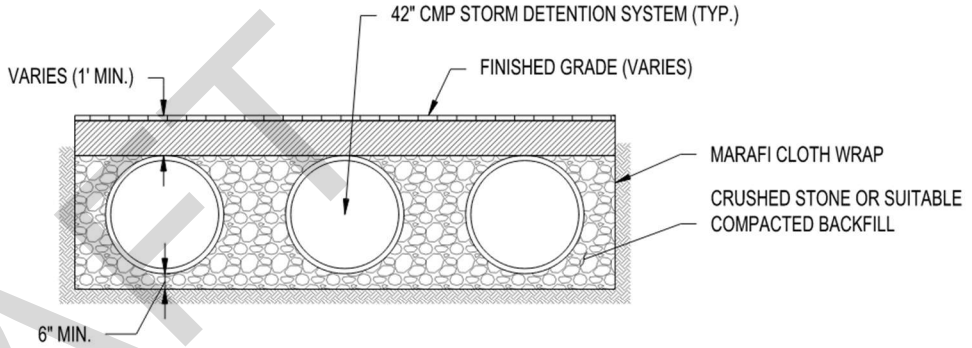
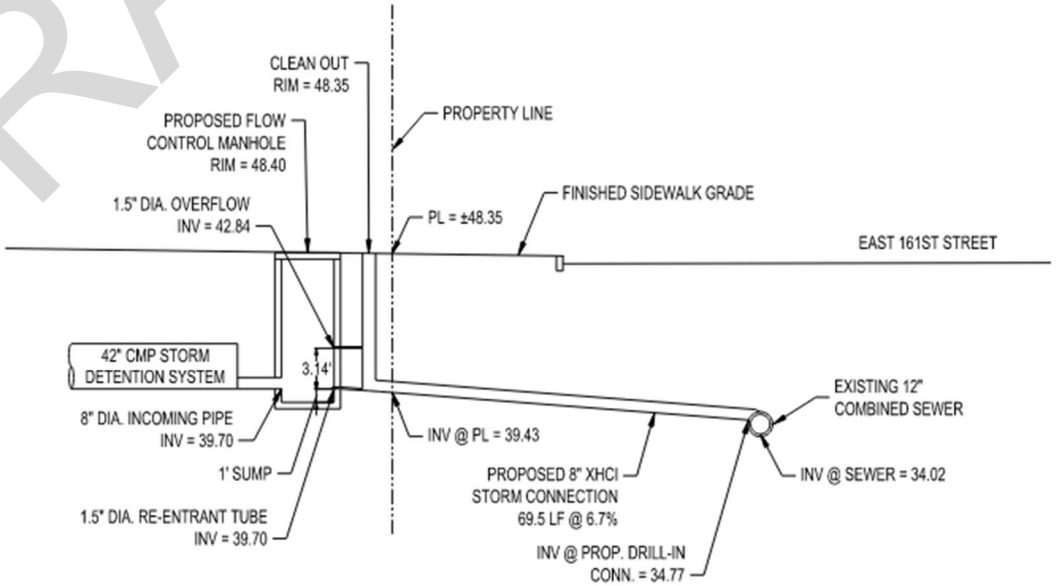
## Section B. SMP Cross-Sections and/or Profiles

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SMP Installation Detention Tank SMP ID: 8

SMP Primary Function: Detention

SMP Secondary Function: _____

## Section C. SMP Photograph Log

| **SMP Certification Photographs**<br>*Include digital photographs, with date stamp, that clearly show the condition of all SMP components that have been certified.* | |
|---|---|
| | |
| **SMP Component:**<br>**Date & Time of Certification:** | **SMP Component:**<br>**Date & Time of Certification:** |

*[Duplicate table rows as needed]*

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# Appendix G: Construction Amendment Forms

## Documents included:

☐ Amendment Cover Letter, including

- SWPPP Revision Number
- Amendment type (major/minor)
- Reason(s) for amendment request
- Proposed changes
- If the amendment was based on DEP comments, a table including reference to comment, explanation of comment, responses, and location of change in document.

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# Appendix H: Draft Stormwater Maintenance Easement

## Documents included:

☒ Draft Construction Maintenance Easement, including

- Cover Letter
- Easement Document (Exhibit A)
- Metes & Bounds Description
    - Note: A Survey Map of Project Lot may be used as an acceptable substitute to Metes & Bounds Description only if it is signed and sealed by a licensed surveyor.
- City/State Transfer Tax Forms

## If any of the above documents are not included, explain why below:

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# STORMWATER MAINTENANCE EASEMENT

THIS STORMWATER MAINTENANCE EASEMENT (this "Easement"), made this 11th day of December, 2024, (the "Effective Date") is by and among MORRISANIA DEVELOPMENT HOUSING DEVELOPMENT FUND CORPORATION, a New York not-for-profit corporation organized pursuant to Article XI of the Private Housing Finance Law of the State of New York and Section 402 of the Not-for-Profit Corporation Law of the State of New York, having an office c/o Settlement Housing Fund, Inc.,247 West 37th Street, 4th Floor, New York, NY 10018 (together with its successors and assigns, the "Lot 130 HDFC"), TEG MORRISANIA DEVELOPMENT LLC, a New York limited liability company an office at 7 Jackson Walkway, Providence, RI 02903 (together with its successors and assigns, the "Lot 130 Company"; the Lot 130 HDFC and the Lot 130 Company are referred to herein collectively as the "Grantor"), and THE CITY OF NEW YORK c/o Dept. of Environmental Protection, having an address at 59-17 Junction Blvd., Flushing, New York 11373 (together with its authorized representatives, successors, and assigns, the "Grantee"; the Grantor and the Grantee are hereinafter referred to collectively as the "Parties").

WHEREAS, the Lot 130 Housing Company is the legal owner of certain real property situated in the Borough of the Bronx, Bronx County, and City and State of New York, known and designated as Block 2420, Lot 130 (the "Property"), as shown on the Tax Map of the City of New York for Bronx County and more particularly described in **Exhibit A** hereof;

WHEREAS, the Lot 130 Company is the beneficial owner of the Property pursuant to a certain Declaration of Interest and Nominee Agreement dated December 8, 2022 by and between the Lot 130 Company and the Lot 130 HDFC;

WHEREAS, Title 24, Chapter 5-A of the New York City Administrative Code, in part, regulates the post-construction stormwater management facilities at the Property; and

WHEREAS, Grantor desires to develop the Property in a manner that requires a stormwater construction permit that includes post-construction stormwater management facilities and therefore must grant this easement and, when construction is complete, apply for and comply with a stormwater maintenance permit; and

WHEREAS, it is the intention of the Parties to enter into an easement related to the post-construction stormwater management facilities at the Property in accordance with Title 24, Chapter 5-A of the New York City Administrative Code;

NOW, THEREFORE, in consideration of the foregoing and the covenants hereinafter set forth, the Parties agree as follows:

1. The Grantor is required to maintain the post-construction stormwater management facilities at the Property pursuant to Title 24, Chapter 5-A of the New York City Administrative Code and Grantor's stormwater maintenance permit, which will be on file with the New York City Department of Environmental Protection (the "Department") upon recording of this Easement. Grantor shall operate and maintain the facilities in good working condition throughout their useful life and shall replace them as necessary in accordance with the Grantor's stormwater maintenance permit and applicable laws.

2. The Grantor grants to the Grantee and to persons authorized by the Grantee a perpetual easement (the "Easement") in, through, under, over, and across the Property for periodic inspection of the post-construction stormwater management facilities at reasonable times

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in accordance with law in order to ensure that such facilities are maintained in good working order and condition and in accordance with applicable design standards and applicable law. The Easement is granted only for the purpose of this inspection of the stormwater management facilities.

3. All of the covenants, agreements, and conditions contained in this Easement run with the land and shall inure to the benefit of and be binding upon the Parties and their respective successors and assigns, and shall remain in full force and effect for as long as the Grantee requires stormwater management facilities at the Property.

4. The Grantor agrees to execute, acknowledge, and deliver to or for the Grantee such further instruments and take such further actions as may be reasonably required to carry out and effectuate the intent and purpose of this Easement, or to confirm or perfect any right created hereunder.

5. Grantor hereby covenants and agrees that any deed for the conveyance of the Property or any portion thereof shall contain a provision establishing the Easement described herein for the benefit of the Grantee.

6. In the event of any breach, or threatened breach, of this Easement by either party hereto, the non-defaulting party shall have the right to any remedy available at law or in equity, including but not limited to, injunctive relief and specific performance.

7. This Easement constitutes the entire agreement between the Parties and may not be modified, amended, or terminated except by an instrument in writing signed by both of the Parties.

8. This Easement shall be recorded by the Grantor in the Office of the City Register within thirty (30) days of the Effective Date.

9. This Easement shall be governed and construed in accordance with the laws of the State of New York and the laws of the City of New York.

10. Any forbearance by either the Grantee or the Grantor in exercising any right or remedy afforded under this Easement or by law shall not be a waiver or preclude the exercising of any such right or remedy.

11. Invalidation of any one of these terms or provisions by any Court shall in no way affect any other provisions, which shall remain in full force and effect.

12. The Grantor, his/her heirs, successors and assigns do hereby covenant that the Grantee shall be held harmless from any and all claims of any person or persons arising from the use of the Property and the granting of this Easement.

[*remainder of page intentionally left blank; signature page follows*]

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WHEREFORE, the Parties have executed this Easement as of this 11th day of December, 2024.

GRANTOR

*Lot 130 HDFC:*

MORRISANIA DEVELOPMENT HOUSING DEVELOPMENT FUND CORPORATION,
a New York not-for-profit corporation

By: _____

Name: Jacqueline Tom
Title: Treasurer

*Lot 130 Company:*

TEG MORRISANIA DEVELOPMENT LLC,
a New York limited liability company

By: _____

Name: Matthew Lawrence
Title: Authorized Signatory

For the Grantee, THE CITY OF NEW YORK

BY: _____
Joseph Murin, Chief Financial Officer
New York City Department of Environmental Protection

Approved as to Form and Certified as to Legal Authority
by Standard Type of Class:

s/ Corporation Counsel

Dated: February 20, 2024

DRAFT

**ACKNOWLEDGEMENTS**

STATE OF NEW YORK )
) ss:
COUNTY OF New York )

On the day 16th of December, in the year 24, before me the undersigned, personally appeared Jacqueline Tom. personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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

SONJA L. PINEDA
Notary Public, State of New York
No. 01PI6172910
Qualified in New York County
Commission Expires August 20, 2027

STATE OF RHODE ISLAND )
) ss:
COUNTY OF PROVIDENCE )

On the day of 12/11 in the year 24, before me the undersigned, personally appeared Matthew Lawrence personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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 )
) ss:
COUNTY OF )

On the day of ___, in the year ___, before me the undersigned, personally appeared _____ personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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

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**EXHIBIT A**

**Legal Description**

BLOCK 2420, Lot 130

Borough of the Bronx

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

Beginning at a point on the easterly side of Concourse Village East distant 181.54 feet southerly from the corner formed by the intersection of the southerly side of East 161st Street with the easterly side of Concourse Village East;

Thence easterly along a line forming a right angle with the easterly side of Concourse Village East, 68.41 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 1.63 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 46.33 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 94.46 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 124.33 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 29.88 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 97.09 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 62.99 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 100.00 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 100 feet to a point on the easterly side of Concourse Village East;

Thence northerly along the easterly side of Concourse Village East 73.46 feet to the point or place of beginning.

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# STORMWATER MAINTENANCE EASEMENT

THIS STORMWATER MAINTENANCE EASEMENT (this "Easement"), made this 11th day of December, 2024, (the "Effective Date") is by and among MORRISANIA DEVELOPMENT HOUSING DEVELOPMENT FUND CORPORATION, a New York not-for-profit corporation organized pursuant to Article XI of the Private Housing Finance Law of the State of New York and Section 402 of the Not-for-Profit Corporation Law of the State of New York, having an office c/o Settlement Housing Fund, Inc.,247 West 37th Street, 4th Floor, New York, NY 10018 (together with its successors and assigns, the "Lot 150 HDFC"), TEG MORRISANIA DEVELOPMENT LLC, a New York limited liability company an office at 7 Jackson Walkway, Providence, RI 02903 (together with its successors and assigns, the "Lot 150 Company"; the Lot 150 HDFC and the Lot 150 Company are referred to herein collectively as the "Grantor"), and THE CITY OF NEW YORK c/o Dept. of Environmental Protection, having an address at 59-17 Junction Blvd., Flushing, New York 11373 (together with its authorized representatives, successors, and assigns, the "Grantee"; the Grantor and the Grantee are hereinafter referred to collectively as the "Parties").

WHEREAS, the Lot 150 Housing Company is the legal owner of certain real property situated in the Borough of the Bronx, Bronx County, and City and State of New York, known and designated as Block 2420, Lot 150 (the "Property"), as shown on the Tax Map of the City of New York for Bronx County and more particularly described in **Exhibit A** hereof;

WHEREAS, the Lot 150 Company is the beneficial owner of the Property pursuant to a certain Declaration of Interest and Nominee Agreement dated December 8, 2022 by and between the Lot 150 Company and the Lot 150 HDFC;

WHEREAS, Title 24, Chapter 5-A of the New York City Administrative Code, in part, regulates the post-construction stormwater management facilities at the Property; and

WHEREAS, Grantor desires to develop the Property in a manner that requires a stormwater construction permit that includes post-construction stormwater management facilities and therefore must grant this easement and, when construction is complete, apply for and comply with a stormwater maintenance permit; and

WHEREAS, it is the intention of the Parties to enter into an easement related to the post-construction stormwater management facilities at the Property in accordance with Title 24, Chapter 5-A of the New York City Administrative Code;

NOW, THEREFORE, in consideration of the foregoing and the covenants hereinafter set forth, the Parties agree as follows:

1. The Grantor is required to maintain the post-construction stormwater management facilities at the Property pursuant to Title 24, Chapter 5-A of the New York City Administrative Code and Grantor's stormwater maintenance permit, which will be on file with the New York City Department of Environmental Protection (the "Department") upon recording of this Easement. Grantor shall operate and maintain the facilities in good working condition throughout their useful life and shall replace them as necessary in accordance with the Grantor's stormwater maintenance permit and applicable laws.

2. The Grantor grants to the Grantee and to persons authorized by the Grantee a perpetual easement (the "Easement") in, through, under, over, and across the Property for periodic inspection of the post-construction stormwater management facilities at reasonable times

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in accordance with law in order to ensure that such facilities are maintained in good working order and condition and in accordance with applicable design standards and applicable law. The Easement is granted only for the purpose of this inspection of the stormwater management facilities.

3. All of the covenants, agreements, and conditions contained in this Easement run with the land and shall inure to the benefit of and be binding upon the Parties and their respective successors and assigns, and shall remain in full force and effect for as long as the Grantee requires stormwater management facilities at the Property.

4. The Grantor agrees to execute, acknowledge, and deliver to or for the Grantee such further instruments and take such further actions as may be reasonably required to carry out and effectuate the intent and purpose of this Easement, or to confirm or perfect any right created hereunder.

5. Grantor hereby covenants and agrees that any deed for the conveyance of the Property or any portion thereof shall contain a provision establishing the Easement described herein for the benefit of the Grantee.

6. In the event of any breach, or threatened breach, of this Easement by either party hereto, the non-defaulting party shall have the right to any remedy available at law or in equity, including but not limited to, injunctive relief and specific performance.

7. This Easement constitutes the entire agreement between the Parties and may not be modified, amended, or terminated except by an instrument in writing signed by both of the Parties.

8. This Easement shall be recorded by the Grantor in the Office of the City Register within thirty (30) days of the Effective Date.

9. This Easement shall be governed and construed in accordance with the laws of the State of New York and the laws of the City of New York.

10. Any forbearance by either the Grantee or the Grantor in exercising any right or remedy afforded under this Easement or by law shall not be a waiver or preclude the exercising of any such right or remedy.

11. Invalidation of any one of these terms or provisions by any Court shall in no way affect any other provisions, which shall remain in full force and effect.

12. The Grantor, his/her heirs, successors and assigns do hereby covenant that the Grantee shall be held harmless from any and all claims of any person or persons arising from the use of the Property and the granting of this Easement.

[*remainder of page intentionally left blank; signature page follows*]

DRAFT

WHEREFORE, the Parties have executed this Easement as of this 11th day of December, 2024.

GRANTOR

*Lot 150 HDFC:*

MORRISANIA DEVELOPMENT HOUSING DEVELOPMENT FUND CORPORATION,
a New York not-for-profit corporation

By: _____

Name: Jacqueline Tom
Title: Treasurer

*Lot 150 Company:*

TEG MORRISANIA DEVELOPMENT LLC,
a New York limited liability company

By: _____

Name: Matthew Lawrence
Title: Authorized Signatory

For the Grantee, THE CITY OF NEW YORK

BY: _____
Joseph Murin, Chief Financial Officer
New York City Department of Environmental Protection

Approved as to Form and Certified as to Legal Authority
by Standard Type of Class:

s/ Corporation Counsel

Dated: February 20, 2024

DRAFT

**ACKNOWLEDGEMENTS**

STATE OF NEW YORK )
) ss:
COUNTY OF New York )

On the 16th day of December, in the year 2024, before me the undersigned, personally appeared Jacqueline Tom personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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

SONJA L. PINEDA
Notary Public, State of New York
No. 01PI6172910
Qualified in New York County
Commission Expires August 20, 20 24

STATE OF RHODE ISLAND )
) ss:
COUNTY OF PROVIDENCE )

On the day of ___, in the year ___, before me the undersigned, personally appeared Matthew Lauren personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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

LAUREE SCOTT - NOTARY PUBLIC
STATE OF RHODE ISLAND
ID NO. 766337
QUALIFIED IN PROVIDENCE COUNTY
COMMISSION EXPIRES: JANUARY 15, 2025

STATE OF NEW YORK )
) ss:
COUNTY OF )

On the day of ___, in the year ___, before me the undersigned, personally appeared _____ personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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

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**EXHIBIT A**

**Legal Description**

BLOCK 2420, Lot 150

Borough of the Bronx

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

Beginning at a point on the southerly side of East 161st Street distant 378.43 feet easterly form the corner formed by the intersection of the southerly side of East 161st Street with the easterly the easterly side of Concourse Village East;

Running Thence easterly along the southerly side of East 161st Street, 82.98 feet;

Thence southwesterly along a line forming an interior angle of 62 degrees 51 minutes 20 seconds with southerly side of East 161st Street, 398.94 feet;

Thence westerly along a line forming an interior angle of 117 degrees 08 minutes 40 seconds with the last mentioned course, 116.41 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 97.09 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 29.88 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 124.33 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 80.71 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 70.25 feet;

Thence northeasterly along a line forming an exterior angle of 117 degrees 08 minutes 40 seconds with the last mentioned course, 75.84 feet;

Thence northerly along a line forming a right angle with the southerly side of East 161st Street, 96.09 feet to a point on the southerly side of East 161st Street to the point or place of beginning

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# STORMWATER MAINTENANCE EASEMENT

THIS STORMWATER MAINTENANCE EASEMENT (this "Easement"), made this 11th day of December, 2024, (the "Effective Date") is by and between MORRISANIA APARTMENTS LLC, a New York limited liability company having an address at 7 Jackson Walkway, Providence, RI 02903 (the "Grantor"), and THE CITY OF NEW YORK c/o Dept. of Environmental Protection, having an address at 59-17 Junction Blvd., Flushing, New York 11373 (together with its authorized representatives, successors, and assigns, the "Grantee"; the Grantor and the Grantee are hereinafter referred to collectively as the "Parties").

WHEREAS, the Grantor is the legal owner of certain real property situated in the Borough of the Bronx, Bronx County, and City and State of New York, known and designated as Block 2420, Lot 120 (the "Property"), as shown on the Tax Map of the City of New York for Bronx County and more particularly described in **Exhibit A** hereof;

WHEREAS, Title 24, Chapter 5-A of the New York City Administrative Code, in part, regulates the post-construction stormwater management facilities at the Property; and

WHEREAS, Grantor desires to develop the Property in a manner that requires a stormwater construction permit that includes post-construction stormwater management facilities and therefore must grant this easement and, when construction is complete, apply for and comply with a stormwater maintenance permit; and

WHEREAS, it is the intention of the Parties to enter into an easement related to the post-construction stormwater management facilities at the Property in accordance with Title 24, Chapter 5-A of the New York City Administrative Code;

NOW, THEREFORE, in consideration of the foregoing and the covenants hereinafter set forth, the Parties agree as follows:

1. The Grantor is required to maintain the post-construction stormwater management facilities at the Property pursuant to Title 24, Chapter 5-A of the New York City Administrative Code and Grantor's stormwater maintenance permit, which will be on file with the New York City Department of Environmental Protection (the "Department") upon recording of this Easement. Grantor shall operate and maintain the facilities in good working condition throughout their useful life and shall replace them as necessary in accordance with the Grantor's stormwater maintenance permit and applicable laws.

2. The Grantor grants to the Grantee and to persons authorized by the Grantee a perpetual easement (the "Easement") in, through, under, over, and across the Property for periodic inspection of the post-construction stormwater management facilities at reasonable times in accordance with law in order to ensure that such facilities are maintained in good working order and condition and in accordance with applicable design standards and applicable law. The Easement is granted only for the purpose of this inspection of the stormwater management facilities.

3. All of the covenants, agreements, and conditions contained in this Easement run with the land and shall inure to the benefit of and be binding upon the Parties and their respective successors and assigns, and shall remain in full force and effect for as long as the Grantee requires stormwater management facilities at the Property.

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4. The Grantor agrees to execute, acknowledge, and deliver to or for the Grantee such further instruments and take such further actions as may be reasonably required to carry out and effectuate the intent and purpose of this Easement, or to confirm or perfect any right created hereunder.

5. Grantor hereby covenants and agrees that any deed for the conveyance of the Property or any portion thereof shall contain a provision establishing the Easement described herein for the benefit of the Grantee.

6. In the event of any breach, or threatened breach, of this Easement by either party hereto, the non-defaulting party shall have the right to any remedy available at law or in equity, including but not limited to, injunctive relief and specific performance.

7. This Easement constitutes the entire agreement between the Parties and may not be modified, amended, or terminated except by an instrument in writing signed by both of the Parties.

8. This Easement shall be recorded by the Grantor in the Office of the City Register within thirty (30) days of the Effective Date.

9. This Easement shall be governed and construed in accordance with the laws of the State of New York and the laws of the City of New York.

10. Any forbearance by either the Grantee or the Grantor in exercising any right or remedy afforded under this Easement or by law shall not be a waiver or preclude the exercising of any such right or remedy.

11. Invalidation of any one of these terms or provisions by any Court shall in no way affect any other provisions, which shall remain in full force and effect.

12. The Grantor, his/her heirs, successors and assigns do hereby covenant that the Grantee shall be held harmless from any and all claims of any person or persons arising from the use of the Property and the granting of this Easement.

[*remainder of page intentionally left blank; signature page follows*]

DRAFT

WHEREFORE, the Parties have executed this Easement as of this 11th day of December, 2024.

GRANTOR

MORRISANIA APARTMENTS LLC,
a New York limited liability company

By: _____

Name: Matthew Lawrence
Title: Authorized Signatory

For the Grantee, THE CITY OF NEW YORK

BY: _____
Joseph Murin, Chief Financial Officer
New York City Department of Environmental Protection

Approved as to Form and Certified as to Legal Authority
by Standard Type of Class:

s/ Corporation Counsel

Dated: February 20, 2024

DRAFT

## ACKNOWLEDGEMENTS

STATE OF RHODE ISLAND )
) ss:
COUNTY OF PROVIDENCE )

On the day of 12/11 in the year 24, before me the undersigned, personally appeared Matthew Lawrence personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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.

Laurie Scott
Notary Public

LAUREE SCOTT - NOTARY PUBLIC
STATE OF RHODE ISLAND
ID NO. 766337
QUALIFIED IN PROVIDENCE COUNTY
COMMISSION EXPIRES: JANUARY 15, 2025

STATE OF NEW YORK )
) ss:
COUNTY OF )

On the day of ___, in the year ___, before me the undersigned, personally appeared _____ personally known to me or proved to me on the basis of satisfactory evidence, to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that (he) (she) (they) executed the same in (his) (her) (their) capacity(y)(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

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**EXHIBIT A**

**Legal Description**

BLOCK 2420, Lot 120

Borough of the Bronx

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

Beginning at the corner formed by the intersection of the southerly side of East 161st Street with the easterly side of Concourse Village East;

Running Thence easterly along the southerly side of East 161st Street, 378.43 feet;

Thence southerly along a line forming a right angle with the southerly side of East 161st Street, 96.09 feet;

Thence southwesterly along a line forming an interior angle of 152 degrees 51 minutes 20 seconds with the last mentioned course, 75.84 feet;

Thence westerly along a line forming an interior angle of 117 degrees 08 minutes 40 seconds with the last mentioned course, 70.25 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 175.17 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 46.33 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 1.63 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 68.41 feet to a point on the easterly side of Concourse Village East;

Thence northerly along the easterly side of Concourse Village East, 181.54 feet to the corner point or place of beginning.

