HCS Civil & Environmental Engineering, LLC
Professional Engineering Consultants
Licensed MA, VT, CT, NY

April 9, 2021

New York State Department of Environmental Conservation
Division of Environmental Remediation
Site Control Section
625 Broadway
Albany, NY 12233

Attn: Mr. Steven Wu

Subject: M4778 Broadway LLC
NYSDEC BCP Number: C231131
4778 Broadway, New York, New York
Remedial Action Work Plan (RAWP)

HCS File: 20-0799

Dear Mr. Wu:

In accordance with the New York State Department of Environmental Conservation (NYSDEC) Technical Guidance DER-10, we are submitting for the NYSDEC review and approval the enclosed revised RAWP for the referenced site.

The RAWP submission is being made on behalf of 4778 Broadway LLC in accordance with our professional engineering services agreement. Technical questions and comments may be directed to Anthony Cauterucci with AEI Consultants, Inc. and the undersigned.

Our client intends on beginning remedial work described in the RAWP as soon as NYSDEC approval is granted.

Sincerely,
HCS CIVIL & ENVIRONMENTAL ENGINEERING, LLC

Philip G. Clark, P.E., LSP
President

Cc: E. Weiss, M4778 Broadway LLC; A. Cauterucci, AEI Consultants, Inc.

M4778 BROADWAY LLC
NEW YORK, NEW YORK

Remedial Action Work Plan

NYSDEC BCP Number: C231131

Prepared for:
M4778 Broadway LLC
C/O Joy Construction Corporation
40 Fulton Street, 21st Floor
New York, New York 10038

Prepared by:
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APRIL 2021

CERTIFICATIONS

I, Philip G. Clark, 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).

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.

088422	4/9/2021	
NYS Professional Engineer #	Date	Signature

STATE OF NEW YORK
PHILIP GERALD CLARK
078 088422
LICENSED PROFESSIONAL ENGINEER

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.

REMEDIAL ACTION WORK PLAN

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

Appendix A: Proposed Development Plans

Appendix B: Geophysical Survey Report

Appendix C: Historic Sanborn Maps

Appendix D: Citizen Participation Plan

Appendix E: Health and Safety Plan

Appendix F: Quality Assurance Project Plan

Appendix G: Community Air Monitoring Plan

Appendix H: Project Team Resumes

Appendix I: Disposal Facility Conditional Approval Letters

Appendix J: Request to Import/Reuse Fill Material

Appendix K: Waterproofing/Vapor Barrier Product Specifications

Appendix L: MRCE Geotechnical Report

LIST OF ACRONYMS

Acronym	Definition
AST	Aboveground Storage Tank
CAMP	Community Air Monitoring Plan
C&D	Construction & Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
CO	Certificate of Occupancy
CPC	City Planning Commission
DSNY	Department of Sanitation
“E”	E-Designation
EAS	Environmental Assessment Statement
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment
EC/IC	Engineering Control and Institutional Control
ELAP	Environmental Laboratory Accreditation Program
FDNY	New York City Fire Department
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IDW	Investigation Derived Waste
Notice - NNO	Notice of No Objection
Notice - NTP	Notice To Proceed
Notice - NOS	Notice Of Satisfaction
Notice - FNOS	Final Notice of Satisfaction
NYC BSA	New York City Board of Standards and Appeals
NYC DCP	New York City Department of City Planning
NYC DEP	New York City Department of Environmental Protection
NYC DOB	New York City Department of Buildings
NYC DOF	New York City Department of Finance
NYC HPD	New York City Housing Preservation and Development

NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DEC PBS	New York State Department of Environmental Conservation Petroleum Bulk Storage
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
OSHA	United States Occupational Health and Safety Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
PM	Particulate Matter
QEP	Qualified Environmental Professional
RA	Register Architect
RAWP	Remedial Action Work Plan
RAR	Remedial Action Report
RCA	Recycled Concrete Aggregate
RCR	Remedial Closure Report
RD	Restrictive Declaration
RI	Remedial Investigation
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOCs	Semi-Volatile Organic Compounds
USCS	Unified Soil Classification System
USGS	United States Geological Survey
UST	Underground Storage Tank
TAL	Target Analyte List

TCL	Target Compound List
TCO	Temporary Certificate of Occupancy
VB	Vapor Barrier
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

M4778 Broadway LLC has established this plan to remediate a 0.28-acre property located at 4778 Broadway in Manhattan, New York City, New York (the Site). A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this remedial action work plan (RAWP). The remedial action described in this document achieves the remedial objectives, complies with applicable environmental standards, criteria and guidance, and conforms with applicable laws and regulations. An Interim Remedial Measure (IRM) Workplan was previously submitted to NYSDEC in July 2020; however, that plan has been withdrawn and the remedial activities included in that work plan have been incorporated into the current RAWP.

Site Description/Physical Setting/Site History/Proposed Redevelopment Plan

The Site, identified as, M4778 Broadway LLC, (NYSDEC BCA Index No. C231131-07-19 Site No. C231131) is located in the Borough of Manhattan, County of New York, New York and is identified as Block 2233, Lot 10 on the New York City Tax Map. M4778 Broadway LLC is a Volunteer in the Brownfield Cleanup Program. A United States Geological Survey (USGS) topographical map (Figure 1) shows the Site location and a Site Map presented as Figure 2. The Site is situated on an approximately 0.28-acre area bounded by Broadway followed by a New York Presbyterian Hospital outpatient medical center to the northwest, athletic fields associated with Harold O. Levy School 52 to the southeast, the Inwood Branch of the New York Public Library to the east, and Fine Fare Supermarket to the west (see Figure 3).

The Site was most recently occupied by an automobile laundry/car wash known as Broadway Hand Carwash and Soft Touch Carwash from approximately 1988 to 2017. Based on a review of historical sources, the Site was developed with a gasoline filling and/or service station from as early as 1921 until 1988, known as Broadyck Service Center. During this time span, multiple generations of tanks were likely installed on the Site. Three (3) gasoline tanks were labeled on Sanborn maps from 1935 and 1951 and according to state agency and regulatory records, additional tanks were installed in 1951 during the redevelopment of the Site. It is suspected that the former Site use as a gasoline filling and service station, along with the presence of USTs, has resulted in the environmental impacts onsite.

The proposed redevelopment at the Site includes the construction of a new eight-story building totaling approximately 86,615 gross square feet. The planned building will be developed with a basement and will occupy the entire footprint of the Site. The building is planned to be utilized for commercial storage and mechanical/utility space on the basement level, a supermarket on the first and second floors, and a school on the 3rd through 8th floors. Redevelopment Plans are included as Appendix A.

Summary of the Remedial Investigation

The Remedial investigation was conducted between February 10, 2020 and February 25, 2020. The following work was completed during the RI:

- Twenty-eight (28) soil samples were collected from various depths at the seven (7) borings;
- Eighteen (18) soil vapor samples were collected, including nine (9) shallow soil vapor (3-5 feet below ground surface [bgs]) and nine (9) deep soil vapor (collected from 12' bgs, or between one and two feet above the groundwater interface);
- Five (5) groundwater samples were collected from the two new monitoring wells and the three original monitoring wells;
- A geophysical survey conducted during the RI identified as many as nine (9) USTs onsite in the area of the former gasoline filling station.

The soil recovered in the borings advanced during the RI generally consisted of grey to brown silt and reddish-brown silty sand with weathered gravel. Refusal was generally encountered due to the presence of weathered bedrock at approximately 20 feet bgs. Based on the monitoring well survey conducted at the Site, it is evident that weathered bedrock is present at approximately 4-10 feet above mean sea level (AMSL). Published geologic information indicates the Site is underlain by bedrock of the Inwood Marble Formation interlayered with Fordham Gneiss Formations. The Inwood Marble Formation consists of dolomitic marble and the Fordham Gneiss Formation consists of gneiss and schist.

The results of the soil sampling completed during the BCP RI indicated that Benzene, Toluene, Ethylbenzene, Xylene (BTEX), and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC Residential Restricted Use Soil Cleanup Objective (RRUSCO) and/or Protection of Groundwater Soil Cleanup Objective (PGWSCO) at various depths in boring locations on the north and northwestern portion of the Site. PAHs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable SCOs; however, the presence of these compounds is likely the result of fill material present in the subsurface. No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-

Dioxane, or PFAS were detected in any of the soil samples at concentrations exceeding the applicable NYSDEC RRUSCOs or PGWSCOs.

The results of the soil vapor sampling completed during the BCP RI indicate that significant soil vapor concentrations of gasoline related compounds including BTEX were detected in soil vapor sample SGS-9D, located on the northern portion of the Site.

The results of the groundwater sampling completed during the BCP RI indicate that BTEX and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC AWQS in the monitoring wells MW-1, MW-2, MW-3, MW-5 onsite. The highest concentrations of petroleum-related VOCs were detected in monitoring wells, MW-2 and MW-5, located on the north and northwestern portion of the Site in the area of the former gasoline filling station. No VOCs were detected in MW-4 located on the southern portion of the Site.

SVOCs 2,4-Dimethylphenol, Phenol, and Naphthalene, and dissolved and total metals Arsenic, Barium, Iron, Magnesium, Manganese, Sodium, and Thallium were also detected in groundwater samples at the Site at concentrations exceeding their applicable NYSDEC AWQS.

Additionally, individual PFOA and PFOS concentrations, other individual PFAS concentrations, and combined PFAS concentrations exceeded the screening levels outlined in the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020). The highest concentrations of PFAS compounds were detected in groundwater samples from monitoring wells MW-2, MW-3, and MW-5, located on the north and northwestern portions of the Site. Based on this information, it is possible that the former onsite car wash operations and use of car-wash solutions/surfactants may have resulted in onsite PFAS groundwater impacts.

No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the groundwater samples at concentrations exceeding the applicable NYSDEC AWQS or guidance levels.

Table 1 through Table 3 present a summary of the findings of the soil, soil vapor, and groundwater data collected during the RI, respectively. Figures 4 through 7 illustrate the locations and results of the soil, soil vapor, and groundwater samples collected as well as the onsite groundwater elevation contours.

Qualitative Human Health Exposure Assessment

The table below summarizes the potential exposure routes and receptors and presents a human exposure assessment for each.

Potential Exposure Route	Potential Receptors	Human Exposure Assessment
Dermal contact with surface soils and incidental ingestion	Site workers during sampling activities and construction workers during site remediation	The potential for on- and off-site exposure during ground-intrusive activities will be avoided by implementation of a HASP and CAMP during sampling events and Site redevelopment. Exposure is mitigated by the current asphalt, concrete, or building slab, and the future planned building slab which will cover the entire Site footprint.
Ingestion of groundwater	Area residents through ingestion of groundwater	Groundwater is not nor will be used as a potable source for the Site or surrounding community. Potable water is provided from reservoirs in upstate New York.
Dermal contact with groundwater/ Inhalation of volatile groundwater constituents	Site workers during sampling activities and construction workers during site remediation	Exposure will be avoided by having environmental professionals conducting groundwater sampling and workers engaged in construction, excavation, and dewatering adhering to a HASP. Current exposure is prevented by the current Site building and paved parking lot, which cover the entire Site.
Inhalation of vapors	Future onsite building occupants, Construction workers, and nearby residents	• Elevated ambient levels are not currently present. • Exposures during Site remediation will be mitigated through implementation of a HASP and CAMP. • Remediation will include excavation of the VOC source area, remediation of the groundwater below the Site, and vapor mitigation in the planned development, all of which will reduce potential exposure.

Summary of the Remedy

The preferred remedial action alternative is Alternative 2, the Track 2 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry. The proposed remedial action will consist of:

1. Preparation of a Citizen Participation Plan and performance of all NYSDEC BCP required activities according to the approved Citizen Participation Plan.
2. Preparation of a Community Air Monitoring Program and adherence to the CAMP for particulates and volatile organic carbon compound monitoring during site work.
3. Excavation of all unsaturated soil/fill exceeding Restricted Residential Use SCOs. The majority of the site will be excavated to approximately 15 feet bgs for the development of the basement level of the planned building. A narrow portion of the Site along the southwestern property boundary, bordering the adjacent grocery store building, will be excavated to a maximum of six (6) feet bgs to ensure that the adjacent building foundation is not undermined. On the northwestern portion of the Site, where petroleum impacted soil is present in unsaturated, vadose zone soil, the western adjacent building will be structurally supported to allow for the excavation and removal of impacted soil to occur. Approximately 8,300 tons of soils will be excavated and removed from this Site. Soil/fill exceeding Restricted Residential Use SCOs below the groundwater table, will be treated in-situ.
4. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;

5. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials;

6. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;

7. Removal of all known USTs and any new USTs that are encountered during soil/fill removal actions in compliance with applicable local, State and Federal laws and regulations;

8. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 2 Restricted Residential Use SCOs;

9. Installation of temporary groundwater recovery wells on the northwestern portion of the Site, in the area of elevated groundwater contamination, for the purpose of enhanced fluid recovery (EFR) treatment in order to reduce source groundwater impacts. The temporary groundwater recovery wells will be constructed of 36" diameter corrugated and perforated polyethylene piping, advanced approximately 3-4 feet into the groundwater table to allow for the removal of a significant quantity of petroleum impacted groundwater following adjacent UST and soil excavations;

10. Localized excavations will extend into groundwater table and dewatering will be required. Dewatering will be conducted in compliance with city, state, and federal laws and regulations. Extracted groundwater will be containerized for off-site licensed or permitted disposal.

11. A chemical oxidant (e.g., RegenOx®) will be applied to saturated soil and groundwater by a series of injections in the area on the northwestern portion of the Site where soil/fill exceeding Restricted Residential Use SCOs is present below the groundwater table and excavation is not feasible. Post-treatment soil sampling will be conducted to evaluate the performance of the remedy with respect to attainment of Restricted Residential Use SCOs. The in-situ chemical oxidation plan will be approved by NYSDEC prior to implementation.

12. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications outlined in Section 5.4.9 (2) all Federal, State and local rules and regulations for handling and transport of material;

13. Installation of a vapor barrier system and an active sub-slab depressurization system (SSDS). A vapor barrier will be installed beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 46-mil Preprufe 300R below the slab throughout the full building area and a 32-mil Preprufe 160R outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The SSDS will consist of a branched piping network installed within porous granular material consisting of 2-inch stone beneath the basement foundation. Each branch will consist of a network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and up foundation walls and vapor barrier system. The horizontal piping will consist of fabric-wrapped, perforated schedule 40 4-inch PVC pipe connected to a 6-inch steel pipe that penetrates the foundation and vented to the roof. The gas permeable layer will consist of a 12-inch thick layer of 3/4-inch trap rock stone. The pipe will be finished at the roof line with a 6-inch goose neck pipe to prevent rain infiltration. The active SSDS will be hardwired and will include a blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement. The vapor barrier system in conjunction with the active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the vapor barrier system and active SSDS were designed and properly installed to mitigate potential soil vapor intrusion impacts to the building's indoor air environment.

14. Construction and maintenance of an engineered composite cover consisting of a 6 to 12 inch thick concrete building slab beneath all building areas, to prevent human exposure to residual contaminated soil/fill remaining under the Site;

15. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site;

16. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

17. Performance of post-development indoor air sampling to ensure the effectiveness of the vapor barrier and SSDS in eliminating vapor intrusion into the onsite building. Indoor air sampling results will be submitted to NYSDEC and NYSDOH.

18. Performance of post-remediation groundwater monitoring from five (5) shallow-zone groundwater monitoring wells for a minimum of eight (8) quarters. Samples will be collected in accordance with NYSDEC DER-10 and analyzed for Site-related VOCs via EPA Method 8260. Groundwater well numbers and sampling plan will be approved by NYSDEC prior to implementation. Quarterly monitoring results will be submitted to NYSDEC to assess the effectiveness of the source soil removal and fluid recovery in reducing residual groundwater impacts.

19. 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 rules and regulations.

20. Request for closure of onsite petroleum spill number #1700751 under the authority of NYSDEC pending the results of the investigation and remediation and in accordance with CP-51 soil cleanup objectives;

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 Final Engineering Report (FER).

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

M4778 Broadway LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) in September 2019, to investigate and remediate a 0.28-acre property located at 4778 Broadway in the borough of Manhattan in the City of New York, New York. M4778 Broadway LLC is a Volunteer in the Brownfield Cleanup Program. Commercial use, specifically occupancy of the building by a charter school, is currently proposed for the property. When completed, the Site will contain one new eight-story building totaling approximately 86,615 gross square feet. Refer to the Brownfield Cleanup Program (BCP) application for additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between February 10, 2020 and February 25, 2020. An Interim Remedial Measure (IRM) Workplan was previously submitted to NYSDEC in July 2020; however, that plan has been withdrawn and the remedial activities included in that work plan have been incorporated into the current RAWP.

This RAWP provides an evaluation of a Track 2 Restricted Residential 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 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 that this 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.

1.1 SITE LOCATION AND DESCRIPTION

The Site is located in the Borough of Manhattan, County of New York, New York and is identified as Block 2233, Lot 10 on the New York City Tax Map. A United States Geological Survey (USGS) topographical map (Figure 1) shows the Site location. The Site is situated on an approximately 0.28-acre area bounded by Broadway followed by a New York Presbyterian Hospital outpatient medical center to the northwest, athletic fields associated with Harold O. Levy School 52 to the southeast, the Inwood Branch of the New York Public Library to the east, and Fine Fare Supermarket to the west (see Figure 2). A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419.

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.

When completed, the Site will contain one new eight-story building totaling approximately 86,615 gross square feet. The planned building will be developed with a basement and will occupy the entire footprint of the Site. The building is planned to be utilized for commercial storage and mechanical/utility space on the basement level, a supermarket on the first and second floors, and a school on the 3rd through 8th floors. The proposed project would be constructed in conformance with the project Site's overlay zoning district – the Special Inwood District. Redevelopment Plans are included as Appendix A.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located in a mixed residential and commercial area. The building to the northeast, at 4780-4790 Broadway, is occupied by the Inwood Branch of the New York Public Library. The area to the southeast of the Site, at 630-650 Academy Street, is developed with athletic fields associated with Harold O. Levy School 52. The building to the southwest, at 4768 Broadway, is occupied by Fine Fare Supermarket. The building to the northwest, beyond Broadway and addressed at 4781 Broadway, is occupied by a New York Presbyterian Hospital outpatient medical center.

The nearest school to the Site is Harold O. Levy School 52, located at 630 Academy Street, New York, NY 10034, approximately 150 feet to the east of the Site. The nearest preschool/daycares are Aura's Bright Children Daycare, located at 13-19 Cumming Street, New York, NY 10034, approximately 400 feet to the northeast of the Site, and a family day care provided by Naura J. Rojas, located at 89 Thayer Street, New York, NY 10040, approximately 550 feet to the southwest of the Site.

The New York Presbyterian Hospital outpatient medical center, located adjacent to the Site beyond Broadway, approximately 30 feet to the northwest, treats sensitive populations with potentially compromised immune systems. Additionally, the Inwood Senior Center, a Senior Citizen Center, is located at 84 Vermilyea Ave, New York, NY 10034, approximately 800 feet to the east of the Site. No other sensitive populations such as medical or senior citizen facilities were identified within the vicinity of the Site.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated November 2019. The investigation was conducted between February 10, 2020 and February 25, 2020. The RI was originally submitted to NYSDEC in April 2020, and after multiple rounds of revisions, was most recently submitted to NYSDEC as a final document in September 2020.

2.1 SUMMARY REMEDIAL INVESTIGATIONS PERFORMED

Following entry into the Brownfield Cleanup Program and approval of the November 2019 Remedial Investigation Work Plan (RIWP) by NYSDEC and public review period, AEI mobilized to the Site in February 2020 to complete the BCP Remedial Investigation. RI field work was conducted at the Site on February 10-13th and February 25th, 2020.

2.1.1. Borings and Wells

The work included using a direct-push rig to conduct soil sampling at seven (7) locations onsite. Additionally, a total of nine (9) borings, were converted to soil vapor probes for the collection soil vapor samples. Last, two (2) additional permanent groundwater monitoring wells (MW-4 and MW-5) were installed at the Site during the BCP RI.

2.1.2 Samples Collected

A total of twenty-eight (28) soil samples were collected from various depths at the seven (7) borings, eighteen (18) soil vapor samples; nine (9) shallow soil vapor (3-5 feet bgs) and nine (9) deep soil vapor (collected from 12' bgs, or between one and two feet above the groundwater interface) were collected, and five (5) groundwater samples were collected from the two new monitoring wells and the three original monitoring wells.

2.1.3 Chemical Analytical Work Performed

Sample Media	Number of Samples					Analysis
	Field Samples	Duplicates	MS/MSD	Field Blank	Trip Blank	
Soil	28 (4 samples from each boring)	1	1	1	1	-VOCs+TICs per Method 8260C (not analyzed in surface soil samples) -SVOCs+TICs by Method 8270D -TAL Metals by EPA 6010C / 7471B -TCL PCBs and Pesticides by Method 8082A/8081B -Herbicides by Method 8151A -1,4-Dioxane by EPA Method 8270D-SIM - PFAS by modified EPA Method 537
Groundwater	5	1	1	1	1	-VOCs+TICs per Method 8260C -SVOCs+TICs by Method 8270D -TAL Metals by EPA 200.7 / 200.8/ 245.2 / 6010C / 6020A / 7470A (filtered and total metals) -TCL PCBs and Pesticides by Method 8082A/8081B -Herbicides by Method 8151A -1,4-Dioxane by EPA Method 8270D-SIM

Sample Media	Number of Samples					Analysis
	Field Samples	Duplicates	MS/MSD	Field Blank	Trip Blank	
						- PFAS by modified EPA Method 537
Soil Vapor	18	0	0	0	0	-VOCs per Method TO-15

2.1.4 Geophysical Survey

On February 10, 2020, a geophysical survey was conducted by Delta Geophysics, Inc. (Delta). The purpose of the survey was to investigate the areas in the vicinity of the proposed boring locations, and to evaluate the presence of underground structures, including utilities, and underground storage tanks (USTs) using a Radio-Detection RD 1000 cart-mounted ground penetrating radar (GPR) unit, and other geophysical methods. The geophysical survey was conducted throughout exterior portions of the Site only. According to a geophysical survey conducted during the current RI, as many as nine (9) USTs may remain onsite in the area of the former gasoline filling station. Results of the geophysical survey are presented in Appendix B.

2.1.5 Remedial Investigation Results and Documentation

Table 1 through Table 3 present a summary of the findings of the soil, soil vapor, and groundwater data collected during the RI, respectively. Figures 4 through 7 illustrate the locations and results of the soil, soil vapor, and groundwater samples collected as well as the onsite groundwater elevation contours.

Below is a summary of RI findings.

The results of the soil sampling completed during the current BCP RI indicated that Benzene, Toluene, Ethylbenzene, Xylene (BTEX), and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC Restricted Residential Use Soil Cleanup Objective (RRUSCO) and/or Protection of Groundwater Soil Cleanup Objective (PGWSCO) at various depths in boring locations on the north and northwestern portion of the Site. PAHs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable SCOs; however, the presence of these compounds is likely the result of fill material present in the subsurface. No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-

Dioxane, or PFAS were detected in any of the soil samples at concentrations exceeding the applicable NYSDEC RRUSCOs or PGWSCOs.

The results of the soil vapor sampling completed during the current BCP RI indicate that significant soil vapor concentrations of gasoline related compounds including BTEX were detected in soil vapor sample SGS-9D, located on the northern portion of the Site.

The results of the groundwater sampling completed during the current BCP RI indicate that BTEX and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC AWQS in the monitoring wells MW-1, MW-2, MW-3, MW-5 onsite. The highest concentrations of petroleum-related VOCs were detected in monitoring wells, MW-2 and MW-5, located on the north and northwestern portion of the Site in the area of the former gasoline filling station. No VOCs were detected in MW-4 located on the southern portion of the Site.

SVOCs 2,4-Dimethylphenol, Phenol, and Naphthalene, and dissolved and total metals Arsenic, Barium, Iron, Magnesium, Manganese, Sodium, and Thallium were also detected in groundwater samples at the Site at concentrations exceeding their applicable NYSDEC AWQS.

Additionally, individual PFOA and PFOS concentrations, other individual PFAS concentrations, and combined PFAS concentrations exceeded the screening levels outlined in the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020). The highest concentrations of PFAS compounds were detected in groundwater samples from monitoring wells MW-2, MW-3, and MW-5, located on the north and northwestern portions of the Site. Based on this information, it is possible that the former onsite car wash operations and use of car-wash solutions/surfactants may have resulted in onsite PFAS groundwater impacts.

No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the groundwater samples at concentrations exceeding the applicable NYSDEC AWQS or guidance levels.

2.1.6 Significant Threat

The NYSDEC and NYSDOH have determined that this Site does not pose a significant threat to human health and the environment.

2.2 SITE HISTORY

2.2.1 Past Uses and Ownership

The Site was most recently occupied by an automobile laundry/car wash known as Broadway Hand Carwash and Soft Touch Carwash from approximately 1988 to 2017. Based on a review of historical sources, the Site was developed with a gasoline filling and/or service station from as early as 1921 until 1988, known as Broadyck Service Center . During this time span, multiple generations of tanks were likely installed on the Site. Three (3) gasoline tanks were labeled on Sanborn maps from 1935 and 1951 and according to state agency and regulatory records, additional tanks were installed in 1951 during the redevelopment of the Site. No documentation has been identified that indicates typical tank closure activities (including proper tank closure/removal, soil and/or groundwater sampling, and summary closure reports) were performed.

2.2.2 Phase I and Phase II Reports

A Phase I Environmental Site Assessment was conducted at the Site in June 2015 for the previous owner. The Phase I ESA identified the long-term use as a gasoline filling and/or service station onsite as a Recognized Environmental Condition. The June 2015 Phase I recommended that a limited Phase II Subsurface Investigation be conducted to evaluate if the long-term use of the site as a gasoline filling station has impacted the subsurface of the site.

Based on the findings of the June 2015 Phase I, a Phase II was conducted at the Site in March/April 2017 for the previous owner. The results of this investigation indicated that a release of gasoline had impacted soil, groundwater, and soil vapor at the Site. Based on this information, the NYSDEC was notified of the release on April 24, 2017, and NYSDEC Spill #1700751 was issued.

After the March/April 2017 Phase II, the former Site owner and AEI were notified by the NYSDEC that a Remedial Investigation (RI) would be required to delineate and characterize the magnitude and extent of the soil and groundwater impacts at the Site.

In July of 2017, a RI including the installation of eight (8) additional boring locations for soil and temporary well point groundwater samples was conducted. Following the completion of the soil and temporary well point sampling, three (3) permanent groundwater monitoring wells were installed and sampled on the Site in late July and early August of 2017. The results of this investigation were detailed in an October 2017 RIR.

Based upon the investigations conducted to date, the primary contaminants of concern for the Site are gasoline related volatile organic compounds (VOCs).