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# Appendix I: Draft Post-Construction Operation and Maintenance Manual

## Documents included:

☒ Draft Post-Construction Operation and Maintenance Manual **(Include when project installed post-construction stormwater management practices),** including:

- List of all SMPs installed on the project, including SMP IDs and plan references as listed in the SWPPP
- If applicable, a list of all BMPs that will be followed to address pollutant of concern sources
- Location map depicting SMPs to be maintained
- Contact information for Owner
- Contact information for responsible maintenance party, including information regarding whether the responsible maintenance party is employed by the Owner or by an outside contractor
- Table of maintenance tasks and frequencies for each SMP type
- Inspection form with list of maintenance checks and fields for recording observations
- Schedule of proposed self-inspections

Note: The final version of the Post-Construction Operation and Maintenance Manual shall be included in the NOT/Stormwater Maintenance Permit request, along with the following as-built plans:

- As-Built Drainage Utility Plan, showing:
    - Site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any installed SMPs
    - Drainage structures, including manholes, inlets, rooftop drains, outfalls, and catch basins
    - Drainage pipes
    - Subsurface drainage features of installed SMPs, including the subsurface footprint (when different from the surface footprint) and any internal pipes or structures
    - Topographic contours, or spot elevations if the site is relatively flat
    - Callouts for all points of discharge from the site, including sewer connections, outfalls, on-site disposal systems, direct discharges, or any others related to other SPDES permits
    - Callouts for each installed SMP, including the SMP ID, type (manufacturer and model name), function, size, and storage volume
    - Callouts for drainage structures and pipes, including sizes, materials, and inverts, as known
- As-Built Cover and Contributing Drainage Area Plan, including:
    - Site surface features, including buildings, structures, and site furnishings, as well as surface footprints of any installed SMPs
    - Drainage structures, including manholes, inlets, rooftop drains, and catch basins
    - Drainage pipes
    - Delineation of all individual drainage areas across the entire site (i.e. no overlapping drainage areas). Indicate the "drainage point" (or points) associated with each individual drainage area
    - Within the boundary of each drainage area, also delineate each cover type shown in Table 2.8 of the NYC SWM, using a different hatch for each type

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    - Add "design points" of interest, where the total contributing drainage area to that point is required for design or reporting purposes. At a minimum, include design points for each proposed SMP and any points of discharge, including sewer connections, outfalls, on-site disposal systems, direct discharges, or any others related to other SPDES permits
    - Callouts for each design point, including the IDs of all individual drainage areas that contribute to the design point, the total contributing area to the design point, and the total area of each surface type within the total contributing area
- As-Built SMP Section/Detail Plans, showing:
    - Elevations for bottom of practice, interface of each media layer, top of ponding, and top of practice
    - Elevations for inverts in, inverts out, and/or overflows
    - Elevations of any groundwater table or bedrock
    - Elevations for the top and bottom of active storage zones
    - Ponding depths
    - Media slope, depths, and specifications
    - Any observation wells and their materials specifications
    - Any pretreatment devices and proprietary SMPs.

**If any of the above documents are not included, explain why below:**

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# Draft Post-Construction Operation and Maintenance Manual

The owner, TEG Morrisania Development LLC, is responsible for long-term operation and maintenance of the SMPs. The primary contact is Matthew Lawrence at MLawrence@GilbaneCo.com.

The draft Operation and Maintenance (O&M) manual is provided for the SMPs which are included in the project. The three SMPs to be maintained are bioretention, green roof, and detention tank:

- SMP #1 – Stormwater Planter #1
- SMP #2 – Stormwater Planter #2
- SMP #3 – Green Roof #1
- SMP #4 – Green Roof #2
- SMP #5 – Green Roof #3
- SMP #6 – Green Roof #4
- SMP #7 – Detention Tank #1
- SMP #8 – Detention Tank #2

The manufacturer's information for the installation, inspection and maintenance of the green roof system is attached.

The stormwater planter, green roof, and detention tank have required maintenance tasks as shown in the tables below.

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STORMWATER PLANTER MAINTENANCE TASKS (SMP ID #1 and 2)

| TASK | DESCRIPTION | FREQUENCY |
|---|---|---|
| WEEDING | Removal of non-native or undesirable vegetation | Quarterly during the growing season or more frequetly based on ongoing inspections |
| MULCHING | Mulching of planting beds | Once annually for the first two growing seasons or until beds have filled in |
| VEGETATION MANAGEMENT | Cutting and trimming of detrital herbaceous vegetation from the previous growing season to four to six inches above the ground | Annually in late winter or early spring prior to break in dormancy |
| SEDIMENT REMOVAL | Removal of accumulated sediment and debris from practice areas | Twice per year or more frequently if needed based on ongoing inspections |
| EROSION CONTROL | Stabilization of eroded soil areas with vegetative or mechanical means | As warranted based on ongoing inspections |

GREEN ROOF MAINTENANCE TASKS (SMP ID #3-6)

| TASK | DESCRIPTION | FREQUENCY |
|---|---|---|
| WEEDING | Removal of non-native or undesirable vegetation. | Bi-weekly during the growing season or any time the roof is not frozen. |
| VEGETATION MANAGEMENT | Removal of detrital herbaceous vegetation from the previous growing season | Annually or as needed depending on the type of green roof vegetation |
| FERTILIZATION | Use of slow-release fertilization capsules to supply plant nutrients; may only be done in the first year of establishment | As necessary based on visual observation of plant health or soil fertility testing |
| DRAIN CLEANING | Removal of sediment, leaves, or debris from roof drains, gutters, scuppers, downspouts, and secondary overflows. | Bi-weekly or as needed based on ongoing inspections. |
| EROSION CONTROL | Stabilization of eroded soil areas via vegetative or mechanical means | During the growing season for plant materials and as warranted for mechanical methods based on annual and ongoing inspections |

DETENTION TANK MAINTENANCE TASKS (SMP ID #7 and 8)

| TASK | DESCRIPTION | FREQUENCY |
|---|---|---|
| SEDIMENT REMOVAL | Vacuum cleaning of accumulated sediment from primary storage tank | As warranted based on annual inspections |
| PIPE CLEANING | Hydraulic cleaning of inflow and outflow piping | As warranted based on video pipe inspectio conducted every three years |
| INLET CLEANING | Vacuum cleaning of accumulated sediment within inlet piping | Minimum annually or more frequently if debris accumulation is rapid based on ongoing and annual inspections |

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STORMWATER PLANTER MAINTENANCE LOG (SMP ID #1 and 2)

| PROJECT NAME | DATE | |
|---|---|---|
| | | |
| NAME OF PERSON | ACTIVITY | OBSERVATIONS |
| | | |
| | | |
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GREEN ROOF MAINTENANCE LOG (SMP ID #3-6)

| PROJECT NAME | DATE | |
|---|---|---|
| | | |
| NAME OF PERSON | ACTIVITY | OBSERVATIONS |
| | | |
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DETENTION TANK MAINTENANCE LOG (SMP ID #7 and 8)

| PROJECT NAME | | | |
|---|---|---|---|
| | | | |
| NAME | DATE | TASK | OBSERVATIONS & CORRECTIVE ACTIONS NEEDED |
| | | | |
| | | | |
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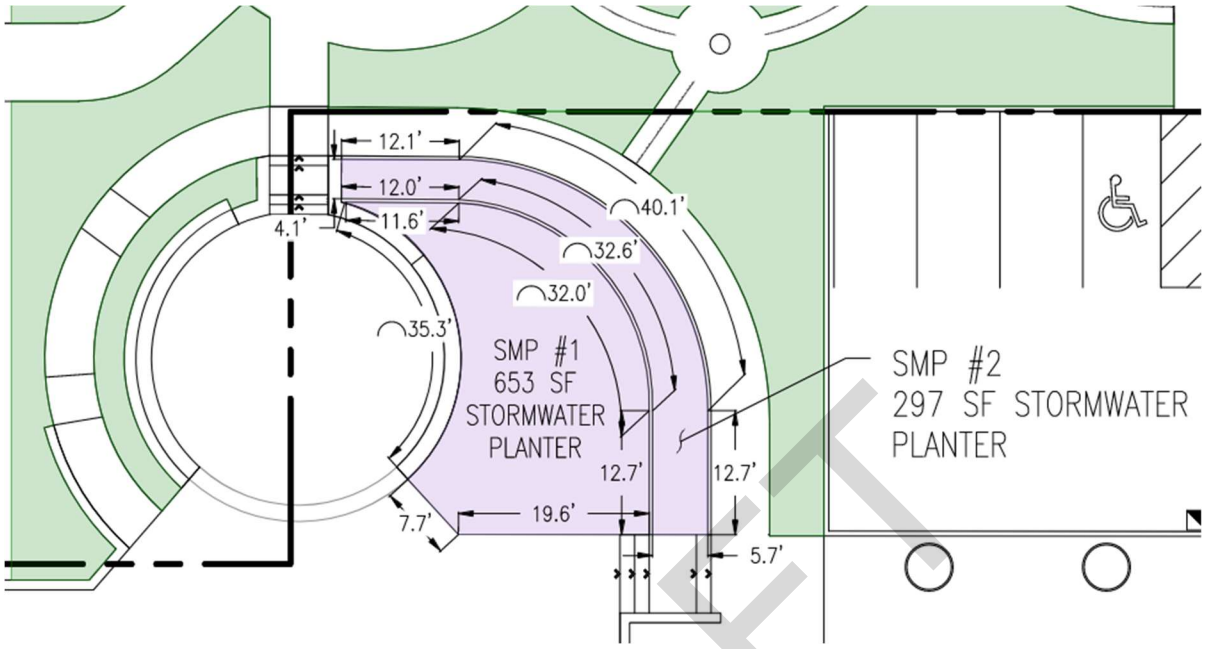
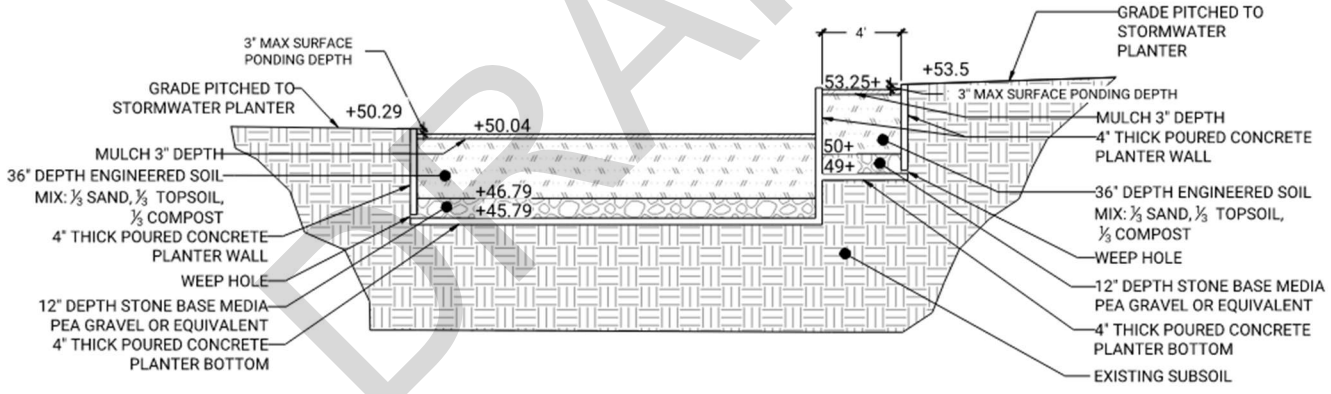
**As-Built Drainage Utility Plan, Cover & Contributing Drainage Area Plan, and SMP Section/Detail Plans**

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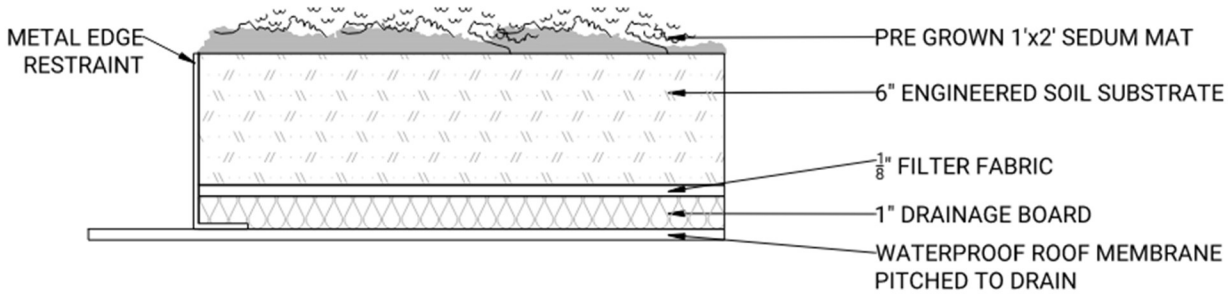
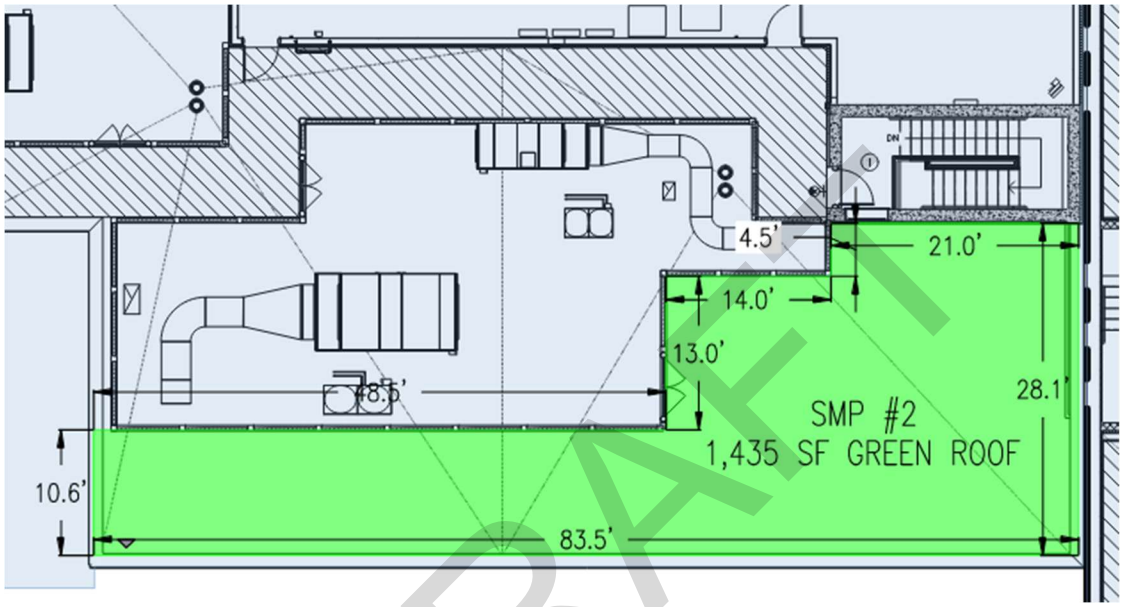
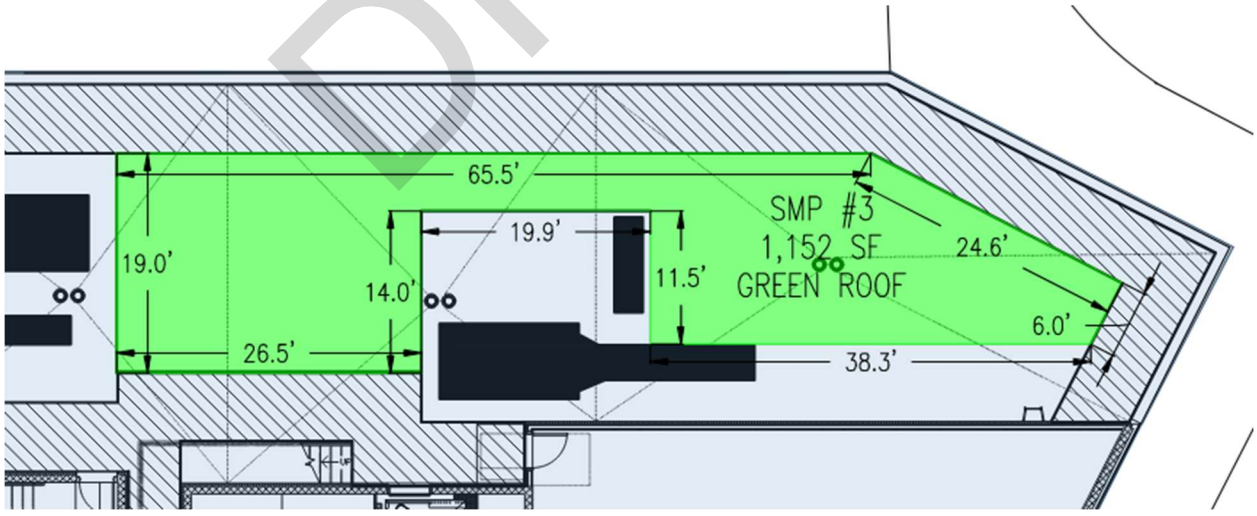

METAL EDGE RESTRAINT
PRE GROWN 1'x2' SEDUM MAT
6" ENGINEERED SOIL SUBSTRATE
1/8" FILTER FABRIC
1" DRAINAGE BOARD
WATERPROOF ROOF MEMBRANE PITCHED TO DRAIN


4.5'
21.0'
14.0'
13.0'
28.1'
48.5'
SMP #2
1,435 SF GREEN ROOF
10.6'
83.5'


65.5'
19.9'
SMP #3
1,152 SF
GREEN ROOF
24.6'
19.0'
14.0'
11.5'
6.0'
26.5'
38.3'

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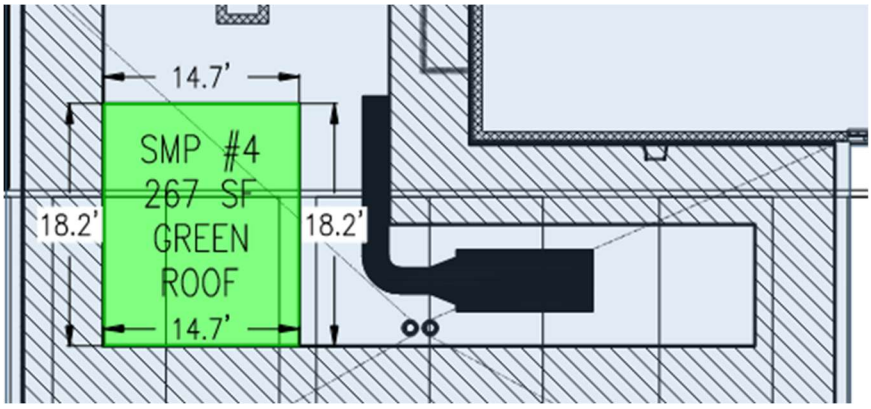
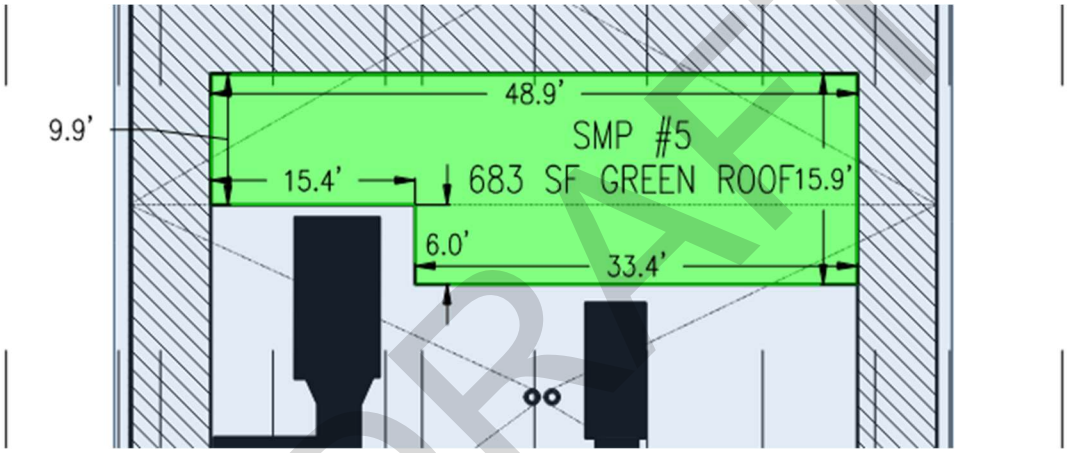

14.7'
SMP #4
267 SF
GREEN
ROOF
18.2'
18.2'
14.7'


48.9'
9.9'
SMP #5
683 SF GREEN ROOF
15.4'
15.9'
6.0'
33.4'

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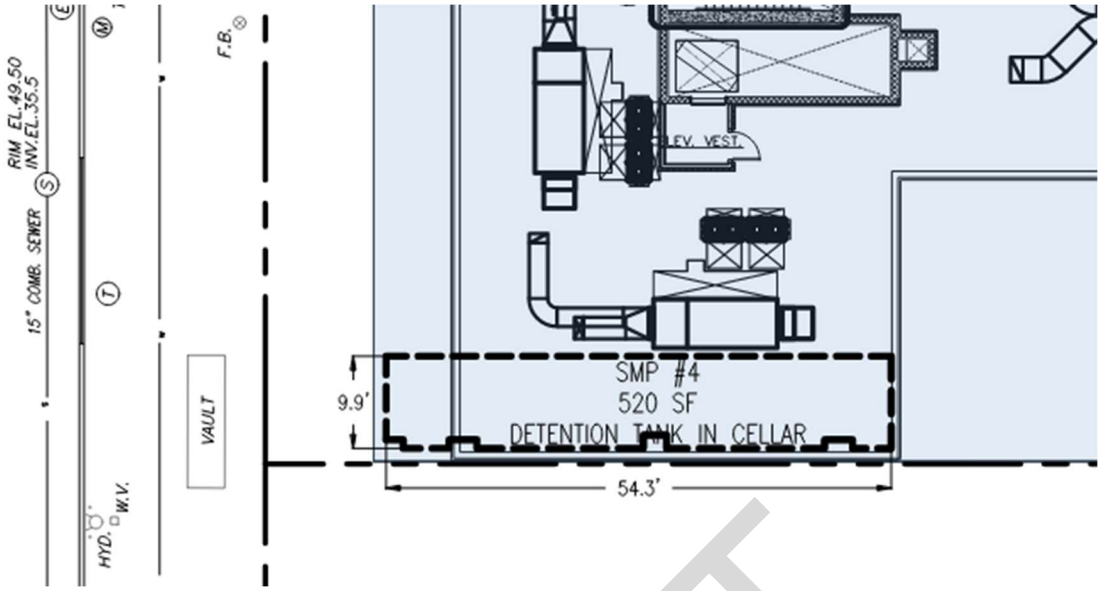
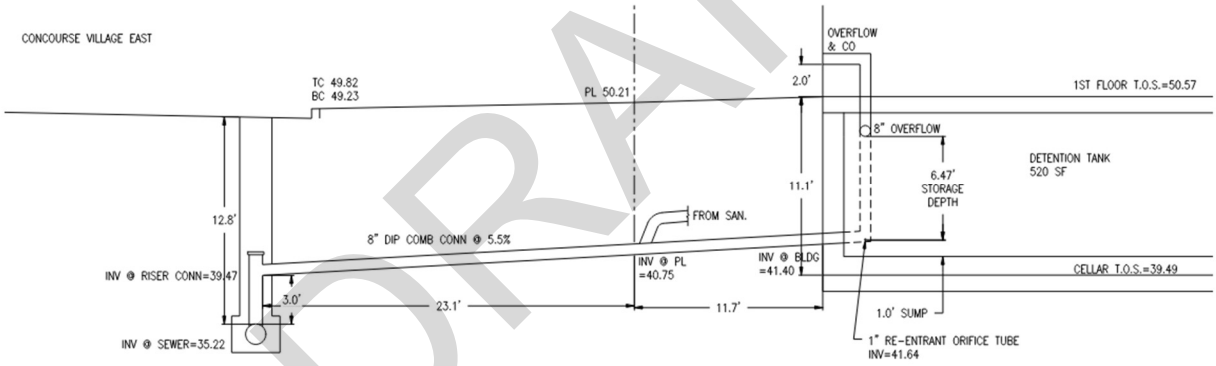

RIM EL.49.50
INV.EL.35.5
15" COMB. SEWER
F.B.
E.V. VEST.
VAULT
HYD.
W.V.
SMP #4
520 SF
DETENTION TANK IN CELLAR
9.9'
54.3'


CONCOURSE VILLAGE EAST
TC 49.82
BC 49.23
PL 50.21
OVERFLOW
& CO
2.0'
1ST FLOOR T.O.S.=50.57
8" OVERFLOW
DETENTION TANK
520 SF
6.47'
STORAGE
DEPTH
11.1'
12.8'
FROM SAN.
8" DIP COMB CONN @ 5.5%
INV @ RISER CONN=39.47
INV @ PL
=40.75
INV @ BLDG
=41.40
CELLAR T.O.S.=39.49
3.0'
23.1'
11.7'
1.0' SUMP
1" RE-ENTRANT ORIFICE TUBE
INV=41.64
INV @ SEWER=35.22

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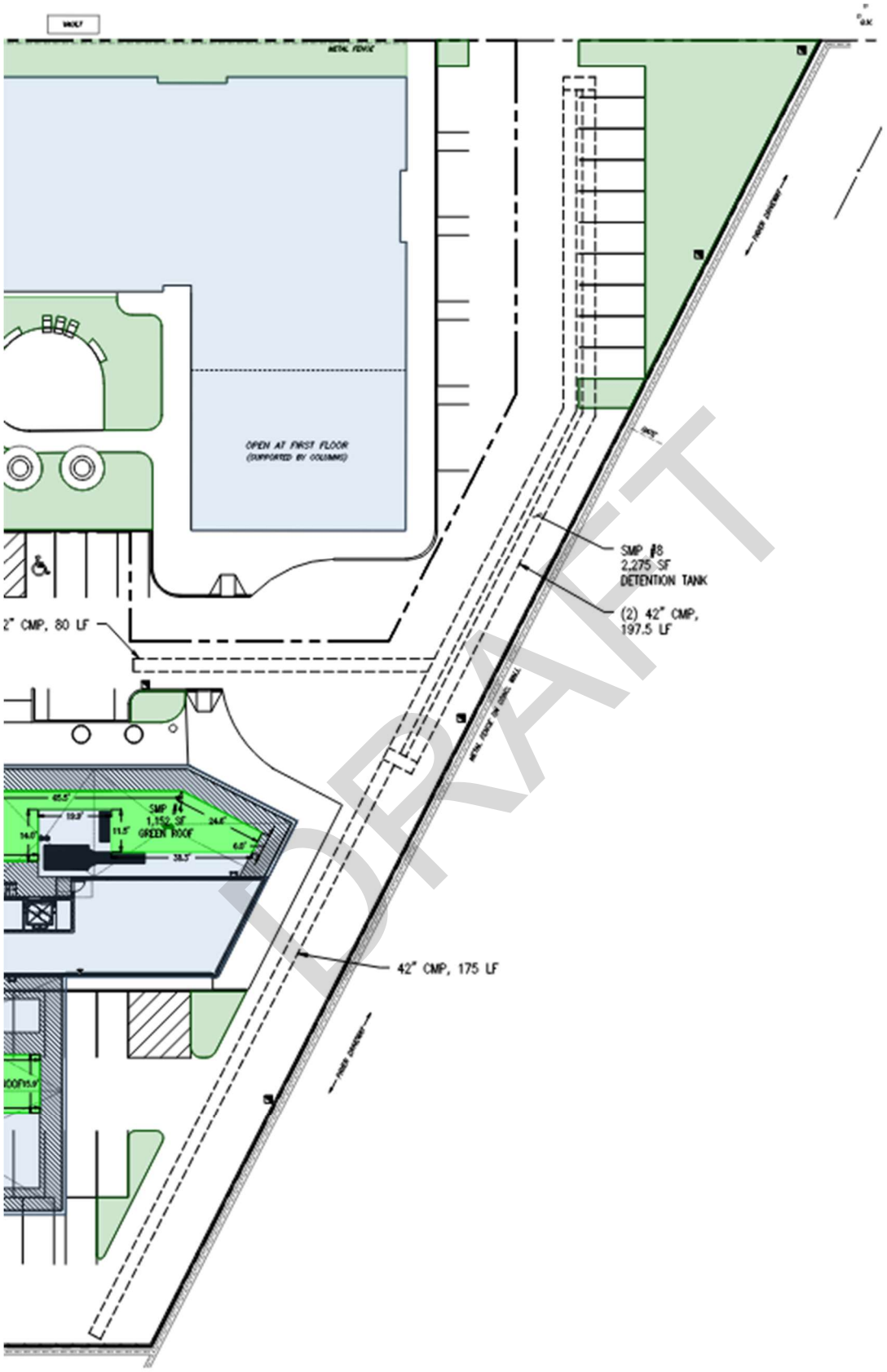
METAL FENCE
OPEN AT FIRST FLOOR
(SUPPORTED BY COLUMNS)
SMP #8
2,275 SF
DETENTION TANK
(2) 42" CMP,
197.5 LF
42" CMP, 80 LF
SMP #4
1,152 SF
GREEN ROOF
42" CMP, 175 LF
METAL FENCE ON CONC. WALL

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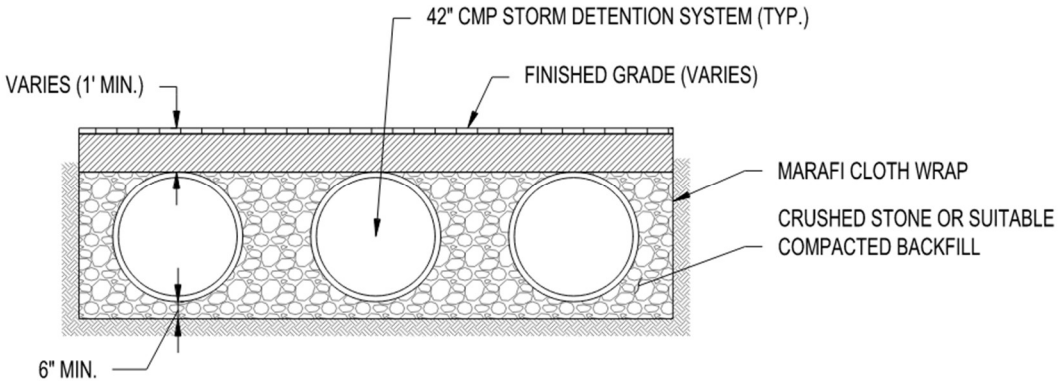
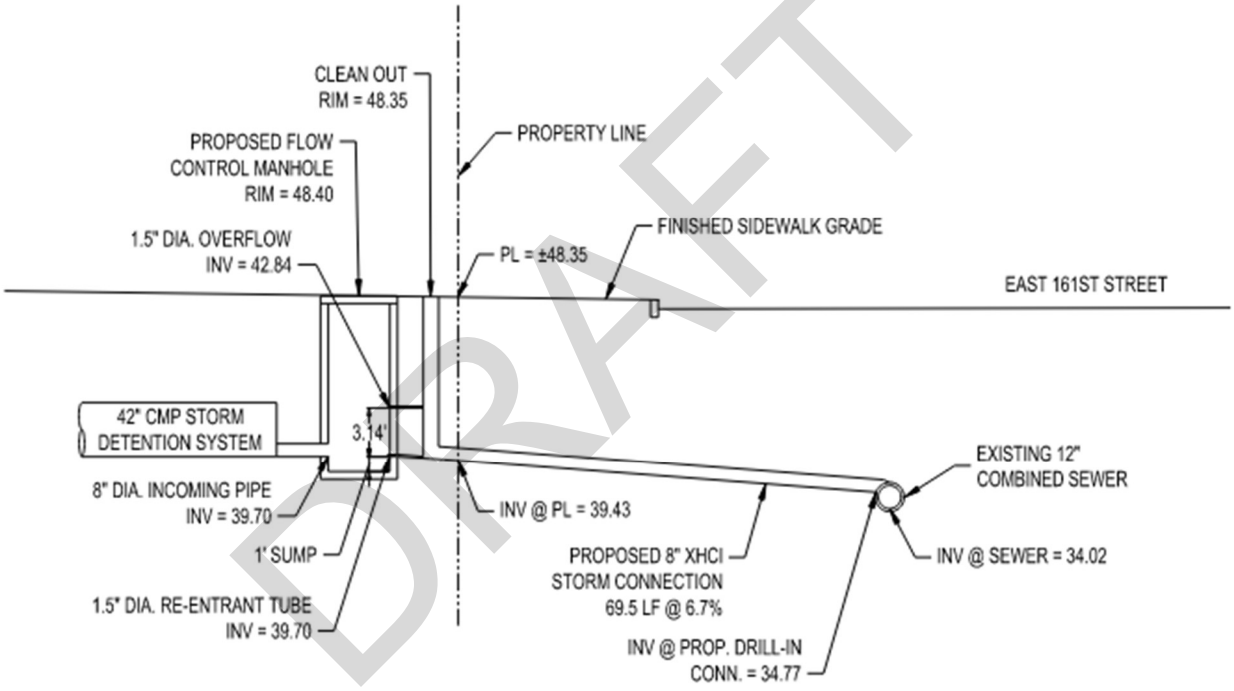

42" CMP STORM DETENTION SYSTEM (TYP.)
FINISHED GRADE (VARIES)
VARIES (1' MIN.)
MARAFI CLOTH WRAP
CRUSHED STONE OR SUITABLE
COMPACTED BACKFILL
6" MIN.


CLEAN OUT
RIM = 48.35
PROPERTY LINE
PROPOSED FLOW
CONTROL MANHOLE
RIM = 48.40
1.5" DIA. OVERFLOW
INV = 42.84
FINISHED SIDEWALK GRADE
PL = ±48.35
EAST 161ST STREET
42" CMP STORM
DETENTION SYSTEM
3.14'
EXISTING 12"
COMBINED SEWER
8" DIA. INCOMING PIPE
INV = 39.70
INV @ PL = 39.43
1' SUMP
PROPOSED 8" XHCI
STORM CONNECTION
69.5 LF @ 6.7%
INV @ SEWER = 34.02
1.5" DIA. RE-ENTRANT TUBE
INV = 39.70
INV @ PROP. DRILL-IN
CONN. = 34.77

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**Stormwater Maintenance Permit**

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**SEDUM MAT CARE AND INSTALLATION GUIDELINES**

Whether your sedum mats arrived to you via UPS in a box or via truck on a pallet, you must always **UNPACK IMMEDIATELY!**

***Rooftop Installation:***

Sedum mats are the perfect vegetative answer to most green roof systems with industry standard growth media and excellent drainage.

- Install **IMMEDIATELY!**
- Saturate the green roof media. Level and roll media until compact. Continue to water the green roof media during the installation if it is starting to dry out.
- Lay each mat so the sides of each mat are touching. Avoid allowing the vegetation to drape between the mats. Mats can be staggered for a more "seamless" look.
- Sedum mats can be cut to work around obstacles such as roof vents and equipment.
- Utilize overhead watering to thoroughly water mats immediately after installation.
- Continue to utilize overhead watering until the roots have extended into the green roof media and the sedum mat has become well established. (Approximately 4-6 weeks.) During this time you will want to keep the soil in the sedum mat at an **evenly moist level**. Not soggy-wet. Not pale-dry. Do not overwater! Likewise, if the mats start to separate from each other and the sides are curling up, they are much too dry!

***Rooftop Maintenance:***

A certain level of maintenance will need to follow a green roof installation. Once established, irrigation can be administered overhead or by drip. During times of low rainfall/ excessive heat, a green roof should always be checked for proper water levels. Again, if the mats start to separate from each other and the sides are curling up, they are much too dry!

Weed seeds can be carried to a green roof via wind or birds. Occasionally check your green roof for weeds and hand pull any that are found. Dead flowers can be removed, but it is not necessary.

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***Landscape Installation:***

Sedum mats are an excellent choice for on-grade applications that require a low maintenance answer.

- Install **IMMEDIATELY!**
- Make sure you prepared your area in advance! Completely clear the area of grass, weeds, etc. before installation time. Do not use herbicides prior to installation.
- Rake and loosen-up the soil. Make sure it is thoroughly moist.
- Lay each mat so the sides of each mat are touching. Avoid allowing the vegetation to drape between the mats.
- Sedum mats can be cut to create curves or cut around obstacles.
- Utilize overhead watering to thoroughly water mats immediately after installation.
- Continue to utilize overhead watering until the roots have extended into the soil and the sedum mat has become well established. (Approximately 4-6 weeks.) During this time you will want to keep the soil in the sedum mat at an **evenly moist level**. Not soggy-wet. Not pale-dry. Do not overwater! Likewise, if the mats start to separate from each other and the sides are curling up, they are much too dry!

***Landscape Maintenance:***

A certain level of maintenance will need to follow a landscape installation. The most important thing to remember is to check that it is not being overwatered! During times of low rainfall/ excessive heat, your installation should always be checked for proper water levels. Again, if the mats start to separate from each other and the sides are curling up, they are much too dry!

Sedum mats work very much like mulch in keeping the weeds out. Pull any weeds by hand that do appear before they spread. Dead flowers can be removed, but it is not necessary.

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***Other Applications:***

Sedum mats can be used for endless applications, many of which are listed on our website. Whatever the use, sedum should always be unpacked immediately and kept at a moderate moisture level.

***Seasonal Color:***

With the onset of winter and cooler temperatures, sedum goes dormant. Some varieties will partially defoliate at the bottom of the stems. Most varieties will take on “winter” tones (ie dark red, orange, chartreuse). This is normal and it will fill-in and green-up when spring and warmer temperatures return. During the summer months sedum will take on its most vibrant range of colors.

# Appendix J: NYSDEC General Permit for Stormwater Discharges from Construction Sites

## Documents included:

☒ New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges for Construction Activity

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NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION (NYSDEC)

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

**CONSTRUCTION ACTIVITY**

Permit No. GP-0-25-001

Construction General Permit (CGP)

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

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Effective Date: January 29, 2025 Expiration Date: January 28, 2030

Scott E. Sheeley

Chief Permit Administrator

Scott E. Sheeley JAN. 29, 2025

Authorized Signature Date

Address: NYSDEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

## PREFACE

Pursuant to Section 402 of the Clean Water Act (CWA), and 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), *stormwater discharges* from certain *construction activities* are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York State administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7 and 8, and Article 70, as well as 6 NYCRR Parts 621 and 750.

C*onstruction activities* constitute construction of a *point source* and, therefore, pursuant to ECL sections 17-0505, 17-0701, and 17-0803, the *owner or operator* must have coverage under a SPDES permit prior to *commencement of construction activities*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

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**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**SPDES CONSTRUCTION GENERAL PERMIT (CGP) GP-0-25-001**
**FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES**

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## Part I. How to Obtain Coverage and General Requirements

To be covered under this permit, the *owner or operator* must meet all eligibility requirements in Part I.A. and follow the requirements for obtaining permit coverage in Part I.D., F., or G.

### A. Eligibility Requirements

For a *common plan of development or sale*, the *phase(s)* that meet the eligibility requirements in Part I.A. may obtain coverage under this permit even if other *phase(s)* of the same *common plan of development or sale* do not meet the eligibility requirements and require an individual SPDES permit.

1. The *owner's or operator's construction activities* involve soil disturbances of:

    a. one or more acres; or

    b. less than one acre which are part of a *common plan of development or sale* that will ultimately disturb one or more acres; or

    c. less than one acre where NYSDEC has determined that a SPDES permit is required for *stormwater discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of pollutants to *surface waters of the State*.

        i. 5,000 square feet or more, but less than one acre, and are in the New York City Watershed located east of the Hudson River, Appendix C Figure 1; or

        ii. 20,000 square feet or more, but less than one acre, within the municipal boundaries of the City of New York (NYC); or

        iii. less than 20,000 square feet which are part of a *common plan of development or sale* that will ultimately disturb 20,000 square feet or more, but less than one acre, within the municipal boundaries of NYC; or

        iv. that creates 5,000 square feet or more of *impervious area* within the municipal boundaries of NYC.

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2. *Discharges* from the *owner's or operator's construction activities* are/were not:

    a. already covered by a different SPDES permit; or

    b. covered under a different SPDES permit that was denied, terminated, or revoked; or

    c. identified in an expired individual SPDES permit that was not renewed; or

    d. required to obtain an individual SPDES permit or another general SPDES permit in accordance with Part VII.K.

3. If *construction activities* may adversely affect a species that is endangered or threatened, the *owner or operator* must obtain a:

    a. permit issued pursuant to 6 NYCRR Part 182 for the project; or

    b. letter issued by NYSDEC of non-jurisdiction pursuant to 6 NYCRR Part 182 for the project.

4. If *construction activities* have the potential to affect an *historic property*, the *owner or operator* must obtain one of the following:

    a. documentation that the *construction activity* is not within an archeological buffer area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant:

        i. 1-5 acres of disturbance - 20 feet; or

        ii. 5-20 acres of disturbance - 50 feet; or

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iii. 20+ acres of disturbance - 100 feet.

b. NYSDEC consultation form sent to OPRHP,[1] and copied to NYSDEC's Agency Historic Preservation Officer (APO), and

i. the State Environmental Quality Review Act (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or

ii. documentation from OPRHP that the *construction activity* will result in No Impact; or

iii. documentation from OPRHP providing a determination of No Adverse Impact; or

iv. a Letter of Resolution signed by the *owner or operator*, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA).

c. documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

i. No Affect; or

ii. No Adverse Affect; or

iii. Executed Memorandum of Agreement.

d. documentation that SHPA Section 14.09 has been completed by NYSDEC or another state agency.

5. If *construction activities* are subject to SEQR, the *owner or operator* must obtain documentation that SEQR has been satisfied.

6. If *construction activities* are not subject to SEQR, but subject to the equivalent environmental review from another New York State or federal agency, the

[1] The consultation form can be submitted, along with other project information, through OPRHP's Cultural Resource Information System (CRIS) portal. If submitted through CRIS, paper copies of the consultation form need not be mailed.

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*owner or operator* must obtain documentation that project review, pursuant to a process equivalent to SEQR from another New York State or federal agency, has been satisfied.

7. If *construction activities* require Uniform Procedures Act (UPA) Permits (see 6 NYCRR Part 621) from NYSDEC, or the equivalent from another New York State or federal agency, the *owner or operator* must:

    a. obtain all such necessary permits; or

    b. receive notification from NYSDEC pursuant to 6 NYCRR 621.3(a)(4) excepting Part I.A.7.a.

8. *Construction activities* are not eligible if they meet the following criteria in Part I.A.8.a. or b.:

    a. For linear transportation and linear utility project types, the *construction activities*:

        i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

        ii. are undertaken on land with no existing *impervious cover*; and

        iii. disturb two or more acres of *steep slope*.

    b. For all other project types, the *construction activities*:

        i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and

        ii. are undertaken on land with no existing *impervious cover*; and

        iii. disturb one or more acres of *steep slope*.

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## B. Types of *Discharges* Authorized

1. The following *stormwater discharges* are authorized under this permit:

    a. *Stormwater discharges*, including *stormwater* runoff, snowmelt runoff, and surface runoff and drainage, associated with *construction activity*, are authorized under this permit provided that appropriate *stormwater* controls are designed, installed, and maintained in accordance with Part II. and Part III.

    b. *Stormwater discharges* from construction support activities at the *construction site* (including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas) if the following requirements are met:

        i. The support activity is directly related to the *construction site* required to have permit coverage for *stormwater discharges*; and

        ii. The support activity is not a commercial operation, nor does it serve multiple unrelated *construction sites*; and

        iii. The support activity does not continue to operate beyond the completion of the *construction activity* at the site it supports; and

        iv. *Stormwater* controls are implemented in accordance with Part II. and Part III. for *discharges* from the support activity areas.

2. The following non-*stormwater discharges* associated with *construction activity* are authorized under this permit:

    a. Non-*stormwater discharges* listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "*Discharges* from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; and

    b. Non-*stormwater discharges* of waters to which other components have not been added that are used in accordance with the *SWPPP* to control dust or irrigate vegetation in stabilized areas; and

    c. Uncontaminated *discharges* from *dewatering* operations

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3. Authorized *discharges* of *stormwater* or authorized *discharges* of non-*stormwater*, commingled with a *discharge* authorized by a different SPDES permit and/or a *discharge* that does not require SPDES permit authorization, are also authorized under this permit.

## C. Prohibited *Discharges*

1. Non-*stormwater discharges* prohibited under this permit include but are not limited to:

    a. Wastewater from washout of concrete; and

    b. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and

    c. Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance; and

    d. Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and

    e. Toxic or hazardous substances from a spill or other release.

## D. Electronic Notice of Intent (eNOI) Submittal

To receive authorization in accordance with Part I.D.3.b., the *owner or operator* must submit a complete eNOI in accordance with the requirements in Part I.D. The eNOI contains questions to: ensure eligibility requirements in Part I.A. have been met; obtain *owner or operator* contact information; obtain the total area to be disturbed and the existing/future *impervious areas* (rounded to the nearest tenth of an acre); confirm *Traditional Land Use Control MS4 Operator* jurisdiction over construction projects; satisfy the EPA eRule requirements; confirm that the Water Quality-Based Effluent Limitations in Part II. have been met; demonstrate consideration of the future risks due to climate change in accordance with Part III.A.2.; and confirm that the other *Stormwater Pollution Prevention Plan (SWPPP)* requirements in Part III. have been met.

1. An eNOI may be submitted for:

    a. *construction activities* that are not part of a *common plan of development or sale*; or

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b. an entire *common plan of development or sale*; or

c. separate *phase(s)* of a *common plan of development or sale* if the following requirements are met:

   i. the *common plan of development or sale* meets the eligibility requirements of Part I.A.5. or 6.; and

   ii. the *phase(s)* meet(s) all other eligibility requirements of Part I.A.; and

   iii. Part III.C. Required *SWPPP* Components by Project Type is based on the *common plan of development or sale*, not the *phase(s)*; or

d. *tree clearing* that is associated with, or will support, a *renewable energy* generation, transmission, or storage project that meets Part I.A.5. and 6., if the *tree clearing*:

   i. meets all other eligibility requirements of Part I.A.; and

   ii. will occur in NYSDEC's Regions 3-9; and

   iii. is not within ¼ mile of a bat hibernaculum protected pursuant to 6 NYCRR Part 182; and

   iv. will occur between November 1st and March 31st.

2. As prerequisites for submitting an eNOI, the *owner or operator* must:

   a. prepare a *SWPPP* for Part I.D.1.a., b., c., or d. in accordance with Part III.; and

   b. based on the following criteria, upload the following signature forms signed in accordance with Part VII.J. to the eNOI prior to submission:

      i. for all eNOIs:

         1. the SWPPP Preparer Certification Form, Appendix F, signed by the *SWPPP* preparer; and

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2. the Owner/Operator Certification Form, Appendix J, signed by the *owner or operator*; and

ii. if an eNOI includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that will *discharge* to the *MS4(s)*:

1. determine if the *Traditional Land Use Control MS4 Operator(s)* have review authority. A *Traditional Land Use Control MS4 Operator* does not have review authority where:

a. the *owner or operator* of the *construction activities* in Part I.D.2.b.ii. is the same entity as the *Traditional Land Use Control MS4 Operator* identified in Part I.D.2.b.ii.; or

b. there is a statute exempting the *owner or operator* from zoning review by the *Traditional Land Use Control MS4 Operator*; or

c. there is no such statute per Part I.D.2.b.ii.1.b., the *Traditional Land Use Control MS4 Operator* concludes, after public hearing, that it does not have zoning review authority in accordance with Legal Memorandum LU14 Updated January 2020 “Governmental Immunity from Zoning and Other Legislation”; and

2. if the *Traditional Land Use Control MS4 Operator(s)* have review authority, submit the *SWPPP* to the *Traditional Land Use Control MS4 Operator(s)* for review and have:

a. if outside the municipal boundaries of NYC: the MS4 SWPPP Acceptance Form, Appendix G, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.; or

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b. if within the municipal boundaries of NYC: The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval Form, Appendix H, signed by the principal executive officer or ranking elected official from the Traditional Land Use Control MS4 Operator, or by a duly authorized representative of that person in accordance with Part VII.J.2.; and

3. if the *Traditional Land Use Control MS4 Operator* does not have review authority, have the MS4 No Jurisdiction Form, Appendix I, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator,* or by a duly authorized representative of that person in accordance with Part VII.J.2.

3. Submitting an eNOI:

a. The *owner or operator* must submit a complete Notice of Intent electronically using a NYSDEC approved form.[2]

b. The *owner or operator* is authorized to *commence construction activity* as of the authorization date indicated in the Letter of Authorization (LOA), which is sent by NYSDEC after a complete eNOI is submitted.

i. If an eNOI is received for a *SWPPP* that deviates from one of the technical standards but demonstrates *equivalence* in accordance with Part III.B.1.a.ii. or Part III.B.2.b.ii., if the *SWPPP* includes *construction activities* that are not within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)*, and/or if the *SWPPP* includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that do not have review authority in accordance with Part I.D.2.b.ii.1., the authorization date indicated in the LOA will be 60 business days after the eNOI submission date.

[2] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.



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c. If *Traditional Land Use Control MS4 Operator(s)* have review authority in accordance with Part I.D.2.b.ii.2., the *owner or operator* must, within five business days of receipt of the LOA, send an electronic copy of the LOA to the *Traditional Land Use Control MS4 Operator(s)* with review authority.