The current owner, M4778 Broadway LLC, purchased the Site in June 2018. AEI has since been retained by M4778 Broadway LLC and has assisted with the entry into the NYSDEC BCP and submission of a RIWP. The final RIWP, dated November 2019, was approved by NYSDEC on November 14, 2019 via email sent by NYSDEC Project Manager Mr. Steven Wu.

This RIR was conducted per the NYSDEC approved November 2019 RIWP and was prepared in accordance with the NYSDEC's DER-10/Technical Guidance for Site Investigation and Remediation in order to delineate the impacts of the release at the Site.

2.2.3 Sanborn Maps

A search was made of the Environmental Risk Information Services (ERIS) collection of Sanborn Fire Insurance maps.

The following maps were reviewed:

Year(s)	Subject Property Description (Listed Address)
1893, 1900, 1913	Unimproved land (no address listed)
1935, 1951	One commercial retail store, multiple automobile storage stalls, and a label for three 550-gallon gasoline tanks, presumably underground (no address listed)
1968, 1977, 1979, 1980, 1981, 1983, 1985, 1986	A gasoline filling station with one unlabeled building and a parking lot; no tanks are depicted or labeled (4778 Broadway)
1988, 1989	The site building is labeled as an auto laundry/car wash. The parking lot remains and no filling station labels or tanks are depicted (4778 Broadway)

Based on a review of Sanborn maps, the Site was identified to consist of a gasoline filling station from 1935 until at least 1986. Copies of historical Sanborn maps are provided as Appendix C.

All Sanborn Maps available for this Site were reviewed prior to preparation of the RAWP.

2.3 GEOLOGICAL CONDITIONS

The soil recovered in the borings advanced during the February 2020 RI generally consisted of grey to brown silt and reddish-brown silty sand with weathered gravel. A total of 19 soil borings have been advanced at the Site between the March/April 2017 Phase II, the October 2017 RI, and the borings at the Site have generally been advanced to 20 feet bgs, where refusal was encountered due to the presence of weathered bedrock. Based on the monitoring well survey conducted at the Site, it is evident that weathered bedrock is present at approximately 4-10 feet AMSL.

The Site is relatively flat at an elevation of approximately 25 feet AMSL. The monitoring wells onsite are screened from the terminus of the borings (approximately 20 feet bgs) to ten feet bgs. The depth to groundwater was measured between 13.14 feet and 14.30 feet below the top of casing (TOC) in the five permanent monitoring wells at the Site. Based on a survey of monitoring wells onsite and groundwater measurements in the wells, the measured groundwater gradient onsite is to the southwest, with groundwater elevations ranging from 11.72 feet AMSL in MW-3 on the northeast portion of the Site to 10.69 feet AMSL in MW-4 on the southern portion of the Site. The shallow groundwater hydrogeologic unit encountered in the unconsolidated overburden is the only groundwater unit that has been encountered at the Site and no hydrogeologic units with different flow patterns have been identified. The closest surface water body, the Hudson River, is located approximately 0.38 miles to the west of the Site.

A groundwater elevation contour map is included as Figure 7 and a Geotechnical Report completed by Mueser Rutledge Consulting Engineers is included as Appendix L.

2.4 CONTAMINATION CONDITIONS

2.4.1 Conceptual Model of Site Contamination

The soil, soil vapor, and groundwater onsite are impacted with petroleum-related VOCs, specifically, VOCs associated with weathered gasoline. These impacts are likely related to the historic use of the Site as a gasoline filling and/or service station. A BTEX source area has been identified onsite and is present on the northern portion of the property in the area of the potential nine (9) USTs identified by a geophysical survey.

Analytical results from soil samples collected as part of this RI indicate that petroleum-related VOC exceedances in soil are limited to the north and northwestern portion of the Site. SVOCs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable SCOs; however, the presence of these compounds is likely the result of fill material present in the subsurface.

The distribution of groundwater impacts supports a relationship between the soil source area and petroleum-related VOC concentrations in groundwater downgradient of the source area. Petroleum-related VOCs were found in soil vapor at the Site, with the highest concentrations detected in soil vapor samples located on the north and northwestern portion of the Site.

Based on the current land use and the anticipated future land use of the Site, the following potential receptors may be exposed to on-Site media:

- Employee/customer/visitor (future)
- Worker (future)
- Construction worker (future)
- Trespasser (current/future)
- Emergency Repair worker (current/future)

The potential off-site receptors include off-site workers, residents, and visitors.

2.4.2 Description of Areas of Concern

Based on information from historic Sanborn maps and results of the geophysical survey conducted during the RI, it is evident that as many as nine (9) USTs may remain onsite in the area of the former gasoline filling station. The former onsite gasoline filling station, associated tanks and piping, and residual soil contamination represents AOC-1. The gasoline-impacted groundwater and associated soil vapor represent AOC-2. The AOCs are depicted on Figure 10.

2.4.3 Identification of Standards, Criteria and Guidance

The Site will be remediated in accordance with the NYSDEC's DER-10/Technical Guidance for Site Investigation and Remediation. The following SCGs will be used in the remediation program.

Soil Cleanup Objectives (SCOs): As the Site is proposed to be used for commercial, educational (charter school), and/or residential activities in the future, the Restricted Residential Use Soil Cleanup Objectives (RRUSCOs) have been targeted, (see Table A below). Results from soil samples collected from below the groundwater table will also be compared to the Protection of Groundwater SCOs (PGWSCOs). Based on the results of previous onsite investigations, the following VOCs that have been identified in soil were detected in the area of the former gasoline service station at concentrations exceeding the RRUSCOs and PGWSCOs: benzene, toluene, ethylbenzene, total xylenes, 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene. Additionally, the following VOCs have been identified in soil samples collected below the groundwater table at concentrations exceeding PGWSCOs but below the RRUSCOs: acetone, n-butylbenzene, n-propylbenzene, and naphthalene.

Table A – VOC Soil SCOs

Contaminant	CAS Number	Restricted Residential (mg/kg)	Protection of Groundwater (mg/kg)
Tetrachloroethene	127-18-4	19	1.3
Benzene	71-43-2	4.8	0.06
Toluene	108-88-3	100	0.7
Ethylbenzene	100-41-4	41	1
Chloromethane	74-87-3	NS	NS
Bromomethane	74-83-9	NS	NS
1,2-Dichlorobenzene	95-50-1	`100	1.1
1,4-Dichlorobenzene	106-46-7	13	1.8
Methyl tert butyl ether	1634-04-4	100	0.93
p/m-Xylene	179601-23-1	NS	NS
o-Xylene	95-47-6	NS	NS
Xylenes, Total	1330-20-7	100	1.6
Styrene	100-42-5	NS	NS
Acetone	67-64-1	100	0.05
Carbon disulfide	75-15-0	NS	NS
2-Butanone	78-93-3	100	0.12
1,2,3-Trichloropropane	96-18-4	NS	NS
n-Butylbenzene	104-51-8	100	12
sec-Butylbenzene	135-98-8	100	11
tert-Butylbenzene	98-06-6	100	5.9
Isopropylbenzene	98-82-8	NS	NS
p-Isopropyltoluene	99-87-6	NS	NS

Naphthalene	91-20-3	100	12
n-Propylbenzene	103-65-1	100	3.9
1,3,5-Trimethylbenzene	108-67-8	52	8.4
1,2,4-Trimethylbenzene	95-63-6	52	3.6
p-Diethylbenzene	105-05-5	NS	NS
p-Ethyltoluene	622-96-8	NS	NS
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS

NS – No NY Soil Cleanup Objective for this compound.

Groundwater: The New York State Ambient Water Quality Standards and Guidance Values, Class GA (Groundwater), will be used to evaluate groundwater contaminants. The values for petroleum related VOCs are shown below in Table B.

Table B - NYS Groundwater Standards and Guidance Values

Contaminant	CAS Number	Groundwater Standard (µg/L)
Benzene	71-43-2	1
Toluene	108-88-3	5
Ethylbenzene	100-41-4	5
Methyl tert butyl ether	1634-04-4	10
p/m-Xylene	179601-23-1	5
o-Xylene	95-47-6	5
Xylenes, Total	1330-20-7	NS
Acetone	67-64-1	50
2-Butanone	78-93-3	50
n-Butylbenzene	104-51-8	5
sec-Butylbenzene	135-98-8	5
Isopropylbenzene	98-82-8	5
p-Isopropyltoluene	99-87-6	5
Naphthalene	91-20-3	10
n-Propylbenzene	103-65-1	5
1,3,5-Trimethylbenzene	108-67-8	5
1,2,4-Trimethylbenzene	95-63-6	5
p-Diethylbenzene	105-05-5	NS
p-Ethyltoluene	622-96-8	NS
1,2,4,5-Tetramethylbenzene	95-93-2	5

NS – No NY State Class GA AWQS for this compound.

Soil Vapor: The New York State SVI Guidance does not establish soil vapor action levels for non-chlorinated petroleum compounds like those detected at the Site.

2.4.4 Soil/Fill Contamination

The following information is a summary of the soil sample analytical test results and details the compounds detected in the onsite soil samples that exceed the NYSDEC RRUSCOs for soil samples collected at all depths and compounds detected in exceedance of the NYSDEC PGWSCOs in soil samples collected from below the groundwater table.

A summary table of data for chemical analyses performed on soil samples is included in Table 1. Figure 4 shows the location and posts the values for soil samples that exceed the above listed SCOs.

2.4.4.1 Summary of Soil/Fill Data

The results of the soil sampling completed during the RI indicated that BTEX, and other petroleum-related VOCs including Naphthalene, n-Propylbenzene, 1,3,5-Trimethylbenzene, and 1,2,4-Trimethylbenzene are present at concentrations in exceedance of the applicable NYSDEC RRUSCO and/or PGWSCO at various depths in boring locations on the north and northwestern portion of the Site. PAHs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable SCOs; however, the presence of these compounds is likely the result of fill material present in the subsurface. No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the soil samples at concentrations exceeding the applicable NYSDEC RRUSCOs or PGWSCOs.

A summary table of data for chemical analyses performed on soil samples is included in Table 1.

2.4.4.2 Comparison of Soil/Fill with SCGs

The following compounds were detected in soil samples at concentrations that exceed the applicable SCGs/SCOs.

VOCs

- Benzene was detected in sample SB-16-17.5-18’ at a concentration of 1.9 mg/kg, in sample SB-18-19.5-20.0’ at a concentration of 54 mg/kg, and in sample SB-19-19.5-20’ at a concentration of 3.1 mg/kg. These concentrations are greater than the applicable NYSDEC RRUSCO and/or PGWSCO for this compound.

- Toluene was detected in sample SB-16-17.5-18’ at a concentration of 46 mg/kg, in sample SB-18-19.5-20.0’ at a concentration of 810 mg/kg, and in sample SB-19-19.5-20’ at a concentration of 17 mg/kg. These concentrations are greater than the applicable NYSDEC RRUSCO and/or PGWSCO for this compound.
- Ethylbenzene was detected in sample SB-16-17.5-18’ at a concentration of 110 mg/kg, in sample SB-18-19.5-20.0’ at a concentration of 360 mg/kg, and in sample SB-19-19.5-20’ at a concentration of 2 mg/kg. These concentrations are greater than the applicable NYSDEC RRUSCO and/or PGWSCO for this compound.
- Xylene was detected in sample SB-16-17.5-18’ at a concentration of 570 mg/kg, in sample SB-18-19.5-20.0’ at a concentration of 1,700 mg/kg, in sample SB-19-12.5-13’ at a concentration of 130 mg/kg, and in sample SB-19-19.5-20’ at a concentration of 10 mg/kg. These concentrations are greater than the applicable NYSDEC RRUSCO and/or PGWSCO for this compound.
- Naphthalene was detected in sample SB-16-17.5-18’ at a concentration of 20 mg/kg and in sample SB-18-19.5-20.0’ at a concentration of 56 mg/kg. These concentrations are greater than the applicable NYSDEC PGWSCO for this compound.
- n-Propylbenzene was detected in sample SB-16-17.5-18’ at a concentration of 33 mg/kg and in sample SB-18-19.5-20.0’ at a concentration of 66 mg/kg. These concentrations are greater than the applicable NYSDEC PGWSCO for this compound.
- 1,3,5-Trimethylbenzene was detected in sample SB-16-17.5-18’ at a concentration of 59 mg/kg and in sample SB-18-19.5-20.0’ at a concentration of 120 mg/kg. These concentrations are greater than the applicable NYSDEC RRUSCO and/or PGWSCO for this compound.
- 1,2,4-Trimethylbenzene was detected in sample SB-16-17.5-18’ at a concentration of 190 mg/kg, in sample SB-18-1.5-2’ at a concentration of 98 mg/kg, and in sample SB-18-19.5-20.0’ at a concentration of 420 mg/kg. These concentrations are greater than the applicable NYSDEC RRUSCO and/or PGWSCO for this compound.

<u>SVOCs</u>

- Benzo(b)fluoranthene was detected in sample SB-15-0-2” at a concentration of 2.4 mg/kg. This concentration is greater than the applicable NYSDEC RRUSCO and PGWSCO for this compound.
- Indeno(1,2,3-cd)pyrene was detected in sample SB-15-0-2” at a concentration of 1.2 mg/kg. This concentration is greater than the applicable NYSDEC RRUSCO for this compound.
- 3-Methylphenol/4-Methylphenol was detected in sample SB-19-19.5-20’ at a concentration of 0.38 mg/kg. This concentration is greater than the applicable NYSDEC PGWSCO for this compound but below the RRUSCO.

No other VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the soil samples at concentrations exceeding the applicable NYSDEC RRUSCOs or PGWSCOs.

Analytical results from soil samples collected as part of the RI indicated that petroleum-related VOC exceedances in soil are limited to the north and northwestern portion of the Site. These impacts are likely related to the historic use of the Site as a gasoline filling and/or service station. A BTEX source area has been identified onsite and is present on the northern portion of the property in the area of the potential nine (9) USTs identified by a geophysical survey. SVOCs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable SCOs; however, the presence of these compounds is likely the result of fill material or asphalt present in the subsurface.

Table 4 shows exceedances from Unrestricted SCOs for all soil/fill at the Site. Figure 8 is a spider map that shows the location and summarizes exceedances from Unrestricted SCOs for all soil/fill.

2.4.5 On-Site and Off-Site Groundwater Contamination

2.4.5.1 Summary of Groundwater Data

The results of the groundwater sampling completed during the RI indicated that BTEX and other petroleum-related VOCs including sec-Butylbenzene, Isopropylbenzene, Naphthalene, n-Propylbenzene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, and 1,2,4,5-Trimethylbenzene are present at concentrations in exceedance of the applicable NYSDEC AWQS in the monitoring wells MW-1, MW-2, MW-3, MW-5 onsite. The highest concentrations of petroleum-related VOCs were detected in monitoring wells, MW-2 and MW-5, located on the north and northwestern portion of the Site in the area of the former gasoline filling station. No VOCs were detected in MW-4 located on the southern portion of the Site.

SVOCs 2,4-Dimethylphenol, Phenol, and Naphthalene, and dissolved and total metals Arsenic, Barium, Iron, Magnesium, Manganese, Sodium, and Thallium were also detected in groundwater samples at the Site at concentrations exceeding their applicable NYSDEC AWQS.

Additionally, individual PFOA and PFOS concentrations, other individual PFAS concentrations, and combined PFAS concentrations exceeded the screening levels outlined in the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020). The highest concentrations of PFAS compounds were detected in groundwater samples from monitoring wells MW-2, MW-3, and MW-5, located on the north and northwestern portions of the Site. Based on this information, it is possible that the former onsite car wash operations and use of car-wash solutions/surfactants may have resulted in onsite PFAS groundwater impacts.

No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the groundwater samples at concentrations exceeding the applicable NYSDEC AWQS or guidance levels.

Based on the elevated concentrations of petroleum-related VOCs, SVOCs, Metals, and PFAS detected in groundwater monitoring wells MW-2 and MW-5, located adjacent to the northern and western property boundaries, respectively, there is a potential for site-related groundwater contamination to impact offsite properties.

2.4.5.2 Comparison of Groundwater with SCGs

The following compounds were detected in groundwater samples at concentrations that exceed the applicable SCGs/NYSDEC AWQS.

VOCs

- Benzene was detected in groundwater sample MW-1 at a concentration of 920 micrograms per liter (ug/L), in groundwater sample MW-2 at a concentration of 8,000 ug/L, in groundwater sample MW-3 at a concentration of 120 ug/L, in groundwater sample MW-5 at a concentration of 8,200 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound. Benzene was not detected in groundwater sample MW-4.
- Toluene was detected in groundwater sample MW-1 at a concentration of 1,500 ug/L, in groundwater sample MW-2 at a concentration of 39,000 ug/L, in groundwater sample MW-3 at a concentration of 490 ug/L, in groundwater sample MW-5 at a concentration of 34,000 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound. Toluene was not detected in groundwater sample MW-4.
- Ethylbenzene was detected in groundwater sample MW-1 at a concentration of 2,000 ug/L, in groundwater sample MW-2 at a concentration of 5,300 ug/L, in groundwater sample MW-3 at a concentration of 410 ug/L, in groundwater sample MW-5 at a concentration of 3,600 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound. Ethylbenzene was not detected in groundwater sample MW-4.

- p/m-Xylene was detected in groundwater sample MW-1 at a concentration of 5,700 ug/L, in groundwater sample MW-2 at a concentration of 16,000 ug/L, in groundwater sample MW-3 at a concentration of 500 ug/L, in groundwater sample MW-5 at a concentration of 11,000 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound. p/m-Xylene was not detected in groundwater sample MW-4.
- o-Xylene was detected in groundwater sample MW-1 at a concentration of 1,800 ug/L, in groundwater sample MW-2 at a concentration of 6,600 ug/L, in groundwater sample MW-3 at a concentration of 160 ug/L, in groundwater sample MW-5 at a concentration of 5,100 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound. o-Xylene was not detected in groundwater sample MW-4.
- Additional petroleum-related VOCs including sec-Butylbenzene, Isopropylbenzene, Naphthalene, n-Propylbenzene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, and 1,2,4,5-Trimethylbenzene were detected at concentrations exceeding the NYSDEC AWQS in groundwater samples MW-1, MW-2, MW-3, and MW-5. No VOCs were detected in groundwater sample MW-4.

<u>SVOCs</u>

- 2,4-Dimethylphenol was detected in groundwater sample MW-2 at a concentration of 72 ug/L and in groundwater sample MW-5 at a concentration of 87 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Phenol was detected in groundwater sample MW-1 at a concentration of 6.7 ug/L, in groundwater sample MW-2 at a concentration of 6.7 ug/L, and in groundwater sample MW-5 at a concentration of 49 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Naphthalene was detected in groundwater sample MW-1 at a concentration of 300 ug/L, in groundwater sample MW-2 at a concentration of 380 ug/L, and in groundwater sample MW-5 at a concentration of 260 ug/L. These concentrations are greater than the applicable NYSDEC AWQS for this compound.

<u>Dissolved Metals</u>

- Arsenic was detected in groundwater sample MW-3 at a concentration of 27.65 ug/L. This concentration is greater than the applicable NYSDEC AWQS for this compound.
- Barium was detected in groundwater sample MW-5 at a concentration of 2,194 ug/L. This concentration is greater than the applicable NYSDEC AWQS for this compound.
- Iron was detected in groundwater samples MW-1, MW-2, MW-3, and MW-5 at concentrations of 33,600 ug/L, 1,680 ug/L, 687 ug/L, and 20,400 ug/L, respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Magnesium was detected in groundwater samples MW-1, MW-4, MW-5, and MW-6 (MW-4 duplicate sample) at concentrations of 123,000 ug/L, 41,000 ug/L, 68,600 ug/L,

41,700 ug/L, respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.

- Manganese was detected in groundwater samples MW-1, MW-2, MW-3, and MW-5 at concentrations of 12,280 ug/L, 727 ug/L, 324 ug/L, and 4,363 ug/L, respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Sodium was detected in groundwater samples MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 (MW-4 duplicate sample) at concentrations of 374,000 ug/L, 566,000 ug/L, 441,000 ug/L, 95,300 ug/L, 1,100,000 ug/L, and 946,000 ug/L, respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.

<u>Total Metals</u>

- Barium was detected in groundwater sample MW-5 at a concentration of 2,251 ug/L. This concentration is greater than the applicable NYSDEC AWQS for this compound.
- Iron was detected in groundwater samples MW-1, MW-2, MW-3, MW-4, and MW-5 at concentrations of 29,900 ug/L, 4,450 ug/L, 1,800 ug/L, 4,530 ug/L, and 22,700 ug/L, respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Magnesium was detected in groundwater samples MW-1, MW-4, MW-5, and MW-6 (MW-4 duplicate sample) at concentrations of 121,000 ug/L, 45,800 ug/L, 72,700 ug/L, and 41,500 ug/L, respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Manganese was detected in groundwater samples MW-1, MW-2, MW-3, and MW-5 at concentrations of 11,790 ug/L, 879 ug/L, 314 ug/L, and 3,925 ug/L, respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Sodium was detected in groundwater samples MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 (MW-4 duplicate sample) at concentrations of 371,000 ug/L, 642,000 ug/L, 473,000 ug/L, 95,400 ug/L, 1,130,000 ug/L, and 94,000 ug/L respectively. These concentrations are greater than the applicable NYSDEC AWQS for this compound.
- Thallium was detected in groundwater sample MW-4 at a concentration of 0.74 ug/L. This concentration is greater than the applicable NYSDEC AWQS for this compound.

<u>PFAS</u>

The following information is a summary of the groundwater sample analytical test results that exceed the screening levels outlined in the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020):

- PFOA was detected in groundwater samples MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 (MW-4 duplicate sample) at concentrations of 0.0841 ug/L, 0.105 ug/L, 0.172 ug/L, 0.0676 ug/L, 0.200 ug/L, and 0.0685 ug/L, respectively. These concentrations are greater than the applicable NYSDEC screening levels for this compound.

- PFOS was detected in groundwater samples MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 (MW-4 duplicate sample) at concentrations of 0.0173 ug/L, 0.745 ug/L, 1.37 ug/L, 0.0452 ug/L, 1.53 ug/L, and 0.0455 ug/L, respectively. These concentrations are greater than the applicable NYSDEC screening levels for this compound.
- Multiple other individual PFAS (not PFOA or PFOS) were detected in water at or above 100 nanograms per liter (ng/L) / 0.100 ug/L in groundwater samples MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 (MW-4 duplicate sample).
- The total concentration of PFAS (including PFOA and PFOS) was detected in water at or above 500 ng/L / 0.500 ug/L in groundwater samples MW-1, MW-2, MW-3, and MW-5.

No other VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the groundwater samples at concentrations exceeding the applicable NYSDEC AWQS.

Analytical results from groundwater samples collected as part of the RI indicated that petroleum-related VOC exceedances in groundwater are limited to the north and northwestern portion of the Site. These impacts are likely related to the historic use of the Site as a gasoline filling and/or service station. A BTEX source area has been identified onsite and is present on the northern portion of the property in the area of the potential nine (9) USTs identified by a geophysical survey. SVOCs and metals were also detected in groundwater samples at the Site at concentrations exceeding applicable SCGs; however, the presence of these compounds is likely the result of fill material or present in the subsurface.

Additionally, PFAS compounds were detected in groundwater samples exceeded the screening levels outlined in the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020). The highest concentrations of PFAS compounds were located on the north and northwestern portions of the Site. Based on this information, it is possible that the former onsite car wash operations and use of car-wash solutions/surfactants may have resulted in onsite PFAS groundwater impacts.

A table that indicates exceedances from GA groundwater standards in monitor wells prior to the remedy is shown in Table 3. A spider map that indicates the location(s) of and summarizes exceedances from GA groundwater standards prior to the remedy is shown in Figure 6.

2.4.6 On-Site and Off-Site Soil Vapor Contamination

The results of the soil vapor sampling completed during the RI indicated that elevated concentrations of Methylene Chloride and gasoline related compounds including BTEX were detected at the Site.

Based on the elevated concentrations of petroleum-related VOCs detected in soil vapor samples SGS-8S/8D and SGS-9S/9D, located adjacent to the western and northern property boundaries, respectively, there is a potential for site-related soil vapor to impact offsite properties. The groundwater data from monitor wells MW-2 and MW-5, located in the vicinity of soil vapor samples SGS-9S/9D and SGS-8S/8D, respectively, also indicate that there may be a potential for site-related groundwater and soil vapor to impact offsite properties.

2.4.6.1 Comparison of Soil Vapor with SCGs

The following compounds were detected in soil vapor samples at elevated concentrations and/or at concentrations that exceed the applicable SCGs / New York State SVI Guidance Matrices Values.

VOCs

- Methylene Chloride was detected in soil vapor sample SGS-7D at a concentration of 167 micrograms per cubic meter (ug/m^3).
- Benzene was detected in soil vapor samples throughout the Site, with the highest concentration detected in soil vapor sample SGS-9D at a concentration of 371,000 ug/m^3.
- Toluene was detected in soil vapor samples throughout the Site, with the highest concentration detected in soil vapor sample SGS-9D at a concentration of 897,000 ug/m^3.
- Ethylbenzene was detected in soil vapor samples throughout the Site, with the highest concentration detected in soil vapor sample SGS-9D at a concentration of 155,000 ug/m^3.
- Total Xylenes were detected in soil vapor samples throughout the Site, with the highest concentrations detected in soil vapor sample SGS-9D at a concentration of 237,100 ug/m^3.

The New York State SVI Guidance does not establish soil vapor action levels for non-chlorinated petroleum compounds like those detected at the Site. Additionally, New York State decision matrices are used as a comparison tool to evaluate and address potential exposures related to SVI using sub-slab soil vapor and indoor air samples. The soil vapor samples collected during this RI are not considered sub-slab and indoor air samples were not collected; therefore, the New York State SVI Guidance decision matrices do not apply to the results of this investigation.

Analytical results from soil vapor samples collected as part of the RI indicated that petroleum-related VOC exceedances in soil vapor are limited to the north and northwestern portion of the Site. These impacts are likely related to the historic use of the Site as a gasoline filling and/or service station. A BTEX source area has been identified onsite and is present on the northern portion of the property in the area of the potential nine (9) USTs identified by a geophysical survey.

A table of soil vapor data collected prior to the remedy is shown in Table 2. A spider map that indicates the location(s) of and summarizes soil vapor data prior to the remedy is shown in Figure 5.

2.5 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.5.1 Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment (QHHEA) has been completed in accordance with Section 3.3(c)4 of DER-10 and the NYSDOH guidance for performing a QHHEA (NYSDEC DER-10; Technical Guidance for Site Investigation and Remediation; Appendix 3-B).