## E. General Requirements for *Owners or Operators* with Permit Coverage

1. As of the date the LOA is received, the *owner or operator* must make the eNOI, *SWPPP*, and LOA available for review and copying in accordance with the requirements in Part VII.H. When applicable, as of the date an updated LOA is received, the *owner or operator* must make the updated LOA available for review and copying in accordance with the requirements in Part VII.H.

2. The *owner or operator* must ensure compliance with all requirements of this permit and that the provisions of the *SWPPP*, including any changes made to the *SWPPP* in accordance with Part III.A.5., are properly implemented and maintained from the *commencement of construction activity* until:

   a. all areas of disturbance have achieved *final stabilization;* and

   b. the owner's or operator's coverage under this permit is terminated in accordance with Part V.A.5.a.

3. As of the date of the *commencement of construction activities* until Part I.E.2.a. and b. have been met, the *owner or operator* must maintain at the *construction site*, a copy of:

   a. all documentation necessary to demonstrate eligibility with this permit; and

   b. this permit; and

   c. the *SWPPP*; and

   d. the signed SWPPP Preparer Certification Form; and

   e. the signed MS4 SWPPP Acceptance Form or signed NYCDEP SWPPP Acceptance/Approval Form or signed MS4 No Jurisdiction Form (when applicable); and

   f. the signed Owner/Operator Certification Form; and

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g. the eNOI; and

h. the LOA; and

i. the LOA transmittal to the Traditional Land Use Control MS4 Operator in accordance with Part I.D.3.c. (when applicable).

4. The *owner or operator* must maintain at the *construction site*, until Part I.E.2.a. and b. have been met, as of the date the documents become final or are received, a copy of the:

   a. responsible contractor's or subcontractor's certification statement(s) in accordance with Part III.A.7.; and

   b. inspection reports in accordance with Part IV.C.4. and 6.; and

   c. Request to Disturb Greater Than Five Acres and the Authorization Letter to Disturb Greater Than Five Acres in accordance with Part I.E.6. (when applicable); and

   d. Request to Continue Coverage and the Letter of Continued Coverage (LOCC) in accordance with Part I.F.2. and 4. (when applicable); and

   e. The updated LOA(s) in accordance with Part I.E.9. (when applicable).

5. The *owner or operator* must maintain the documents in Part I.E.3. and 4. in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection. The documents must be paper documents unless electronic documents are accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be. If electronic documents are kept on site, the *owner or operator* must maintain functional equipment on site available to an inspector during normal hours of operation such that an inspector may view the electronic documents in a format that can be read in a similar manner as a paper record and in a legally dependable format with no less evidentiary value than their paper equivalent.

6. The *owner or operator* must meet the following requirements prior to disturbing greater than five acres of soil at any one time:

   a. The *owner or operator* must submit a written Request to Disturb Greater Than Five Acres to:

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i. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, if a *Traditional Land Use Control MS4 Operator* does not have review authority in accordance with Part I.D.2.b.ii.1.; or

ii. the *Traditional Land Use Control MS4 Operator*, if a *Traditional Land Use Control MS4 Operator* has review authority in accordance with Part I.D.2.b.ii.1.; or

iii. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, and each involved *Traditional Land Use Control MS4 Operator*, if the project spans multiple municipalities with more than one *Traditional Land Use Control MS4 Operator* involved with review authority in accordance with Part I.D.2.b.ii.1.

b. The written Request to Disturb Greater Than Five Acres must include:

i. The SPDES permit identification number (Permit ID); and

ii. Full technical justification demonstrating why alternative methods of construction that would result in five acres of soil disturbance or less at any one time are not feasible; and

iii. The phasing plan for the project and sequencing plans for all *phases* from the *SWPPP* in accordance with Part III.B.1.d.; and

iv. Plans with locations and details of erosion and sediment control practices such that the heightened concern for erosion when disturbing greater than five acres at one time has been addressed; and

v. Acknowledgment that "the *owner or operator* will comply with the requirements in Part IV.C.2.b."; and

vi. Acknowledgment that "the *owner or operator* will comply with the requirements in Part II.B.1.b."

c. The *owner or operator* must be in receipt of an Authorization Letter to Disturb Greater Than Five Acres, which will include when the

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authorization begins and ends and indicate a maximum area (acres) of soil disturbance allowed at any one time, from:

i. NYSDEC, if Part I.E.6.a.i. or iii. apply; or

ii. the *Traditional Land Use Control MS4 Operator*, if Part I.E.6.a.ii. applies.

7. Upon a finding of significant non-compliance with the practices described in the *SWPPP* or violation of this permit, NYSDEC may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order must be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

8. If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE).[3] *Construction activity* shall not resume until written permission to do so has been received from the RWE.

9. To be authorized to implement modifications to the information previously submitted in the eNOI, the *owner or operator* must:

   a. notify NYSDEC via email at Stormwater_info@dec.ny.gov requesting access to update the eNOI; and

   b. update the eNOI to reflect the modifications and resubmit the eNOI in accordance with Part I.D.; and

   c. receive an updated LOA.

10. The eNOI, *SWPPP*, LOA, updated LOAs (when applicable), and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

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[3] The Regional Water Manager where a DEC Region does not have a RWE.

## F. Permit Coverage for *Discharges* Authorized Under GP-0-20-001

When applicable:

1. Upon the effective date of this permit, an *owner or operator* of *a construction activity*, with coverage under GP-0-20-001, will have interim coverage under GP-0-25-001 for 45 calendar days starting on the effective date of GP-0-25-001 so long as the *owner or operator* maintains compliance with all applicable requirements of this permit.

2. Within 30 calendar days of the effective date of this permit, the *owner or operator*, with coverage under GP-0-20-001, must submit a complete Request to Continue Coverage electronically using a NYSDEC approved form,[4] which contains the information identified in Part I.F.3. below, if:

   a. the *owner or operator* continues to implement the SMP component in conformance with the technical standards in place at the time of initial project authorization; and

   b. the *owner or operator* will comply with all non-design requirements of GP-0-25-001.

3. The Request to Continue Coverage form contains questions to: ensure eligibility requirements in Part I.A. have been met; verify *owner or operator* contact information; verify the permit identification number; verify the original eNOI submission ID, if applicable; verify Part I.F.2.a. and b.; verify the version of the Design Manual that the technical/design components conform to; and receive an updated Owner/Operator Certification Form, Appendix I.

4. The *owner or operator* has obtained continued coverage under GP-0-25-001 as of the date indicated in the LOCC, which is sent by NYSDEC after a complete Request to Continue Coverage form is submitted.

5. If the owner or operator does not submit the Request to Continue Coverage form in accordance with Part I.F.2. and 3., coverage under this permit is automatically terminated after interim coverage expires.

[4] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

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## G. Change of *Owner or Operator*

When applicable:

1. When property ownership changes, or when there is a change in operational control over the construction plans and specifications, the following process applies:

    a. The new *owner or operator* must meet the applicable prerequisites for submitting an eNOI in accordance with Part I.D.2.; and

    b. The new *owner or operator* must submit an eNOI in accordance with Part I.D.3.; and

    c. Permit coverage for the new *owner or operator* will be effective upon receipt of the LOA in accordance with Part I.D.3.b.; and

    d. The new *owner or operator*, upon receipt of their LOA, must provide their Permit ID to the original *owner or operator*; and

    e. If the original *owner or operator* will no longer be the *owner or operator* of the *construction activity* identified in the original *owner's or operator's* eNOI, the original *owner or operator*, upon receipt of the new *owner's or operator's* Permit ID in accordance with Part I.G.1.d., must submit to NYSDEC a completed eNOT in accordance with Part V. that includes the name and Permit ID of the new *owner or operator*; or

    f. If the original *owner or operator* maintains ownership of a portion of the *construction activity*, the original *owner or operator* must maintain their coverage under the permit by modifying their eNOI; modifications to the eNOI must include:

        i. the revised area of disturbance and/or *impervious area(s)*; and

        ii. the revised SMP information, if applicable; and

        iii. a narrative description of what has changed; and

        iv. the new *owner's or operator's* Permit ID for the portion of the project removed from the eNOI.

    *Owners or operators* must follow Part I.E.9. to modify the eNOI.

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## Part II. Water Quality-Based Effluent Limitations

### A. Maintaining Water Quality

NYSDEC expects that compliance with the requirements of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any *discharge* to either cause or contribute to a violation of the following *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York:

1. There must be no increase in turbidity that will cause a substantial visible contrast to natural conditions; and

2. There must be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There must be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the *stormwater discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standard,* the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this permit and document in accordance with Part IV.C.4. of this permit. To address the *water quality standard* violation the *owner or operator* must include and implement appropriate controls in the *SWPPP* to correct the problem or obtain an individual SPDES permit.

If, despite compliance with the requirements of this permit, it is demonstrated that the *stormwater discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if NYSDEC determines that a modification of this permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit, and the *owner or operator* must obtain an individual SPDES permit prior to further *discharges* from the *construction site*.

### B. Effluent Limitations Applicable to *Discharges* from *Construction Activities*

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part II.B.1.a., b., c., d., and e. These limitations represent the

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degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement, and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part II.B.1.a., b., c., d., and e. and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (BB), dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in *SWPPP* the reason(s) for the deviation, or alternative design, and provide information in the *SWPPP* demonstrating that the deviation or alternative design is *equivalent* to the technical standard.

    a. **Erosion and Sediment Controls.** At a minimum, erosion and sediment controls must be selected, designed, installed, implemented, and maintained to:

        i. *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s; and

        ii. Control *stormwater discharge*s, including both peak flow rates and total *stormwater* volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points; and

        iii. *Minimize* the amount of soil exposed during *construction activity*; and

        iv. *Minimize* the disturbance of *steep slope*; and

        v. *Minimize* sediment *discharge*s from the site; and

        vi. Provide and maintain *natural buffers* around surface waters, direct *stormwater* to vegetated areas and maximize *stormwater* infiltration to reduce *pollutant discharge*s, unless *infeasible*; and

        vii. *Minimize* soil compaction. *Minimizing* soil compaction is not required

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where the intended function of a specific area of the site dictates that it be compacted; and

viii. Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

ix. *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of *pollutants* that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has ceased, whether permanently or *temporarily ceased*, the application of soil stabilization measures must be initiated by the end of the next business day and completed within 14 calendar days from the date the current soil disturbance activity ceased. For *construction sites* that *directly discharge* to one of the 303(d) segments listed in Appendix D, or are located in one of the watersheds listed in Appendix C, or are authorized to disturb greater than five acres in accordance with Part I.E.5.a.viii., the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven calendar days from the date the soil disturbance activity ceased.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Select, design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be selected, designed, installed, implemented, and maintained to:

i. *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. Soaps, detergents and solvents cannot be used; and

ii. *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation

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and to *stormwater*. *Minimization* of exposure is not required in cases where the exposure to precipitation and to *stormwater* will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of *stormwater* contamination (such as final products and materials intended for outdoor use); and

iii. Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Surface Outlets.** When discharging from basins and impoundments, the surface outlets must be designed, constructed, and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

## C. Post-Construction Stormwater Management Practice (SMP) Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction SMPs, in accordance with Part III.C., must select, design, install, implement, and maintain the SMPs to meet the *performance criteria* in the New York State Stormwater Management Design Manual, dated July 31, 2024 (DM), using sound engineering judgment. Where SMPs are not designed in conformance with the *performance criteria* in the DM, the *owner or operator* must include in the *SWPPP* the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity*, that requires SMPs in accordance with Part III.C., must design the practices to meet the applicable *sizing criteria* in Part II.C.2.a., b., c., or d.

### a. Sizing Criteria for *New Development*

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the total WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv must be calculated in accordance with the criteria in Section 4.2 of the DM; or

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2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the requirements in Part II.C.2.a.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

   **In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.4 of the DM.** The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

   1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

   2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs without detention or velocity controls; or

   3. The site *directly discharges* into a fifth order or larger water body (stream, river, or lake), or tidal waters, where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

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iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams, or

2. A downstream analysis reveals that *overbank* control is not required.

**b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watersheds**

i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):

1. Reduce the WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24-hour design storm over the post-developed watershed and must be calculated in accordance with the criteria in Section 4.3 of the DM; or

2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part II.C.2.b.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include

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documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

**In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.5 of the DM.** The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:

1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or

2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs; or

3. The site *directly discharges* to tidal waters, or a fifth order or larger water body (stream, river, or lake) where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

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iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

1. the site *directly discharges* to tidal waters or fifth order or larger streams; or

2. A downstream analysis reveals that *overbank* control is not required.

**c. *Sizing Criteria* for *Redevelopment Activity***

i. Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* must be addressed by one of the following options, as outlined in Section 9.2.1. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C) must calculate the WQv in accordance with Section 4.3 of the DM. All other *redevelopment activities* must calculate the WQv in accordance with Section 4.2 of the DM.

1. Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the DM must be applied to all newly created pervious areas; or

2. Capture and treat 100% of the required WQv, for a minimum of 25% of the disturbed redevelopment *impervious area*, by implementation of standard SMPs or reduced by application of runoff reduction techniques; or

3. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a volume-based alternative SMP, as defined in Section 9.4 of the DM; or

4. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a flow-through alternative SMP sized to treat the peak rate of runoff from the WQv design storm; or

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5. Application of a combination of 1 through 4 above that provide a weighted average of at least two of the above methods. Application of this method must be in accordance with the criteria in Section 9.2.1(A)(V) of the DM; or

6. If there is an existing SMP located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 through 5 above.

ii. Channel Protection Volume (CPv) is not required if there is 0% change to hydrology that increases the *discharge* rate and volume from the project site.

iii. *Overbank* Flood Control (Qp) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

iv. Extreme Flood Control (Qf) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

**d. *Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development***

Construction projects, that include both *new development* and *redevelopment activity*, must use SMPs that meet the *sizing criteria* calculated as an aggregate of the *sizing criteria* in Part II.C.2.a. or b. for the *new development* portion of the project and Part II.C.2.c. for the *redevelopment activity* portion of the project.

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## Part III. Stormwater Pollution Prevention Plan (SWPPP)

### A. General *SWPPP* Requirements

1. A *SWPPP* must be prepared and implemented by the *owner or operator* of all *construction activity* covered by this permit. All authorized *discharges* must be identified in the *SWPPP*. The *SWPPP* must document the selection, design, installation, implementation and maintenance of the control measures and

practices that will be used to meet the effluent limitations in Part II.B. and, where applicable, the SMP requirements in Part II.C.

2. The *SWPPP* must demonstrate consideration in narrative format of the future physical risks due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490, and associated guidance.

    a. The owner or operator must consider:

        i. the following physical risks due to climate change:

            (i) increasing temperature; and

            (ii) increasing precipitation; and

            (iii) increasing variability in precipitation, including chance of drought; and

            (iv) increasing frequency and severity of flooding; and

            (v) rising sea level; and

            (vi) increasing storm surge; and

            (vii) shifting ecology.

        ii. for each of the following:

            (i) overall site planning; and

            (ii) location, elevation, and sizing of:

                a. control measures and practices; and

                b. conveyance system(s); and

                c. detention system(s).

3. The *SWPPP* must describe the erosion and sediment control practices and where required, SMPs that will be used and/or constructed to reduce the *pollutants* in *stormwater discharges* and to assure compliance with the

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requirements of this permit. In addition, the *SWPPP* must identify potential sources of pollution which may reasonably be expected to affect the quality of *stormwater discharges*.

4. All *SWPPPs*, that require the SMP component in accordance with Part III.B.2., must be prepared by a *qualified professional*.

5. The *owner or operator* must keep the *SWPPP* current so that, at all times, it accurately documents the erosion and sediment control practices that are being used or will be used during construction, and all SMPs that will be constructed on the site. At a minimum, the *owner or operator* must modify the *SWPPP*, including construction drawings:

   a. whenever the current provisions prove to be ineffective in *minimizing pollutants* in *stormwater discharges* from the site; and

   b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* NYSDEC, or other regulatory authority; and

   d. to document the final construction conditions in an as-built drawing.

6. NYSDEC may notify the *owner or operator* at any time that the *SWPPP* does not meet one or more of the minimum requirements of this permit. The notification must be in writing and identify the provisions of the *SWPPP* that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by NYSDEC, the *owner or operator* must make the required changes to the *SWPPP* and submit written notification to NYSDEC that the changes have been made. If the *owner or operator* does not respond to NYSDEC's comments in the specified time frame, NYSDEC may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4.

7. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion and sediment control practices included in the *SWPPP* and the

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contractor(s) and subcontractor(s) that will be responsible for constructing the SMPs included in the *SWPPP*. The *owner or operator* must have each of the contractors and subcontractors identify at least one person from their company to be *trained contractor* that will be responsible for implementation of the *SWPPP*. The *owner or operator* must ensure that at least one *trained contractor* is on site daily when soil disturbance activities are being performed.

The *owner or operator* must have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before the *commencement of construction activities*:

> "I hereby certify under penalty of law that I understand and agree to comply with the requirements of the *SWPPP* and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the requirements of the most current version of the New York State Pollutant Discharge Elimination System (SPDES) Construction General Permit (CGP) for Stormwater Discharges from Construction Activities and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the *SWPPP* that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for *SWPPP* implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* must attach the certification statement(s) to the copy of the *SWPPP* that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the *SWPPP* after the *commencement of construction activities*, they must also sign the certification statement and provide the information listed above prior to performing *construction activities*.

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## B. Required *SWPPP* Contents

1. Erosion and sediment control component - The *owner or operator* must prepare a *SWPPP* that includes erosion and sediment control practices.

    a. Erosion and sediment control practices must be designed:

        i. in conformance with the BB; or

        ii. *equivalent* to the BB if deviating from Part III.B.1.a.i.

    b. If the erosion and sediment control practices are designed in conformance with Part III.B.1.a.ii., the *SWPPP* must include a demonstration of *equivalence* to the BB.

    c. At a minimum, the erosion and sediment control component of the *SWPPP* must include the following:

        i. Background information about the scope of the project, including the location, type and size of project; and

        ii. A site map/construction drawing(s) with north arrows for the project, including a general location map. At a minimum, the site map must show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the *stormwater discharge*(s) and receiving surface water(s); and

        iii. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG); and

        iv. A phasing plan for the project and sequencing plans for all *phases*, both of which must address clearing and grubbing, excavation and grading, utility and infrastructure installation, *final stabilization*,

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and any other *construction activity* at the site that will result in soil disturbance.

1. The phasing plan must include:

    a. a map delineating and labeling the limits of soil disturbance for all *phases* of a project; and

    b. a table identifying the order and intended schedule of when each *phase* will begin and end its sequencing plan. The table must identify the total disturbed area for each *phase* at any one time and the total disturbed area for the overall project at any one time all on one timeline showing all overlapping quantities of disturbed area at any one time; and

2. A sequencing plan for a specific *phase* must include:

    a. a table indicating the order and intended schedule of *construction activities* within a *phase*, and corresponding construction drawings with a description of the work to be performed; and

    b. all permanent and *temporary stabilization* measures; and

v. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented; and

vi. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice; and

vii. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any

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temporary sediment basins and structural practices that will be used to divert flows from exposed soils; and

viii. A maintenance inspection schedule for the contractor(s) and subcontractor(s) identified in Part III.A.7. to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule must be in accordance with the requirements in the BB technical standard; and

ix. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the *stormwater discharges*; and

x. A description and location of any *stormwater discharges* associated with industrial activity other than construction at the site, including, but not limited to, *stormwater discharges* from asphalt plants and concrete plants located on the *construction site*; and

xi. Identification of any elements of the design that are not in conformance with the design criteria in the BB technical standard. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. SMP component – The *owner or operator* of *construction activity* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs.

   a. SMPs must be designed in conformance with the applicable *sizing criteria* in Part II.C.2.a., c., or d.; and

   b. SMPs must be designed in conformance with the *performance criteria*:

      i. in the DM; or

      ii. *equivalent* to the DM if deviating from Part III.B.2.b.i.; or

      iii. in the New York State Stormwater Management Design Manual, dated January 2015 (2015 Design Manual), or *equivalent* to it, if the following criteria are met:

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1. The eNOI is submitted in accordance with Part I.D. before January 29, 2027 for *construction activities* that are either:

    a. subject to governmental review and approval:

        i. where the *owner or operator* made any application to that governmental entity prior to the effective date of this permit; and

        ii. such application included a *SWPPP* developed using the 2015 Design Manual or *equivalent* to it; or

    b. not subject to governmental review and approval:

        i. where a fiscal allocation for the *construction activities* has been developed and approved by a governmental entity; and

        ii. the *SWPPP* was developed using the 2015 Design Manual or *equivalent* to it; and

c. If SMPs are designed in conformance with Part III.B.2.b.ii., the *SWPPP* must include the reason(s) for the deviation or alternative design and a demonstration of *equivalence* to the DM; and

d. If SMPs are designed in conformance with Part III.B.2.b.iii., the *SWPPP* must include supporting information or documentation demonstrating that Part III.B.2.b.iii.1.a. or b. apply; and

e. The SMP component of the *SWPPP* must include the following:

    i. Identification of all SMPs to be constructed as part of the project, including which option the SMP designs conform to, either Part III.B.2.b.i., ii., or iii. Include the dimensions, material specifications and installation details for each SMP; and

    ii. A site map/construction drawing(s) showing the specific location and size of each SMP; and

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iii. A Stormwater Modeling and Analysis Report that includes:

(i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points; and

(ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and SMPs; and

(iii) Results of *stormwater* modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre- and post-development runoff rates and volumes for the different storm events; and

(iv) Summary table, with supporting calculations, which demonstrates that each SMP has been designed in conformance with the *sizing criteria* included in the DM; and

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part II.C.; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the DM. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the DM.

iv. Soil testing results and locations (test pits, borings); and

v. Infiltration test results, when required in accordance with Part III.B.2.a.; and

vi. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each SMP. The plan must identify the entity

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that will be responsible for the long-term operation and maintenance of each practice; and

3. Enhanced Phosphorus Removal Standards - The *owner or operator* of *construction activity* identified in Table 2 of Appendix B that is located in a watershed identified in Appendix C must prepare a *SWPPP* that includes SMPs designed in conformance with the applicable *sizing criteria* in Part II.C.2.b., c., or d. and the *performance criteria* Enhanced Phosphorus Removal Standards included in the DM. At a minimum, the SMP component of the *SWPPP* must meet the requirements of Part III.B.2.

### C. Required *SWPPP* Components by Project Type

*Owners or operators* of *construction activities*, identified in Table 1 of Appendix B, are required to prepare a *SWPPP* that only includes erosion and sediment control practices designed in accordance with Part III.B.1. *Owners or operators* of the *construction activities*, identified in Table 2 of Appendix B, must prepare a *SWPPP* that also includes SMPs designed in accordance with Part III.B.2 or 3.

For the entire area of disturbance, including the entire *common plan of development or sale* if applicable, the owner or operator must evaluate every bullet from Appendix B Table 1 and Table 2 separately. If bullets from both Table 1 and Table 2 apply, the *SWPPP* must include erosion and sediment control practices for all *construction activities* but SMPs for only those portions of the *construction activities* that fall under Table 2 bullet(s).

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## Part IV. Inspection and Maintenance Requirements

### A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures), and all SMPs identified in the *SWPPP*, are inspected and maintained in accordance with Part IV.B. and C.

### B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity*, identified in Tables 1 and 2 of Appendix B, must have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being

implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor must:

a. if the corrective action does not require engineering design:

    i. begin implementing corrective actions within one business day; and

    ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

    i. begin the engineering design process within five business days; and

    ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

2. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. The *trained contractor* must begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

3. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational.

**C. *Qualified Inspector* Inspection Requirements**

1. With the exception of the following *construction activities* identified in Tables 1 and 2 of Appendix B, a *qualified inspector* must conduct site inspections for all other *construction activities* identified in Tables 1 and 2 of Appendix B:

    a. the construction of a single-family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than or equal to five (5) acres and is

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not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D; and

b. the construction of a single-family home that involves soil disturbances of one (1) or more acres but less than or equal to five (5) acres and is not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D; and

c. construction on *agricultural property* that involves soil disturbances of one (1) or more acres but less than five (5) acres; and

d. *construction activities* located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances of 5,000 square feet or more, but less than one acre.

2. The *qualified inspector* must conduct site inspections in accordance with the following timetable:

a. For *construction sites* where soil disturbance activities are on-going, the *qualified inspector* must conduct a site inspection at least once every seven (7) calendar days; or

b. For *construction sites* where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part I.E.6. to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days; or

c. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* must conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas under the jurisdiction of a *Traditional Land Use Control MS4 Operator,* the *Traditional Land Use Control MS4 Operator* (provided the *Traditional Land Use Control MS4 Operator* is not the *owner or operator* of the *construction activity*) by hard copy or email prior to reducing the inspections to this frequency and again by hard copy or email prior to re-commencing construction; or

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d. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the requirement to have the *qualified inspector* conduct inspections ceases if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1., the *Traditional Land Use Control MS4 Operator(s)* (provided the *Traditional Land Use Control MS4 Operator(s)* are not the *owners or operators* of the *construction activity*) in writing prior to the shutdown and again in writing prior to resuming *construction activity*. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* must terminate coverage by meeting the requirements of Part V; or

e. For *construction sites* involving soil disturbance of one (1) or more acres that *directly discharge* to one of the 303(d) segments listed in Appendix D or is located in one of the watersheds listed in Appendix C, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* must inspect:

   a. all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness; and

   b. all SMPs under construction to ensure that they are constructed in conformance with the *SWPPP*; and

   c. all areas of disturbance that have not achieved *final stabilization*; and

   d. all points of *discharge* to *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site*; and

   e. all points of *discharge* from the *construction site*.