The objectives of QHHEA are to evaluate and document how humans might be exposed to Site-related contaminants and to assess whether there are any complete or potentially complete exposure pathways now and under the reasonably anticipated future land use of the Site.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: (1) a contaminant source; (2) contaminant release and transport mechanisms to an exposed population; (3) a receptor population; (4) a route of exposure; and (5) a point of exposure to a receptor population. The following sections discuss the potential exposure pathways to petroleum compounds at the Site. A table describing the environmental media, potential exposure routes and a human exposure assessment is included at the end of this section.

2.5.1.1 Contaminant Sources

The contaminants of concern detected during previous investigations and the current RI include petroleum-related VOCs, SVOCs, metals, and PFAS compounds.

The soil, soil vapor, and groundwater onsite are impacted with Benzene, Toluene, Ethylbenzene, Xylene (BTEX) and other petroleum-related VOCs and SVOCs, consistent with the historic use of the Site as a gasoline filling and/or service station for a period of approximately 67 years. BTEX have been detected in soil and groundwater at concentrations above applicable regulatory and/or ambient levels. While no regulatory standards exist for BTEX in soil vapor in New York, the concentrations of BTEX detected in soil vapor onsite warrant further investigation and/or vapor intrusion mitigation in the planned development.

A number of dissolved and total metals and PFAS compounds were also detected in groundwater samples at the Site at concentrations exceeding their applicable NYSDEC AWQS and the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020), respectively. The presence of these compounds in groundwater is likely attributable to the local urban environment of the Site and the concentrations detected are comparable to regional background concentrations in New York City.

2.5.1.2 Contaminant Release and Transport Mechanisms

The soil, soil vapor, and groundwater onsite are impacted with petroleum-related VOCs, specifically, VOCs associated with weathered gasoline. These impacts are likely related to the historic use of the Site as a gasoline filling and/or service station. A BTEX source area has been identified onsite and is present on the northern portion of the property in the area of the potential nine (9) USTs identified by a geophysical survey.

Analytical results from soil samples collected as part of this RI indicate that petroleum-related VOC exceedances in soil are limited to the north and northwestern portion of the Site. SVOCs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable

SCOs; however, the presence of these compounds is likely the result of fill material present in the subsurface.

The distribution of groundwater impacts supports a relationship between the soil source area and petroleum-related VOC concentrations in groundwater downgradient of the source area. Petroleum-related VOCs were found in soil vapor at the Site, with the highest concentrations detected in soil vapor samples located on the north and northwestern portion of the Site.

2.5.1.3 Potential Receptor Populations

Based on the current land use and the anticipated future land use of the Site, the following potential receptors may be exposed to on-Site media:

- Resident/visitor (future)
- Worker (future)
- Construction worker (future)
- Trespasser (current/future)
- Emergency repair worker (future)

The potential off-site receptors include off-site workers, residents, and visitors.

2.5.1.4 Potential Routes and Points of Exposure

The findings of prior investigations and this RI indicate petroleum-related VOCs and SVOCs are present at concentrations above regulatory levels in soils at depths extending from 1.5-2 feet bgs to an approximate maximum depth of 20 feet bgs. The entirety of the Site is currently capped with either asphalt, concrete, or a building slab, and therefore on-Site exposures are currently unlikely; however, there is potential for exposure via dermal adsorption, inhalation and incidental ingestion if proper protective measures are not implemented during ground-intrusive sampling and Site remediation. Exposure of environmental professionals during sampling will be mitigated by adherence to a Health and Safety Plan (HASP). During remediation activities, the potential for exposure of Site construction workers and nearby residents to contaminated soil via onsite handling and off-site transportation of disturbed soil will be avoided by implementation of a Community Air Monitoring Plan (CAMP) and HASP.

Concentrations of petroleum-related VOCs, SVOCs, and metals were detected above the Class GA AWQS, which were developed to be protective of public health based upon groundwater as a potential drinking water source. While concentrations of these constituents exceed Class GA Standards and there is the potential for these constituents to migrate off Site, exposure to contaminants via drinking water is not applicable to the Site given the fact that the Site and surrounding community are supplied by an upstate New York municipal system.

Dermal and inhalation exposure to VOCs, SVOCs, and metals in groundwater, based on the depth to groundwater, should be limited to construction workers involved in dewatering and excavation below the groundwater table, and Site workers collecting groundwater samples for environmental analysis. These exposures would be mitigated by adherence to a HASP during sampling activities and a CAMP and HASP during construction.

Exposure to contaminants in soil and groundwater is currently, and will continue to be, mitigated by the current asphalt, concrete, or a building slab, and the future planned building slab which will cover the entire Site footprint.

There is potential for volatilization of petroleum-related compounds into ambient air and indoor air on and off Site. Exposure to site workers and nearby residents during remediation will be mitigated by adherence to a HASP during sampling activities and to a HASP and CAMP during remediation.

2.5.1.5 Summary of Qualitative Human Health Exposure Assessment e

The table below summarizes the potential exposure routes and receptors and presents a human exposure assessment for each.

Potential Exposure Route	Potential Receptors	Human Exposure Assessment
Dermal contact with surface soils and incidental ingestion	Site workers during sampling activities and construction workers during site remediation	The potential for on- and off-site exposure during ground-intrusive activities will be avoided by implementation of a HASP and CAMP during sampling events and Site redevelopment. Exposure is mitigated by the current asphalt, concrete, or building slab, and the future planned building slab which will cover the entire Site footprint.
Ingestion of groundwater	Area residents through ingestion of groundwater	Groundwater is not nor will be used as a potable source for the Site or surrounding community. Potable water is provided from reservoirs in upstate New York.
Dermal contact with groundwater/ Inhalation of volatile groundwater constituents	Site workers during sampling activities and construction workers during site remediation	Exposure will be avoided by having environmental professionals conducting groundwater sampling and workers engaged in construction, excavation, and dewatering adhering to a HASP. Current exposure is prevented by the current Site building and paved parking lot, which cover the entire Site.
Inhalation of vapors	Future onsite building occupants, Construction workers, and nearby residents	• Elevated ambient levels are not currently present. • Exposures during Site remediation will be mitigated through implementation of a HASP and CAMP. • Remediation will include excavation of the VOC source area, remediation of the groundwater below the Site, and vapor mitigation in the planned development, all of which will reduce potential exposure.

2.6 REMEDIAL ACTION OBJECTIVES

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

2.6.1 Groundwater

RAOs for Public Health Protection

- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Remove the source of groundwater contamination.
- Bulk reduction in groundwater contamination to asymptotic levels.

2.6.2 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 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.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

The goal of the remedy selection process 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. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the criteria outlined below.

3.1 EVALUATION OF REMEDIAL ALTERNATIVES

Protection of human health and the environment

This evaluation criterion addresses the degree to which each alternative achieves protection of human health and the environment.

Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 2 Restricted Residential Use SCOs, both of which are protective of public health and the environment for its planned use.

Compliance with standards, criteria, and guidelines (SCGs)

This evaluation criterion assesses the ability of the alternatives to achieve applicable standards, criteria and guidance.

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of onsite USTs and associated contaminated soil to achieve Track 1 Unrestricted Use SCO's and Protection of Groundwater SCO's. Compliance with SCGs for soil vapor would also be achieved by installing a waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier outside of subgrade foundation walls, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of onsite USTs and associated contaminated soil to meet Track 2 Restricted Residential SCO's. Compliance with SCG's for soil vapor would also be achieved by installing a waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier outside of subgrade foundation walls as well as the installation of a SSDS beneath the building slab. A Site Management Plan would ensure that these controls remained protective for the long term.

Health and safety measures contained in the HASP and Community Air Monitoring Plan (CAMP) will be implemented during Site redevelopment under this RAWP. For both Alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-term effectiveness and impacts

This evaluation criterion assesses the effects of the alternatives during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their short-term effects during the remedial action on public health and the environment during implementation of the remedial action, including protection of the community, protection of onsite workers and environmental impacts.

Both Alternative 1 and 2 have similar short-term effectiveness during their implementation, as each requires excavation of the onsite USTs and associated petroleum-impacted material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. However, focused attention to means and methods during removal action, including community air monitoring and appropriate truck routing, would minimize the overall impact of these activities.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

The potential adverse impact to the community, workers and the environment for both alternatives would be minimized through implementation of control plans including a Construction Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants.

Construction workers operating under appropriate management procedures and a Health and Safety Plan (HASP) would provide protection from on-Site contaminants by using personal protective equipment would be worn consistent with the documented risks within the respective work zones.

Long-term effectiveness and permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of Engineering Controls/Institutional Controls (ECs/ICs) that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all onsite USTs and impacted soil/fill above Track 1 Unrestricted Use SCO's. Removal of on-Site contaminant sources will also prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing onsite USTs and on-Site contamination to the Track 2 Restricted Residential SCOs; installing a composite cover system across the Site; maintaining use restrictions; establishing an SMP to ensure long-term management of ICs and ECs; and instituting a restrictive declaration to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy continue to provide the required level of protection.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to 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 of total volume of contaminated media.

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all onsite USTs and soil in excess of Track 1 Unrestricted Use SCO's.

Alternative 2 would remove all onsite USTs and remove or treat most of the petroleum contaminated soil at the Site, and the on-Site soil/fill beneath the new building will meet Track 2 Restricted Residential SCO's.

Alternative 1 would remove a greater total mass of contaminants from the Site. The removal of soil for the new development in both scenarios would lessen the difference in contaminant mass removal between these two alternatives.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

The techniques, materials and equipment to implement both Alternatives 1 and 2 are readily available and have been proven to be effective in remediating the contaminants present on the Site. They use standard equipment and technologies that are well established in the industry. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

<u>Cost effectiveness</u>

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Since the new building requires excavation of the entire Site to a depth of up to 15 feet for the planned basement level, the costs associated with both Alternative 1 and Alternative 2 will likely be comparable. Additional soil excavation below 15 feet bgs would be necessary on the northwestern portion of the Site due to the presence of soil with concentrations of petroleum-related VOCs exceeding the Restricted Residential SCOs at depths up to 20 feet bgs (identified in borings SB-16 and SB-18 during the RIR); however, due to the proximity of the adjacent building foundation to the west, removal of soil down to bedrock in these areas would likely compromise the structural integrity of the adjacent building and is therefore not feasible. Alternative 1 would also require additional soil excavation and dewatering on the northern portion of the site in the area of RIR soil boring SB-19, due to the presence of soil with concentrations of petroleum-related VOCs exceeding the Unrestricted SCOs but below the Restricted Residential SCOs at depths up to 20 feet bgs. For this reason, costs associated with Alternative 1 could potentially be higher than Alternative 2 since soil with analytes above Unrestricted Use SCOs are present below the excavation depth required for development in certain areas of the Site. Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, import of clean soil for backfill, and dewatering. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on the in-situ treatment of remaining impacted soil below the groundwater table and implementation of a Site Management Plan as part of Alternative 2.

The remedial plan would couple the remedial action with the redevelopment of the Site, lowering total costs. The remedial plan will also consider the selection of the most appropriate disposal facilities to reduce transportation and disposal costs during cleanup and redevelopment of the Site.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

This RAWP will be subject to a public review under the NYSDEC BCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by NYSDEC prior to approval of this plan. The Citizen Participation Plan for the project is provided in Appendix D. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

Land use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: 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; 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 Institutional Controls applicable to the site.

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. The proposed future use of the Site includes an 8-story mixed-use building. The building is currently planned to be utilized for commercial storage and mechanical/utility space on the basement level, a supermarket on the first and second floors, and a school on the 3rd through 8th floors. The proposed project would be constructed in conformance with the project Site's overlay zoning district – the Special Inwood

District. Redevelopment Plans are included as Appendix A. Following remediation, the Site will meet Track 2 Restricted Residential Use SCOs, which is protective of public health and the environment for its planned use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns. The proposed use is compliant with the property's zoning and is consistent with recent development patterns.

The areas surrounding the Site is urban and consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses. The development would remediate a vacant contaminated lot and provide a modern building. The proposed development would clean up the property and make it safer, create new employment opportunities, and associated societal benefits to the community, and other economic benefits from land revitalization.

Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities. Following remediation, the Site will meet Restricted Residential SCOs, which is protective of public health and the environmental for its planned use.

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain. Both alternatives are equally protective of natural resources and cultural resources. Improvements in the current environmental condition of the property achieved by both alternatives considered in this plan are consistent with the State and City's goals for cleanup of contaminated land.

<u>Remedial Action standards, criteria and guidance</u>

The following SCGs apply to the work to be completed as outlined in this RAWP:

- 6 NYCRR Part 375-6 Soil Cleanup Objectives

- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1;
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation - December 2002 (or later version if available);
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004;
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan
- NYS Waste Transporter Permits – 6 NYCRR Part 364;
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364;

As required, a Track 1 Unrestricted Use scenario is evaluated for the remedial action. The following is a detailed description of the alternatives analyzed to address impacted media at the Site:

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Unrestricted Use SCOs throughout the Site and confirmation that Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the RI, it is expected that this alternative would be achieved by excavating the entire Site to a depth of approximately 15 feet bgs for the development of the basement of the new building and excavating select areas on the northern portion of the property to 20 feet below grade to remove all petroleum impacted soil. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building's basement level is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Unrestricted Use SCOs.
- Removal of all known USTs and any new USTs that are encountered during soil/fill removal actions in compliance with applicable local, State and Federal laws and regulations;

- No Engineering or Institutional Controls are required for a Track 1 cleanup. As part of development, a sub-slab depressurization system and a vapor barrier would be installed to prevent potential exposures from soil vapor in the future.

Alternative 2:

- Removal of soil/fill exceeding Track 2 Restricted Residential SCOs and confirmation that Track 2 Restricted Residential SCOs have been achieved with post-excavation end point sampling. Based on the results of the RI, it is expected that the Restricted Residential SCOs would be achieved throughout most of the Site by excavating for construction of the new building's basement level to a depth of approximately 15 feet across the entire Site. Due to the proximity of the adjacent building foundation to the west, removal of soil impacts exceeding Track 2 Restricted Residential SCOs the down to bedrock (17-20 feet bgs) in these areas would likely compromise the structural integrity of the adjacent building and is not feasible; therefore, a small amount of soil exceeding the Track 2 Restricted Residential SCOs will likely remain at depths of 17-20 feet bgs in the northwestern portion of the Site. A chemical oxidant (e.g., RegenOx®) will be applied to soil and groundwater in this area by a series of injections in an attempt to remediate these soils to the Track 2 Restricted Residential SCOs.

- Removal of all known USTs and any new USTs that are encountered during soil/fill removal actions in compliance with applicable local, State and Federal laws and regulations;

- Installation of temporary groundwater recovery wells on the northwestern portion of the Site, in the area of elevated groundwater contamination, for the purpose of enhanced fluid recovery (EFR) treatment in order to reduce source groundwater impacts;

- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil/fill;
- Installation of waterproofing/vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Installation of an active Sub Slab Depressurization System (SSDS);

- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use such as single family housing without NYSDEC approval;
- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended. The SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP; and,
- Placement of a deed notice to record the ECs/ICs on the deed to ensure that future owners of the Site continue to comply with the SMP, as required.

3.2 SELECTION OF THE PREFERRED REMEDY

The preferred remedy for the Site is Alternative 2, Restricted Residential Use SCOs. Data generated during the Remedial Investigation support the conclusion that Alternative 1 Unrestricted Use SCOs for soil may be achievable by excavating to bedrock and, in the event that post remedial sampling confirm Alternative 1 cleanup levels have been achieved, that Alternative will be implemented.

The Alternative 2 remedy will remove or treat all soil/fill exceeding Track 2 Restricted Residential Use SCOs throughout the Site, which will be confirmed with post-excavation and post-treatment sampling. Due to the proximity of the adjacent building foundation to the west, removal of soil impacts exceeding Track 2 Restricted Residential SCOs the down to bedrock (17-20 feet bgs) in these areas would likely compromise the structural integrity of the adjacent building and is not feasible; therefore, a small amount of soil exceeding the Track 2 Restricted Residential SCOs will likely remain at depths of 17-20 feet bgs along the northwestern property boundary. A chemical oxidant (e.g., RegenOx®) will be applied to soil and groundwater in this area by a series of injections in order to remediate these soils to the Track 2 Restricted Residential SCOs. A Geotechnical Report completed by Mueser Rutledge Consulting Engineers is included as Appendix L.

Engineering Controls are required for a Track 2 cleanup. A concrete slab covering the entire site and a vapor barrier/waterproofing membrane would be installed as part of standard building development are considered part of the remedy. Additional soil vapor management is required as installation and operation of active SSDS system to address elevated soil vapor.

Use restrictions will be imposed on the Site (including prohibitions on any use higher than Restricted Residential, e.g. the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without NYSDEC approval). The property would receive a deed restriction registered with the county clerk memorializing institutional controls.

3.2.1 Zoning;

The Site is in a residential district (R7A) with a commercial use overlay (C4-4D). According to a Zoning Change diagram date August 8, 2018, the area of the Site is within a “Special Inwood District”. The surrounding parcels are currently used for a combination of commercial and residential purposes.

3.2.2 Applicable comprehensive community master plans or land use plans;

The applicable community master plan(s) for this Site are Inwood Rezoning Proposal (CEQR Number 17DME007M) and the associated Inwood NYC Action Plan. According to the Inwood Rezoning Proposal, the approved plan is to preserve existing affordable housing and protect tenants, support small businesses and entrepreneurs, and provide targeted public realm investments and increased programming and services to enhance overall quality of life for residents. The project area, while irregularly-shaped, is generally bounded by the Harlem River to the east, the Sherman Creek Inlet, Riverside Drive, and Thayer and Dyckman streets to the south, Indian Road, Payson Avenue, Broadway, and Staff Street to the west, and Broadway Bridge to the north.

3.2.3 Surrounding property uses;

The Site is located in a mixed residential and commercial area. The building to the northeast, at 4780-4790 Broadway, is currently vacant but was most recently occupied by the Inwood Branch of the New York Public Library. The area to the southeast of the Site, at 630-650 Academy Street, is developed with athletic fields associated with Harold O. Levy School 52. The building to the southwest, at 4768 Broadway, is occupied by Fine Fare Supermarket. The building to the northwest, beyond Broadway and addressed at 4781 Broadway, is occupied by a New York Presbyterian Hospital outpatient medical center.

The nearest school to the Site is Harold O. Levy School 52, located at 630 Academy Street, New York, NY 10034, approximately 150 feet to the east of the Site. The nearest preschool/daycares are Aura's Bright Children Daycare, located at 13-19 Cumming Street, New York, NY 10034, approximately 400 feet to the northeast of the Site, and a family day care provided by Naura J. Rojas, located at 89 Thayer Street, New York, NY 10040, approximately 550 feet to the southwest of the Site.

The New York Presbyterian Hospital outpatient medical center, located adjacent to the Site beyond Broadway, approximately 30 feet to the northwest, treats sensitive populations with potentially compromised immune systems. Additionally, the Inwood Senior Center, a Senior Citizen Center, is located at 84 Vermilyea Ave, New York, NY 10034, approximately 800 feet to the east of the Site. No other sensitive populations such as medical or senior citizen facilities were identified within the vicinity of the Site.

3.2.4 Citizen participation;

A Citizen Participation Plan will be completed as a part of the RAWP as described in Section 4.1.9 and included as Appendix D.

3.2.5 Environmental justice concerns;

As established in DEC Commissioner Policy 29 on Environmental Justice and Permitting (CP-29), Potential Environmental Justice Areas are U.S. Census block groups of 250 to 500 households each that, in the Census, had populations that met or exceeded at least one of the following statistical thresholds:

- At least 51.1% of the population in an urban area reported themselves to be members of minority groups; or
- At least 33.8% of the population in a rural area reported themselves to be members of minority groups; or
- At least 23.59% of the population in an urban or rural area had household incomes below the federal poverty level.

Based on this information, the Site is considered a Potential Environmental Justice Area.

3.2.6 Land use designations;

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. The proposed future use of the Site includes an 8-story mixed-use building. The building is planned to be utilized for commercial storage and mechanical/utility space on the basement level, a supermarket on the first and second floors, and a school on the 3rd through 8th floors. The proposed project would be constructed in conformance with the project Site's overlay zoning district – the Special Inwood District. Redevelopment Plans are included as Appendix A. Following remediation, the Site will meet Track 2 Restricted Residential Use SCOs, which is protective of public health and the environment for its planned use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns.

The areas surrounding the Site is urban and consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses. The development would remediate a vacant contaminated lot and provide a modern commercial building. The proposed development would clean up the property and make it safer, create new employment opportunities, and associated societal benefits to the community, and other economic benefits from land revitalization.

Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities. Following remediation, the Site will meet Track

2 Restricted Residential SCOs, which is protective of public health and the environmental for its planned use.

The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. Both alternatives are equally protective of natural resources and cultural resources. Improvements in the current environmental condition of the property achieved by both alternatives considered in this plan are consistent with the City's goals for cleanup of contaminated land.

3.2.7 Population growth patterns;

The Site is within Community District 12 of Manhattan. According to information from Community Board #12, this district covers the neighborhoods of Washington Heights and Inwood in Manhattan, from West 155th Street to West 220th Street, with the Harlem River Drive and the Harlem River forming the eastern and northern boundaries and the Hudson River the western boundary. The 2006 American Community Survey and PUMA Report lists the district's official population as 208,867, with 74.3% of Hispanic origin, 14.1% White Non-Hispanic, and 8.6% Black Non-Hispanic. The CB12M District is the second most populated community district in Manhattan. The 2006 ACS Report indicates that CB12M district has 34,871 people between the ages of 5 and 19. This is the largest concentration of children and youth living in a district in Manhattan, according to the report. The 25-54 year age group comprises 47.4% of the district (92,682 people), and the 55 and older age group accounts for 22.6% (27,159 residents). According to information from the New York City Department of City Planning and the US Census Bureau, the Marble Hill-Inwood area saw a decrease of approximately -5% of the population from 2000 to 2010.

3.2.8 Accessibility to existing infrastructure;

The Site has direct accessibility to much of the existing infrastructure of northern Manhattan. The A-line of the New York City Subway runs along Broadway to the north of the Site, with a local subway stop at the corner of Broadway and Dyckman Street. The New York City M100 Bus Line also runs along Broadway with local stops adjacent to the Site. Broadway is a major thoroughfare with access to the Henry Hudson Parkway, George Washington Bridge which provides access to New Jersey, and the Broadway Bridge which provides access to the Marble Hill neighborhood and further to the Bronx.

3.2.9 Proximity to cultural resources;

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species.

3.2.10 Proximity to natural resources;

Natural resources located adjacent to the project Site include the Inwood Hill Park, Isham Park, and Hudson River to the west; the Harlem River to the east; Spuyten Duyvil Creek to the north; and Fort Tryon Park and Sherman Creek to the south.

3.2.11 Off-Site groundwater impacts;

There are no known regional or off-site groundwater impacts that are suspected to have migrated onto the project Site.

3.2.12 Proximity to floodplains;

The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain.

3.2.13 Geography and geology of the Site; and

The Site is located on the southeast side of Broadway, between Dyckman Street and Academy Street, in a commercial and residential area of the Inwood neighborhood of Manhattan, New York. Inwood is physically bounded by the Harlem River to the north and east, the Hudson River to the west, and Fort Tryon Park to the South.

Published geologic information indicates that the site is underlain by bedrock of the Inwood Marble Formation interlayered with Fordham Gneiss Formations. The Inwood Marble Formation consists of dolomitic marble and the Fordham Gneiss Formation consists of gneiss and schist. Typically, where two rock types meet, the rock quality can vary greatly. The Baskerville geologic map of Manhattan, indicates that the top of rock ranges from about Elev. 0 to Elev. +20 at the project site and slopes down to the southeast.

A Geotechnical Report completed by Mueser Rutledge Consulting Engineers is included as Appendix L.

3.2.14 Current Institutional Controls.

There are no institutional controls currently present at the Site.

3.3 SUMMARY OF SELECTED REMEDIAL ACTIONS

The preferred remedial action alternative is Alternative 2, the Track 2 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry. The proposed remedial action will consist of:

1. Preparation of a Citizen Participation Plan and performance of all NYSDEC BCP required activities according to the approved Citizen Participation Plan.
2. Preparation of a Community Air Monitoring Program and adherence to the CAMP for particulates and volatile organic carbon compound monitoring during site work.
3. Excavation of all unsaturated soil/fill exceeding Track 2 Restricted Residential Use SCOs. The majority of the site will be excavated to approximately 15 feet bgs for the development of the basement level of the planned building. A narrow portion of the Site along the southwestern property boundary, bordering the adjacent grocery store

building, will be excavated to a maximum of six (6) feet bgs to ensure that the adjacent building foundation is not undermined. On the northwestern portion of the Site, where petroleum impacted soil is present in unsaturated, vadose zone soil, the western adjacent building will be structurally supported to allow for the excavation and removal of impacted soil to occur. Approximately 8,300 tons of soils will be excavated and removed from this Site. Soil/fill exceeding Track 2 Restricted Residential Use SCOs below the groundwater table, will be treated in-situ.

4. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;

5. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials;

6. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;

7. Removal of all known USTs and any new USTs that are encountered during soil/fill removal actions in compliance with applicable local, State and Federal laws and regulations;

8. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 2 Restricted Residential Use SCOs;

9. Installation of temporary groundwater recovery wells on the northwestern portion of the Site, in the area of elevated groundwater contamination, for the purpose of enhanced fluid recovery (EFR) treatment in order to reduce source groundwater impacts. The temporary groundwater recovery wells will be constructed of 36" diameter corrugated and perforated polyethylene piping, advanced approximately 3-4 feet into the groundwater table to allow for the removal of a significant quantity of petroleum impacted groundwater following adjacent UST and soil excavations;

10. Localized excavations will extend into groundwater table and dewatering will be required. Dewatering will be conducted in compliance with city, state, and federal laws

and regulations. Extracted groundwater will be containerized for off-site licensed or permitted disposal.

11. A chemical oxidant (e.g., RegenOx®) will be applied to saturated soil and groundwater by a series of injections in the area on the northwestern portion of the Site where soil/fill exceeding Track 2 Restricted Residential Use SCOs is present below the groundwater table and excavation is not feasible. Post-treatment soil sampling will be conducted to evaluate the performance of the remedy with respect to attainment of Track 2 Restricted Residential Use SCOs. The in-situ chemical oxidation plan will be approved by NYSDEC prior to implementation.

12. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications outlined in Section 5.4.9 (2) all Federal, State and local rules and regulations for handling and transport of material;

13. Installation of a vapor barrier system and an active sub-slab depressurization system (SSDS). A vapor barrier will be installed beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 46-mil Preprufe 300R below the slab throughout the full building area and a 32-mil Preprufe 160R outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The SSDS will consist of a branched piping network installed within porous granular material consisting of 2-inch stone beneath the basement foundation. Each branch will consist of a network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and up foundation walls and vapor barrier system. The horizontal piping will consist of fabric-wrapped, perforated schedule 40 4-inch PVC pipe connected to a 6-inch steel pipe that penetrates the foundation and vented to the roof. The gas permeable layer will consist of a 12-inch thick layer of 3/4-inch trap rock stone. The pipe will be finished at the roof line with a 6-inch goose neck pipe to prevent rain infiltration. The active SSDS will be hardwired and will include a blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement. The vapor barrier

system in conjunction with the active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the vapor barrier system and active SSDS were designed and properly installed to mitigate potential soil vapor intrusion impacts to the building's indoor air environment.

14. Construction and maintenance of an engineered composite cover consisting of a 6 to 12 inch thick concrete building slab beneath all building areas, to prevent human exposure to residual contaminated soil/fill remaining under the Site;

15. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site;

16. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

17. Performance of post-development indoor air sampling to ensure the effectiveness of the vapor barrier and SSDS in eliminating vapor intrusion into the onsite building. Indoor air sampling results will be submitted to NYSDEC and NYSDOH.

18. Performance of post-remediation groundwater monitoring from five (5) shallow-zone groundwater monitoring wells for a minimum of eight (8) quarters. Samples will be collected in accordance with NYSDEC DER-10 and analyzed for Site-related VOCs via EPA Method 8260. Groundwater well numbers and sampling plan will be approved by NYSDEC prior to implementation. Quarterly monitoring results will be submitted to NYSDEC to assess the effectiveness of the source soil removal and fluid recovery in reducing residual groundwater impacts.

19. 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 rules and regulations.

20. Request for closure of onsite petroleum spill number #1700751 under the authority of NYSDEC pending the results of the investigation and remediation and in accordance with CP-51 soil cleanup objectives;

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.

4.0 REMEDIAL ACTION PROGRAM

4.1 GOVERNING DOCUMENTS

4.1.1 Standards, Criteria and Guidance

The following standards, criteria, and guidance are typically applicable to Remedial Action projects in New York State, and will be consulted and adhered to as applicable:

4.1.1.1 Standards and criteria typically applicable to UST closures:

- 6 NYCRR Part 613 - Petroleum Bulk Storage
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

4.1.1.2 Guidance typically applicable to UST closures:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy (1992) (Sections III and IV have been replaced CP-51)
- CP-51- Soil Cleanup Guidance (2010)
- Spill Response Guidance Manual (1995)

- Permanent Closure of Petroleum Storage Tanks (2003)
- 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 and 2004)
- DAR-1 (formerly Air Guide 1) (1997) - Guidelines for the Control of Toxic Ambient Air Contaminants

4.1.1.3 Standards and criteria typically applicable to Remedial Actions:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 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 Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Part 375 - Environmental Remediation Programs
- 6 NYCRR Part 376 - Land Disposal Restrictions

4.1.1.4 Guidance typically applicable to Remedial Actions:

- CP – 51 – Soil Cleanup Guidance (2010)
- DER-2 - Making Changes To Selected Remedies (Revised April, 2008)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy (1992) (Sections III and IV have been replaced CP-51)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March, 2010)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations

- DAR-1 (formerly Air Guide 1) - Guidelines for the Control of Toxic Ambient Air Contaminants (1997)
- U.S. EPA OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (December 1997)
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)

4.1.2 Site Specific Health & Safety Plan (HASP)

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

The Volunteer, M4778 Broadway LLC, 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 Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

The Health and Safety Plan (HASP) and requirements defined in this Remedial Action Work Plan pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion. A copy of the HASP is included as Appendix E.

The Site Safety Coordinator will be Anthony Cauterucci. A resume will be provided to NYSDEC prior to the start of remedial construction.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.3 Quality Assurance Project Plan (QAPP)

The Quality Assurance Project Plan (QAPP) presents the objectives, functional activities, methods, and QA/QC requirements associated with sample collection and laboratory analysis for characterization activities. The QAPP follows requirements detailed in DER-10, Section 2. A copy of the QAPP is included as Appendix F.

4.1.4 Soil/Materials Management Plan (SMMP)

The SMMP details plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport and disposal during remediation. The SMMP is included in Section 5.4 of this RAWP.

4.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

Erosion and sediment control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff will be in place to adequately protect the excavation work and adjacent areas during the UST removal and soil excavations. Prior to the start of excavation straw bales and/or silt fence will be placed to minimize water flow and soil from entering excavations and to prevent soil from the excavations from migrating off-site and to other areas of the site.

Storm water control measures utilized during the work will be maintained until they are no longer needed. Inspections will be made daily and before and after storm events by the Field Team Leader to ensure that the storm water controls are in place and functioning properly.

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control.

4.1.6 Community Air Monitoring Plan (CAMP)

Monitoring during remedial activities will be performed to protect the health of site workers and the surrounding community. A CAMP has been developed for this project to specify the monitoring procedures, action levels, and contingency measures that are required to protect public health and site workers. A copy of the CAMP is included as Appendix G.

4.1.7 Contractors Site Operations Plan (SOP);

The Remedial Engineer has reviewed all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirms 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.

4.1.8 Citizen Participation Plan

NYSDEC involves the public to improve the process of 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 final decisions are made.

The Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Volunteer.

The following Citizen Participation Activities will be completed before NYSDEC approves the RAWP:

- Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period;
- Public meeting by NYSDEC about proposed RAWP (if requested by affected community or at discretion of NYSDEC project manager);
- Conduct 45-day public comment period

Once the RAWP is approved and before the cleanup action begins, an additional fact sheet will be distributed to the site contact list that describes the upcoming cleanup action.

A certification of mailing will be sent by the Volunteer, M4778 Broadway LLC 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.

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.

The Citizen Participation Plan for this project is attached in Appendix D.

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

Community Board #12 –
Washington Heights/Inwood
530 West 166th Street, 6th Floor
New York, NY 10032
Attn: Ebenezer Smith
Phone: (212) 568-8500
Hours: (call for appointment)

NYSDEC - Region 2
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, NY 11101-5401
Attn: Steven Wu
Phone: (718) 482-6725
Hours: M-F 8-5 (call for appointment)

The New York Public Library -
Washington Heights Branch
1000 Saint Nicholas Avenue,
New York, NY 10032
Attn: Vianela Rivas
Phone: 212-923-6054
Hours: M-Sat 11-5 (call for appointment)

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

The remedial efforts defined in this RAWP will be implemented by HCS and AEI on behalf of M4778 Broadway LLC. The following identifies the responsibilities of various organizations supporting the RAWP:

- The NYSDEC Project Manager (Mr. Steven Wu), in consultation with the NYSDOH, will be responsible for reviewing and approving this work plan, coordinating approval of requested modifications, and providing guidance on regulatory requirements.
- HCS Senior Project Manager (Philip G. Clark, P.E.) will provide technical expertise for review of the project plans, reports, and ongoing field activities.
- AEI Quality Assurance Officer (Jack M. Katz, Ph.D.) will confirm the quality of work associated with the project is in accordance with all project plans.
- AEI Project Manager (Anthony Cauterucci) will be responsible for the day-to-day project management, task leadership, and project engineering support and for the planning and implementation of RA activities. The Project Manager is responsible for ensuring that the requirements of this RAWP are implemented. The project manager will also act as the Site Health and Safety Manager (HSM).
- AEI Field Team Leader (Joseph Maggiulli) will be responsible for sample collection, oversight of subcontractor personnel, and coordination of daily field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan.
- A NYSDOH ELAP certified laboratory (Alpha Analytical Laboratories of Westborough, Massachusetts ELAP ID 11148 and 11627) will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation.
- An independent third-party data validator (Ms. Jeri Rossi) will be contracted to perform data validation and prepare a Data Usability Summary Report (DUSR) in accordance with Section 5.2.5.
- The General Contractor, Joy Construction, along with subcontractors will perform remedial work at the direction of the Field Team Leader in accordance with this work plan.

Resumes of key personnel involved in the Remedial Action are included in Appendix H.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Philip G. Clark, P.E of HCS Civil & Environmental Engineering, LLC. 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 M4778 Broadway LLC Site (NYSDEC BCA Index No. C231131-07-19 Site No. C231131). The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of 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 Remedial Action Work Plan and will certify compliance in the Final Engineering Report.

The Remedial Engineer will provide the certifications listed in Section 10.1 in the Final Engineering Report.

4.2.3 Remedial Action Construction Schedule

A schedule for performance of the remedial work is provided in Section 12 of this RAWP.

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. DEC will be notified by the Volunteer of any variances issued by the Department of

Buildings. NYSDEC reserves the right to deny alternate remedial construction hours. The hours of operation will be conveyed to NYSDEC during the pre-construction meeting.

4.2.5 Site Security

Site access will be controlled by gated entrances to the fenced property.

4.2.6 Traffic Control

The planned route on local roads for trucks leaving the Site is to proceed southwest on Broadway. Remain on Broadway for approximately 1.3 miles and then turn left heading east on West 181st Street. Remain on West 181st Street for approximately 0.3 miles and then turn right on Amsterdam Avenue heading south. Once on Amsterdam Avenue, take an immediate left heading east onto the ramp to George Washington Bridge. Merge onto Interstate 95 Upper Level S/US-1 Upper Level S and continue on Interstate 95.

This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site

4.2.7 Contingency Plan

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to NYSDEC's Project Manager. Petroleum spills will be reported to the NYSDEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to NYSDEC. Chemical analytical testing will be performed for Full List volatiles and semi-volatiles, pesticides/PCBs, and TAL metals, as appropriate.

4.2.8 Worker Training and Monitoring

Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas. Site safety training will be completed by all onsite workers as described in the HASP.

4.2.9 Agency Approvals

The Volunteer has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning for the property as determined by New York City Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work list will be included in the Final Engineering Report. 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.

All planned remedial or construction work in regulated wetlands and adjacent areas will be specifically approved by the NYSDEC Division of Natural Resources to ensure that it meets the requirements for substantive compliance with those regulations prior to the start of construction. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

4.2.10 Pre-Construction Meeting with NYSDEC

NYSDEC will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

4.2.11 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the HASP (Appendix A). That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.12 Remedial Action Costs

An itemized and detailed summary of costs for all remedial activity will be submitted as an Appendix to the Final Engineering Report.

4.3 SITE PREPARATION

4.3.1 Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

4.3.2 Monitoring Well Decommissioning and Replacement

The five (5) existing groundwater monitoring wells onsite will be completely excavated during remediation and development of the Site. New monitoring wells will be installed within the basement level of the planned building in similar locations to the current monitoring well network for use in post-remedial monitoring. The monitoring wells will be installed as a part of the building slab construction to ensure that the vapor barrier beneath the slab is properly sealed around the well casings

The replacement permanent groundwater monitoring wells will be installed to the surface of the bedrock underlying the Site (approximately 20 feet bgs). For each monitoring well, a PVC screen will be set at the base of the well to a depth intersecting the groundwater table, after which the well will extended to basement slab using solid-walled PVC casing. A silica sand pack will be placed a minimum of one foot above the top of the well screen, using media appropriately sized based on Site-specific geologic conditions (tentatively 0.010-slot screen and 20-40 silica sand).

The annular space of the wells will be sealed to ground surface using cement-bentonite grout. The top of the wells installed will be finished with a lockable, water-tight cap and flush-mount steel cover. The newly installed monitoring wells will be developed by purging and/or pumping the water in the well to loosen and remove suspended fines. Measurements of the water volume removed and water quality parameters including temperature, pH, conductivity, and turbidity will be recorded at regular intervals throughout the development process. Development will continue until the NYSDEC standard of 50 Nephelometric Turbidity Unit (NTU) is measured with a nephelometer and water is visibly free of sediment. The top of the PVC casing for each new well will be surveyed by a NY-licensed surveyor and depth to groundwater measurements will be recorded in each well.

Performance of post-remediation groundwater monitoring from the five (5) shallow-zone groundwater monitoring wells will be conducted for a minimum of eight (8) quarters. Samples will be collected in accordance with NYSDEC DER-10 and analyzed for Site-related VOCs via EPA Method 8260.

The proposed monitoring well locations within the basement of the planned development are illustrated on Figure 16.

4.3.3 Erosion and Sedimentation Controls

Erosion and sediment control measures including silt fences and barriers, and hay bale checks will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

4.3.4 Stabilized Construction Entrance(s)

Steps will be taken to ensure that trucks departing the Site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete roads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

4.3.5 Utility Marker and Easements Layout

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

The Volunteer and its 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 Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteer 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 Remedial Action Work Plan is posed by utilities or easements on the Site.

4.3.6 Sheeting and Shoring

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities include excavation is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Volunteer and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the Volunteer and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

4.3.7 Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. The location of proposed equipment and material staging areas, truck inspection station, stockpile areas, and other pertinent remedial management features is shown in Figure 9.

4.3.8 Decontamination Area

Equipment will be decontaminated in an area covered with plastic sheeting near the truck inspection station. Waste material generated during decontamination activities will be containerized, stored, and disposed of in accordance with the procedures detailed in Section 4.3.10. Decontamination of sampling equipment shall be kept to a minimum, and wherever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate personal protective equipment (PPE).

4.3.9 Site Fencing

The Site will be equipped with a fence along the northern boundary of the Site along Broadway. Site access will be controlled by a gated entrance to the fenced property.

4.3.10 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination; and,
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

4.4 REPORTING

All daily and monthly Reports will be included in the Final Engineering Report.

4.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each 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 alphanumeric map for Site activities;

- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions;
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), 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 and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alphanumeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

A Site map that shows a predefined alphanumeric grid for use in identifying locations described in reports submitted to NYSDEC is attached in Figure 10.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the month of the reporting period and will include:

- Activities relative 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 Final Engineering Report.

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

4.4.4 Complaint Management Plan

All complaints from citizens will be promptly reported to NYSDEC and NYSDOH. Complaints will be addressed, and outcomes will also be reported to NYSDEC and NYSDOH in daily reports. Notices to NYSDEC and NYSDOH will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

4.4.5 Deviations from the Remedial Action Work Plan

All changes to the RAWP will be reported to the NYSDEC Project Manager and will be documented in daily reports and reported in the RAR. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from NYSDEC noting the following:

- Reasons for deviating from the approved RAWP;
- Approval process to be followed for changes/editions to the RAWP;
- Effect of the deviations on overall remedy; and
- Determination that the remedial action with the deviation(s) is protective of public health

and the environment.

4.5 IN-SITU CHEMICAL OXIDATION OF SOIL AND GROUNDWATER

The Site-related contaminants of concern at the Site include petroleum hydrocarbons that are well-known to be amenable to chemical oxidation. In-Situ Chemical Oxidation (ISCO) is a technique whereby an oxidant is introduced to the subsurface to chemically oxidize organic contaminants and change them into harmless substances. Unsaturated, impacted, soils exceeding Track 2 Restricted Residential SCOs that represent the primary source of groundwater impacts will be excavated and removed from the Site. Since site-wide remedial excavation into saturated soil is not planned, soil impacts exceeding Track 2 Restricted Residential SCOs down to bedrock (17-20 feet bgs) in saturated soil below the groundwater table in the northwestern portion of the Site will remain in place. The application of a chemical oxidant (e.g., RegenOx®) in this area will greatly improve the soil and groundwater quality. The introduction of this oxidant to the subsurface prior to construction of the building slab is expected to enhance the natural attenuation process of any remaining contaminants.

Therefore, following soil excavation, a chemical oxidant (e.g., RegenOx®) will be applied to soil and groundwater in this area by a series of injections. RegenOx is a two-part ISCO reagent that combines a solid sodium percarbonate based alkaline oxidant (Part A), with a liquid mixture of sodium silicates, silica gel and ferrous sulfate (Part B). RegenOx produces minimal heat and pressure and is non-corrosive making it a relatively safe chemical oxidant that is compatible for use in direct contact with underground infrastructure such as utilities, tanks, piping communication lines, etc. Following the completion of the chemical oxidation reactions, RegenOx creates a significant, short-term oxygen footprint to quickly establish follow-on aerobic biodegradation conditions. The release of dissolved oxygen supports a number of biological oxidation pathways that would be expected to result in the further breakdown of residual petroleum-related VOCs. Application details will be submitted to NYSDEC for approval prior to conducting the application.

In-situ injection points are proposed to be advanced in the northwestern portion of the property in a grid formation with grid spacing at approximately 100 square feet per injection point. Proposed in-situ injection point locations are illustrated on Figure 13.

Following the application of the chemical oxidant to the soil, post-treatment soil sampling will be conducted to evaluate the performance of the remedy with respect to attainment of Track 2 Restricted Residential Use SCOs. Soil borings will be advanced in the locations illustrated on Figure 13 following the application of the chemical oxidant to the soil, and soil samples will be collected and analyzed for VOCs by EPA Method 8260 and SVOCs by EPA Method 8270.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

To facilitate the planned redevelopment and support the final remedy for the Site, the remedial action for the Site will consist of the removal of the following media:

- Removal of known USTs and all appurtenances;
- Excavation of all unsaturated soil/fill exceeding Track 2 Restricted Residential Use SCOs. The majority of the site will be excavated to approximately 15 feet bgs for the development of the basement level of the planned building. A narrow portion of the Site along the southwestern property boundary, bordering the adjacent grocery store building will be excavated to a maximum of six (6) feet bgs to ensure that the adjacent building foundation is not undermined. On the northwestern portion of the Site, where petroleum impacted soil is present in unsaturated, vadose zone soil, the western adjacent building will be structurally supported to allow for the excavation and removal of impacted soil to occur. Approximately 8,300 tons of soils will be excavated and removed from this Site. Soil/fill exceeding Track 2 Restricted Residential Use SCOs below the groundwater table, will be treated in-situ.
- Temporary groundwater recovery wells will be installed on the northwestern portion of the Site, in the area of elevated groundwater contamination, for the purpose of enhanced fluid recovery (EFR) treatment in order to reduce source groundwater impacts. By conducting 4 to 5 EFR treatment events using a vacuum truck, it is estimated that approximately 15,000-20,000 gallons of petroleum contaminated groundwater will be removed from the Site .
- Collection of post-excavation soil and/or groundwater samples in accordance with NYSDEC Guidance documents.

5.1 SOIL CLEANUP OBJECTIVES

Track 2 Restricted Residential SCOs are proposed for this project and SCO's are defined in 6 NYCRR Part 375, Table 6.8(b) Track 2 Restricted Residential Use. Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil Management Plan as described below. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Soil and materials management on-Site and off-Site will be conducted in accordance with the Soil Management Plan as described below.

UST closures will, at a minimum, conform to criteria defined in DER-10.

5.2 REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)

End-point samples will be analyzed for compounds and elements as described below utilizing the following methodology:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs performing end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values.

5.2.1 End-Point Sampling Frequency

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Confirmation samples will be collected from the base of the excavation, at the approximate locations illustrated on Figure 11. To evaluate attainment of Track 2 SCOs, analytes will include those for which SCOs have been developed, including VOCs and SVOCs, according to the analytical methods described above. End point sampling frequency will be conducted per requirements of NYSDEC DER 10 Section 5.4; one sample from the bottom of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area. Based on the anticipated size of the Site excavation (12,000 square feet), at minimum of 14 post-excavation bottom soil samples and 16 post-excavation sidewall samples are required to be collected based on the dimensions of the Site (160' by 75'), for a total of 30 post-excavation samples. Due to the suspected presence of nine (9) USTs on the north side of the property, additional post-excavation soil samples will be collected from beneath the area of the removed USTs, as illustrated on Figure 11. Post-excavation samples will be biased toward areas and depths of highest contamination. In areas where no indication of contamination are identified, post-excavation sidewalls samples will be collected from each sidewall at 6 inches above the base of the excavation. In the area along the southwestern portion of the Site, bordering the adjacent grocery store building, where the excavation will extend to a maximum of six (6) feet bgs, additional excavation sidewall and bottom samples will be collected. Due to the varying excavation bottom depths and presence of USTs to be removed, a total of 24 post-excavation bottom soil samples and 21 post-excavation sidewall samples are planned to be collected, for a total of 45 post-excavation samples. Proposed post-excavation soil samples are illustrated on Figure 11.

5.2.2 Methodology

Post-excavation end-point samples will be analyzed for VOCs by EPA Method 8260 and SVOCs by EPA Method 8270.

5.2.3 Reporting of Results

The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values.

5.2.4 QA/QC

QA/QC procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for documentation and groundwater sampling. Sampling equipment will be disposable/dedicated or decontaminated by wiping clean, washing with Alconox solution, rinsing with deionized water and air drying prior to each use in order to ensure that cross-contamination between sampling locations does not occur. Decontamination procedures will be performed in an area segregated from any sampling areas. Each sample will be collected in pre-cleaned, laboratory supplied glassware, appropriately labeled, stored in a cooler with ice and submitted for analysis under proper chain of custody procedures to Alpha Analytical Laboratories (Alpha) of Westborough, MA, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11148). Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for SVOCs. One blind duplicate sample will be prepared and submitted for analysis every 20 samples.

5.2.5 DUSR

A designee of the AEI Project Manager will complete a data usability evaluation for the data collected during the Remedial Action and a DUSR will be prepared. The DUSR will be prepared in accordance with NYSDEC DER-10, Appendix 2B.

Independent third-party data validation will be performed on 5% of the sample data, or on one sample from each sample delivery group (SDG), whichever is greater. Data validation will be performed by Ms. Jerri Rossi, an independent data validator.

5.2.6 Reporting of End-Point Data in FER

The FER will include a table of end point data with highlights as well as a summary of exceedances of SCOs. A spider map showing all SCO exceedances will also be presented in the FER.

Chemical labs used for all end-point sample results and contingency sampling will be NYSDOH ELAP certified.

End point sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements. Side-wall samples will be collected a minimum of every 30 linear feet. Bottom samples will be collected at a rate of one for every 900 square feet. The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

The locations of planned excavations are depicted on Figure 11. The maximum total quantity of soil/fill expected to be excavated and disposed off-Site is approximately 8,300 tons. The proposed disposal locations for Site-derived impacted materials are listed below. Additional disposal locations established at a later date will be reported promptly to the NYSDEC Project Manager. The estimated quantity of soil to be imported into the Site for backfill is 700 tons of 3/4-inch trap rock stone for the 12-inch thick permeable layer for the SSDS piping beneath the building slab and up the foundation walls. No soil/fill is expected to be reused/relocated on Site.

5.4 SOIL/MATERIALS MANAGEMENT PLAN

5.4.1 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 and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

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

Screening will be performed by qualified environmental professionals. Resumes 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.

5.4.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times and will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points. Water will be available on-site at suitable supply and pressure for use in dust control.

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

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 Remedial Action Work Plan is posed by utilities or easements on the Site.

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

A truck wash will be operated on-Site. 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 off-Site 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 Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of 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 Remedial Action Work Plan.

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

Development-related grading cuts and fills will not 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 on-Site is prohibited.

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

5.4.4 Materials Transport Off-Site

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

The planned route on local roads for trucks leaving the Site is to proceed southwest on Broadway, remain on Broadway for approximately 1.3 miles and then turn left heading east on West 181st Street. Continue/Remain on West 181st Street for approximately 0.3 miles and then turn right on Amsterdam Avenue heading south. Once on Amsterdam Avenue, take an immediate left heading east onto the ramp to George Washington Bridge. Merge onto Interstate 95 Upper Level S/US-1 Upper Level S and continue on Interstate 95. 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 12. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; (f) overall safety in transport; and (g) community input.

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.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting 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 off-Site in an appropriate manner.

5.4.5 Materials Disposal Off-Site

The planned disposal locations are as follows with a breakdown of which type of material will go to each location:

- Soil Safe Metro 12 (Petroleum Impacted Material)
- Soil Safe Logan (Petroleum Impacted Material that Metro 12 cannot accept)
- NJSEA Keegan Landfill (southern portion of the property not impacted by petroleum)
- Hazleton Creek Properties (PA Clean fill material)

Conditional approval letters from these facilities included as Appendix I.

The total quantity of material expected to be disposed off-Site is approximately 8,300 tons. Approximately 4,000 tons of the total amount will likely be considered to be petroleum impacted, non-hazardous material to be disposed of at either Soil Safe Metro 12 or the Safe Soil Logan facilities. The remaining, approximately 4,300 tons of non-petroleum impacted material will be disposed of at either the NJSEA Keegan Landfill or the Hazleton Creek Properties facilities depending on final characterization of the material.

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360.15 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial

Engineer or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. 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 (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360.2.

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360.15 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 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 on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Final Engineering Report 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 off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-Site 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 will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. 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.

5.4.6 Materials Reuse On-Site

There is no plan in the current development to reuse materials that are derived from the on-site demolition or excavation.

5.4.7 Fluids Management

Temporary groundwater recovery wells will be installed on the northwestern portion of the Site, in the area of elevated groundwater contamination, for the purpose of enhanced fluid recovery (EFR) treatment by use of vacuum trucks in order to reduce source groundwater impacts. The temporary groundwater recovery wells will be constructed of 36" diameter corrugated and perforated polyethylene piping, advanced approximately 3-4 feet into the groundwater table to allow for the removal of a significant quantity of petroleum impacted groundwater following adjacent UST and soil excavations.

By conducting 4 to 5 EFR treatment events using a vacuum truck, it is estimated that approximately 15,000-20,000 gallons of petroleum contaminated groundwater will be removed from the Site. Figure 13 illustrates the proposed locations of the temporary groundwater recovery wells.

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

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

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

5.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to 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 Site Management Plan. 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 Site Management Plan. A map showing the survey results will be included in the Final Engineering Report and the Site Management Plan.

5.4.9 Backfill from Off-Site Sources

The estimated quantity of soil to be imported into the Site for backfill is 700 tons of 3/4-inch trap rock stone for the 12-inch thick permeable layer for the SSDS piping. No soil/fill is expected to be reused/relocated on Site. The material will be certified clean fill with accompanying laboratory analytical documentation.

The imported uncontaminated, clean soil cover will be from an approved source/facility and will be evaluated by the PE/QEP to ensure:

1) That a segregated stockpile is properly maintained at the source and will not be comingled with any other material prior to importing and grading the clean soil material at the Site;

2) That the material does not include any solid waste, including construction and demolition material, as it's prohibited;

3) That screening for evidence of contamination by visual, olfactory and PID soil screening practices prior to testing at the source as well as upon importing to the Site for grading is completed; and

4) That a maximum five-part composite sample will be collected from the segregated stockpile at the source at a minimum frequency of one sample per 250 cubic yards and analyzed for the following Full List parameters:

- VOCs by EPA Method 8260C
- SVOCs by EPA Method 8270D
- Pesticides by EPA Method 8081B
- PCBs by EPA Method 8082A
- TAL Metals by EPA Method 6010C

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.

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

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

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. These NYSDEC approved backfill or cover soil quality objectives are the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted Residential Use as set forth in Table 375-6.8(b) of 6 NYCRR Part 375. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved

Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet ‘general fill’ requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this Remedial Action Work Plan 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 J.