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4. The *qualified inspector* must prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report must include and/or address all of the following, for all *construction activities* except those listed in Part IV.C.1.:

   a. Permit identification number; and

   b. Date and time of inspection; and

   c. Name and title of person(s) performing inspection; and

   d. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection, including the temperature at the time of the inspection; and

   e. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This must include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow; and

   f. A description of the condition of all *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This must include identification of any *discharges* of sediment to the *surface waters of the State*; and

   g. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance; and

   h. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced; and

   i. Description and sketch (map) of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection; and

   j. Estimates, in square feet or acres, of the following areas:

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i. Total area with active soil disturbance (not requiring either *temporary stabilization* or *final stabilization*); and

ii. Total area with inactive soil disturbance (requiring either *temporary stabilization* or *final stabilization*); and

iii. Total area that has achieved *temporary stabilization*; and

iv. Total area that has achieved *final stabilization*; and

k. Current stage of construction of all SMPs and identification of all *construction activity* on site that is not in conformance with the *SWPPP* and technical standards; and

l. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the SMP(s); and

m. Identification and status of all corrective actions that were required by previous inspection; and

n. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* must attach color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* must also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* must attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* must notify the *owner or operator*, and appropriate contractor or subcontractor identified in Part III.A.7., of any corrective actions that need to be taken. The contractor or subcontractor must:

a. if the corrective action does not require engineering design:

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i. begin implementing corrective actions within one business day; and

ii. complete the corrective actions within five business days; or

b. if the corrective action requires engineering design:

i. begin the engineering design process within five business days; and

ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.

6. All inspection reports must be signed by the *qualified inspector.* In accordance with Part I.E.3., the inspection reports must be maintained on site with the *SWPPP*.

## Part V. How to Terminate CGP Coverage

### A. Electronic Notice of Termination (eNOT) Submittal

The eNOT contains questions to ensure requirements in Part V.A. have been met.

1. An *owner or operator* must terminate coverage when one or more of the following requirements have been met:

a. Total project completion:

i. all *construction activity* identified in the *SWPPP* has been completed; and

ii. all areas of disturbance have achieved *final stabilization*; and

iii. all temporary, structural erosion and sediment control measures have been removed; and

iv. all SMPs have been constructed in conformance with the *SWPPP* and are operational; and

v. an as-built drawing has been prepared; or

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b. Planned shutdown with partial project completion:

   i. all soil disturbance activities have ceased; and

   ii. all areas disturbed as of the project shutdown date have achieved *final stabilization*; and

   iii. all temporary, structural erosion and sediment control measures have been removed; and

   iv. all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational; and

   v. an as-built drawing has been prepared; or

c. In accordance with Part I.G. Change of Owner or Operator; or

d. The *owner or operator* has obtained coverage under an alternative general SPDES permit or an individual SPDES permit.

2. For *construction activities* that require *qualified inspector* inspections in accordance with Part IV.C.1. and have met Part V.A.1.a. or b., the *owner or operator* must have the *qualified inspector* perform a final site inspection prior to submitting the eNOT. The *qualified inspector* must, by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice(s)" certification statements on the eNOT, certify that all the requirements in Part V.A.1.a. or b. have been achieved.

3. For *construction activities* that are subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1. and meet Part V.A.1.a. or b., the *owner or operator* must have the *Traditional Land Use Control MS4 Operator(s)* sign the "MS4 Acceptance" statement on the eNOT in accordance with the requirements in Part VII.J. A *Traditional Land Use Control MS4 Operator* official, by signing this statement, determined that it is acceptable for the *owner or operator* to submit the eNOT in accordance with the requirements of this Part. A *Traditional Land Use Control MS4 Operator* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) when required in Part V.A.2.

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4. For *construction activities* that require SMPs and meet Part V.A.1.a. or b., the *owner or operator* must, prior to submitting the eNOT, ensure one of the following:

    a. for SMP(s) that were constructed by a private entity, but will be owned, operated, and maintained by a public entity, the SMP(s) and any right-of-way(s) needed to operate and maintain such practice(s) have been deeded to the municipality in which the practice(s) is located; or

    b. for SMP(s) that are privately owned, but will be operated and maintained by a public entity, an executed operation and maintenance agreement is in place with the municipality that will operate and maintain the SMP(s); or

    c. for SMP(s) that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record; or

    d. for SMP(s) that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility, the *owner or operator* has policies and procedures in place that ensure operation and maintenance of the practices in accordance with the operation and maintenance plan.

5. An *owner or operator* that has met the requirements of Part V.A.1., 2., 3., and 4. must request termination of coverage under this permit by submitting a complete Notice of Termination form electronically using a NYSDEC approved form.[5]

    a. The owner's or operator's coverage is terminated as of the termination date indicated in the Letter of Termination (LOT), which is sent by NYSDEC after a complete eNOT is submitted.

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[5] Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

## Part VI. Record Retention and Reporting

### A. Record Retention

The *owner or operator* must retain a copy of the documents listed in Part I.E.3. and a copy of the LOT for a period of at least five years from the date that NYSDEC accepts a complete NOT submitted in accordance with Part V.

### B. Reporting

Except for the eNOI, the signature forms associated with the eNOI, and the eNOT, all other written correspondence requested by NYSDEC, including individual permit applications, must be sent to the address of the appropriate DOW (SPDES) Program contact at the Regional Office listed in Appendix E.

## Part VII. Standard Permit Requirements

For the purposes of this permit, examples of contractors and subcontractors include: third-party maintenance and construction contractors.

### A. Duty to Comply

The *owner or operator*, and all contractors or subcontractors, must comply with all requirements of this permit. Any non-compliance with the requirements of this permit constitutes a violation of the New York State Environmental Conservation Law (ECL), and its implementing regulations, and is grounds for enforcement action. Filing of a request for termination of coverage under this permit, or a notification of planned changes or anticipated non-compliance, does not limit, diminish or stay compliance with any requirements of this permit.

### B. Need to Halt or Reduce Activity Not a Defense

The necessity to halt or reduce the *construction activity* regulated by this permit, in order to maintain compliance with the requirements of this permit, must not be a defense in an enforcement action.

### C. Penalties

There are substantial criminal, civil, and administrative penalties associated with violating the requirements of this permit. Fines of up to $37,500 per day for each

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violation and imprisonment for up to 15 years may be assessed depending upon the nature and degree of the offense.

**D. False Statements**

Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance must, upon conviction, be punished in accordance with ECL §71-1933 and or New York State Penal Law Articles 175 and 210.

**E. Re-Opener Clause**

Upon issuance of this permit, a determination has been made on the basis of a submitted Notice of Intent, plans, or other available information, that compliance with the specified permit requirements will reasonably protect classified water use and assure compliance with applicable *water quality standards*. Satisfaction of the requirements of this permit notwithstanding, if operation pursuant to this permit causes or contributes to a condition in contravention of State *water quality standards* or guidance values, or if NYSDEC determines that a modification is necessary to prevent impairment of the best use of the waters or to assure maintenance of *water quality standards* or compliance with other provisions of ECL Article 17 or the Clean Water Act (CWA), or any regulations adopted pursuant thereto, NYSDEC may require such modification and the Commissioner may require abatement action to be taken by the *owner or operator* and may also prohibit such operation until the modification has been implemented.

**F. Duty to Mitigate**

The *owner or operator*, and its contractors and subcontractors, must take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

**G. Requiring Another General Permit or Individual SPDES Permit**

NYSDEC may require any *owner or operator* authorized to *discharge* in accordance with this permit to apply for and obtain an individual SPDES permit or apply for authorization to *discharge* in accordance with another general SPDES permit.

1. Cases where an individual SPDES permit or authorization to discharge in accordance with another general SPDES permit may be required include, but is not limited to the following:



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a. the *owner or operator* is not in compliance with the conditions of this permit or does not meet the requirements for coverage under this permit; and

b. a change has occurred in the availability of demonstrated technology or practices for the control or abatement of *pollutants* applicable to the *point source*; and

c. new effluent limitation guidelines or new source performance standards are promulgated that are applicable to *point sources* authorized to *discharge* in accordance with this permit; and

d. existing effluent limitation guidelines or new source performance standards that are applicable to *point sources* authorized to *discharge* in accordance with this permit are modified; and

e. a water quality management plan containing requirements applicable to such *point sources* is approved by NYSDEC; and

f. circumstances have changed since the time of the request to be covered so that the *owner or operator* is no longer appropriately controlled under this permit, or either a temporary or permanent reduction or elimination of the authorized *discharge* is necessary; and

g. the *discharge* is in violation of section 17-0501 of the ECL; and

h. the *discharge(s)* is a significant contributor of *pollutants*. In making this determination, NYSDEC may consider the following factors:

   i. the location of the *discharge(s)* with respect to *surface waters of the State*; and

   ii. the size of the *discharge(s)*; and

   iii. the quantity and nature of the *pollutants discharged* to *surface waters of the State*; and

   iv. other relevant factors including compliance with other provisions of ECL Article 17, or the CWA.

2. When NYSDEC requires any *owner or operator* authorized by this permit to apply for an individual SPDES permit as provided for in this subdivision, it must notify the *owner or operator* in writing that a permit application is required. This notice must include a brief statement of the reasons for this decision, an application

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form, a statement setting a time for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from the *owner's or operator's* receipt of the notification letter, whereby the authorization to *discharge* under this permit must be terminated. NYSDEC may grant additional time upon demonstration, to the satisfaction of the RWE,[6] that additional time to apply for an alternative authorization is necessary or where NYSDEC has not provided a permit determination in accordance with 6 NYCRR Part 621.

3. When an individual SPDES permit is issued to an *owner or operator* authorized to *discharge* under this permit for the same *discharge(s)*, this permit authorization for *construction activities* authorized under the individual SPDES permit is automatically terminated on the effective date of the individual SPDES permit unless termination is earlier in accordance with 6 NYCRR Part 750.

## H. Duty to Provide Information

The *owner or operator* must furnish to NYSDEC, within five business days, unless otherwise set forth by NYSDEC, any information that NYSDEC may request to determine whether cause exists to determine compliance with this permit or to determine whether cause exists for requiring an individual SPDES permit in accordance with 6 NYCRR 750-1.21(e) (see Part VII.G. Requiring Another General Permit or Individual Permit).

The *owner or operator* must make available to NYSDEC, for inspection and copying, or furnish to NYSDEC within 25 business days of receipt of a NYSDEC request for such information, any information retained in accordance with this permit.

Except for Part I.D.4. and 5. and Part I.G., the following applies: where the *owner or operator* becomes aware that it failed to submit any relevant facts on the Notice of Intent, or submitted incorrect information in a Notice of Intent or in any report to NYSDEC, the *owner or operator* must submit such facts or corrected information to NYSDEC within five business days.

## I. Extension

In the event a new permit is not issued and effective prior to the expiration of this permit, and this permit is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, then the *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the requirements of this permit until a new permit is issued and effective.

[6] The Regional Water Manager where a DEC Region does not have a RWE.



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## J. Signatories and Certification

The Notice of Intent, Notice of Termination, and reports required by this permit must be signed as provided in 40 CFR §122.22.

1. All Notices of Intent and Notices of Termination must be signed as follows:

    a. For a corporation. By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

        (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or

        (ii) the manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for Notice of Intent or Notice of Termination requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

    Note: NYSDEC does not require specific assignments or delegations of authority to responsible corporate officers identified in 40 CFR §122.22(a)(1)(i). NYSDEC will presume that these responsible corporate officers have the requisite authority to sign the Notice of Intent or Notice of Termination unless the corporation has notified NYSDEC to the contrary. Corporate procedures governing authority to sign a Notice of Intent or Notice of Termination may provide for assignment or delegation to applicable corporate positions under 40 CFR §122.22(a)(1)(ii) rather than to specific individuals.

    b. For a partnership or sole proprietorship. By a general partner or the proprietor, respectively.

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c. For a municipality, State, Federal, or other public agency. By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

   1. the chief executive officer of the agency; or

   2. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. All reports required by this permit, and other information requested by NYSDEC, must be signed by a person described in Part VII.J.1., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Part VII.J.1. or using the Duly Authorized Form, found on the DEC website; and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

   c. The written authorization is submitted to NYSDEC.

3. Changes to authorization. If an authorization under Part VII.J.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the *construction activity*, a new authorization satisfying the requirements of Part VII.J.2. must be submitted to NYSDEC prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under Part VII.J.1. or 2. must make the following certification:

   *I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who*

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*manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

5. Electronic reporting. If documents described in Part VII.J.1. or 2. are submitted electronically by or on behalf of the *construction activity* with coverage under this permit, any person providing the electronic signature for such documents must meet all relevant requirements of this section, and must ensure that all of the relevant requirements of 40 CFR Part 3 (including, in all cases, subpart D to Part 3) (Cross-Media Electronic Reporting) and 40 CFR Part 127 (NPDES Electronic Reporting Requirements) are met for that submission.

## K. Inspection and Entry

The *owner or operator* must allow NYSDEC, the USEPA Regional Administrator, the applicable county health department, or any authorized representatives of those entities, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the *discharge*, upon the presentation of credentials and other documents as may be required by law, to:

1. enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the requirements of this permit; and

2. have access to and copy at reasonable times, any records that must be kept under the requirements of this permit, including records required to be maintained for purposes of operation and maintenance; and

3. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. sample or monitor at reasonable times, for the purposes of assuring general SPDES permit compliance or as otherwise authorized by the CWA or ECL, any substances or parameters at any location; and

5. enter upon the property of any contributor to the regulated facility or activity under authority of the *owner or operator*.

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## L. Confidentiality of Information

The following must not be held confidential: this permit, the fact sheet for this permit, the name and address of any *owner or operator*, effluent data, the Notice of Intent, and information regarding the need to obtain an individual permit or an alternative general SPDES permit. This includes information submitted on forms themselves and any attachments used to supply information required by the forms (except information submitted on usage of substances). Upon the request of the *owner or operator*, NYSDEC must make determinations of confidentiality in accordance with 6 NYCRR Part 616, except as set forth in the previous sentence. Any information accorded confidential status must be disclosed to the Regional Administrator upon his or her written request. Prior to disclosing such information to the Regional Administrator, NYSDEC will notify the Regional Administrator of the confidential status of such information.

## M. Other Permits May Be Required

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

## N. NYSDEC Orders or Civil Decrees/Judgments

The issuance of this permit by the NYSDEC, and the coverage under this permit by the *owner or operator*, does not supersede, revoke, or rescind any existing order on consent or civil Decree/Judgment, or modification to any such documents or to any order issued by the Commissioner, or any of the terms, conditions, or requirements contained in such order or modification therefore, unless expressly noted.

## O. Property Rights

Coverage under this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining the assent of any other jurisdiction as required by law for the *discharge* authorized.

## P. Compliance with Interstate Standards

If the *construction activity* covered by this permit originates within the jurisdiction of an interstate water pollution control agency, then the *construction activity* must also comply with any applicable effluent standards or *water quality standards* promulgated by that interstate agency and as set forth in this permit for such *construction activities*.

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## Q. Oil and Hazardous Substance Liability

Coverage under this permit does not affect the imposition of responsibilities upon, or the institution of any legal action against, the *owner or operator* under section 311 of the CWA, which must be in conformance with regulations promulgated pursuant to section 311 governing the applicability of section 311 of the CWA to *discharges* from facilities with *NPDES* permits, nor must such issuance preclude the institution of any legal action or relieve the *owner or operator* from any responsibilities, liabilities, or penalties to which the *owner or operator* is or may be subject pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. section 9601 et seq. (CERCLA).

## R. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, must not be affected thereby.

## S. NYSDEC Approved Forms

The *owner or operator* must provide all relevant information that is requested by NYSDEC, and required by this permit, on all NYSDEC approved forms.

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## APPENDIX A – Abbreviations and Definitions

### Abbreviations

APO – Agency Preservation Officer
BB – New York State Standards and Specifications for Erosion and Sediment Control (Blue Book), dated November 2016
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
CPv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DM – New York State Stormwater Management Design Manual (Design Manual), dated July 31, 2024
DOW – Division of Water
EAF – Environmental Assessment Form
ECL – chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law
EPA – U.S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
NYC – The City of New York
NYCDEP – The City of New York Department of Environmental Protection
NYSDEC – The New York State Department of Environmental Conservation
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RR – Runoff Reduction
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SMP – Post-Construction Stormwater Management Practice
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

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**Definitions**

All definitions in this section are solely for the purposes of this permit. If a word is not italicized in the permit, use its common definition.

**Agricultural Building** – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

**Agricultural Property** – the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023).

**Alter Hydrology from Pre- to Post-Development Conditions** – the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

**Combined Sewer System** – a sewer system which conveys sewage and *stormwater* through a single pipe system to a publicly owned treatment works.

**Commence (Commencement of) Construction Activities** – the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the *SWPPP*. See definition for "*Construction Activity(ies)*" also.

**Common Plan of Development or Sale** – a contiguous area where multiple separate and distinct *construction activities* are occurring, or may occur, under one plan. The "common plan" of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQR) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating *construction activities* may occur on a specific plot. A *common plan of development or sale* is comprised of two or more *phases*.

*Common plan of development or sale* does not include separate and distinct *construction activities* that are occurring, or may occur, under one plan that are at least 1/4 mile apart provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

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**Construction Activity(ies)** – identified within 40 CFR 122.26(b)(14)(x), 122.26(b)(15)(i), and 122.26(b)(15)(ii), any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, mechanized logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal.

*Construction activity* does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, which is excluded from the calculation of the soil disturbance for a project. Routine maintenance includes, but is not limited to:

- Re-grading of gravel roads or parking lots; and
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of the ditch; and
- Replacement of existing culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of a ditch; and
- Replacement of existing bridges that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity beneath the bridges; and
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch); and
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*; and
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material; and
- Long-term use of equipment storage areas at or near highway maintenance facilities; and
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*; and
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts; and
- Maintenance of ski trails including brush hog use and mowing; and
- Above ground snowmaking pipe replacement; and
- Replacement of existing utility poles; etc.

**Construction Site** – the land area where *construction activity(ies)* will occur. See also the definitions for "*Commence (Commencement of) Construction Activities"* and "*Common Plan of Development or Sale."*

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**Dewatering** – the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

**Directly Discharge(s)(ing) (to a specific surface waterbody)** – runoff flows from a *construction site* by overland flow and the first point of *discharge* is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system and the first point of *discharge* from the separate storm sewer system is the specific surface waterbody.

**Discharge(s)(d)** – any addition of any *pollutant* to waters of the State through an outlet or *point source*.

**Embankment** – an earthen or rock slope that supports a road/highway.

**Equivalent (Equivalence)** – the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

**Final Stabilization** – all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other *equivalent* stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

**Historic Property** – any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

**Impervious Area (Cover)** – all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and compacted gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

**Infeasible** – not technologically possible, or not economically practicable and achievable considering best industry practices.

**Minimize(ing)(ation)** – reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

**Municipal Separate Storm Sewer System (MS4)** - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

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1. owned or operated by a State, city, town, village, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, *stormwater*, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA, that *discharges* to *surface waters of the State*; and

2. designed or used for collecting or conveying *stormwater*; and

3. which is not a *combined sewer system*; and

4. which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

**Natural Buffer(s)** – an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

**New Development** – any land disturbance that does not meet the definition of *Redevelopment Activity* included in this appendix.

**New York State Erosion and Sediment Control Certificate Program** – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

**Nonpoint Source(s)** – any source of water pollution or *pollutants* which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

**Overbank** – flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

**Owner or Operator** – the person, persons, or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit requirements.

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**Performance Criteria** – the six performance criteria for each group of SMPs in Chapters 5 and 6 of the technical standard, New York State Stormwater Management Design Manual (DM), dated July 31, 2024. These include feasibility, conveyance, pretreatment, treatment, landscaping, and maintenance. It does not include the *Sizing Criteria* (i.e. WQv, RRv, CPv, Qp and Qf) in Part I.C.2. of the permit.

**Phase** – a defined area in which *construction activities* are occurring or will occur separate from other defined area(s).

**Point Source** – any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be *discharged*.

**Pollutant(s)** – dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast *discharged* into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq.

**Qualified Inspector** – a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder or other NYSDEC endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any SMPs that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

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**Qualified Professional** – a person that is knowledgeable in the principles and practices of *stormwater* management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other NYSDEC endorsed individual(s). Individuals preparing *SWPPPs* that require the SMP component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the *SWPPP* that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

**Redevelopment Activity(ies)** – the disturbance and reconstruction of existing *impervious area*, including *impervious areas* that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

**Renewable Energy** – electricity or thermal energy generated by renewable energy systems through use of the following technologies: solar thermal, photovoltaics, on land and offshore wind, hydroelectric, geothermal electric, geothermal ground source heat, tidal energy, wave energy, ocean thermal, and fuel cells which do not utilize a fossil fuel resource in the process of generating electricity.

**Site Limitations** – site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical *site limitations* include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of *site limitations* shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

**Sizing Criteria** – the criteria included in Part I.C.2 of the permit that are used to size SMPs. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

**Steep Slope** – land area designated on the current United States Department of Agriculture (USDA) Soil Survey as Soil Slope Phase D, (provided the map unit name or description is inclusive of slopes greater than 25%), or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

**Stormwater** – that portion of precipitation that, once having fallen to the ground, is in excess of the evaporative or infiltrative capacity of soils, or the retentive capacity of surface features, which flows or will flow off the land by surface runoff to waters of the State.

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**Streambank** – the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

**Stormwater Pollution Prevention Plan (SWPPP)** – a project specific report, including construction drawings, that among other things: describes the *construction activity(ies)*, identifies the potential sources of pollution at the *construction site*; describes and shows the *stormwater* controls that will be used to control the *pollutants* (i.e. erosion and sediment controls; for many projects, includes SMPs); and identifies procedures the *owner or operator* will implement to comply with the requirements of the permit. See Part III of the permit for a complete description of the information that must be included in the *SWPPP*.

**Surface Waters of the State** – shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

**Temporarily Ceased** – an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

**Temporary Stabilization** – exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

**Total Maximum Daily Load** (TMDL) – the sum of the allowable loads of a single *pollutant* from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a *pollutant* that a waterbody can receive and still meet *water quality standards*, and an allocation of that amount to the *pollutant's* sources. A TMDL stipulates Waste Load Allocations (WLA) for *point source discharges*, Load Allocations (LA) for *nonpoint source*s, and a margin of safety (MOS).

**Traditional Land Use Control MS4 Operator** – a city, town, or village with land use control authority that is authorized to *discharge* under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

**Trained Contractor** – an employee from the contracting (construction) company, identified in Part III.A.7., that has received four (4) hours of NYSDEC endorsed training



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in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.7., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity).

The *trained contractor* is responsible for the day-to-day implementation of the *SWPPP*.

**Tree Clearing** – *construction activities* limited to felling and removal of trees.

*Tree clearing* does not include hand felling and leaving the trees in place with no support from mechanized equipment, which is not considered *construction activity* requiring coverage under this permit.

**Water Quality Standard** – such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

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## APPENDIX B – Required SWPPP Components by Project Type

### Table 1
### *CONSTRUCTION ACTIVITIES* THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

**The following *construction activities* that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:**

- Single-family home not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions with 25% or less *impervious cover* at total site build-out and not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix D
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that include construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.

**The following *construction activities* that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:**

- All construction activities located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

**Within the municipal boundaries of NYC:**

- Stand-alone road reconstruction, where the total soil disturbance from only that road construction, is less than one (1) acre of land.

**The following *construction activities*:**

- Installation of underground linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation, *stormwater* retrofits, stream restoration, and resiliency projects that reconstruct shoreline areas to address sea level rise
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an *impervious cover*
- Cross-country ski trails, walking/hiking trails, and mountain biking trails, including a de minimis parking lot (maximum 10 spaces total, sized for passenger cars) with 35 feet minimum preservation of undisturbed area downgradient from the parking lot
- Dam rehabilitation (the structure of the dam itself)
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are not part of residential, commercial, or institutional development;
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path, or walking path.