5.4.10 Stormwater Pollution Prevention

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

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

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

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

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

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

5.4.11 Contingency Plan

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

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

5.4.12 Community Air Monitoring Plan

Monitoring during remedial activities will be performed to protect the health of site workers and the surrounding community. A CAMP has been developed for this project to specify the monitoring procedures, action levels, and contingency measures that are required to protect public health and site workers. A copy of the CAMP is included as Appendix G.

CAMP data summary tables will be provided to the NYSDEC and NYSDOH on a weekly basis, at a minimum, and the Departments will be notified immediately (within 24 hours) of any exceedances and corrective measures taken. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

5.4.13 Odor, Dust and Nuisance Control Plan

The Final Engineering Report 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."

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include (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; [add other elements as appropriate]. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors 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 Volunteer, Remedial Engineer, who is responsible for certifying the Final Engineering Report.

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

5.4.13.2 Dust Control Plan

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

- Water will be available on-site at suitable supply and pressure for use in dust control.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water spraying.

5.4.13.3 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.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil, groundwater, and soil vapor will exist beneath the Site after the remedy is complete, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a Site-specific Site Management Plan (SMP) that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have two (2) primary EC systems. These are: (1) a composite cover system consisting concrete building foundation slabs and walls, (2) a vapor barrier system in conjunction with an active sub-slab depressurization system.

The FER will report residual contamination on the Site in tabular and map form.

7.0 ENGINEERING CONTROLS: COMPOSITE COVER SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the Site. This composite cover system will be comprised of the concrete building slab that covers the entire footprint of the Site. This composite cover system is comprised of a 6 to 12 inch thick concrete building slab beneath the entire proposed building, and 12-inch thick concrete foundation walls.

The proposed development plans included in Appendix A includes details for the composite cover type used on this Site. The cover system will extend across the entire footprint of the Site and will serve as a permanent engineering control for the Site.

A diagram showing the design detail for the cover type is shown in Figure 14.

A Soil Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete.

Maintenance of this composite cover system will be described in the Site Management Plan in the FER.

8.0 ENGINEERING CONTROLS: TREATMENT SYSTEMS

8.1 Vapor Barrier System

A vapor barrier will be installed as part of the waterproofing system for the proposed new construction. The barrier will consist of Grace Preprufe 160R along the foundation walls and Grace Preprufe 300R below the lowest level horizontal slab and elevator pits. This waterproofing will also serve as a vapor barrier that would mitigate potential vapors from off-site properties. The barrier will be installed in accordance with the manufacturer's specifications, including those for sealing penetrations through the foundations. Proof of installation of the barrier will be included in the Professional Engineer (P.E.) certified RAR.

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the FER.

A diagram showing the general design detail for the vapor barrier is shown in Figure 15.

8.2 Active Sub-Slab Depressurization System

An active sub-slab depressurization system will be installed beneath the footprint of the new building slab to address residual soil vapors (Figure 16). The SSDS will consist of a branched piping network installed within porous granular material consisting of 3/4"-inch stone beneath the basement foundation (Bluestone or approved equivalent). Each branch will consist of a network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The SSDS network will provide the correct coverage in accordance with

USEPA sub-slab depressurization design specifications, where practicable. The horizontal piping will consist of fabric-wrapped, perforated schedule 40 4-inch PVC pipe connected to a 6-inch steel pipe that penetrates the foundation and vented to the roof. The gas permeable layer will consist of a 12-inch thick layer of 3/4-inch trap rock stone. The pipe will be finished at the roof line with a 6-inch goose neck pipe to prevent rain infiltration. The exhaust will be placed at a minimum distance of 15 ft from all air intakes. The active SSDS will be hardwired and will include a blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement.

The SSDS is a permanent engineering control that will be inspected and certified by the designated Professional Engineer following construction and performance testing. Performance test results and as-built documentation (including photo-documentation) will be included in the RAR. Maintenance of this SSDS will be described in the Site Management Plan in the RAR. Operation and maintenance activities will initially be conducted by the QEP periodically during the first year after installation. Thereafter, building management staff trained by the QEP will continue operation and maintenance activities for the SSDS.

A diagram showing the general design detail for the SSDS piping is shown in Figure 17.

9. CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS

9.1 Composite Cover System

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

9.2 Vapor Barrier System

The vapor barrier system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

9.3 Sub-slab Depressurization System (SSDS)

The active SSD system will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSD system may be submitted by the property owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

9.4 Groundwater Monitoring

Groundwater monitoring activities to assess the performance of the remedy, or natural attenuation following the removal of contaminant sources, will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities will be outlined in the Monitoring Plan of the SMP. It is anticipated that, following remediation, a minimum of eight quarterly monitoring events will be performed.

10.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (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 residual contamination in perpetuity: an Environmental Easement and a Site Management Plan.

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the FER. A Site-specific Environmental Easement will be recorded with New York County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The Site Management Plan (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.

10.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the New York County Office of the City Register. The Environmental Easement will be submitted as part of the Final Engineering Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the New York County Office of the City Register before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to Restricted-Residential use(s) only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls 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 Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of concrete building foundation slabs must be inspected, certified and maintained as required in the SMP;
- A vapor barrier system and soil vapor mitigation system consisting of a sub-slab depressurization system under all building structures must be inspected, certified, operated and maintained as required by the SMP;

- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, indoor air, and other environmental or public health monitoring must be performed as defined in the SMP;
- 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;
- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and soil vapor probes, must be protected and/or replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls 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;
- 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 residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;
- The Controlled Property may be used for restricted residential use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;

- The Controlled Property may not be used for a higher level of use, such as unrestricted residential use without an amendment or extinguishment of this Environmental Easement;
- 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 statement must be certified by an expert that the NYSDEC finds acceptable.

10.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) for the Remedial Action. The Site Management Plan 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 Site Management Plan 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 includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (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.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

The Site Management Plan in the Final Engineering Report will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site-wide performance of the remedy. Appropriately placed groundwater monitor wells will also be installed immediately down-gradient of all VOC remediation areas for the purpose of evaluation of the effectiveness of the remedy that is implemented.

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

11.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the 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 Final Engineering Report will include as-built drawings for all constructed elements, calculation and manufacturer documentation for treatment systems, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. 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.

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 Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the Final Engineering Report review.

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

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

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 Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action 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 Final Engineering Report 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.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

11.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer Philip G. Clark, P.E of HCS Civil & Environmental Engineering, LLC, who is a Professional Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Philip G. Clark, P.E , am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the M4778 Broadway LLC Site (NYSDEC BCA Index No. C231131-07-19 Site No. C231131).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for the M4778 Broadway LLC Site and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all 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. A Site Management Plan has been submitted by the Volunteer for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

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.

It is a violation of Article 130 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 130, New York State Education Law.

12.0 SCHEDULE

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to NYSDEC. Currently, a ten (10) month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Work Plan Submission	Duration (weeks)
NYSDEC Review, Public Comment, and Approval of RAWP	0	12
Mobilization	12	2
Remedial Action	14	16
Demobilization	30	2
Submit Final Engineering Report	32	8

FIGURES

LEGEND

N

Source: USGS

AEI Consultants

20 Gibson Place, Suite 310, Freehold, NJ

SITE LOCATION MAP

4778 BROADWAY MANHATTAN, NEW YORK 10034

FIGURE 1
Project No. 384736

Legend

Approximate Property Boundary

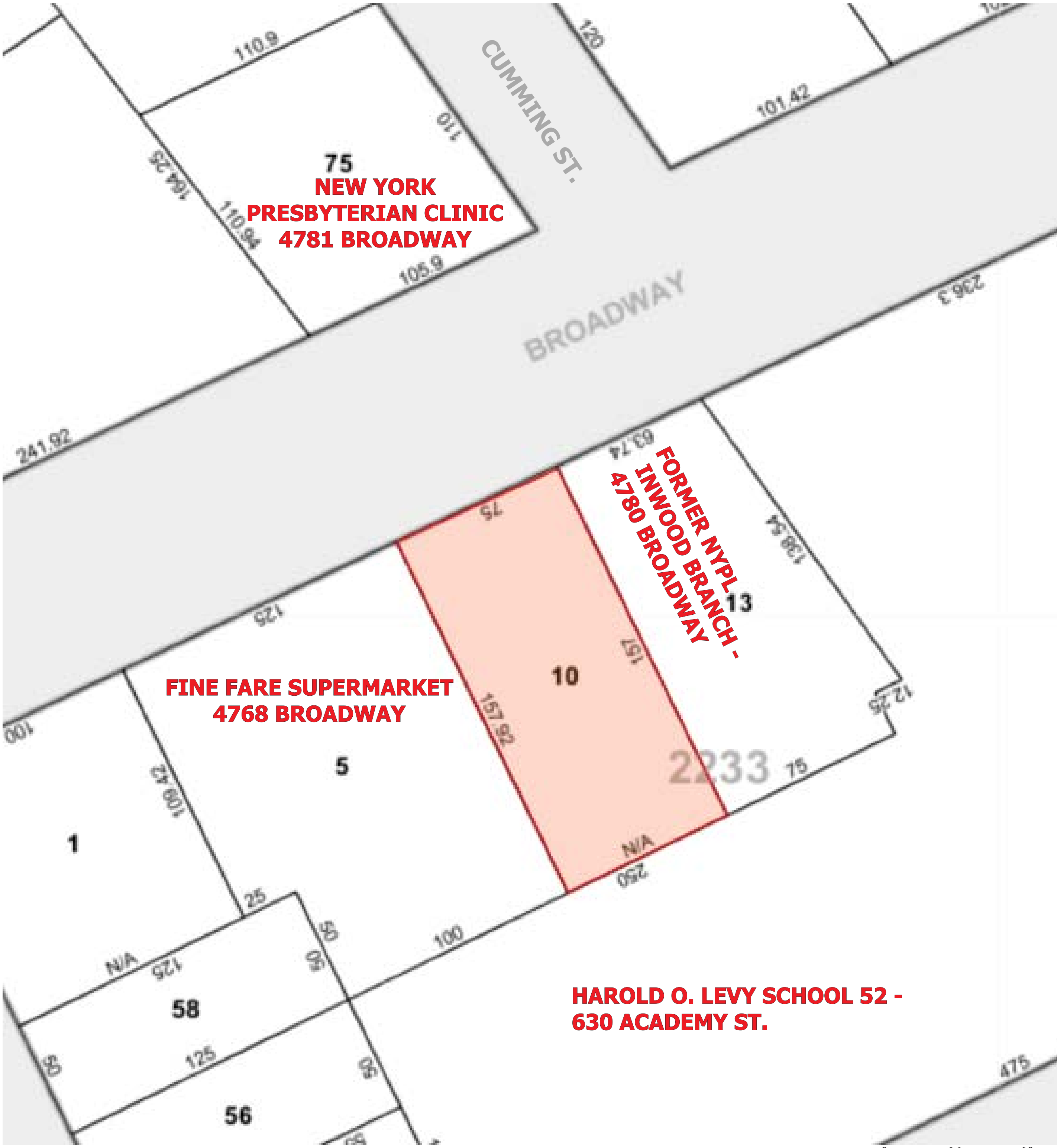
N

Figure 2: SITE MAP

4778 Broadway, Manhattan, New York 10034

Project Number: 384736

AEI Consultants



Legend

Site Location

0 30 60

SCALE: 1" = 60'

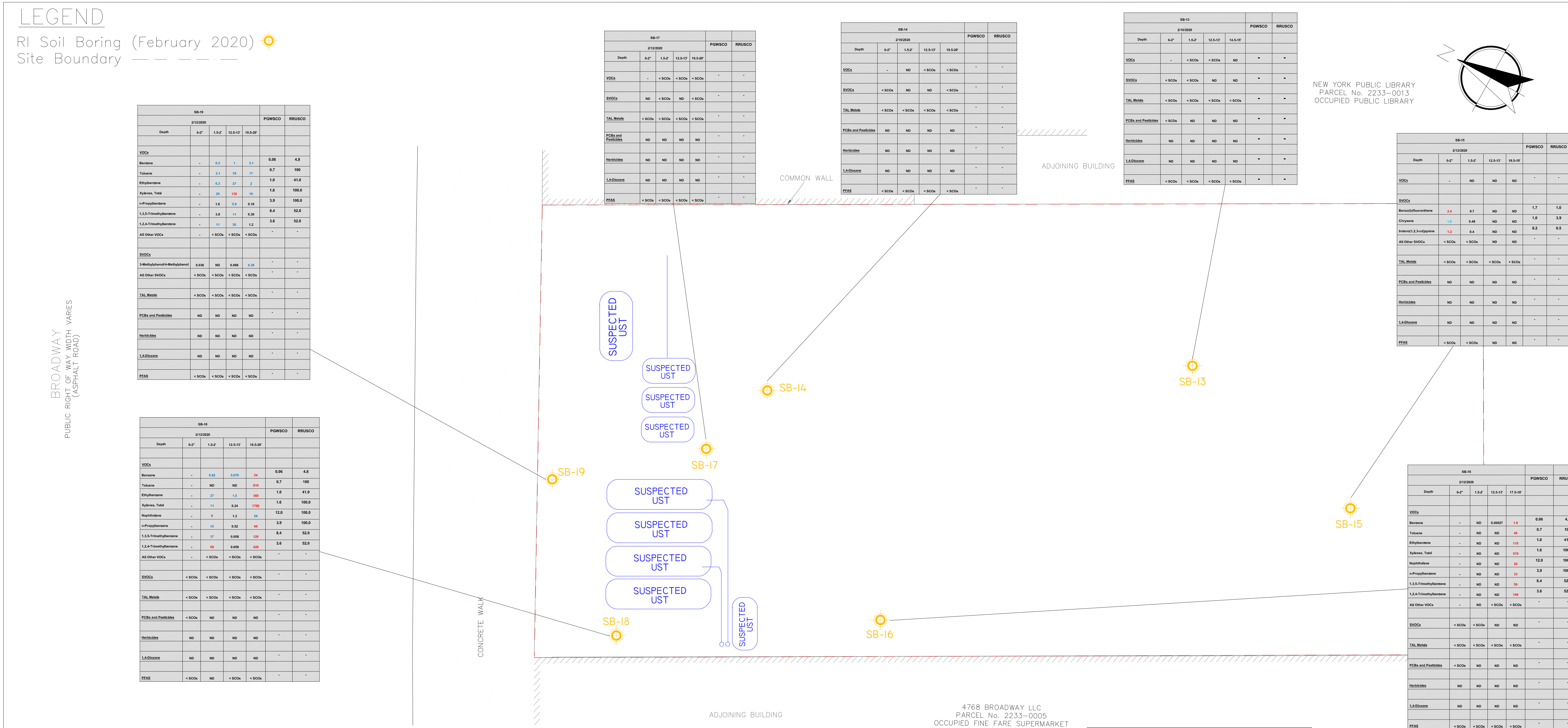
N

Figure 3: Surrounding Land Usage Map

4778 Broadway, Manhattan, New York 10034

Project Number: 384736

AEI Consultants



SB-19					PGWSCO	RRUSCO
2/12/2020						
Depth	0-2"	1.5-2'	12.5-13'	19.5-20'		
VOCs						
Benzene	-	0.3	1	3.1	0.06	4.8
Toluene	-	2.1	19	17	0.7	100
Ethylbenzene	-	6.3	27	2	1.0	41.0
Xylenes, Total	-	29	130	10	1.6	100.0
n-Propylbenzene	-	1.6	5.8	0.18	3.9	100.0
1,3,5-Trimethylbenzene	-	3.8	11	0.36	8.4	52.0
1,2,4-Trimethylbenzene	-	11	36	1.2	3.6	52.0
All Other VOCs	-	< SCOs	< SCOs	< SCOs	-	-
SVOCs						
3-Methylphenol/4-Methylphenol	0.036	ND	0.066	0.38	-	-
All Other SVOCs	< SCOs	< SCOs	< SCOs	< SCOs	-	-
TAL Metals	< SCOs	< SCOs	< SCOs	< SCOs	-	-
PCBs and Pesticides	ND	ND	ND	ND	-	-
Herbicides	ND	ND	ND	ND	-	-
1,4-Dioxane	ND	ND	ND	ND	-	-
PFAS	< SCOs	< SCOs	< SCOs	< SCOs	-	-

SB-18					PGWSCO	RRUSCO
2/12/2020						
Depth	0-2"	1.5-2'	12.5-13'	19.5-20'		
VOCs						
Benzene	-	0.82	0.076	54	0.06	4.8
Toluene	-	ND	ND	810	0.7	100
Ethylbenzene	-	27	1.5	360	1.0	41.0
Xylenes, Total	-	71	0.24	1700	1.6	100.0
Naphthalene	-	7	1.3	56	12.0	100.0
n-Propylbenzene	-	15	0.52	66	3.9	100.0
1,3,5-Trimethylbenzene	-	37	0.058	120	8.4	52.0
1,2,4-Trimethylbenzene	-	98	0.058	420	3.6	52.0
All Other VOCs	-	< SCOs	< SCOs	< SCOs	-	-
SVOCs	< SCOs	< SCOs	< SCOs	< SCOs	-	-
TAL Metals	< SCOs	< SCOs	< SCOs	< SCOs	-	-
PCBs and Pesticides	< SCOs	ND	ND	ND	-	-
Herbicides	ND	ND	ND	ND	-	-
1,4-Dioxane	ND	ND	ND	ND	-	-
PFAS	< SCOs	ND	< SCOs	< SCOs	-	-

SB-17					PGWSCO	RRUSCO
2/12/2020						
Depth	0-2"	1.5-2'	12.5-13'	19.5-20'		
VOCs	-	< SCOs	< SCOs	< SCOs	-	-
SVOCs	ND	< SCOs	ND	< SCOs	-	-
TAL Metals	< SCOs	< SCOs	< SCOs	< SCOs	-	-
PCBs and Pesticides	ND	ND	ND	ND	-	-
Herbicides	ND	ND	ND	ND	-	-
1,4-Dioxane	ND	ND	ND	ND	-	-
PFAS	< SCOs	< SCOs	< SCOs	< SCOs	-	-

SB-14					PGWSCO	RRUSCO
2/10/2020						
Depth	0-2"	1.5-2'	12.5-13'	19.5-20'		
VOCs	-	ND	< SCOs	< SCOs	-	-
SVOCs	< SCOs	ND	ND	< SCOs	-	-
TAL Metals	< SCOs	< SCOs	< SCOs	< SCOs	-	-
PCBs and Pesticides	ND	ND	ND	ND	-	-
Herbicides	ND	ND	ND	ND	-	-
1,4-Dioxane	ND	ND	ND	ND	-	-
PFAS	< SCOs	< SCOs	< SCOs	< SCOs	-	-

SB-13					PGWSCO	RRUSCO
2/10/2020						
Depth	0-2"	1.5-2'	12.5-13'	14.5-15'		
VOCs	-	< SCOs	< SCOs	ND	-	-
SVOCs	< SCOs	< SCOs	ND	ND	-	-
TAL Metals	< SCOs	< SCOs	< SCOs	< SCOs	-	-
PCBs and Pesticides	< SCOs	ND	ND	ND	-	-
Herbicides	ND	ND	ND	ND	-	-
1,4-Dioxane	ND	ND	ND	ND	-	-
PFAS	< SCOs	< SCOs	< SCOs	< SCOs	-	-

SB-15					PGWSCO	RRUSCO
2/12/2020						
Depth	0-2"	1.5-2'	12.5-13'	18.5-19'		
VOCs	-	ND	ND	ND	-	-
SVOCs						
Benzo(b)fluoranthene	2.4	0.7	ND	ND	1.7	1.0
Chrysene	1.5	0.48	ND	ND	1.0	3.9
Indeno(1,2,3-cd)pyrene	1.2	0.4	ND	ND	8.2	0.5
All Other SVOCs	< SCOs	< SCOs	ND	ND	-	-
TAL Metals	< SCOs	< SCOs	< SCOs	< SCOs	-	-
PCBs and Pesticides	ND	ND	ND	ND	-	-
Herbicides	ND	ND	ND	ND	-	-
1,4-Dioxane	ND	ND	ND	ND	-	-
PFAS	< SCOs	< SCOs	ND	ND	-	-

SB-16					PGWSCO	RRUSCO
2/12/2020						
Depth	0-2"	1.5-2'	12.5-13'	17.5-18'		
VOCs						
Benzene	-	ND	0.00027	1.9	0.06	4.8
Toluene	-	ND	ND	46	0.7	100
Ethylbenzene	-	ND	ND	110	1.0	41.0
Xylenes, Total	-	ND	ND	570	1.6	100.0
Naphthalene	-	ND	ND	20	12.0	100.0
n-Propylbenzene	-	ND	ND	33	3.9	100.0
1,3,5-Trimethylbenzene	-	ND	ND	59	8.4	52.0
1,2,4-Trimethylbenzene	-	ND	ND	190	3.6	52.0
All Other VOCs	-	ND	< SCOs	< SCOs	-	-
SVOCs	< SCOs	< SCOs	ND	ND	-	-
TAL Metals	< SCOs	< SCOs	< SCOs	< SCOs	-	-
PCBs and Pesticides	< SCOs	ND	ND	ND	-	-
Herbicides	ND	ND	ND	ND	-	-
1,4-Dioxane	ND	ND	ND	ND	-	-
PFAS	< SCOs	< SCOs	< SCOs	< SCOs	-	-

Sample Name	
Date	
Depth	Sample Depth (feet below ground surface)
Analyte	Concentrations in milligrams per kilogram (mg/kg)
	< SCO = Analyte is less than Soil Cleanup Objectives
	ND = Analyte is Non-Detect
	- = Analysis Not Conducted
	Concentrations In BLUE exceed NYSDEC Protection of Groundwater Soil Cleanup Objective (PGWSCO)
	Concentrations in RED exceed NYSDEC Restricted-Residential Soil Cleanup Objective (RRUSCO)

GRAPHIC SCALE

0 16 32

(1 INCH = 16 FEET)

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WASHINGTON, MA 01223

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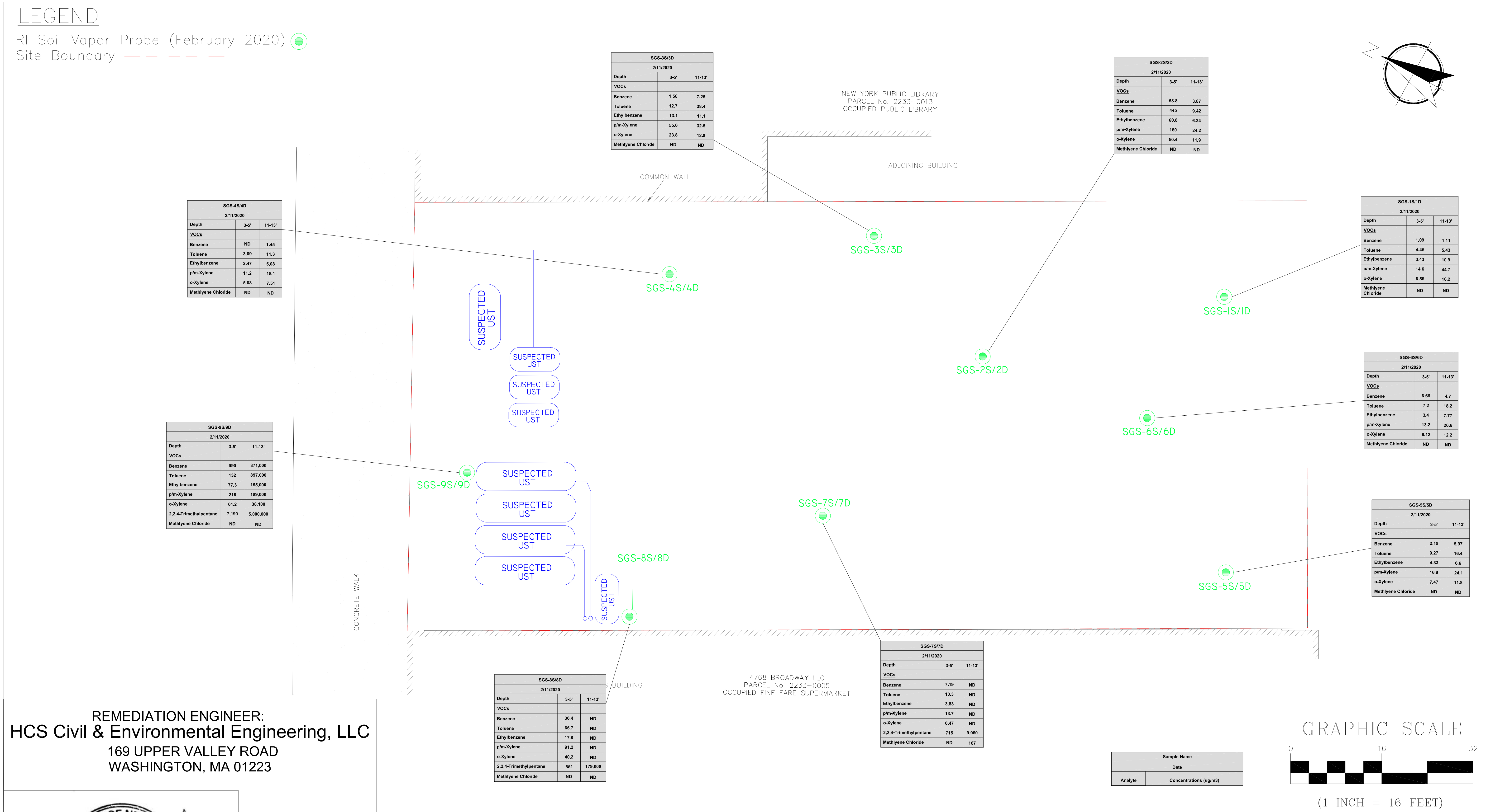
SOIL SAMPLE RESULTS MAP – NYSDEC SCO EXCEEDANCES

4778 Broadway, New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE 4



SGS-3S/3D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	1.56	7.25
Toluene	12.7	38.4
Ethylbenzene	13.1	11.1
p/m-Xylene	55.6	32.5
o-Xylene	23.8	12.9
Methlyene Chloride	ND	ND

SGS-2S/2D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	58.8	3.87
Toluene	445	9.42
Ethylbenzene	60.8	6.34
p/m-Xylene	160	24.2
o-Xylene	50.4	11.9
Methlyene Chloride	ND	ND

SGS-4S/4D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	ND	1.45
Toluene	3.09	11.3
Ethylbenzene	2.47	5.08
p/m-Xylene	11.2	18.1
o-Xylene	5.08	7.51
Methlyene Chloride	ND	ND

SGS-1S/1D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	1.09	1.11
Toluene	4.45	5.43
Ethylbenzene	3.43	10.9
p/m-Xylene	14.6	44.7
o-Xylene	6.56	16.2
Methlyene Chloride	ND	ND

SGS-6S/6D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	6.68	4.7
Toluene	7.2	18.2
Ethylbenzene	3.4	7.77
p/m-Xylene	13.2	26.6
o-Xylene	6.12	12.2
Methlyene Chloride	ND	ND

SGS-9S/9D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	990	371,000
Toluene	132	897,000
Ethylbenzene	77.3	155,000
p/m-Xylene	216	199,000
o-Xylene	61.2	38,100
2,2,4-Trimethylpentane	7,190	5,000,000
Methlyene Chloride	ND	ND

SGS-5S/5D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	2.19	5.97
Toluene	9.27	16.4
Ethylbenzene	4.33	6.6
p/m-Xylene	16.9	24.1
o-Xylene	7.47	11.8
Methlyene Chloride	ND	ND

SGS-7S/7D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	7.19	ND
Toluene	10.3	ND
Ethylbenzene	3.83	ND
p/m-Xylene	13.7	ND
o-Xylene	6.47	ND
2,2,4-Trimethylpentane	715	9,060
Methlyene Chloride	ND	167

SGS-8S/8D		
2/11/2020		
Depth	3-5'	11-13'
VOCs		
Benzene	36.4	ND
Toluene	66.7	ND
Ethylbenzene	17.8	ND
p/m-Xylene	91.2	ND
o-Xylene	40.2	ND
2,2,4-Trimethylpentane	551	179,000
Methlyene Chloride	ND	ND

Sample Name	
Date	
Analyte	Concentrations (ug/m3)

REMEDIATION ENGINEER:
HCS Civil & Environmental Engineering, LLC
169 UPPER VALLEY ROAD
WASHINGTON, MA 01223

STATE OF NEW YORK
PHILIP GERALD CLARK
LICENSED PROFESSIONAL ENGINEER
088422

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SOIL VAPOR SAMPLE RESULTS MAP

4778 Broadway, New York, New York 10034

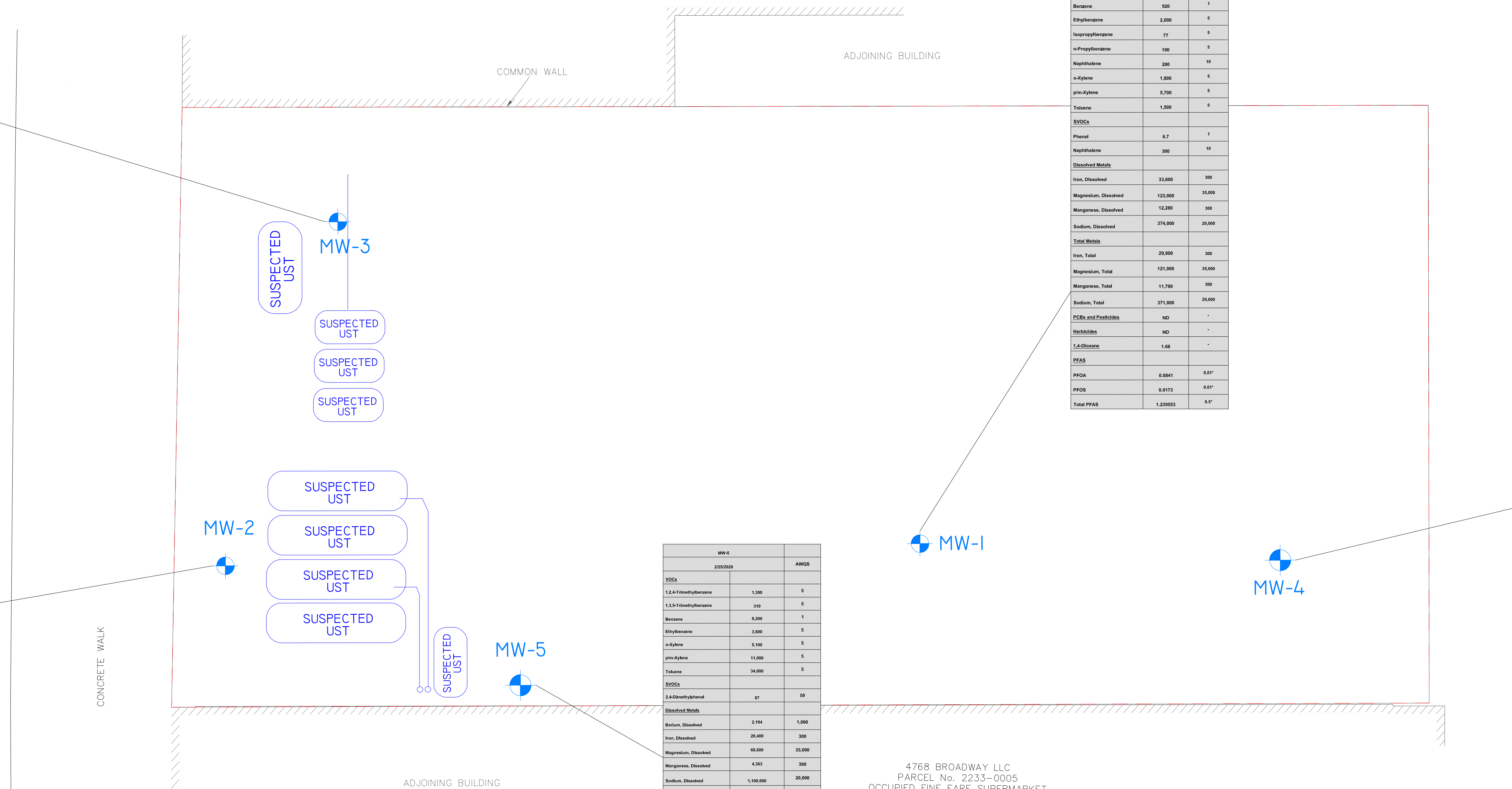
AEI Project #384736
BCP #C231131

FIGURE 5

LEGEND

RI Monitoring Well Groundwater Sample (February 2020)

Site Boundary



MW-3		
2/25/2020		AWQS
VOCs		
1,2,4,5-Tetramethylbenzene	40	5
1,2,4-Trimethylbenzene	140	5
1,3,5-Trimethylbenzene	23	5
Benzene	120	1
Ethylbenzene	410	5
Isopropylbenzene	32	5
n-Propylbenzene	71	5
Naphthalene	13	10
o-Xylene	160	5
p/m-Xylene	500	5
sec-Butylbenzene	6.5	5
Toluene	490	5
SVOCs	<AWQS	-
Dissolved Metals		
Arsenic, Dissolved	28	25
Iron, Dissolved	687	300
Manganese, Dissolved	324	300
Sodium, Dissolved	441,000	20,000
Total Metals		
Iron, Total	1,800	300
Manganese, Total	314	300
Sodium, Total	473,000	20,000
PCBs and Pesticides	ND	-
Herbicides	ND	-
1,4-Dioxane	ND	-
PFAS		
PFOA	0.172	0.01*
PFOS	1.37	0.01*
Total PFAS	4.47611	0.5*

MW-2		
2/25/2020		AWQS
VOCs		
1,2,4-Trimethylbenzene	1,800	5
1,3,5-Trimethylbenzene	450	5
Benzene	8,000	1
Ethylbenzene	5,300	5
Naphthalene	360	10
o-Xylene	6,600	5
p/m-Xylene	16,000	5
Toluene	39,000	5
SVOCs		
2,4-Dimethylphenol	72	50
Phenol	6.7	1
Naphthalene	380	10
Dissolved Metals		
Iron, Dissolved	1,680	300
Manganese, Dissolved	727	300
Sodium, Dissolved	566,000	20,000
Total Metals		
Iron, Total	4,450	300
Manganese, Total	879	300
Sodium, Total	642,000	20,000
PCBs and Pesticides	ND	-
Herbicides	ND	-
1,4-Dioxane	ND	-
PFAS		
PFOA	0.105	0.01*
PFOS	0.745	0.01*
Total PFAS	4.27755	0.5*

MW-1		
2/25/2020		AWQS
VOCs		
1,2,4,5-Tetramethylbenzene	64	5
1,2,4-Trimethylbenzene	1,400	5
1,3,5-Trimethylbenzene	380	5
Benzene	920	1
Ethylbenzene	2,000	5
Isopropylbenzene	77	5
n-Propylbenzene	190	5
Naphthalene	280	10
o-Xylene	1,800	5
p/m-Xylene	5,700	5
Toluene	1,500	5
SVOCs		
Phenol	6.7	1
Naphthalene	300	10
Dissolved Metals		
Iron, Dissolved	33,600	300
Magnesium, Dissolved	123,000	35,000
Manganese, Dissolved	12,280	300
Sodium, Dissolved	374,000	20,000
Total Metals		
Iron, Total	29,900	300
Magnesium, Total	121,000	35,000
Manganese, Total	11,790	300
Sodium, Total	371,000	20,000
PCBs and Pesticides	ND	-
Herbicides	ND	-
1,4-Dioxane	1.68	-
PFAS		
PFOA	0.0841	0.01*
PFOS	0.0173	0.01*
Total PFAS	1.239553	0.5*

MW-5		
2/25/2020		AWQS
VOCs		
1,2,4-Trimethylbenzene	1,300	5
1,3,5-Trimethylbenzene	310	5
Benzene	8,200	1
Ethylbenzene	3,600	5
o-Xylene	5,100	5
p/m-Xylene	11,000	5
Toluene	34,000	5
SVOCs		
2,4-Dimethylphenol	87	50
Dissolved Metals		
Barium, Dissolved	2,194	1,000
Iron, Dissolved	20,400	300
Magnesium, Dissolved	68,600	35,000
Manganese, Dissolved	4,363	300
Sodium, Dissolved	1,100,000	20,000
Total Metals		
Barium, Total	2251	1,000
Iron, Total	22,700	300
Magnesium, Total	72,700	35,000
Manganese, Total	3,925	300
Sodium, Total	1,130,000	20,000
PCBs and Pesticides	ND	-
Herbicides	ND	-
1,4-Dioxane	ND	-
PFAS		
PFOA	0.2	0.01*
PFOS	1.53	0.01*
Total PFAS	6.199794	0.5*

MW-4		
2/25/2020		AWQS
VOCs	ND	-
SVOCs	<AWQS	-
Dissolved Metals		
Magnesium, Dissolved	41,000	35,000
Sodium, Dissolved	95,300	20,000
Total Metals		
Iron, Total	4,530	300
Magnesium, Total	45,800	35,000
Sodium, Total	95,400	20,000
Thallium, Total	0.74	0.5
PCBs and Pesticides	ND	-
Herbicides	ND	-
1,4-Dioxane	ND	-
PFAS		
PFOA	0.0676	0.01*
PFOS	0.0452	0.01*
Total PFAS	<AWQS	0.5*

Sample Name	
Date	
Analyte	Concentration (ug/L) All Concentrations Exceed NYSDEC AWQS or Screening Level
	* Guidelines for Sampling and Analysis of PFAS

GRAPHIC SCALE

0 16 32

(1 INCH = 16 FEET)

REMEDIATION ENGINEER:

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GROUNDWATER SAMPLE RESULTS MAP– AWQS & PFAS SCREENING LEVEL EXCEEDANCES

4778 Broadway, New York, New York 10034

AEI Project #384736

BCP #C231131

FIGURE 6

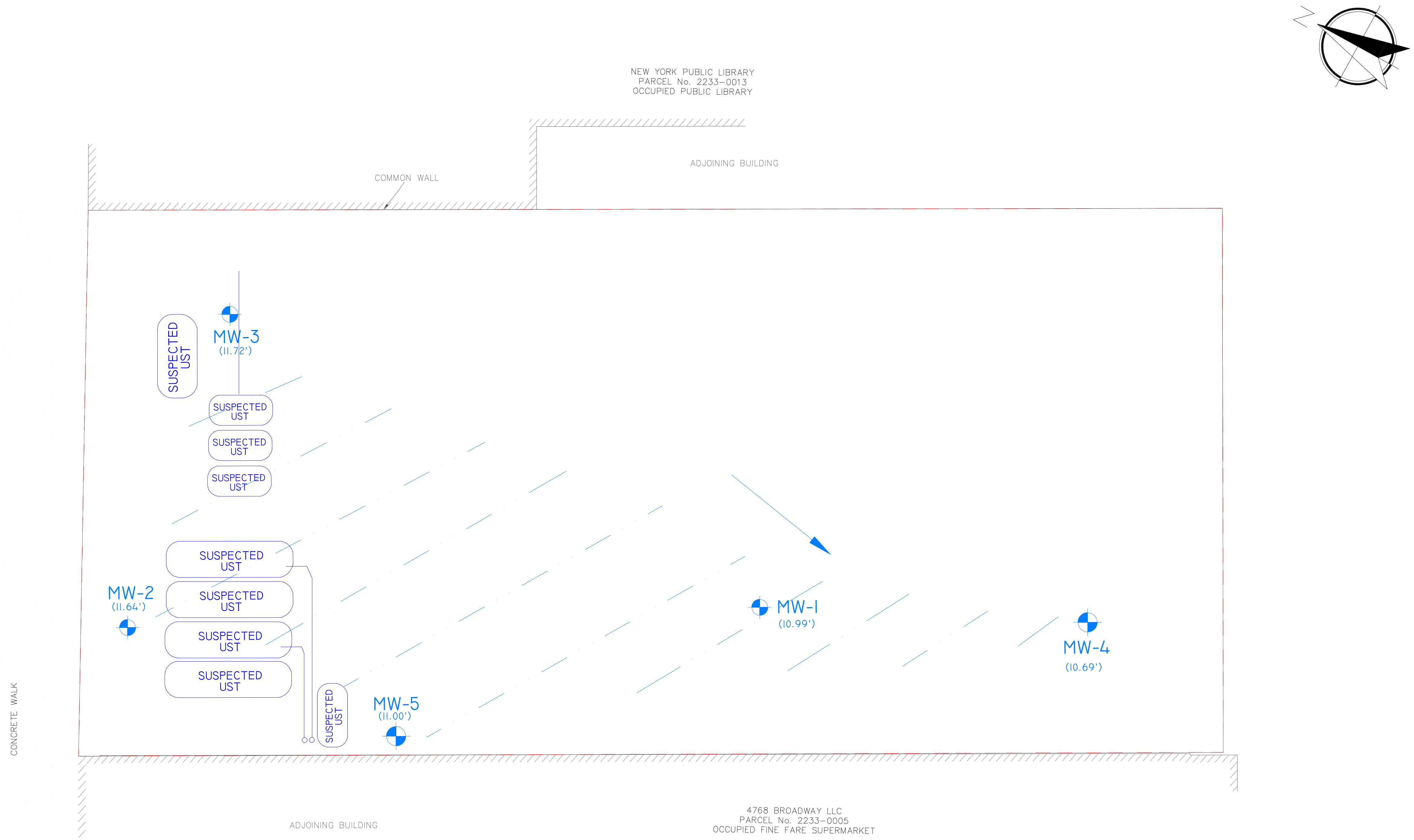
LEGEND

MONITORING WELL

GROUNDWATER ELEVATION CONTOUR

(50.82) GROUNDWATER ELEVATION (feet above mean sea level)

INFERRED DIRECTION OF GROUNDWATER FLOW



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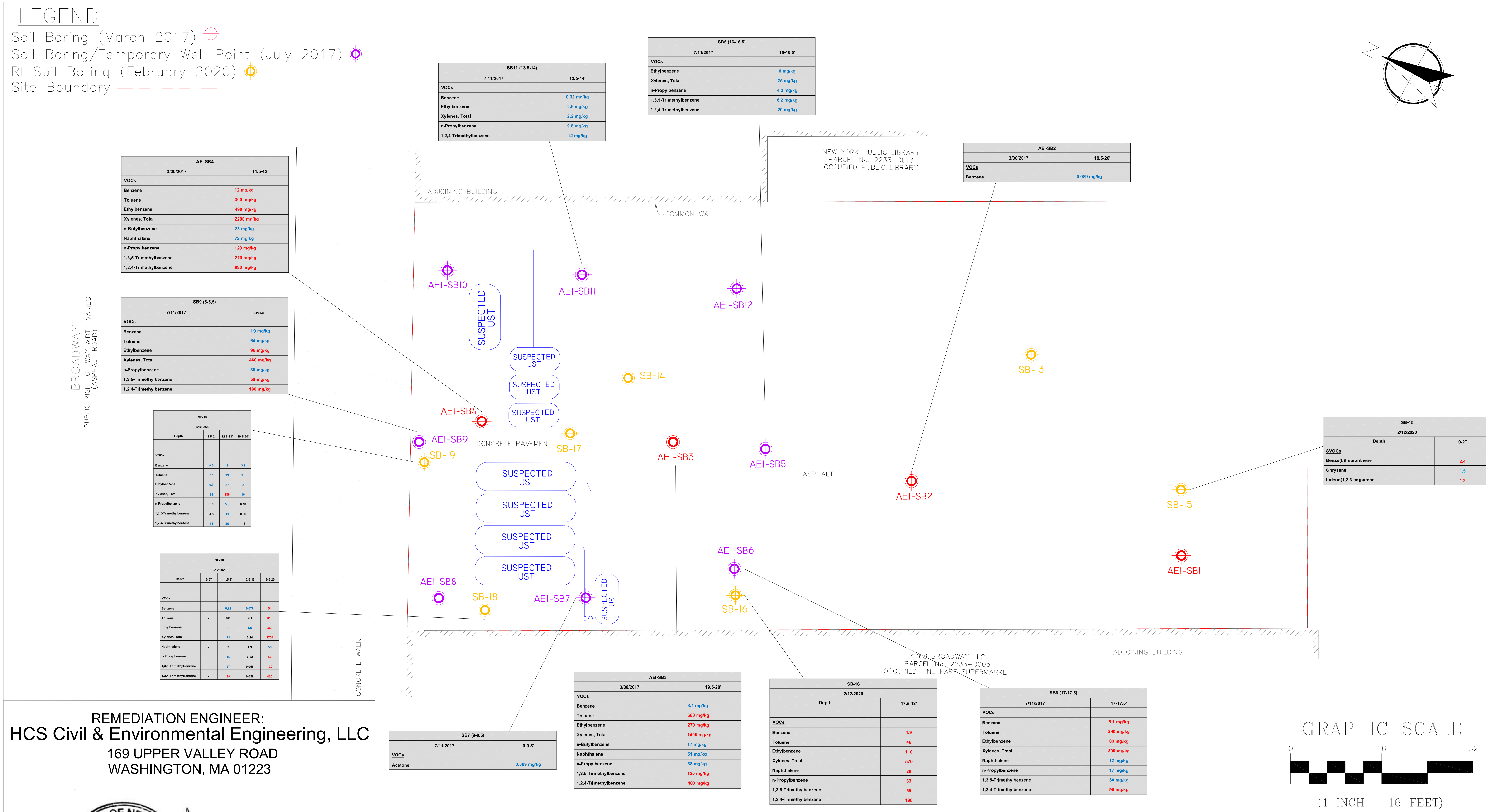
GROUNDWATER ELEVATION CONTOUR MAP– FEBRUARY 25, 2020

4778 Broadway, New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE 7



SB11 (13.5-14)	
7/11/2017	13.5-14'
VOCs	
Benzene	0.32 mg/kg
Ethylbenzene	2.6 mg/kg
Xylenes, Total	2.2 mg/kg
n-Propylbenzene	9.8 mg/kg
1,2,4-Trimethylbenzene	12 mg/kg

SB5 (16-16.5)	
7/11/2017	16-16.5'
VOCs	
Ethylbenzene	6 mg/kg
Xylenes, Total	25 mg/kg
n-Propylbenzene	4.2 mg/kg
1,3,5-Trimethylbenzene	6.2 mg/kg
1,2,4-Trimethylbenzene	20 mg/kg

AEI-SB4	
3/30/2017	11.5-12'
VOCs	
Benzene	12 mg/kg
Toluene	300 mg/kg
Ethylbenzene	490 mg/kg
Xylenes, Total	2200 mg/kg
n-Butylbenzene	25 mg/kg
Naphthalene	72 mg/kg
n-Propylbenzene	120 mg/kg
1,3,5-Trimethylbenzene	210 mg/kg
1,2,4-Trimethylbenzene	690 mg/kg

SB9 (5-5.5)	
7/11/2017	5-5.5'
VOCs	
Benzene	1.9 mg/kg
Toluene	64 mg/kg
Ethylbenzene	96 mg/kg
Xylenes, Total	460 mg/kg
n-Propylbenzene	30 mg/kg
1,3,5-Trimethylbenzene	59 mg/kg
1,2,4-Trimethylbenzene	180 mg/kg

SB-19			
2/12/2020			
Depth	1.5-2'	12.5-13'	19.5-20'
VOCs			
Benzene	0.3	1	3.1
Toluene	2.1	19	17
Ethylbenzene	6.3	27	2
Xylenes, Total	29	130	10
n-Propylbenzene	1.6	5.8	0.18
1,3,5-Trimethylbenzene	3.8	11	0.36
1,2,4-Trimethylbenzene	11	36	1.2

SB-18				
2/12/2020				
Depth	0-2"	1.5-2'	12.5-13'	19.5-20'
VOCs				
Benzene	-	0.82	0.076	54
Toluene	-	ND	ND	810
Ethylbenzene	-	27	1.5	360
Xylenes, Total	-	71	0.24	1700
Naphthalene	-	7	1.3	56
n-Propylbenzene	-	15	0.52	66
1,3,5-Trimethylbenzene	-	37	0.058	120
1,2,4-Trimethylbenzene	-	98	0.058	420

AEI-SB2	
3/30/2017	19.5-20'
VOCs	
Benzene	0.089 mg/kg

SB-15	
2/12/2020	
Depth	0-2"
SVOCs	
Benzo(b)fluoranthene	2.4
Chrysene	1.5
Indeno(1,2,3-cd)pyrene	1.2

SB7 (9-9.5)	
7/11/2017	9-9.5'
VOCs	
Acetone	0.089 mg/kg

AEI-SB3	
3/30/2017	19.5-20'
VOCs	
Benzene	3.1 mg/kg
Toluene	680 mg/kg
Ethylbenzene	270 mg/kg
Xylenes, Total	1400 mg/kg
n-Butylbenzene	17 mg/kg
Naphthalene	51 mg/kg
n-Propylbenzene	68 mg/kg
1,3,5-Trimethylbenzene	120 mg/kg
1,2,4-Trimethylbenzene	400 mg/kg

SB-16	
2/12/2020	
Depth	17.5-18'
VOCs	
Benzene	1.9
Toluene	46
Ethylbenzene	110
Xylenes, Total	570
Naphthalene	20
n-Propylbenzene	33
1,3,5-Trimethylbenzene	59
1,2,4-Trimethylbenzene	190

SB6 (17-17.5)	
7/11/2017	17-17.5'
VOCs	
Benzene	5.1 mg/kg
Toluene	240 mg/kg
Ethylbenzene	83 mg/kg
Xylenes, Total	390 mg/kg
Naphthalene	12 mg/kg
n-Propylbenzene	17 mg/kg
1,3,5-Trimethylbenzene	30 mg/kg
1,2,4-Trimethylbenzene	98 mg/kg

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PG CLARK
3/11/2021

SOIL EXCEEDANCES OF TRACK 1 SCOs MAP

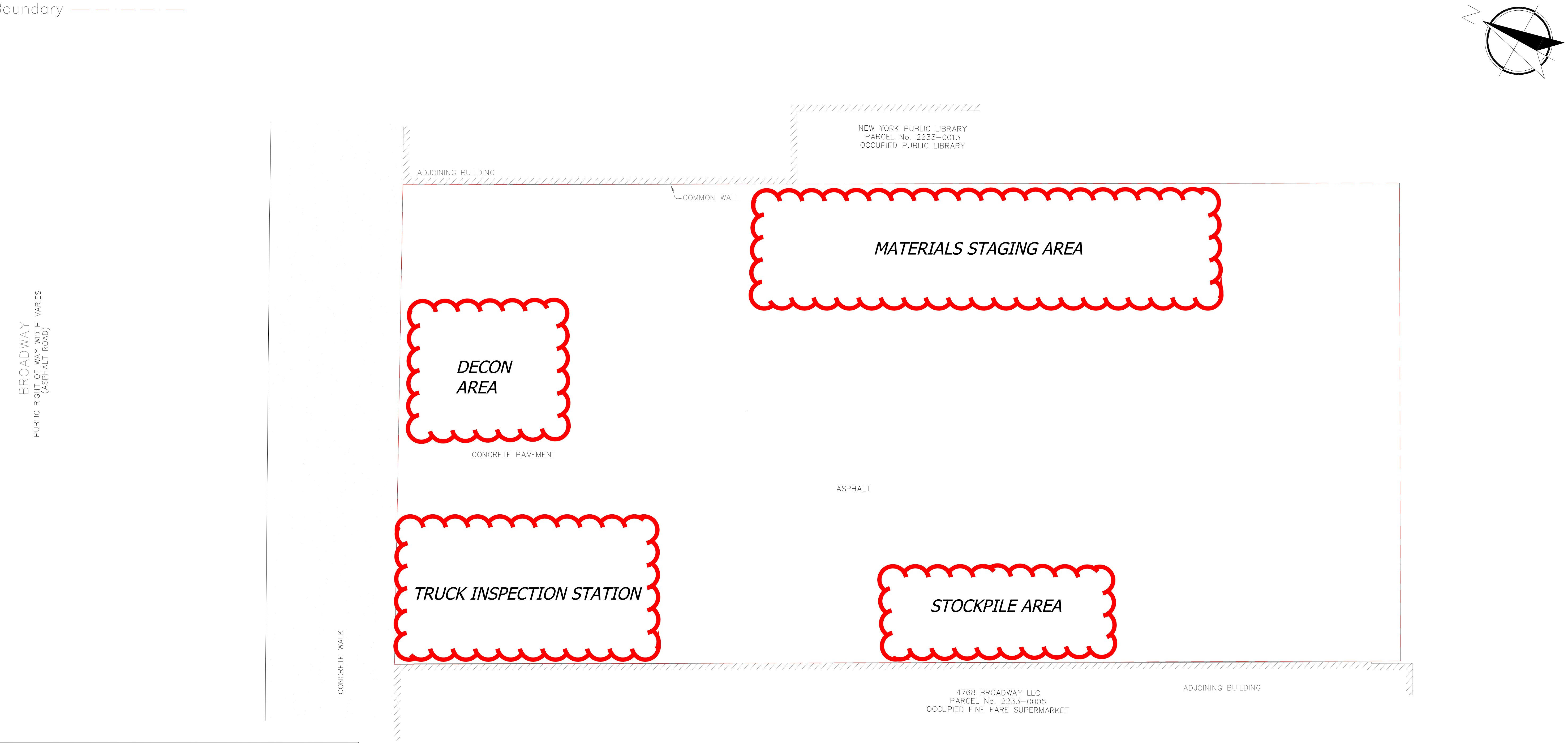
4778 Broadway,
New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE 8