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## Table 1 (Continued)
## *CONSTRUCTION ACTIVITIES* THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

**The following *construction activities*:**

- Slope stabilization
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Vegetated open space (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) that do not *alter hydrology from pre- to post-development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions
- Demolition where vegetation will be established, and no *redevelopment activity* is planned[1]
- Installation or replacement of either an overhead electric transmission line or a ski lift tower that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*.
- Solar array field areas that have tables elevated off the ground, spaced one table width apart, do not *alter hydrology from pre- to post-development conditions*, and address water quality volume and runoff reduction volume by maintaining sheet flow on slopes less than 8%.
- Structural agricultural conservation practices as identified in Table II in the "Agricultural Best Management Practice Systems Catalogue" (dated June 2023) that do not include construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions.
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary *impervious areas* that will be restored to pre-construction conditions once the *construction activity* is complete (in this context, "temporary" means the *impervious area* will be in place for two years or less)
- Other *construction activities* that do not include the construction or reconstruction of *impervious area*, and do not *alter hydrology from pre- to post-development* conditions, and are not listed in Table 2.

1. If the site is redeveloped in the future, a new eNOI must be submitted.

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## Table 2
## *CONSTRUCTION ACTIVITIES* THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)

**The following *construction activities*:**

- Single-family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family home that disturbs five (5) or more acres of land
- Single-family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of between 20,000 square feet and one (1) acre of land within the municipal boundaries of NYC with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single-family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a *common plan of development or sale* that will ultimately disturb five (5) or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Creation of 5,000 square feet or more of *impervious area* in the municipal boundaries of NYC
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) that involves soil disturbance greater than five acres.
- Structural agricultural conservation practices as identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023) that involves soil disturbance greater than five acres and include the construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.
- Facility buildings, including ski lodges, restroom buildings, pumphouses, ski lift terminals, and maintenance and groomer garages
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills; including creation of landfills or capping landfills.
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTWs, water treatment plants, and water storage tanks
- Golf courses
- Office complexes

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## Table 2 (Continued)

### *CONSTRUCTION ACTIVITIES* THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPS)

**The following *construction activities*:**

- Permanent laydown yards and equipment storage lots
- Playgrounds that include the construction or reconstruction of *impervious area*
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surfaces
- Road construction or reconstruction, outside the municipal boundaries of NYC
- Road construction within the municipal boundaries of NYC
- Stand-alone road reconstruction, within the municipal boundaries of NYC where the total soil disturbance from that road reconstruction involves soil disturbance of one (1) acre or more of land
- Parking lot construction or reconstruction (as with all Table 2 bullets, this includes parking lots constructed as part of the *construction activities* listed in Table 1, unless a Table 1 bullet specifies otherwise)
- Athletic fields (natural grass) that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations, and well drilling pads, surfaced with *impervious cover,* and constructed as part of an overhead electric transmission line, wind-power, cell tower, oil or gas well drilling, sewer or water main, ski lift, or other linear utility project
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of a residential, commercial or institutional development
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of highway construction or reconstruction
- Solar array field areas on slopes greater than 8% that cannot maintain sheet flow using management practices identified in the BB or the DM
- Solar array field areas on slopes less than 8% that will *alter the hydrology from pre- to post-development* conditions
- Solar array field areas with tables that are not elevated high enough to achieve *final stabilization* beneath the tables
- Traditional *impervious areas* associated with solar development (e.g. roads, buildings, transformers)
- Utility pads surfaced with *impervious cover*, including electric vehicle charging stations
- All other *construction activities* that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre- to post-development* conditions, and are not listed in Table 1

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## APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

**Watersheds where *owners or operators* of *construction activities* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs designed in conformance with the Enhanced Phosphorus Removal Standards included in the DM technical standard.**

- Entire New York City Watershed located east of the Hudson River – Figure 1
- Onondaga Lake Watershed – Figure 2
- Greenwood Lake Watershed – Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

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**Figure 1 - New York City Watershed East of the Hudson**

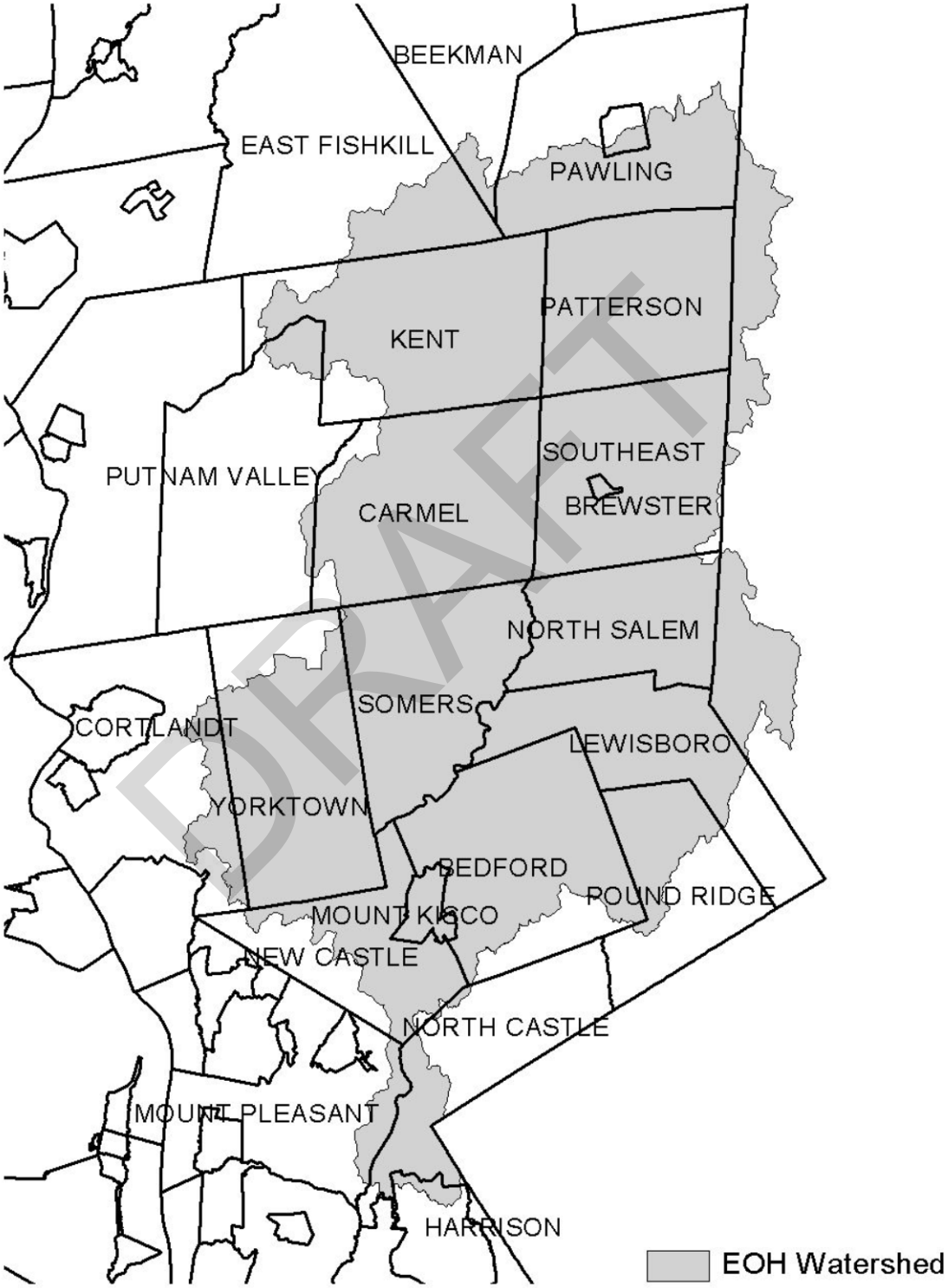

**Figure 2 - Onondaga Lake Watershed**

**Figure 3 - Greenwood Lake Watershed**

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**Figure 4 - Oscawana Lake Watershed**

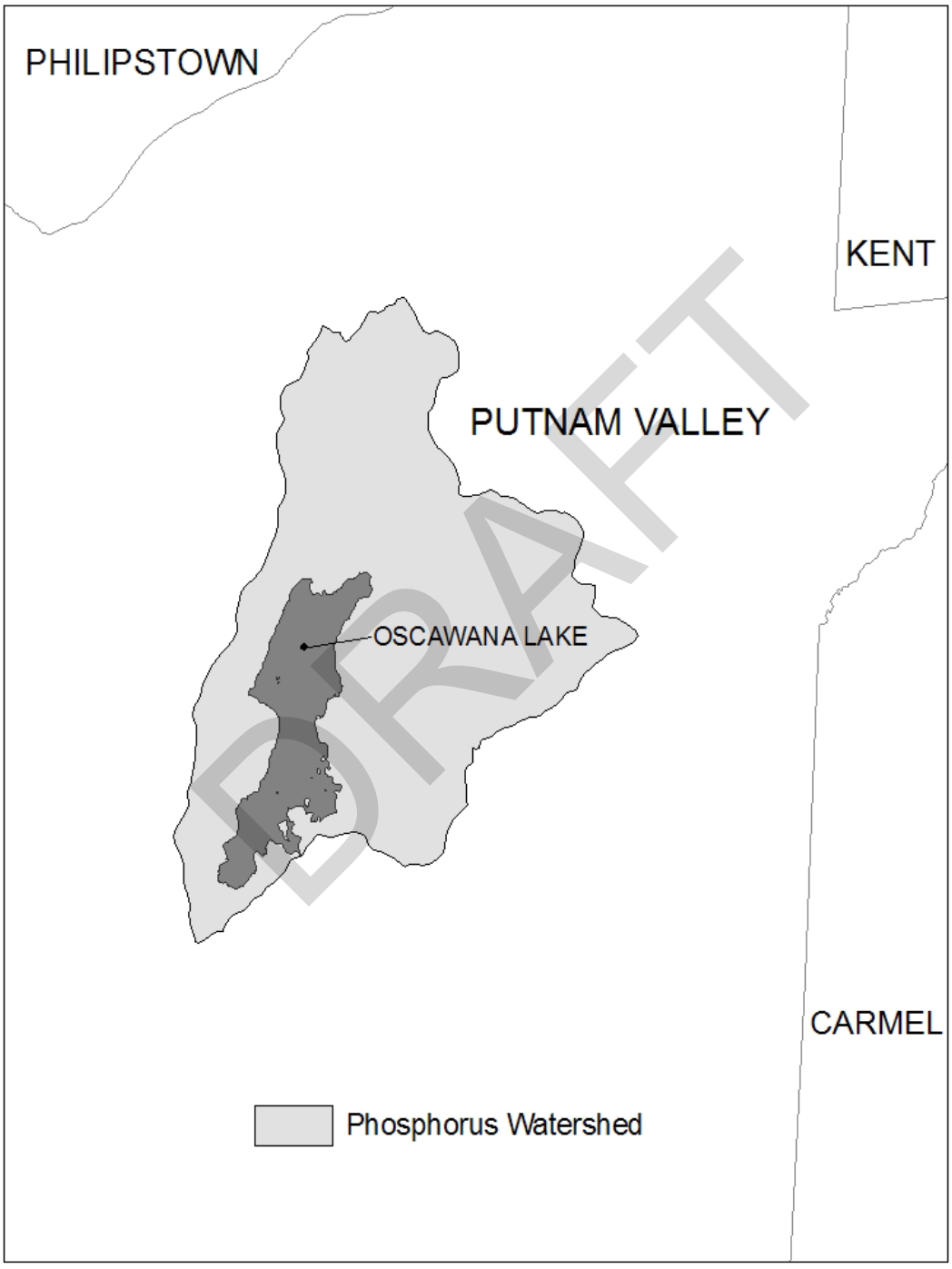
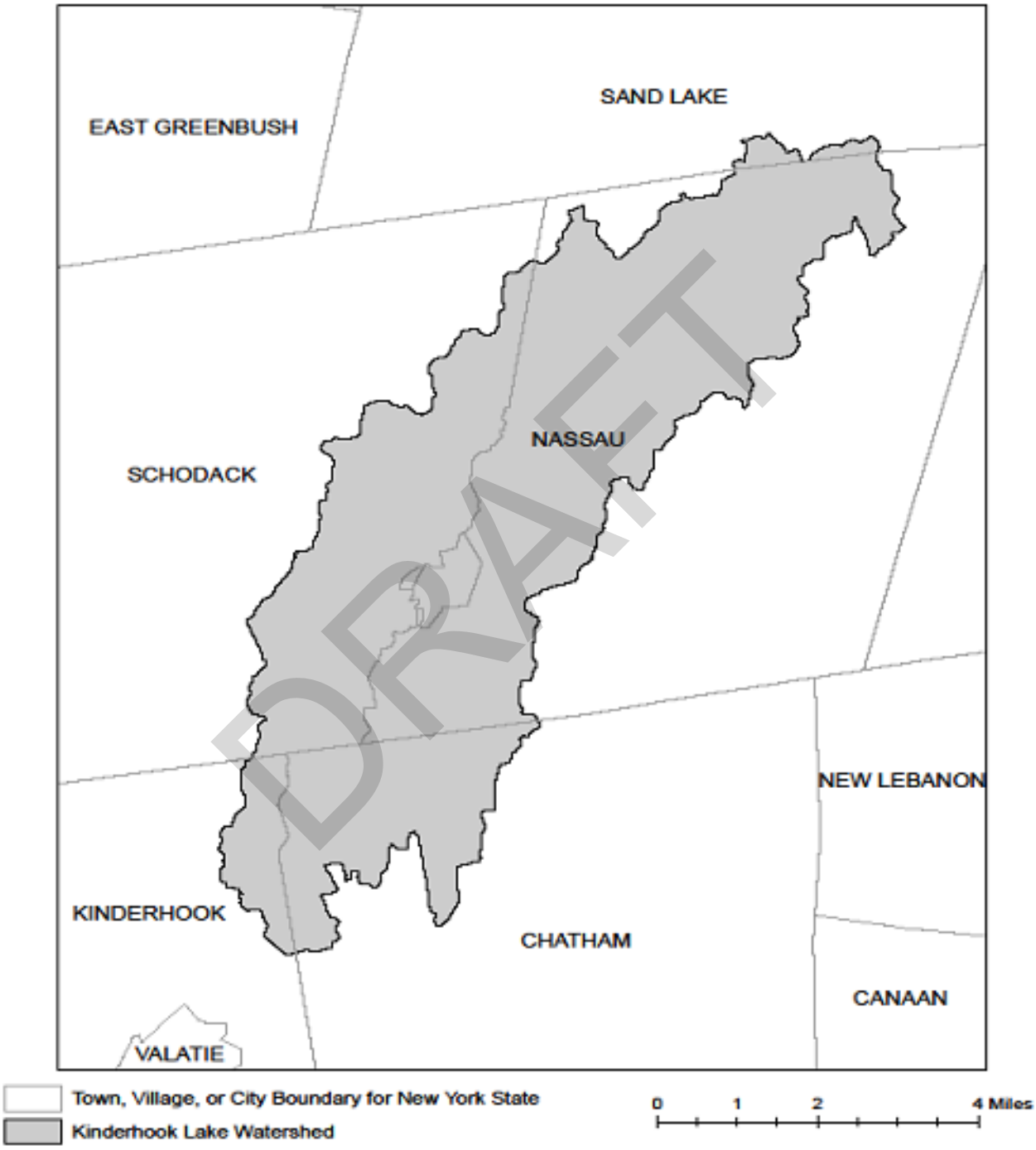


**Figure 5 - Kinderhook Lake Watershed**



## APPENDIX D – Impaired Waterbodies (by Construction Related Pollutants)

List of waterbodies impaired by *pollutants* related to *construction activity*, including turbidity, silt/sediment, and nutrients (e.g. nitrogen, phosphorus). This list is a subset of "The Final New York State 2018 Section 303(d) List of Impaired Waters Requiring a TMDL" dated June 2020.

| County | Waterbody | Pollutant |
|---|---|---|
| Albany | Ann Lee (Shakers) Pond, Stump Pond (1201-0096) | Phosphorus |
| Albany | Lawsons Lake (1301-0235) | Phosphorus |
| Allegany | Amity Lake, Saunders Pond (0403-0054) | Phosphorus |
| Allegany | Andover Pond (0403-0056) | Phosphorus |
| Bronx | Reservoir No.1/Lake Isle (1702-0075) | Phosphorus |
| Bronx | Van Cortlandt Lake (1702-0008) | Phosphorus |
| Broome | Blueberry, Laurel Lakes (1404-0033) | Phosphorus |
| Broome | Fly Pond, Deer Lake (1404-0038) | Phosphorus |
| Broome | Minor Tribs to Lower Susquehanna (0603-0044) | Phosphorus |
| Broome | Whitney Point Lake/Reservoir (0602-0004) | Phosphorus |
| Cattaraugus | Allegheny River/Reservoir (0201-0023) | Phosphorus |
| Cattaraugus | Beaver Lake/Alma Pond (0201-0073) | Phosphorus |
| Cattaraugus | Case Lake (0201-0020) | Phosphorus |
| Cattaraugus | Linlyco/Club Pond (0201-0035) | Phosphorus |
| Cayuga | Duck Lake (0704-0025) | Phosphorus |
| Cayuga | Owasco Inlet, Upper, and tribs (0706-0014) | Nutrients |
| Chautauqua | Chadakoin River and tribs (0202-0018) | Phosphorus |
| Chautauqua | Hulburt/Clymer Pond (0202-0079) | Phosphorus |
| Chautauqua | Middle Cassadaga Lake (0202-0002) | Phosphorus |
| Clinton | Great Chazy River, Lower, Main Stem (1002-0001) | Silt/Sediment |
| Columbia | Robinson Pond (1308-0003) | Phosphorus |
| Cortland | Dean Pond (0602-0077) | Phosphorus |
| Dutchess | Fallkill Creek (1301-0087) | Phosphorus |
| Dutchess | Hillside Lake (1304-0001) | Phosphorus |
| Dutchess | Wappingers Lake (1305-0001) | Phosphorus |
| Dutchess | Wappingers Lake (1305-0001) | Silt/Sediment |
| Erie | Beeman Creek and tribs (0102-0030) | Phosphorus |
| Erie | Delaware Park Pond (0101-0026) | Phosphorus |
| Erie | Ellicott Creek, Lower, and tribs (0102-0018) | Phosphorus |
| Erie | Ellicott Creek, Lower, and tribs (0102-0018) | Silt/Sediment |
| Erie | Green Lake (0101-0038) | Phosphorus |
| Erie | Little Sister Creek, Lower, and tribs (0104-0045) | Phosphorus |
| Erie | Murder Creek, Lower, and tribs (0102-0031) | Phosphorus |

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| | | |
|---|---|---|
| Erie | Rush Creek and tribs (0104-0018) | Phosphorus |
| Erie | Scajaquada Creek, Lower, and tribs (0101-0023) | Phosphorus |
| Erie | Scajaquada Creek, Middle, and tribs (0101-0033) | Phosphorus |
| Erie | Scajaquada Creek, Upper, and tribs (0101-0034) | Phosphorus |
| Erie | South Branch Smoke Cr, Lower, and tribs (0101-0036) | Phosphorus |
| Erie | South Branch Smoke Cr, Lower, and tribs (0101-0036) | Silt/Sediment |
| Genesee | Bigelow Creek and tribs (0402-0016) | Phosphorus |
| Genesee | Black Creek, Middle, and minor tribs (0402 0028) | Phosphorus |
| Genesee | Black Creek, Upper, and minor tribs (0402-0048) | Phosphorus |
| Genesee | Bowen Brook and tribs (0102-0036) | Phosphorus |
| Genesee | LeRoy Reservoir (0402-0003) | Phosphorus |
| Genesee | Mill Pond (0402-0050) | Phosphorus |
| Genesee | Oak Orchard Cr, Upper, and tribs (0301-0014) | Phosphorus |
| Genesee | Oatka Creek, Middle, and minor tribs (0402-0031) | Phosphorus |
| Genessee | Tonawanda Cr, Middle, Main Stem (0102-0002) | Phosphorus |
| Greene | Schoharie Reservoir (1202-0012) | Silt/Sediment |
| Greene | Sleepy Hollow Lake (1301-0059) | Silt/Sediment |
| Herkimer | Steele Creek tribs (1201-0197) | Phosphorus |
| Herkimer | Steele Creek tribs (1201-0197) | Silt/Sediment |
| Kings | Hendrix Creek (1701-0006) 18 | Nitrogen |
| Kings | Prospect Park Lake (1701-0196) | Phosphorus |
| Lewis | Mill Creek/South Branch, and tribs (0801-0200) | Nutrients |
| Livingston | Christie Creek and tribs (0402-0060) | Phosphorus |
| Livingston | Conesus Lake (0402-0004) | Phosphorus |
| Livingston | Mill Creek and minor tribs (0404-0011) | Silt/Sediment |
| Monroe | Black Creek, Lower, and minor tribs (0402-0033) | Phosphorus |
| Monroe | Buck Pond (0301-0017) | Phosphorus |
| Monroe | Cranberry Pond (0301-0016) | Phosphorus |
| Monroe | Durand, Eastman Lakes (0302-0037) | Phosphorus |
| Monroe | Lake Ontario Shoreline, Western (0301-0069) 9 | Phosphorus |
| Monroe | Long Pond (0301-0015) | Phosphorus |
| Monroe | Mill Creek and tribs (0302-0025) | Phosphorus 2 |
| Monroe | Mill Creek/Blue Pond Outlet and tribs (0402-0049) | Phosphorus |
| Monroe | Minor Tribs to Irondequoit Bay (0302-0038) | Phosphorus |
| Monroe | Rochester Embayment - East (0302-0002) [9] | Phosphorus |
| Monroe | Rochester Embayment - West (0301-0068) 9 | Phosphorus |
| Monroe | Shipbuilders Creek and tribs (0302-0026) | Phosphorus 2 |
| Monroe | Thomas Creek/White Brook and tribs (0302-0023) | Phosphorus |

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|---|---|---|
| Nassau | Bannister Creek/Bay (1701-0380) | Nitrogen |
| Nassau | Beaver Lake (1702-0152) | Phosphorus |
| Nassau | Browswere Bay (1701-0383) | Nitrogen |
| Nassau | Camaans Pond (1701-0052) | Phosphorus |
| Nassau | East Meadow Brook, Upper, and tribs (1701-0211) | Silt/Sediment |
| Nassau | East Rockaway Channel (1701-0381) | Nitrogen |
| Nassau | Glen Cove Creek, Lower, and tribs (1702-0146) | Silt/Sediment |
| Nassau | Grant Park Pond (1701-0054) | Phosphorus |
| Nassau | Hempstead Bay, Broad Channel (1701-0032) | Nitrogen |
| Nassau | Hempstead Lake (1701-0015) | Phosphorus |
| Nassau | Hewlett Bay (1701-0382) | Nitrogen |
| Nassau | Hog Island Channel (1701-0220) | Nitrogen |
| Nassau | Massapequa Creek, Upper, and tribs (1701-0174) | Phosphorus |
| Nassau | Milburn/Parsonage Creeks, Upp, and tribs (1701-0212) | Phosphorus |
| Nassau | Reynolds Channel, East (1701-0215) [12] | Nitrogen |
| Nassau | Reynolds Channel, West (1701-0216) 12 | Nitrogen |
| Nassau | Tidal Tribs to Hempstead Bay (1701-0218) | Nitrogen |
| Nassau | Tribs (fresh) to East Bay (1701-0204) | Silt/Sediment |
| Nassau | Tribs (fresh) to East Bay (1701-0204) | Phosphorus |
| Nassau | Tribs to Smith Pond/Halls Pond (1701-0221) | Phosphorus |
| Nassau | Woodmere Channel (1701-0219) | Nitrogen |
| New York | Harlem Meer (1702-0103) | Phosphorus |
| New York | The Lake in Central Park (1702-0105) | Phosphorus |
| Niagara | Bergholtz Creek and tribs (0101-0004) | Phosphorus |
| Niagara | Hyde Park Lake (0101-0030) | Phosphorus |
| Niagara | Lake Ontario Shoreline, Western (0301-0053) 9 | Phosphorus |
| Niagara | Lake Ontario Shoreline, Western (0301-0072) 9 | Phosphorus |
| Oneida | Ballou, Nail Creeks (1201-0203) | Phosphorus |
| Onondaga | Ley Creek and tribs (0702-0001) 10 | Nutrients (phosphorus) |
| Onondaga | Minor Tribs to Onondaga Lake (0702-0022) 10 | Nutrients (phosphorus) |
| Onondaga | Minor Tribs to Onondaga Lake (0702-0022) 10 | Nitrogen (NH3, NO2) |
| Onondaga | Onondaga Creek, Lower (0702-0023) 10 | Nutrients (phosphorus) |
| Onondaga | Onondaga Creek, Lower, and tribs (0702-0023) | Turbidity |
| Onondaga | Onondaga Creek, Middle, and tribs (0702-0004) | Turbidity |
| Onondaga | Onondaga Creek, Upper, and tribs (0702-0024) | Turbidity |
| Ontario | Great Brook and minor tribs (0704-0034) | Phosphorus 2 |
| Ontario | Great Brook and minor tribs (0704-0034) | Silt/Sediment |