LEGEND

Site Boundary



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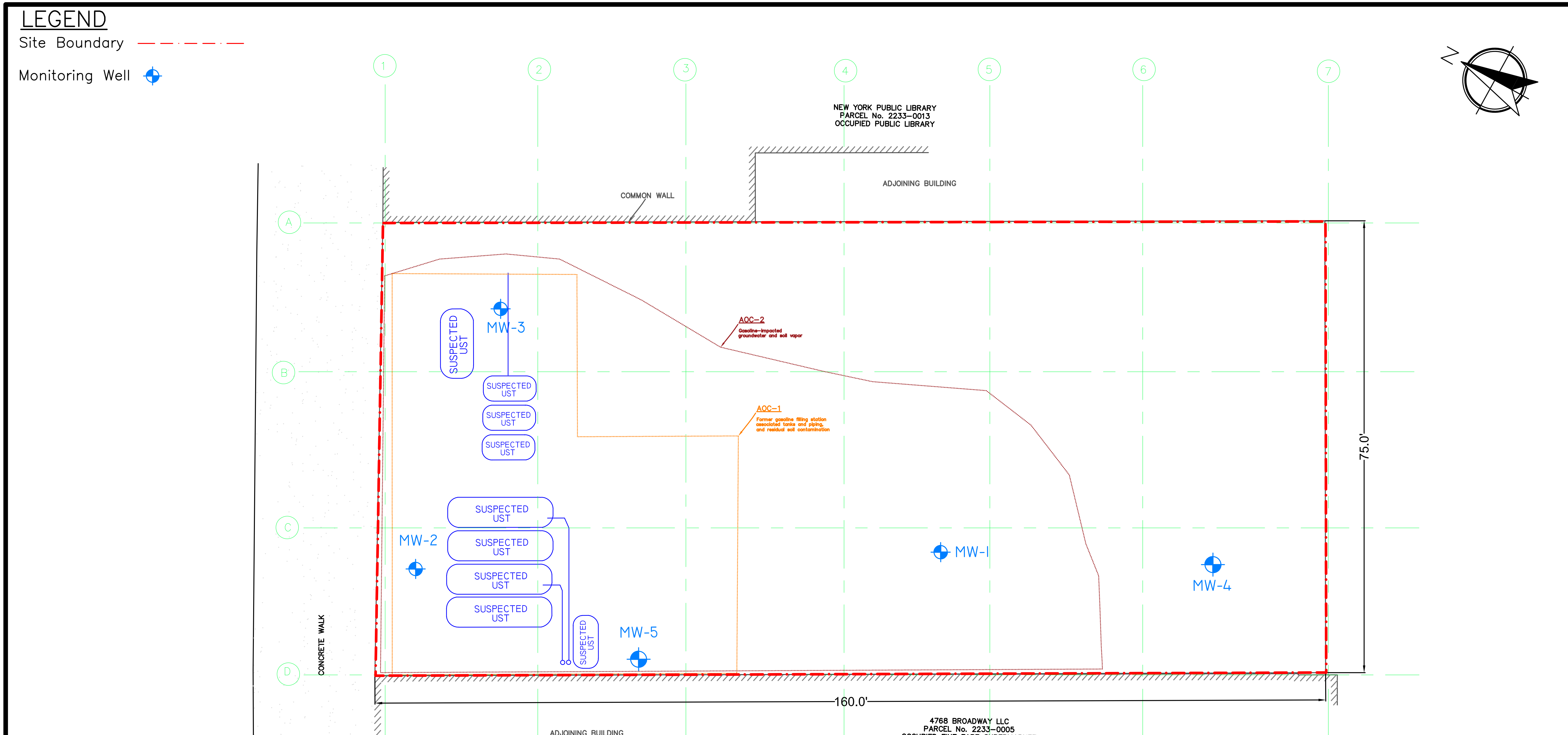
EQUIPMENT AND MATERIALS STAGING LOCATION MAP

4778 Broadway, New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE 9



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WASHINGTON, MA 01223

GRAPHIC SCALE

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PHILIP GERALD CLARK
LICENSED PROFESSIONAL ENGINEER
088422

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PG CLARK
4/7/2021

ALPHANUMERIC GRID &
AREAS OF CONCERN MAP

4778 Broadway,
New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE 10

LEGEND

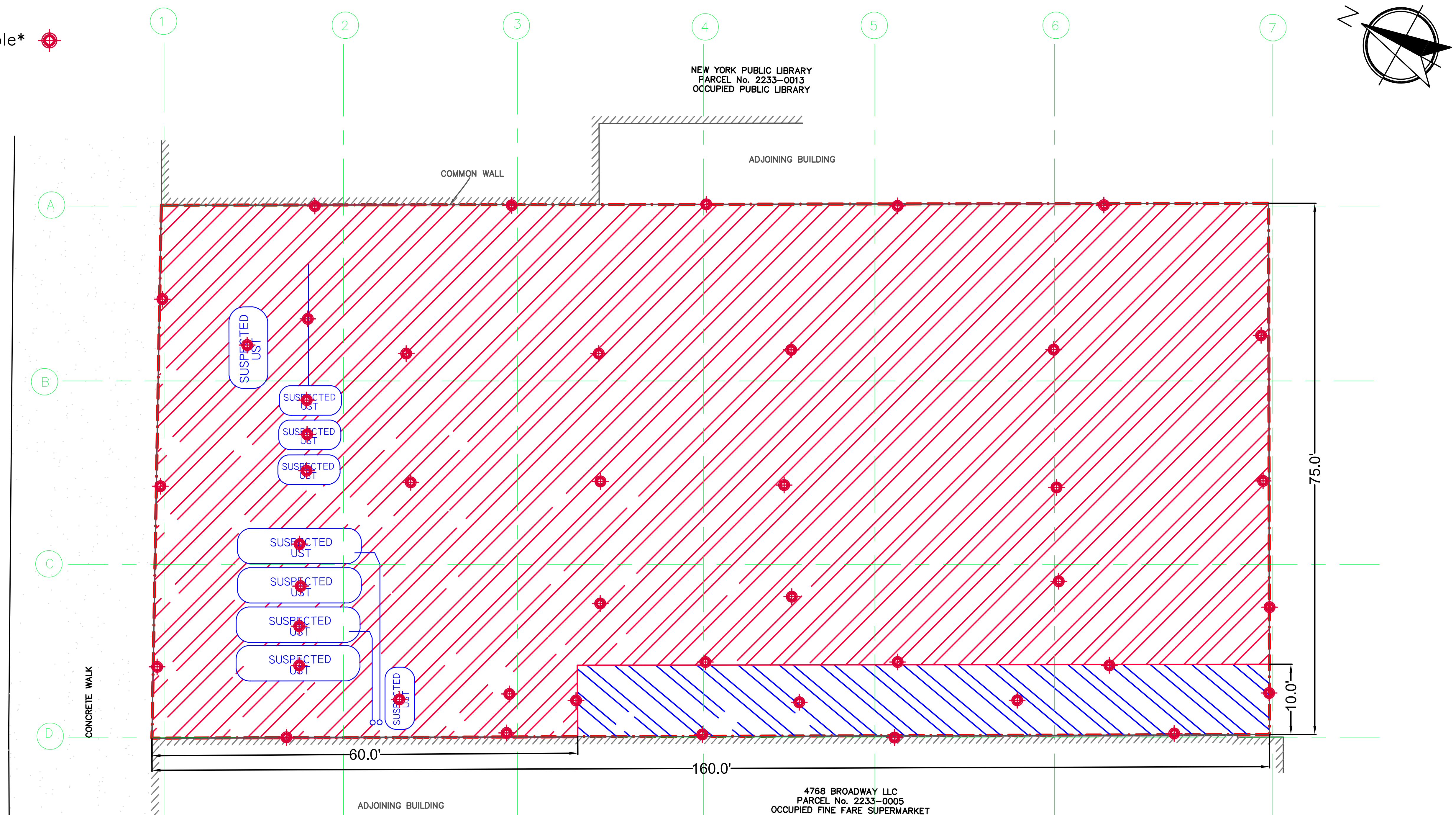
Site Boundary

Proposed Post–Excavation Soil Sample*

Area of Excavation to 15 feet BGS

Area of Excavation to 6 feet BGS

*Proposed Post-Excavation Soil Samples will be collected at a frequency of one sample for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area, with additional samples biased toward areas where USTs are being removed



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SITE EXCAVATION AND POST–EXCAVATION SAMPLE LOCATION MAP

4778 Broadway,
New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE 11

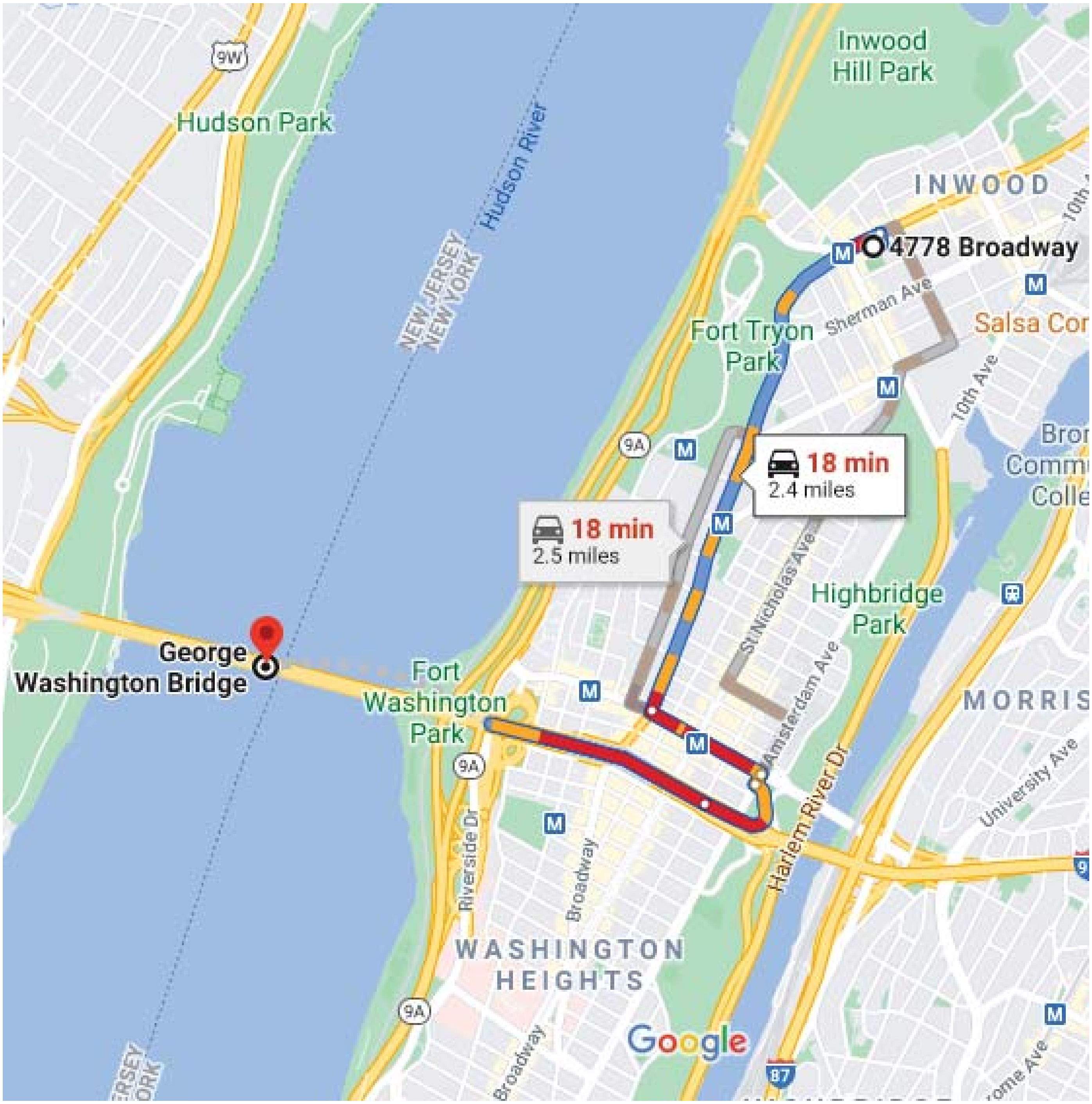


Figure 12: Truck Transport Routes

4778 Broadway, Manhattan, New York 10034

Project Number: 384736

AEI Consultants

LEGEND

Site Boundary

In–Situ Injection Point*

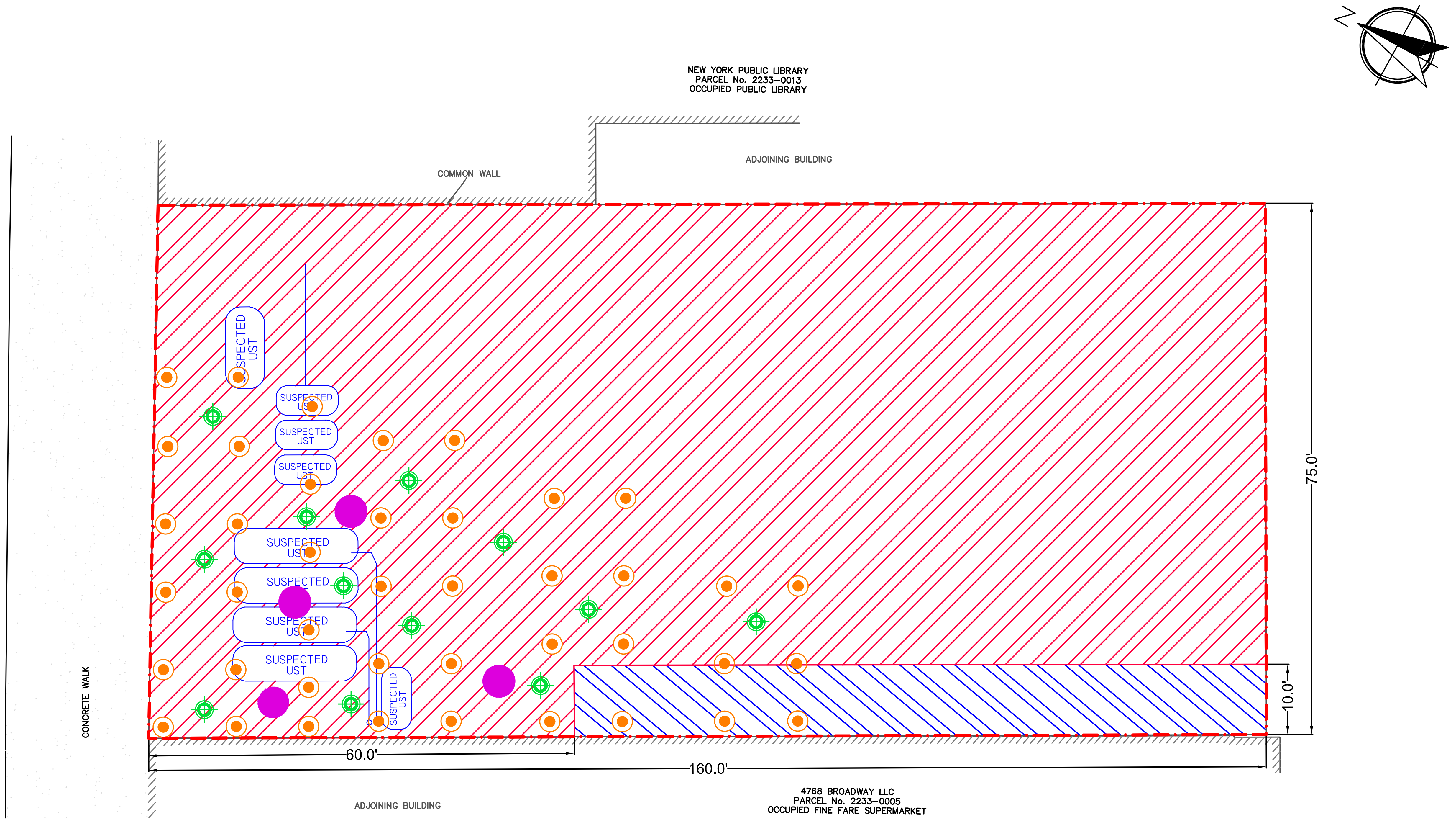
Temporary Groundwater Recovery Well

Area of Excavation to 14 feet BGS

Area of Excavation to 6 feet BGS

Post–Remedial Soil Boring

*Proposed in-situ injection points will be advanced in a grid formation with the grid spacing at approximately 100 square feet per injection point.



GRAPHIC SCALE

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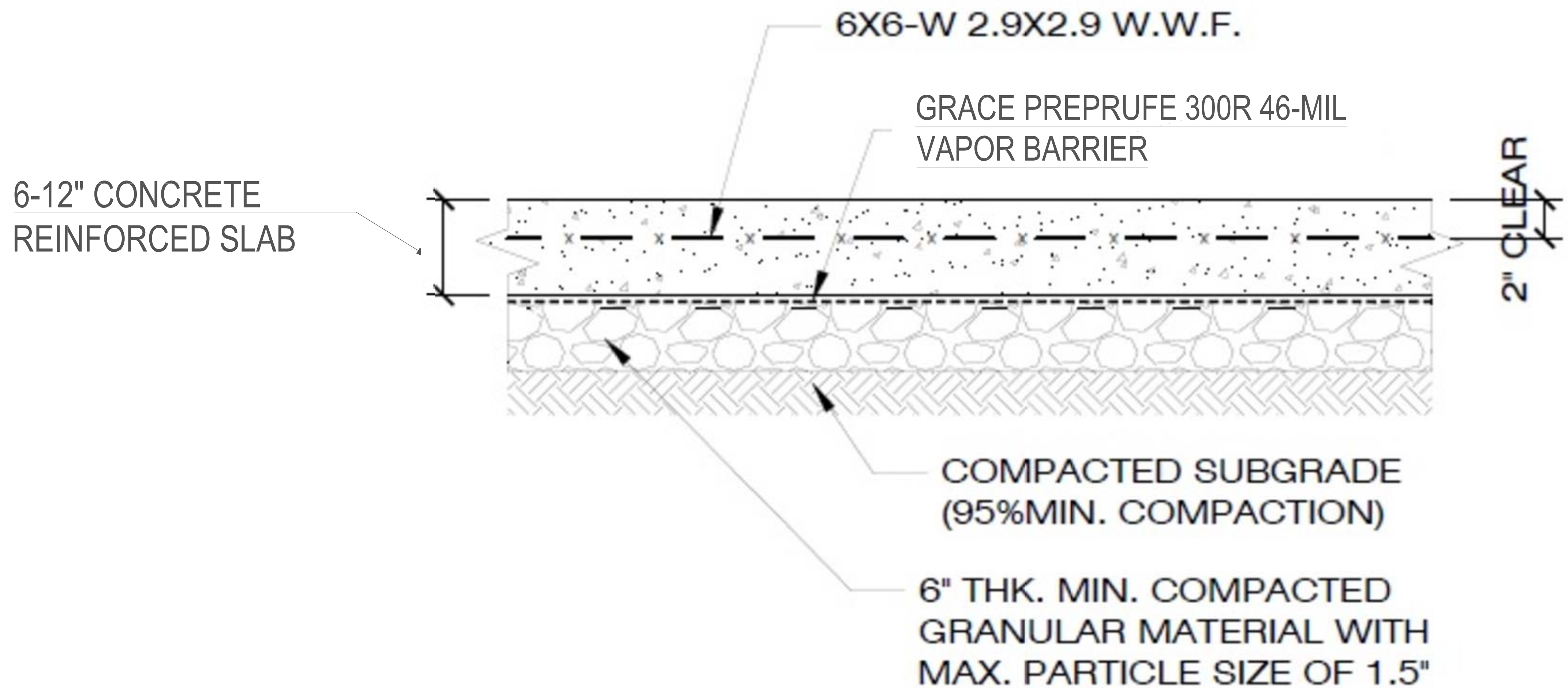
REMEDIAL ACTION SITE PLAN

4778 Broadway, New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE 13



NOTES:
1) THIS DETAIL IS INTENDED SOLELY TO SHOW MINIMUM REQUIREMENTS FOR ENGINEERING CONTROL RELATED TO SOIL MANAGEMENT PLAN

SCALE: N.T.S.

REMEDIATION ENGINEER:
HCS Civil & Environmental Engineering, LLC
169 UPPER VALLEY ROAD
WASHINGTON, MA 01223

STATE OF NEW YORK PHILIP GERALD CLARK 16 080422 LICENSED PROFESSIONAL ENGINEER

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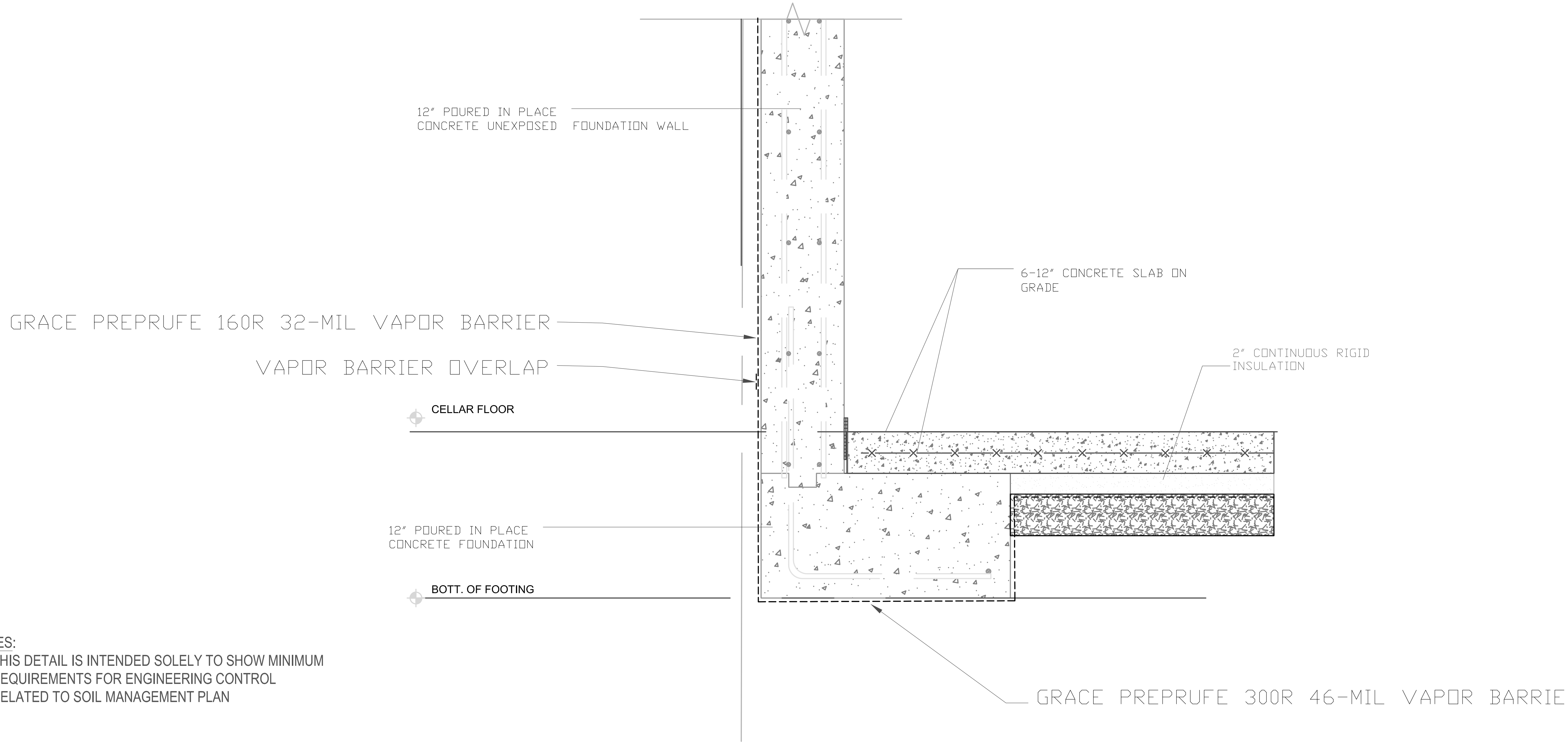
PG CLARK
3/11/2021

TYPICAL COVER DETAIL
FOR ALL COVER TYPES

4778 Broadway,
New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE
14



NOTES:
1) THIS DETAIL IS INTENDED SOLELY TO SHOW MINIMUM REQUIREMENTS FOR ENGINEERING CONTROL RELATED TO SOIL MANAGEMENT PLAN

1
-
PROPOSED FOUNDATION DETAIL

SCALE: N.T.S.

REMEDIATION ENGINEER:
HCS Civil & Environmental Engineering, LLC
169 UPPER VALLEY ROAD
WASHINGTON, MA 01223

STATE OF NEW YORK · PHILIP GERALD CLARK · 16 088422 · LICENSED PROFESSIONAL ENGINEER

It is a violation of law for any person to alter any document that bears the seal of a professional engineer, unless the person is acting under the direction of a licensed professional engineer.