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|---|---|---|
| Ontario | Hemlock Lake Outlet and minor tribs (0402-0013) | Phosphorus |
| Ontario | Honeoye Lake (0402-0032) | Phosphorus |
| Orange | Brown Pond Reservoir (1303-0013) | Phosphorus |
| Orange | Lake Washington (1303-0012) | Phosphorus |
| Orange | Minor Tribs to Middle Wallkill (1306-0061) | Phosphorus |
| Orange | Monhagen Brook and tribs (1306-0074) | Phosphorus |
| Orange | Orange Lake (1301-0008) [16] | Phosphorus |
| Orange | Quaker Creek and tribs (1306-0025) | Phosphorus |
| Orange | Wallkill River, Middle, Main Stem (1306-0038) | Phosphorus |
| Orange | Wallkill River, Upper, and Minor tribs (1306-0017) | Phosphorus |
| Orleans | Glenvwood Lake (0301-0041) | Phosphorus |
| Orleans | Lake Ontario Shoreline, Western (0301-0070) 9 | Phosphorus |
| Orleans | Lake Ontario Shoreline, Western (0301-0071) 9 | Phosphorus |
| Oswego | Lake Neatahwanta (0701-0018) | Nutrients (phosphorus) |
| Oswego | Pleasant Lake (0703-0047) | Phosphorus |
| Putnam | Lost Lake, Putnam Lake (1302-0053) | Phosphorus |
| Putnam | Minor Tribs to Croton Falls Reservoir (1302-0001) | Phosphorus |
| Queens | Bergen Basin (1701-0009) 18 | Nitrogen |
| Queens | Jamaica Bay, Eastern, and tribs, Queens (1701-0005) 18 | Nitrogen |
| Queens | Kissena Lake (1702-0258) | Phosphorus |
| Queens | Meadow Lake (1702-0030) | Phosphorus |
| Queens | Shellbank Basin (1701-0001) 18 | Nitrogen |
| Queens | Willow Lake (1702-0031) | Phosphorus |
| Rensselaer | Nassau Lake (1310-0001) | Phosphorus |
| Rensselaer | Snyders Lake (1301-0043) | Phosphorus |
| Richmond | Grassmere Lake/Bradys Pond (1701-0357) | Phosphorus |
| Rockland | Congers Lake, Swartout Lake (1501-0019) | Phosphorus |
| Rockland | Rockland Lake (1501-0021) | Phosphorus |
| Saratoga | Ballston Lake (1101-0036) | Phosphorus |
| Saratoga | Dwaas Kill and tribs (1101-0007) | Phosphorus |
| Saratoga | Dwaas Kill and tribs (1101-0007) | Silt/Sediment |
| Saratoga | Lake Lonely (1101-0034) | Phosphorus |
| Saratoga | Round Lake (1101-0060) | Phosphorus |
| Saratoga | Tribs to Lake Lonely (1101-0001) | Phosphorus |
| Schenectady | Collins Lake (1201-0077) | Phosphorus |
| Schenectady | Duane Lake (1311-0006) | Phosphorus |
| Schenectady Lake | Mariaville Lake (1201-0113) | Phosphorus |
| Schuyler | Cayuta Lake (0603-0005) | Phosphorus |

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|---|---|---|
| Seneca | Reeder Creek and tribs (0705-0074) | Phosphorus |
| St.Lawrence | Black Lake Outlet, Black Lake (0906-0001) | Phosphorus |
| St.Lawrence | Fish Creek and minor tribs (0906-0026) | Phosphorus |
| Steuben | Smith Pond (0502-0012) | Phosphorus |
| Suffolk | Agawam Lake (1701-0117) | Phosphorus |
| Suffolk | Big/Little Fresh Ponds (1701-0125) | Phosphorus |
| Suffolk | Canaan Lake (1701-0018) | Phosphorus |
| Suffolk | Canaan Lake (1701-0018) | Silt/Sediment |
| Suffolk | Fresh Pond (1701-0241) | Phosphorus |
| Suffolk | Great South Bay, East (1701-0039) | Nitrogen |
| Suffolk | Great South Bay, Middle (1701-0040) | Nitrogen |
| Suffolk | Great South Bay, West (1701-0173) | Nitrogen |
| Suffolk | Lake Ronkonkoma (1701-0020) | Phosphorus |
| Suffolk | Mattituck/Marratooka Pond (1701-0129) | Phosphorus |
| Suffolk | Mill and Seven Ponds (1701-0113) | Phosphorus |
| Suffolk | Millers Pond (1702-0013) | Phosphorus |
| Suffolk | Moriches Bay, East (1701-0305) | Nitrogen |
| Suffolk | Moriches Bay, West (1701-0038) | Nitrogen |
| Suffolk | Quantuck Bay (1701-0042) | Nitrogen |
| Suffolk | Shinnecock Bay and Inlet (1701-0033) | Nitrogen |
| Suffolk | Tidal Tribs to West Moriches Bay (1701-0312) | Nitrogen |
| Sullivan | Bodine, Mongomery Lakes (1401-0091) | Phosphorus |
| Sullivan | Davies Lake (1402-0047) | Phosphorus |
| Sullivan | Evens Lake (1402-0004) | Phosphorus |
| Sullivan | Pleasure Lake (1402-0055) | Phosphorus |
| Sullivan | Swan Lake (1401-0063) | Phosphorus |
| Tompkins | Cayuga Lake, Southern End (0705-0040) | Phosphorus |
| Tompkins | Cayuga Lake, Southern End (0705-0040) | Silt/Sediment |
| Ulster | Ashokan Reservoir (1307-0004) | Silt/Sediment |
| Ulster | Esopus Creek, Lower, Main Stem (1307-0010) [17] | Turbidity |
| Ulster | Esopus Creek, Middle, Main Stem (1307-0003) 17 | Turbidity |
| Ulster | Esopus Creek, Upper, and minor tribs (1307-0007)[3] | Silt/Sediment |
| Ulster | Wallkill River, Lower, Main Stem (1306-0027) | Phosphorus |
| Warren | Hague Brook and tribs (1006-0006) | Silt/Sediment |
| Warren | Huddle/Finkle Brooks and tribs (1006-0003) | Silt/Sediment |
| Warren | Indian Brook and tribs (1006-0002) | Silt/Sediment |
| Warren | Lake George (1006-0016) and tribs | Silt/Sediment |
| Warren | Tribs to Lake George, East Shore (1006-0020) | Silt/Sediment |
| Warren | Tribs to Lake George, Lk.George Village (1006-0008) | Silt/Sediment |

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|---|---|---|
| Washington | Wood Cr/Champlain Canal and tribs (1005-0036) | Phosphorus |
| Westchester | Lake Katonah (1302-0136) | Phosphorus |
| Westchester | Lake Lincolndale (1302-0089) | Phosphorus |
| Westchester | Lake Meahagh (1301-0053) | Phosphorus |
| Westchester | Lake Mohegan (1301-0149) | Phosphorus |
| Westchester | Lake Shenorock (1302-0083) | Phosphorus |
| Westchester | Mamaroneck River, Lower (1702-0071) | Silt/Sediment |
| Westchester | Mamaroneck River, Upp, & minor tribs (1702-0123) | Silt/Sediment |
| Westchester | Saw Mill River (1301-0007) | Phosphorus |
| Westchester | Saw Mill River, Middle, and tribs (1301-0100) | Phosphorus |
| Westchester | Sheldrake River (1702-0069) | Phosphorus |
| Westchester | Sheldrake River (1702-0069) | Silt/Sedimnt |
| Westchester | Silver Lake (1702-0040) | Phosphorus |
| Westchester | Teatown Lake (1302-0150) | Phosphorus |
| Westchester | Truesdale Lake (1302-0054) | Phosphorus |
| Westchester | Wallace Pond (1301-0140) | Phosphorus |

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## APPENDIX E – List of NYSDEC Regional Offices

| Region | Covering the following counties: | DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators | DIVISION OF WATER (DOW) Water (SPDES) Program |
|---|---|---|---|
| 1 | Nassau and Suffolk | 50 Circle Road<br>Stony Brook, NY 11790<br>Tel. (631) 444-0365 | 50 Circle Road<br>Stony Brook, NY 11790-3409<br>Tel. (631) 444-0405 |
| 2 | Bronx, Kings, New York, Queens and Richmond | 1 Hunters Point Plaza,<br>47-40 21st St.<br>Long Island City, NY 11101-5407<br>Tel. (718) 482-4997 | 1 Hunters Point Plaza,<br>47-40 21st St.<br>Long Island City, NY 11101-5407<br>Tel. (718) 482-4933 |
| 3 | Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester | 21 South Putt Corners Road<br>New Paltz, NY 12561-1696<br>Tel. (845) 256-3059 | 220 White Plains Road, Suite 110<br>Tel. (914) 428 - 2505 |
| 4 | Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie | 1130 North Westcott Road<br>Schenectady, NY 12306-2014<br>Tel. (518) 357-2069 | 1130 North Westcott Road<br>Schenectady, NY 12306-2014<br>Tel. (518) 357-2045 |
| 5 | Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington | 1115 State Route 86, Po Box 296<br>Ray Brook, NY 12977-0296<br>Tel. (518) 897-1234 | 232 Golf Course Road<br>Warrensburg, NY 12885-1172<br>Tel. (518) 623-1200 |
| 6 | HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE | STATE OFFICE BUILDING<br>317 WASHINGTON STREET<br>WATERTOWN, NY 13601-3787<br>TEL. (315) 785-2245 | STATE OFFICE BUILDING<br>207 GENESEE STREET<br>UTICA, NY 13501-2885<br>TEL. (315) 793-2554 |
| 7 | BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS | 5786 WIDEWATERS PARKWAY<br>SYRACUSE, NY 13214-1867<br>TEL. (315) 426-7438 | 5786 WIDEWATERS PARKWAY<br>SYRACUSE, NY 13214-1867<br>TEL. (315) 426-7500 |
| 8 | CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES | 6274 EAST AVON-LIMA<br>ROADAVON, NY 14414-9519<br>TEL. (585) 226-2466 | 6274 EAST AVON-LIMA RD.<br>AVON, NY 14414-9519<br>TEL. (585) 226-2466 |
| 9 | ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING | 700 DELAWARE AVENUE<br>BUFFALO, NY 14209-2999<br>TEL. (716) 851-7165 | 700 DELAWARE AVENUE<br>BUFFALO, NY 14209-2999<br>TEL. (716) 851-7070 |

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## APPENDIX F – SWPPP Preparer Certification Form

The SWPPP Preparer Certification Form required by this permit begins on the following page.

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# SWPPP Preparer Certification Form

**SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)**

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

**Project/Site Name:**

**eNOI Submission ID:**

**Owner/Operator Name:**

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## Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with the requirements of GP-0-25-001. I certify under penalty of law that the SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SWPPP Preparer First Name | MI | SWPPP Preparer Last Name

Signature

Date

Revised: January 2025

## APPENDIX G – MS4 SWPPP Acceptance Form

The MS4 SWPPP Acceptance Form required by this permit begins on the following page.

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# MS4 SWPPP Acceptance Form

for construction activities seeking authorization under the

**SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)**

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

| |
|---|
| **I. Project Owner/Operator Information** |
| 1. Owner/Operator Name: |
| 2. Contact Person: |
| 3. Street Address: |
| 4. City/State/Zip: |
| **II. Project Site Information** |
| 5. Project/Site Name: |
| 6. Street Address: |
| 7. City/State/Zip: |
| **III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information** |
| 8. SWPPP Reviewed by: |
| 9. Title/Position: |
| 10. Date Final SWPPP Reviewed and Accepted: |
| **IV. Regulated MS4 Information** |
| 11. Name of MS4 Operator: |
| 12. MS4 SPDES Permit Identification Number: NYR20A |
| 13. Street Address: |
| 14. City/State/Zip: |
| 15. Telephone Number: |
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## MS4 SWPPP Acceptance Form - continued

**V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative**

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in section II. of this form has been reviewed and meets the substantive requirements in the SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP). Note: The MS4 Operator, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 Operator does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name[1]:

Title/Position:

Signature:

Date:

**VI. Additional Information**

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[1] Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.

## APPENDIX H – NYCDEP SWPPP Acceptance/Approval Form

The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval form required by this permit begins on the following page.

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THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Environmental Planning and Analysis
*59-17 Junction Blvd., 9th Floor; Flushing, NY 11373*

# SWPPP Acceptance/Approval

Application Number:

| |
|---|
| **I. Project Owner/Operator Information** |
| 1. Owner/Operator Name: |
| 2. Contact Person: |
| 3. Street Address: |
| 4. City/State/Zip: |
| **II. Project Site Information** |
| 5. Project/Site Name: |
| 6. Street Address: |
| 7. City/State/Zip: |
| **III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance/Approval** |
| 8. SWPPP Reviewed by: |
| 9. Title/Position: / |
| 10. Date Final SWPPP Reviewed and Accepted: |
| 11. Acceptance/Approval Expiration Date: |
| **IV. Regulated MS4 Information for projects that require coverage under the NY State Pollution Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity** |
| 12. Name of MS4: *CITY OF NEW YORK* |
| 13. MS4 SPDES Permit Identification Number: *NY-0287890* |
| 14. Contact Person: |
| 15. Street Address: *59-17 Junction Blvd. 9th Floor* |
| 16. City/State/Zip: *Flushing, NY 11373* |
| 17. Telephone Number: |

DRAFT

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

## V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).

Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

## VI. Conditions of Acceptance/Approval and Additional Information

DRAFT

Projects in the MS4 area must submit a copy of this SWPPP Acceptance with a Notice of Intent for coverage under the NY SPDES General Permit for Stormwater Discharges from Construction Activity to: NYS Department of Environmental Conservation, Division of Water; 625 Broadway, 4th Floor; Albany, New York 12233-3505.

## APPENDIX I – MS4 No Jurisdiction Form

The MS4 No Jurisdiction Form required by this permit begins on the following page.

DRAFT

# MS4 No Jurisdiction Form

for construction activities seeking authorization under the

**SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)**

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

**I. Project Owner/Operator Information**

a. Owner/Operator Name:

b. Contact Person:

c. Street Address:

d. City/State/Zip:

**II. Project Site Information**

a. Project/Site Name:

b. Street Address:

c. City/State/Zip:

d. eNOI Submission ID:

**III. Traditional Land Use Control MS4 Operator Information**

a. Name of MS4 Operator:

b. MS4 SPDES Permit ID Number: NYR20A

c. Street Address:

d. City/State/Zip:

e. Telephone Number:

**IV. Certification Statement**

In accordance with CGP Part I.D.2.b.ii.3., I hereby certify that the Traditional Land Use Control MS4 Operator identified in section III. of this form does not have review authority over the construction project identified in section II. of this form, which is owned/operated by the entity identified in section I. of this form. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

a. Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.:

b. Title/Position:

c. Signature:

d. Date:

DRAFT

## APPENDIX J – Owner/Operator Certification Form

The Owner/Operator Certification Form required by this permit begins on the following page.

DRAFT

# Owner/Operator Certification Form

***SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)***

(In accordance with CGP Part I.D.2.b. or Part I.F.2. and 3., the completed form must be attached to the eNOI or the Request to Continue Coverage, and submitted to NYSDEC electronically.

**Project/Site Name:** _____

**eNOI Submission ID:** _____

**eNOI Submitted by:** ☐ **Owner/Operator** ☐ **SWPPP Preparer** ☐ **Other**

DRAFT

## Certification Statement - Owner/Operator

I hereby certify that I read, and will comply with, the GP-0-25-001 permit requirements. I understand that authorization to discharge under the permit for the project/site named above is dependent on receipt of a Letter of Authorization (LOA) or a Letter of Continued Coverage (LOCC) from the New York State Department of Environmental Conservation (NYSDEC) in accordance with CGP Part I.D.3.b. or Part I.F.4. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner/Operator First Name MI Owner/Operator Last Name

_____

Signature

_____

Date

Revised: January 2025

# Appendix K: NYSDEC eNOI [MS4 Areas Only]

**Documents included:**

☐ NYSDEC eNOI

**If the above document is not included, explain why below:**

Not Applicable

DRAFT

# Appendix L: Underground Injection Well Documentation

## Documents included:

☐ Copy of EPA 7520-16 Online Form
☐ Relevant communication with EPA Region 2 Office indicating compliance with UIC Rule:
- Insert list of correspondence included in this appendix
- Add rows as needed

☐ Relevant technical documentation demonstrating use of BMPs and compliance with UIC Rule
- Insert list of technical documents included in this appendix
- Add rows as needed

## If any of the above documents are not included, explain why below:

Not Applicable

DRAFT

# Appendix Z: Additional Documentation

## Documents included:

- Document title: Approved RP-602
    - Relevant section/page numbers (if applicable):
    - Note to BEPA (if applicable):
- Document title: Draft Deed Restriction
    - Relevant section/page numbers (if applicable):
    - Note to BEPA (if applicable):
- Document title: Abandoned Sewer Findings
    - Relevant section/page numbers (if applicable):
    - Note to BEPA (if applicable): Please find attached letter from the project MEP engineer detailing the investigations and findings that were conducted for the existing 12" sewer running through the property in the former demapped East 160th Street.

DRAFT

New York City Department of Finance • Property Division • Tax Map Office

# APPLICATION FOR APPORTIONMENTS OR MERGERS

**Instructions:** Please complete this application and *submit in person* to: ***Department of Finance, Property Division - Tax Map Office, 66 John Street, 2nd floor, New York, NY 10038.*** Please read the instructions for further details before completing this form. Print clearly.

## SECTION A: PROPERTY INFORMATION

Borough: BRONX Block: 2420 Present Lot(s): 120, 150

DO NOT WRITE IN THIS SPACE - FOR OFFICE USE ONLY

Lot Number: 120, 130, 150

☐ Merger ☒ Apportionment Number of Lots Requested 3

☐ Air ☐ Subterranean

Lot(s)Usage: (check one)

☐ *Residential* Building Gross Sq/Ft:

☐ *Commercial* Building Gross Sq/Ft:

☒ *Mix* (Residential & Commercial) Building Gross Sq/Ft: 121,494

1. Property Owner's Name (as per Deed): LAST NAME FIRST NAME

**OR**

Company Name: MORRISANIA APARTMENTS LLC / MORRISANIA DEVELOPMENT HOUSING DEVELOPMENT FUND CO

2. Property Address: 270 EAST 161 STREET (NUMBER AND STREET) BRONX (CITY) NY (STATE) 10451 (ZIP CODE)

3. Filing Representative (if applicable): JMZoning LLC - AKALDARBEK@JMZONING.COM

## SECTION B: CERTIFICATION

1. Architect/Engineer/Applicant's Name: AUFGANG (LAST NAME) ARIEL (FIRST NAME)

2. Address: 74 LAFAYETTE AVENUE (NUMBER AND STREET) SUFFERN (CITY) NY (STATE) 10901 (ZIP CODE)

3. Telephone Number: (845) 368 - 0004 4. Email Address: ARIEL@AUFGANG.COM

*The applicant hereby certifies that, in making this application for merger/apportionment, s/he is the owner, or acting under the direction of the owner.*

**Signature of Architect/ Engineer/Applicant:** Date: 6 / 13 / 23

**TAX MAP CHANGE WILL NOT BE MADE UNTIL PRESENTATION OF REQUIRED DOCUMENTS (see reverse for the required documents)**

**DRAW SKETCH TO SCALE 1" = 50', IF POSSIBLE INDICATE NORTH ARROW**

REGISTERED ARCHITECT ARIEL AUFGANG 032789 STATE OF NEW YORK

**(Architect or Engineer's seal)**

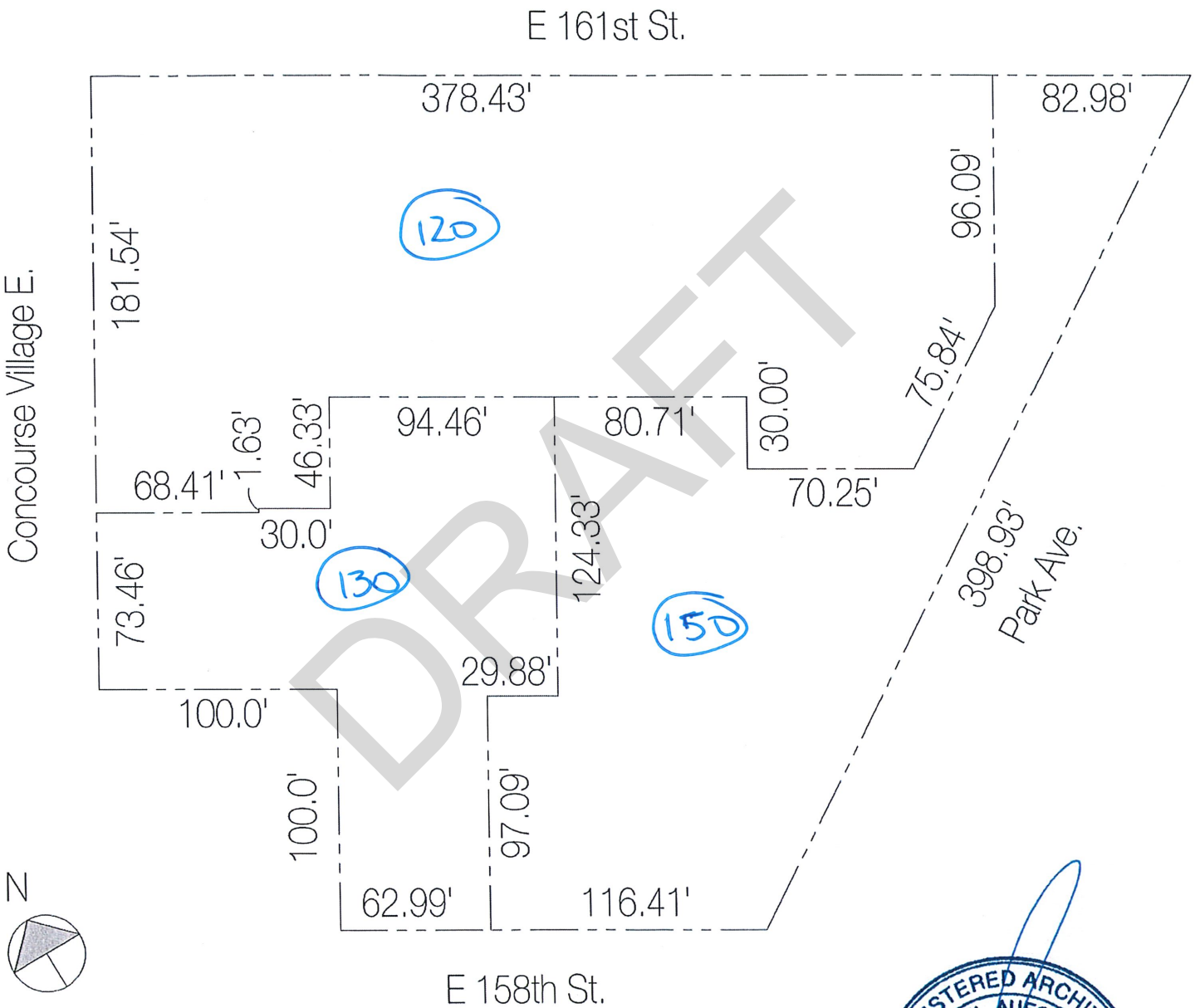
Tentative Lot(s) issued:
Customer Service Representative: AL Date: 6/23/23 New Lot(s): 130 Lot(s) Affected: 120, 150 Lot(s) Dropped: —

**Please note: Map changes will not be made until presentation of all required documents is reviewed and approved by the Specialist. Lots are tentative until final approval is received from the Tax Map Office.**

Map Updated:
Tax Map Specialist: _____ Date: ___/___/___

RP-602 Rev. 7.8.2019

DRAFT


E 161st St.
378.43'
82.98'
96.09'
181.54'
Concourse Village E.
120
75.84'
30.00'
94.46'
80.71'
1.63'
46.33'
68.41'
70.25'
30.0'
130
124.33'
398.93'
Park Ave.
73.46'
150
29.88'
100.0'
100.0'
97.09'
N
62.99'
116.41'
E 158th St.
DRAFT
REGISTERED ARCHITECT
ARIEL AUFGANG
032789
STATE OF NEW YORK

NYC
Department of Finance

# TAX MAP UNIT
# FEE SHEET

**Date:** 6 / 23 / 2023

| | BORO | BLOCK | LOT |
|---|---|---|---|
| 1. | BX | 2420 | 120, 130, 150 |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |

| SERVICE | COST | QUANTITY | AMOUNT |
|---|---|---|---|
| **Tax Map Certification** | **$10.00** | | |
| **New Lot Request For Mergers Apportionments (RP-602), and Lot Request For Condominium Amendment Applications (RP-602CA)** | **$73.00 (per lot)** | 3 | $219.00 |

DRAFT

NYC Business Centers
Department of Finance
Manhattan Business Center
66 John Street, 2nd Floor
New York, NY 10038

Reference Number: 2023174021-46
Date/Time: 06/23/2023 11:06:27 AM

Miscellaneous Fee
2023174021-46-1
CPRR Trans Code: 9507
Transaction ID: 995500000000000000MCE02
UserId:NYC4250
Total: $219.00

American Express Service Fee 1
2023174021-46-2
Total: $4.38

2 ITEMS TOTAL: $223.38

TOTAL: $223.38

American Express $219.00
Card Number: **********2217
Last Name: BERNARD
Payment Type: credit
American Express Service Fee 1 $4.38
Card Number: **********2217
Last Name:
Payment Type: credit
Total Received: $223.38

CE20231740021-46

Thank you! Have a nice day.

# DECLARATION OF DEED RESTRICTION AND MAINTENANCE

This **DECLARATION OF DEED RESTRICTION AND MAINTENANCE** ("**Declaration**") made this [_____] day of [___], 2025 by **MORRISANIA DEVELOPMENT HOUSING DEVELOPMENT FUND CORPORATION**, a New York not-for-profit corporation organized pursuant to Article XI of the Private Housing Finance Law of the State of New York and Section 402 of the Not-for-Profit Corporation Law of the State of New York, having an office c/o Settlement Housing Fund, Inc., 247 West 37th Street, 4th Floor, New York, NY 10018 (together with its successors and assigns, hereinafter referred to as the "**HDFC**"), **TEG MORRISANIA DEVELOPMENT LLC**, a New York limited liability company, having an office at 7 Jackson Walkway, Providence, RI 02903 (together with its successors and assigns, hereinafter referred to as "**TEG**"; and together with, hereinafter collectively referred to as "**Developing Declarant**"), **MORRISANIA APARTMENTS LLC**, a New York limited liability company having an address at 7 Jackson Walkway, Providence, RI 02903 (together with its successors and assigns, hereinafter referred to as "**Lot 120 Declarant**"; and together with the Developing Declarant are hereinafter referred to collectively as the "**Declarants**").

**WHEREAS**, the Lot 120 Declarant is the owner of certain real property situated in the Borough of the Bronx, Bronx County and State of New York, known and designated as Block 2420, Lot 120 ("**Lot 120**"), as shown on the Tax Map of the City of New York for Bronx County and more particularly described in Schedule A hereof;

**WHEREAS**, the HDFC is the owner of certain real property situated in the Borough of the Bronx, Bronx County and State of New York, known and designated as Block 2420, Lot 130 ("**Lot 130**"), as shown on the Tax Map of the City of New York for Bronx County and more particularly described in Schedule B hereof;

**WHEREAS**, TEG is the beneficial owner of Lot 130;

**WHEREAS**, the HDFC is also the owner of certain real property situated in the Borough of the Bronx, Bronx County and State of New York, known and designated as Block 2420, Lot 150 ("**Lot 150**"), as shown on the Tax Map of the City of New York for Bronx County and more particularly described in Schedule C hereof;

**WHEREAS**, TEG is also the beneficial owner of Lot 150;

**WHEREAS**, Lot 120, Lot 130, and Lot 150 consist of a single "zoning lot" (the "**Merged Zoning Lot**") as set forth in Section 12-10 of the Zoning Resolution of the City of New York, effective as of December 15, 1961, as amended to date;

**WHEREAS**, the Merged Zoning Lot was memorialized pursuant to that certain Zoning Lot Exhibit I Certification of Parties of Interest dated January 8, 2019 and recorded with the Office of the City Register of the City of New York ("**Office of the City Register**") on January 9, 2019 under City Register File Number ("**CRFN**") 2019000009975 and an Exhibit III Zoning Lot Description and Ownership Statement dated January 7, 2019 and recorded with the Office of the City Register on January 9, 2019 under CRFN 2019000009976;

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**WHEREAS**, the Developing Declarant proposes to construct improvements on the Merged Zoning Lot in accordance with plans (the "**NB Plans**") filed with the New York City Department of Buildings (the "**DOB**"), and to make certain other landscape, open space, and at-grade parking area improvements on the Merged Zoning Lot; and

**WHEREAS**, the Merged Zoning Lot is to be served by a common storm drain disposal system including storm water detention/retention facilities ("**Common Facilities**"); and

**WHEREAS**, the Developing Declarant proposes to construct the Common Facilities on the Merged Zoning Lot in accordance with site connection proposals on file with the New York City Department of Environmental Protection ("**DEP**") under application Nos. SCX-2623/25 and SCX-3150/25 (collectively, the "**Site Connection Plans**") and in accordance with the NB Plans;

**WHEREAS**, the Developing Declarant must obtain from the DOB and DEP approvals and permits for the construction of the aforesaid Common Facilities; and

**WHEREAS**, the DOB and DEP require as a condition precedent to the issuance of the aforesaid approvals and permits, a firm commitment by the Declarants establishing said Common Facilities as well as providing for the maintenance and repair of such Common Facilities, as hereinafter set forth and, in furtherance of the foregoing, the Declarants wish to enter into further agreements to clarify their respective rights and obligations with respect to the construction, repair, and maintenance of the Common Facilities in accordance with this Declaration, as hereinafter set forth.

**NOW, THEREFORE**, it is agreed as follows:

1. The Developing Declarant and its successors and assigns agree to construct the Common Facilities located on the Merged Zoning Lot in accordance with the Site Connection Plans, and the NB Plans.

2. The Declarants and their successors and assigns shall maintain and keep in good repair the Common Facilities located on the Merged Zoning Lot in accordance with the Site Connection Plans, the NB Plans, and DEP rules and regulations including Title 24, Chapter 5-A of the New York City Administrative Code and Title 15, Chapters 19.1 and 31 of the Rules of the City of New York.

3. The Declarants and their successors and assigns agree that the Common Facilities shall forever be kept free and clear of any and all obstructions to the drainage flow pattern as set forth in the Site Connection Plans.

4. The Declarants and their successors and assigns agree that the Common Facilities shall not be extended or modified without the prior written approval of DEP.

5. The Developing Declarant and its successors and assigns shall, at all times, indemnify and hold harmless the City of New York, its officials and employees against any claims which may result from the construction of the Common Facilities.

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6. The Declarants and their successors and assigns shall, at all times, indemnify and hold harmless the City of New York, its officials and employees against any claims which may result from the maintenance, inspection, malfunction or repair of the Common Facilities.

7. The Declarants agree that any deed for conveyance of the Merged Zoning Lot, or any portion thereof, shall contain the terms, conditions and obligations stated in this Declaration particular to the fee parcel in their respective possession at the time of such conveyance, and shall be subject to such terms, conditions and obligations. Such deed for conveyance shall be made to obligate the Declarants' heirs, successors and assigns to construct, inspect repair, replace or otherwise maintain the aforesaid private internal drains and to indemnify and hold harmless the City of New York, its officials and employees from any claims whatsoever which may arise from such construction, operation maintenance, inspection repair or replacement.

8. This Declaration may not be amended, terminated or modified without the prior written consent of DOB and DEP.

9. Failure to comply with the terms of this Declaration may result in the revocation of a permit or Certificate of Occupancy.

10. The Developing Declarant shall submit this Declaration for filing with the County Clerk in the Borough of within thirty (30) days of the date first written above.

FURTHERMORE, this Declaration shall be a covenant running with the land in perpetuity and shall be binding upon the Declarants' grantees, heirs, assigns and successors.

DRAFT

**[Remainder of this page intentionally left blank; signature pages follow]**

IN WITNESS WHEREOF, this Declaration has been duly executed the day and year first above written.

**DECLARANTS**:

**Developing Declarant**:

**HDFC**:

**MORRISANIA DEVELOPMENT HOUSING DEVELOPMENT FUND CORPORATION**, a New York not-for-profit corporation

By: _____
Name:
Title:

STATE OF NEW YORK )
) ss:
COUNTY OF )

On this [__] day of [__] 2025, before me, the undersigned, personally appeared personally known to me, or proved to me on the basis of satisfactory evidence, to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity and that by his instrument, the individual or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

**[Signatures continue on following page]**

DRAFT

**TEG**:

**TEG MORRISANIA DEVELOPMENT LLC**, a New York limited liability company

By: _____
Name:
Title:

STATE OF NEW YORK )
) ss:
COUNTY OF )

On this [__] day of [__] 2025, before me, the undersigned, personally appeared personally known to me, or proved to me on the basis of satisfactory evidence, to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity and that by his instrument, the individual or the person upon behalf of which the individual acted, executed the instrument.

_____

DRAFT

**[Signatures continue on following page]**

**Lot 120 Declarant**:

**MORRISANIA APARTMENTS LLC**, a New York limited liability company

By: _____
Name:
Title:

STATE OF NEW YORK )
) ss:
COUNTY OF )

On this [__] day of [__] 2025, before me, the undersigned, personally appeared personally known to me, or proved to me on the basis of satisfactory evidence, to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity and that by his instrument, the individual or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

DRAFT

# SCHEDULE A

BLOCK 2420, Lot 120
Borough of the Bronx

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

Beginning at the corner formed by the intersection of the southerly side of East 161st Street with the easterly side of Concourse Village East;

Running Thence easterly along the southerly side of East 161st Street, 378.43 feet;

Thence southerly along a line forming a right angle with the southerly side of East 161st Street, 96.09 feet;

Thence southwesterly along a line forming an interior angle of 152 degrees 51 minutes 20 seconds with the last mentioned course, 75.84 feet;

Thence westerly along a line forming an interior angle of 117 degrees 08 minutes 40 seconds with the last mentioned course, 70.25 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 175.17 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 46.33 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 1.63 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 68.41 feet to a point on the easterly side of Concourse Village East;

Thence northerly along the easterly side of Concourse Village East, 181.54 feet to the corner point or place of beginning.

DRAFT

# SCHEDULE B

BLOCK 2420, Lot 130
Borough of the Bronx

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

Beginning at a point on the easterly side of Concourse Village East distant 181.54 feet southerly from the corner formed by the intersection of the southerly side of East 161st Street with the easterly side of Concourse Village East;

Thence easterly along a line forming a right angle with the easterly side of Concourse Village East, 68.41 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 1.63 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 46.33 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 94.46 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 124.33 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 29.88 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 97.09 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 62.99 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 100.00 feet;

Thence westerly along a line forming a right angle with the last mentioned course, 100 feet to a point on the easterly side of Concourse Village East;

Thence northerly along the easterly side of Concourse Village East 73.46 feet to the point or place of beginning.

DRAFT

# SCHEDULE C

BLOCK 2420, Lot 150
Borough of the Bronx

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

Beginning at a point on the southerly side of East 161st Street distant 378.43 feet easterly form the corner formed by the intersection of the southerly side of East 161st Street with the easterly the easterly side of Concourse Village East;

Running Thence easterly along the southerly side of East 161st Street, 82.98 feet;

Thence southwesterly along a line forming an interior angle of 62 degrees 51 minutes 20 seconds with southerly side of East 161st Street, 398.94 feet;

Thence westerly along a line forming an interior angle of 117 degrees 08 minutes 40 seconds with the last mentioned course, 116.41 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 97.09 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 29.88 feet;

Thence northerly along a line forming a right angle with the last mentioned course, 124.33 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 80.71 feet;

Thence southerly along a line forming a right angle with the last mentioned course, 30.00 feet;

Thence easterly along a line forming a right angle with the last mentioned course, 70.25 feet;

Thence northeasterly along a line forming an exterior angle of 117 degrees 08 minutes 40 seconds with the last mentioned course, 75.84 feet;

Thence northerly along a line forming a right angle with the southerly side of East 161st Street, 96.09 feet to a point on the southerly side of East 161st Street to the point or place of beginning.

DRAFT

A 100 William Street, Suite 1205, NY, NY 10038 T 212. 257. 6190 W epengineering.com EP Engineering, LLC, MEP Consultants

November 4th, 2025

Re: 860 Concourse Village East
Re: De-mapped sewer along E 160th Street

To Whom it May Concern:

The attached sewer map dated August 1895 shows a sewer running beneath E 160th Street with (4) manholes labeled A-D. At some time since, E 160th Street was de-mapped, and this section of sewer is now located within Block 2420 Lot 130 (previously 150). In preparation for a new building development on this lot, the state of this existing sewer was investigated to confirm that it does not take flow from other areas or buildings that would be disturbed by its removal. Based on site investigations by DEP and CityWide Sewer & Drain, and review of such by EP Engineering, we can attest that this sewer does not accept flow from any areas outside lot 30 and it can be removed. See attached plan for references.

On 10/26/22, DEP's site investigation unit produced the attached plan showing the sewer and drainage structures. Due to a large amount of debris clogging catch basin 'A' at the time of survey, the DEP team was unable to inspect the bottom of the structure and the piping connections to it.

On 1/24/23, technicians from CityWide Sewer & Drain cleaned catch basin 'A' and camera inspected the pipes that left the structure in both the east and west directions.

The pipe leaving catch basin 'A' to the west was found to connect to manhole B as indicated on the DEP plans. The pipe leaving catch basin 'A' to the east was a dead end filled with concrete- see attached photo.

Based on the evidence above, we can confirm that the removal of the existing sewer beneath de-mapped E160th Street will not affect drains or buildings on adjacent lots.

If you require any additional information, please contact our office.

Sincerely,

John Rocchio, P.E.
Principal

DRAFT

City of New York.
Office of the Commissioner of Street Improvements
of the 23rd. and 24th. Wards.

# SEWER AND APPURTENANCES

## in E.158TH STREET

from the existing sewer at the West house line of Morris Avenue to Railroad Ave. West

— with branches in —

## MORRIS AVENUE

From Railroad Ave. West to E.161st Street

## and in E.160TH STREET

From Morris Avenue to Railroad Ave. West

## and in RAILROAD AVENUE WEST

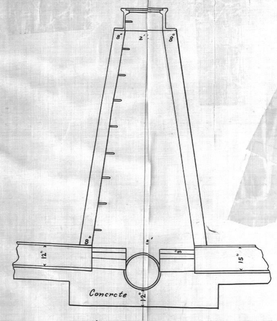
From E.158th Street to E.160th Street.

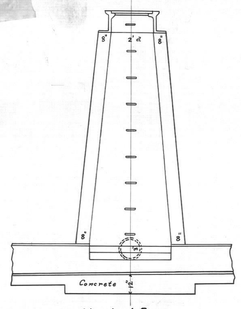
Scale: Horizontal 60'=1". Vertical 10'=1". Details 3' and 1½'=1".

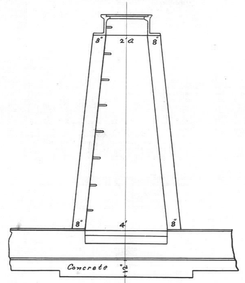
Dated August 14th 1895. Adopted August 20th 1895

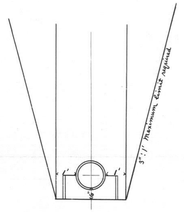
(Signed) Josiah A. Briggs
Chief Engineer of Construction.

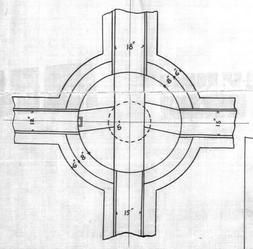
(Signed) Louis F. Haffen
Commissioner of Street Improvements
of the 23rd. and 24th Wards.

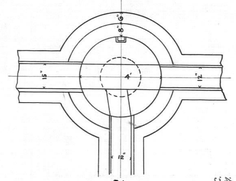


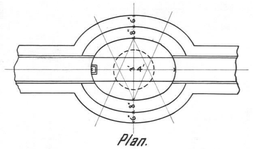



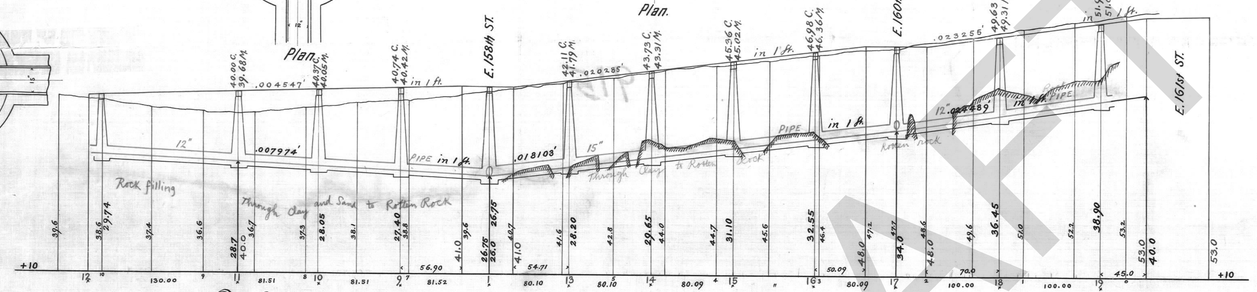



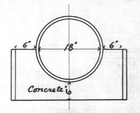



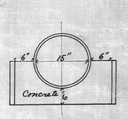



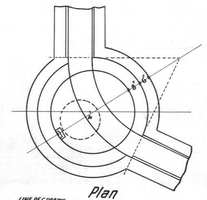



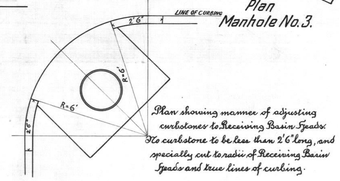



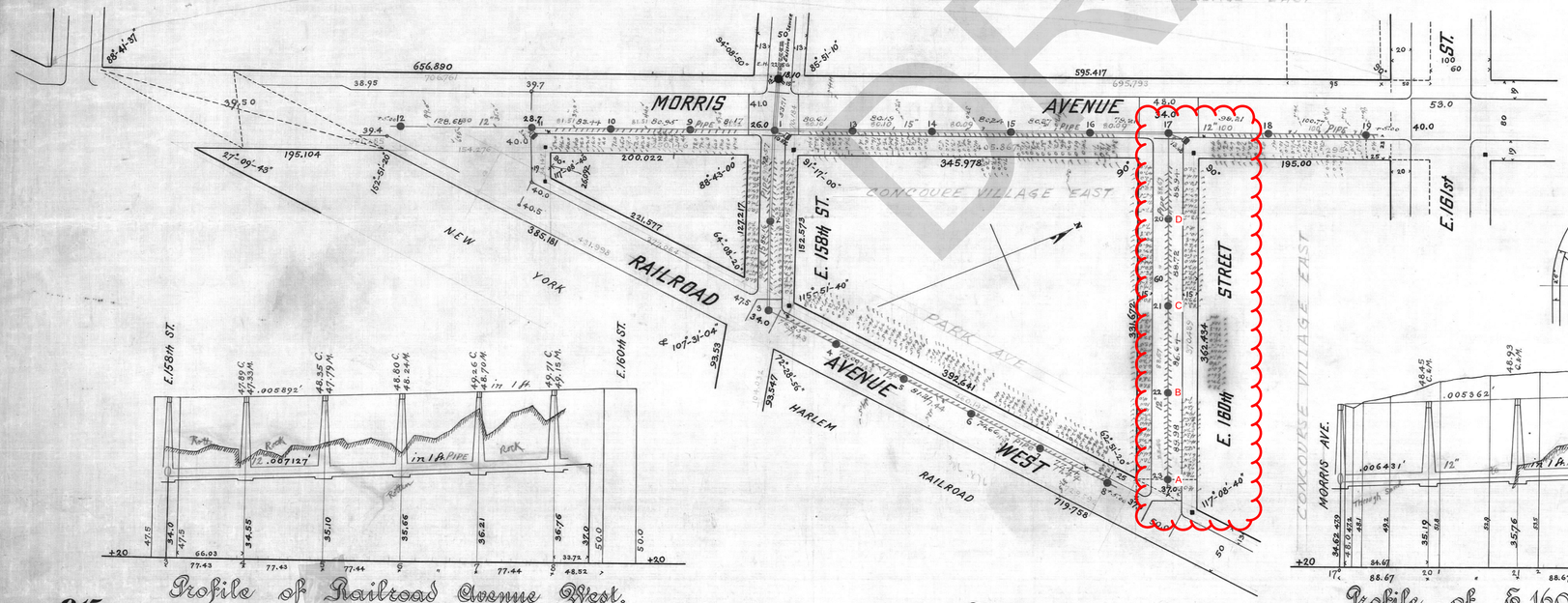

Profile of Morris Avenue.



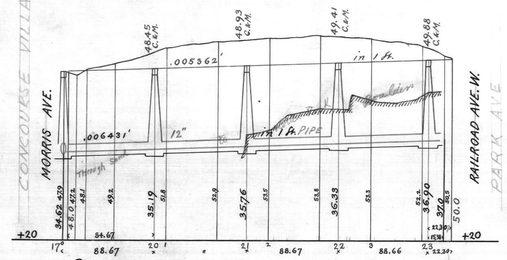





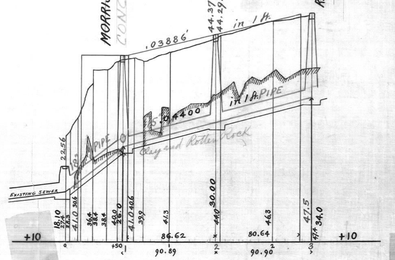




Profile of Railroad Avenue West.




Profile of E. 160th Street.



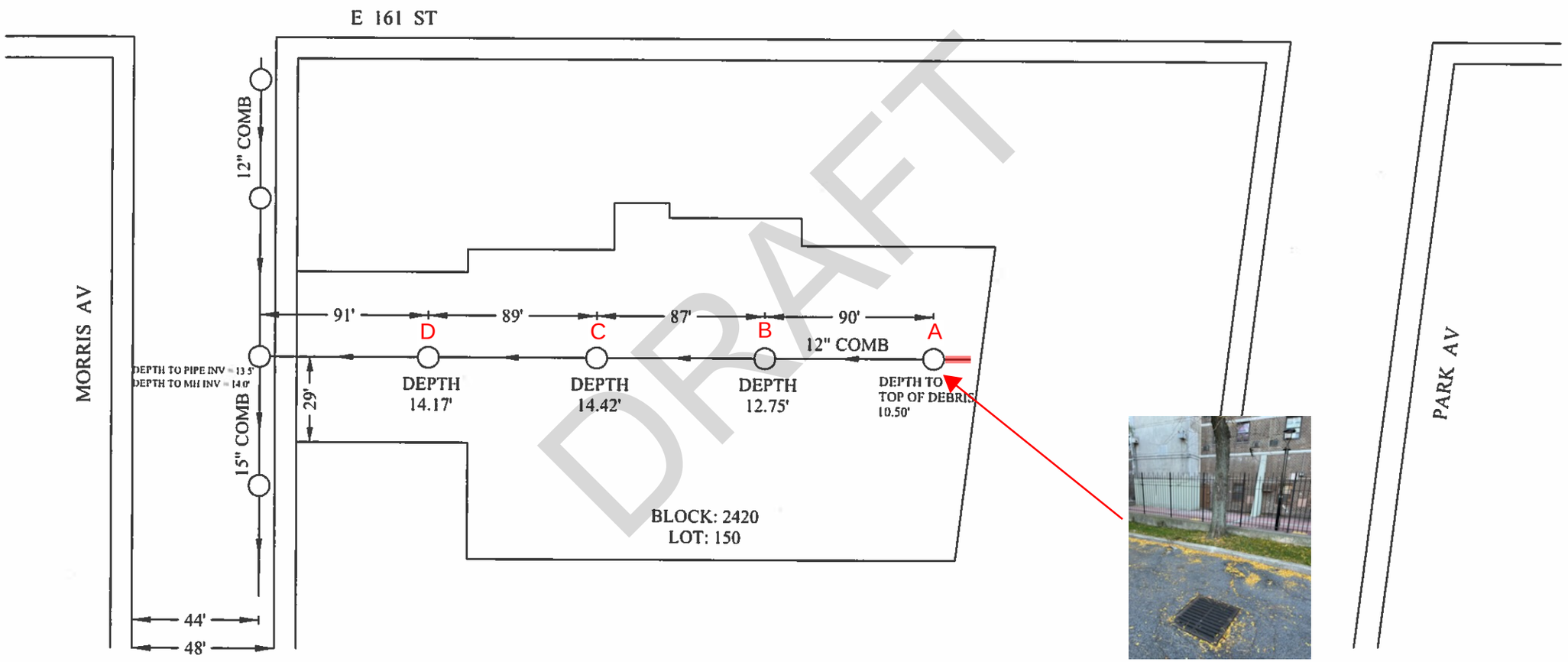

Profile of E. 158th Street.

J.N.A. Harmon
Aug. 19/95
Engineer in charge of Sewers.

915

DRAFT

# DEPARTMENT OF ENVIRONMENTAL PROTECTION
# BUREAU OF WATER AND SEWER OPERATION
# COLLECTION SYSTEMS INVESTIGATION
# BOROUGH OF THE BRONX






CATCH BASIN (A)
THOUGH SHOWN AS MANHOLE, THIS IS A DRAIN

## PLAN VIEW

NTS

FIELD SKETCH __DFO #22-731
PREPARED BY KB
DATE 10/26/22
CHECKED BY: _____

PHOTO 1: TAKEN DOWN CATCH BASIN 'A'

PHOTO 2: TAKEN INSIDE PIPE UPSTREAM FROM CATCH BASIN 'A' (PIPE SEGMENT IN RED ON PLAN)

DRAFT