DRAWN BY:
AC

APPROVED BY:
PG CLARK
3/11/2021

VAPOR BARRIER MEMBRANE
FOUNDATION/SIDEWALL DETAIL

4778 Broadway,
New York, New York 10034

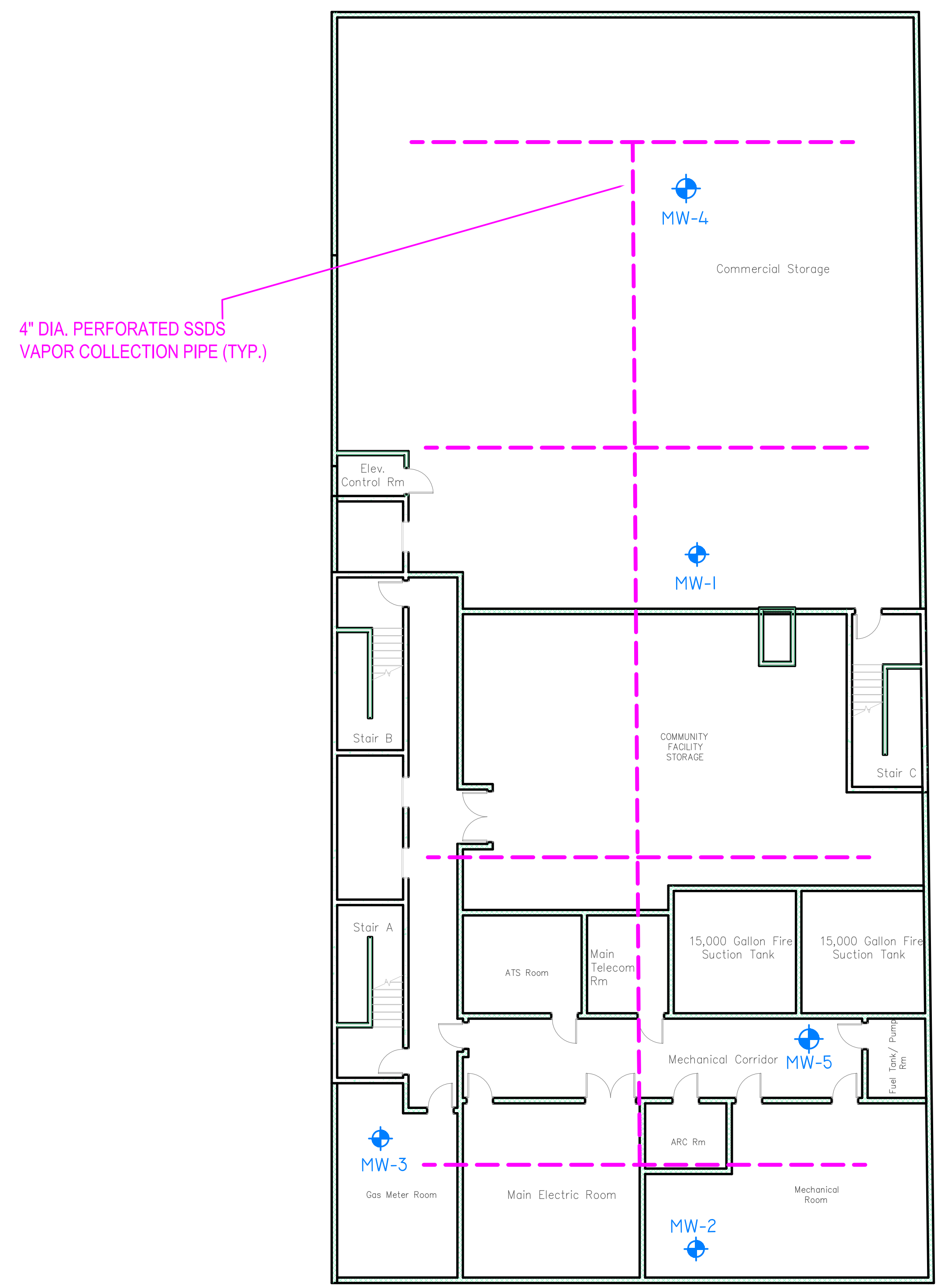
AEI Project #384736
BCP #C231131

FIGURE
15

LEGEND

Proposed Monitoring Well Location

1 PROPOSED CELLAR PLAN



SCALE: N.T.S.

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169 UPPER VALLEY ROAD
WASHINGTON, MA 01223

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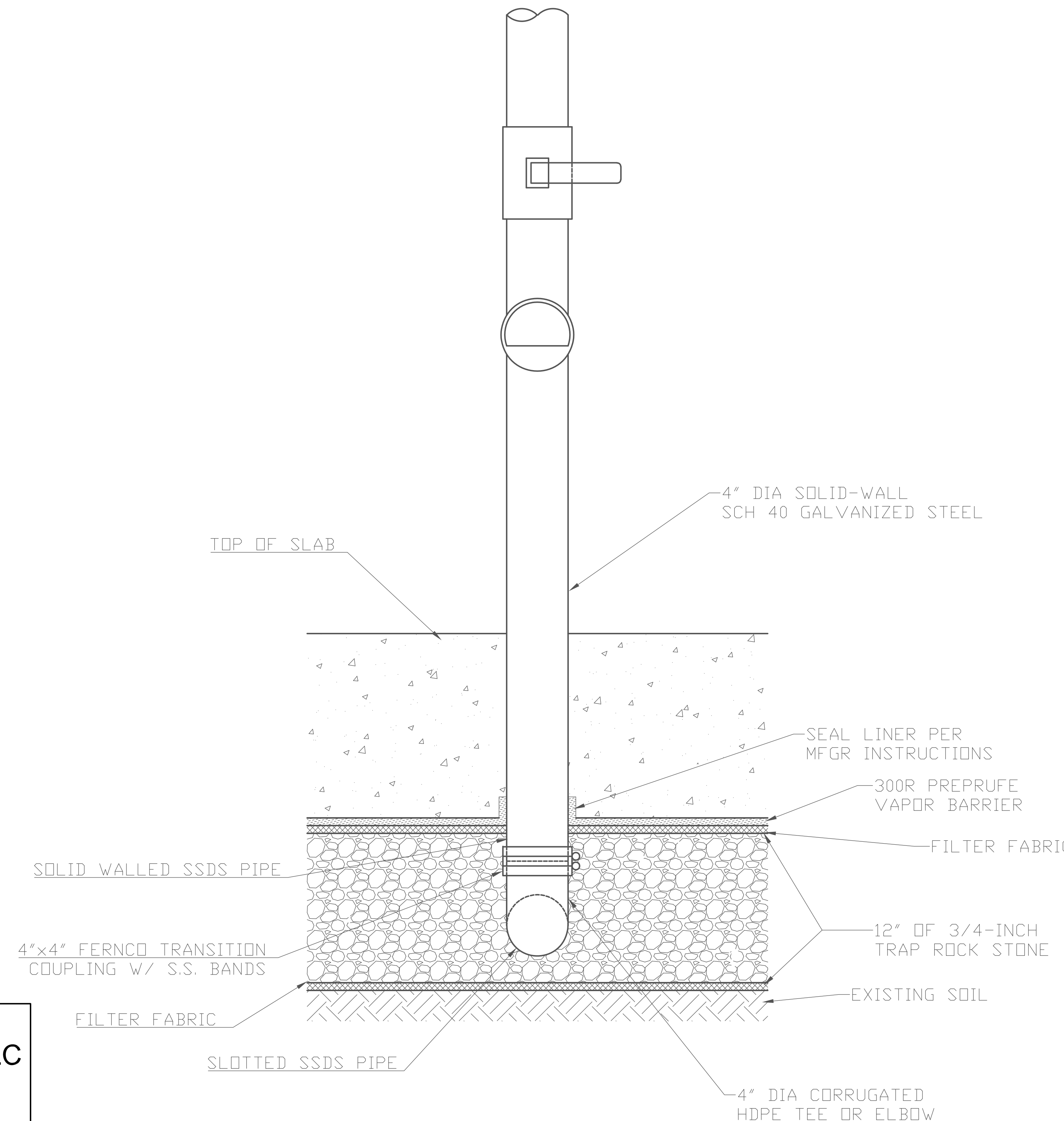
APPROVED BY:
PG CLARK
3/11/2021

VAPOR MITIGATION/SSDS &
MONITORING WELL LOCATION PLAN

4778 Broadway,
New York, New York 10034

AEI Project #384736
BCP #C231131

FIGURE
16



SCALE: N.T.S.

REMEDIATION ENGINEER:
HCS Civil & Environmental Engineering, LLC
169 UPPER VALLEY ROAD
WASHINGTON, MA 01223

STATE OF NEW YORK PHILIP GERALD CLARK 16 088422 LICENSED PROFESSIONAL ENGINEER

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DRAWN BY: AC	DESIGN DIAGRAM FOR SUB-SLAB DEPRESSURIZATION SYSTEM 4778 Broadway, New York, New York 10034	AEI Project #384736 BCP #C231131	FIGURE 17
APPROVED BY: PG CLARK 3/11/2021			

TABLES

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				SB-13-0-2"		SB-13-0-2"		SB-13-1.5-2		SB-13-12.5-13		SB-13-14.5-15		SB-14-0-2"		SB-14-1.5-2.0		SB-14-12.5-13.0		SB-14-19.5-20.0	
SAMPLING DATE				2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020	
SAMPLE TYPE				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)				0-2"		0-2"		1.5-2		12.5-13		14.5-15		0-2"		1.5-2		12.5-13		19.5-20	
	PGWSCO	RRUSCO	Units	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Chlorinated Herbicides by GC																					
2,4-D			mg/kg	0.193	U	-	-	0.195	U	0.193	U	0.183	U	0.196	U	0.19	U	0.194	U	0.182	U
2,4,5-T			mg/kg	0.193	U	-	-	0.195	U	0.193	U	0.183	U	0.196	U	0.19	U	0.194	U	0.182	U
2,4,5-TP (Silvex)	3.8	100	mg/kg	0.193	U	-	-	0.195	U	0.193	U	0.183	U	0.196	U	0.19	U	0.194	U	0.182	U
Organochlorine Pesticides by GC																					
Delta-BHC	0.25	100	mg/kg	0.00184	U	-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
Lindane	0.1	1.3	mg/kg	0.000766	U	-	-	0.00076	U	0.000743	U	0.000738	U	0.000785	U	0.000764	U	0.000776	U	0.000728	U
Alpha-BHC	0.02	0.48	mg/kg	0.000766	U	-	-	0.00076	U	0.000743	U	0.000738	U	0.000785	U	0.000764	U	0.000776	U	0.000728	U
Beta-BHC	0.09	0.36	mg/kg	0.00184	U	-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
Heptachlor	0.38	2.1	mg/kg	0.00092	U	-	-	0.000912	U	0.000892	U	0.000885	U	0.000942	U	0.000917	U	0.000932	U	0.000874	U
Aldrin	0.19	0.097	mg/kg	0.00184	U	-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
Heptachlor epoxide			mg/kg	0.00345	U	-	-	0.00342	U	0.00334	U	0.00332	U	0.00353	U	0.00344	U	0.00349	U	0.00328	U
Endrin	0.06	11	mg/kg	0.000766	U	-	-	0.00076	U	0.000743	U	0.000738	U	0.000785	U	0.000764	U	0.000776	U	0.000728	U
Endrin aldehyde			mg/kg	0.0023	U	-	-	0.00228	U	0.00223	U	0.00221	U	0.00235	U	0.00229	U	0.00233	U	0.00218	U
Endrin ketone			mg/kg	0.00184	U	-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
Dieldrin	0.1	0.2	mg/kg	0.00115	U	-	-	0.00114	U	0.00111	U	0.00111	U	0.00118	U	0.00114	U	0.00116	U	0.00109	U
4,4'-DDE	17	8.9	mg/kg	0.0326		-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
4,4'-DDD	14	13	mg/kg	0.0185		-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
4,4'-DDT	136	7.9	mg/kg	0.424	E	0.266		0.00342	U	0.00334	U	0.00332	U	0.00353	U	0.00344	U	0.00349	U	0.00328	U
Endosulfan I	102	24	mg/kg	0.00184	U	-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
Endosulfan II	102	24	mg/kg	0.00184	U	-	-	0.00182	U	0.00178	U	0.00177	U	0.00188	U	0.00183	U	0.00186	U	0.00175	U
Endosulfan sulfate	1000	24	mg/kg	0.000766	U	-	-	0.00076	U	0.000743	U	0.000738	U	0.000785	U	0.000764	U	0.000776	U	0.000728	U
Methoxychlor			mg/kg	0.00345	U	-	-	0.00342	U	0.00334	U	0.00332	U	0.00353	U	0.00344	U	0.00349	U	0.00328	U
Toxaphene			mg/kg	0.0345	U	-	-	0.0342	U	0.0334	U	0.0332	U	0.0353	U	0.0344	U	0.0349	U	0.0328	U
cis-Chlordane	2.9	4.2	mg/kg	0.0023	U	-	-	0.00228	U	0.00223	U	0.00221	U	0.00235	U	0.00229	U	0.00233	U	0.00218	U
trans-Chlordane			mg/kg	0.0023	U	-	-	0.00228	U	0.00223	U	0.00221	U	0.00235	U	0.00229	U	0.00233	U	0.00218	U
Chlordane			mg/kg	0.0153	U	-	-	0.0152	U	0.0149	U	0.0148	U	0.0157	U	0.0153	U	0.0155	U	0.0146	U
Perfluorinated Alkyl Acids by Isotope Dilution																					
Perfluorobutanoic Acid (PFBA)			mg/kg	0.000218	J	-	-	0.000038	J	0.000043	J	0.000995	U	0.000107	J	0.000255	J	0.000033	J	0.000055	J
Perfluoropentanoic Acid (PFPeA)			mg/kg	0.000554	J	-	-	0.000151	J	0.000118	J	0.000067	J	0.000814	J	0.00162		0.000091	J	0.000384	J
Perfluorobutanesulfonic Acid (PFBS)			mg/kg	0.000059	J	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.000058	J	0.00114	U	0.000981	U
Perfluorohexanoic Acid (PFHxA)			mg/kg	0.000628	J	-	-	0.000157	J	0.000139	J	0.000086	J	0.000711	J	0.00177		0.000104	J	0.000283	J
Perfluoroheptanoic Acid (PFHpA)			mg/kg	0.000545	J	-	-	0.000091	J	0.000075	J	0.000995	U	0.000407	J	0.000594	J	0.00114	U	0.000047	J
Perfluorohexanesulfonic Acid (PFHxS)			mg/kg	0.00106	U	-	-	0.00105	U	0.000066	J	0.000995	U	0.001	J	0.00149		0.00114	U	0.000981	U
Perfluorooctanoic Acid (PFOA)			mg/kg	0.00293		-	-	0.000286	J	0.000348	J	0.000387	J	0.00121		0.00108	J	0.000053	J	0.000981	U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)			mg/kg	0.00106	U	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
Perfluoroheptanesulfonic Acid (PFHpS)			mg/kg	0.00106	U	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
Perfluorononanoic Acid (PFNA)			mg/kg	0.000217	J	-	-	0.000172	J	0.00105	U	0.000995	U	0.000082	J	0.0011	U	0.00114	U	0.000981	U
Perfluorooctanesulfonic Acid (PFOS)			mg/kg	0.0286		-	-	0.0205		0.00116		0.000995	U	0.00195		0.0011	U	0.00114	U	0.000981	U
Perfluorodecanoic Acid (PFDA)			mg/kg	0.000843	J	-	-	0.00108		0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)			mg/kg	0.00106	U	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)			mg/kg	0.00106	U	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
Perfluoroundecanoic Acid (PFUnA)			mg/kg	0.000075	J	-	-	0.000065	J	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
Perfluorodecanesulfonic Acid (PFDS)			mg/kg	0.00106	U	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
Perfluorooctanesulfonamide (FOSA)			mg/kg	0.00106		-	-	0.000322	J	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)			mg/kg	0.00534		-	-	0.000494	J	0.000196	J	0.000995	U	0.00105	U	0.0011	U	0.000102	J	0.000981	U
Perfluorododecanoic Acid (PFDoA)			mg/kg	0.000077	J	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
Perfluorotridecanoic Acid (PFTrDA)			mg/kg	0.00106	U	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
Perfluorotetradecanoic Acid (PFTA)			mg/kg	0.00106	U	-	-	0.00105	U	0.00105	U	0.000995	U	0.00105	U	0.0011	U	0.00114	U	0.000981	U
PFOA/PFOS, Total			mg/kg	0.0315		-	-	0.0208	J	0.00151	J	0.000387	J	0.00316		0.00108	J	0.000053	J	0.000981	U
Polychlorinated Biphenyls by GC																					
Aroclor 1016	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1221	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1232	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1242	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1248	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1254	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1260	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1262	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
Aroclor 1268	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U
PCBs, Total	3.2	1	mg/kg	0.038	U	-	-	0.0394	U	0.0378	U	0.0367	U	0.0376	U	0.0377	U	0.0389	U	0.0349	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				SB-13-0-2"		SB-13-0-2"		SB-13-1.5-2		SB-13-12.5-13		SB-13-14.5-15		SB-14-0-2"		SB-14-1.5-2.0		SB-14-12.5-13.0		SB-14-19.5-20.0	
SAMPLING DATE				2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020	
SAMPLE TYPE				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)				0-2"		0-2"		1.5-2		12.5-13		14.5-15		0-2"		1.5-2		12.5-13		19.5-20	
	PGWSCO	RRUSCO	Units	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Semivolatile Organics by GC/MS																					
Acenaphthene	98	100	mg/kg	0.16	U	-	-	0.046	J	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
1,2,4-Trichlorobenzene			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Hexachlorobenzene	3.2	1.2	mg/kg	0.12	U	-	-	0.12	U	0.12	U	0.11	U	0.12	U	0.11	U	0.11	U	0.11	U
Bis(2-chloroethyl)ether			mg/kg	0.17	U	-	-	0.18	U	0.17	U	0.16	U	0.17	U	0.17	U	0.17	U	0.16	U
2-Chloronaphthalene			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
1,2-Dichlorobenzene	1.1	100	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
1,3-Dichlorobenzene	2.4	49	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
1,4-Dichlorobenzene	1.8	13	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
3,3'-Dichlorobenzidine			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2,4-Dinitrotoluene			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2,6-Dinitrotoluene			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Fluoranthene	1000	100	mg/kg	0.11	J	-	-	0.31		0.12	U	0.11	U	0.042	J	0.11	U	0.11	U	0.11	U
4-Chlorophenyl phenyl ether			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
4-Bromophenyl phenyl ether			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Bis(2-chloroisopropyl)ether			mg/kg	0.23	U	-	-	0.23	U	0.23	U	0.22	U	0.23	U	0.23	U	0.23	U	0.22	U
Bis(2-chloroethoxy)methane			mg/kg	0.21	U	-	-	0.21	U	0.21	U	0.2	U	0.21	U	0.2	U	0.2	U	0.2	U
Hexachlorobutadiene			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Hexachlorocyclopentadiene			mg/kg	0.56	U	-	-	0.56	U	0.55	U	0.52	U	0.56	U	0.54	U	0.54	U	0.53	U
Hexachloroethane			mg/kg	0.16	U	-	-	0.16	U	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
Isophorone			mg/kg	0.17	U	-	-	0.18	U	0.17	U	0.16	U	0.17	U	0.17	U	0.17	U	0.16	U
Naphthalene	12	100	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Nitrobenzene			mg/kg	0.17	U	-	-	0.18	U	0.17	U	0.16	U	0.17	U	0.17	U	0.17	U	0.16	U
NDPA/DPA			mg/kg	0.16	U	-	-	0.16	U	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
n-Nitrosodi-n-propylamine			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Bis(2-ethylhexyl)phthalate			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.1	J	0.19	U	0.19	U	0.18	U
Butyl benzyl phthalate			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Di-n-butylphthalate			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Di-n-octylphthalate			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Diethyl phthalate			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Dimethyl phthalate			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Benzo(a)anthracene	1	1	mg/kg	0.058	J	-	-	0.13		0.12	U	0.11	U	0.024	J	0.11	U	0.11	U	0.11	U
Benzo(a)pyrene	22	1	mg/kg	0.064	J	-	-	0.13	J	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
Benzo(b)fluoranthene	1.7	1	mg/kg	0.083	J	-	-	0.17		0.12	U	0.11	U	0.034	J	0.11	U	0.11	U	0.11	U
Benzo(k)fluoranthene	1.7	3.9	mg/kg	0.12	U	-	-	0.064	J	0.12	U	0.11	U	0.12	U	0.11	U	0.11	U	0.11	U
Chrysene	1	3.9	mg/kg	0.059	J	-	-	0.13		0.12	U	0.11	U	0.035	J	0.11	U	0.11	U	0.11	U
Acenaphthylene	107	100	mg/kg	0.16	U	-	-	0.16	U	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
Anthracene	1000	100	mg/kg	0.12	U	-	-	0.055	J	0.12	U	0.11	U	0.12	U	0.11	U	0.11	U	0.11	U
Benzo(ghi)perylene	1000	100	mg/kg	0.041	J	-	-	0.079	J	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
Fluorene	386	100	mg/kg	0.19	U	-	-	0.024	J	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Phenanthrene	1000	100	mg/kg	0.051	J	-	-	0.22		0.12	U	0.11	U	0.057	J	0.11	U	0.11	U	0.11	U
Dibenzo(a,h)anthracene	1000	0.33	mg/kg	0.12	U	-	-	0.12	U	0.12	U	0.11	U	0.12	U	0.11	U	0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	8.2	0.5	mg/kg	0.043	J	-	-	0.092	J	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
Pyrene	1000	100	mg/kg	0.1	J	-	-	0.24		0.12	U	0.11	U	0.041	J	0.11	U	0.11	U	0.11	U
Biphenyl			mg/kg	0.44	U	-	-	0.44	U	0.44	U	0.42	U	0.44	U	0.43	U	0.43	U	0.42	U
4-Chloroaniline			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2-Nitroaniline			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
3-Nitroaniline			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
4-Nitroaniline			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Dibenzofuran	210	59	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2-Methylnaphthalene			mg/kg	0.23	U	-	-	0.23	U	0.23	U	0.22	U	0.026	J	0.23	U	0.23	U	0.11	J
1,2,4,5-Tetrachlorobenzene			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Acetophenone			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2,4,6-Trichlorophenol			mg/kg	0.12	U	-	-	0.12	U	0.12	U	0.11	U	0.12	U	0.11	U	0.11	U	0.11	U
p-Chloro-m-cresol			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2-Chlorophenol			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2,4-Dichlorophenol			mg/kg	0.17	U	-	-	0.18	U	0.17	U	0.16	U	0.17	U	0.17	U	0.17	U	0.16	U
2,4-Dimethylphenol			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2-Nitrophenol			mg/kg	0.42	U	-	-	0.42	U	0.42	U	0.4	U	0.42	U	0.41	U	0.41	U	0.4	U
4-Nitrophenol			mg/kg	0.27	U	-	-	0.27	U	0.27	U	0.26	U	0.27	U	0.27	U	0.27	U	0.26	U
2,4-Dinitrophenol			mg/kg	0.93	U	-	-	0.94	U	0.92	U	0.88	U	0.93	U	0.91	U	0.92	U	0.88	U
4,6-Dinitro-o-cresol			mg/kg	0.5	U	-	-	0.51	U	0.5	U	0.48	U	0.5	U	0.5	U	0.5	U	0.48	U
Pentachlorophenol	0.8	6.7	mg/kg	0.16	U	-	-	0.16	U	0.15	U	0.15	U	0.16	U	0.15	U	0.15	U	0.15	U
Phenol	0.33	100	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
2-Methylphenol	0.33	100	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
3-Methylphenol/4-Methylphenol	0.33	100	mg/kg	0.28	U	-	-	0.28	U	0.28	U	0.26	U	0.28	U	0.27	U	0.27	U	0.26	U
2,4,5-Trichlorophenol			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Benzoic Acid			mg/kg	0.63	U	-	-	0.63	U	0.62	U	0.6	U	0.63	U	0.62	U	0.62	U	0.6	U
Benzyl Alcohol			mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
Carbazole			mg/kg	0.19	U	-	-	0.027	J	0.19	U	0.18	U	0.19	U	0.19	U	0.19	U	0.18	U
1,4-Dioxane	0.1	13	mg/kg	0.029	U	-	-	0.029	U	0.029	U	0.028	U	0.029	U	0.028	U	0.029	U	0.028	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-13-0-2"**		**SB-13-0-2"**		**SB-13-1.5-2**		**SB-13-12.5-13**		**SB-13-14.5-15**		**SB-14-0-2"**		**SB-14-1.5-2.0**		**SB-14-12.5-13.0**		**SB-14-19.5-20.0**	
SAMPLING DATE				**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**0-2"**		**1.5-2**		**12.5-13**		**14.5-15**		**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
Total Metals																					
Aluminum, Total			mg/kg	10300		-	-	9580		6500		5880		10200		8820		7110		5590	
Antimony, Total			mg/kg	0.624	J	-	-	1.18	J	4.54	U	4.32	U	0.626	J	4.41	U	0.37	J	4.32	U
Arsenic, Total	16	16	mg/kg	6.58		-	-	8.92		2.17		2.29		3.44		3.86		2.78		1.88	
Barium, Total	820	400	mg/kg	52.4		-	-	102		54		23.7		39.5		45.2		43		63.7	
Beryllium, Total	47	72	mg/kg	0.387	J	-	-	0.385	J	0.281	J	0.432	U	0.514		0.353	J	0.471		0.164	J
Cadmium, Total	7.5	4.3	mg/kg	0.491	J	-	-	0.61	J	0.318	J	0.302	J	0.355	J	0.468	J	0.397	J	0.354	J
Calcium, Total			mg/kg	4100		-	-	5060		1320		189000		1480		52400		4020		17900	
Chromium, Total			mg/kg	13.4		-	-	14.2		16.1		8		14.2		13.6		15.4		14.4	
Cobalt, Total			mg/kg	7.83		-	-	6.96		7.29		3.36		4.94		4.75		5.85		8.56	
Copper, Total	1720	270	mg/kg	16.1		-	-	25.4		21.9		3.67		8.27		14.8		10.9		20.2	
Iron, Total			mg/kg	16700		-	-	18000		12500		3740		13700		12300		15000		13100	
Lead, Total	450	400	mg/kg	46.1		-	-	74		3.82	J	3.91	J	7.78		50		6.38		4.15	J
Magnesium, Total			mg/kg	4560		-	-	4520		3320		88500		2560		29000		3720		8360	
Manganese, Total	2000	2000	mg/kg	247		-	-	337		237		353		140		343		302		226	
Mercury, Total	0.73	0.81	mg/kg	0.076	J	-	-	0.099		0.092	U	0.083	U	0.083	U	0.054	J	0.088	U	0.077	U
Nickel, Total	130	310	mg/kg	13.1		-	-	12.9		12.8		5.32		10.1		9.72		10.6		15	
Potassium, Total			mg/kg	470		-	-	448		1680		421		435		897		1160		2600	
Selenium, Total	4	180	mg/kg	1.89	U	-	-	1.88	U	1.82	U	1.12	J	0.449	J	0.582	J	1.85	U	0.268	J
Silver, Total	8.3	180	mg/kg	0.945	U	-	-	0.939	U	0.908	U	0.864	U	0.935	U	0.882	U	0.924	U	0.864	U
Sodium, Total			mg/kg	1180		-	-	1180		973		1280		1040		1150		917		1000	
Thallium, Total			mg/kg	1.89	U	-	-	1.88	U	1.82	U	1.73	U	1.87	U	1.76	U	1.85	U	1.73	U
Vanadium, Total			mg/kg	18		-	-	17.8		22.8		10.3		17.1		16.2		21.1		22.8	
Zinc, Total	2480	10000	mg/kg	73.7		-	-	135		26.8		77.2		27.7		78.7		26.6		30.5	
Volatile Organics by EPA 5035																					
Methylene chloride	0.05	100	mg/kg	-	-	-	-	0.0034	U	0.0045	U	0.005	U	-	-	0.005	U	0.0033	U	0.23	U
1,1-Dichloroethane	0.27	26	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Chloroform	0.37	49	mg/kg	-	-	-	-	0.0001	J	0.0013	U	0.0015	U	-	-	0.0015	U	0.00099	U	0.069	U
Carbon tetrachloride	0.76	2.4	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
1,2-Dichloropropane			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Dibromochloromethane			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
1,1,2-Trichloroethane			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Tetrachloroethene	1.3	19	mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
Chlorobenzene	1.1	100	mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
Trichlorofluoromethane			mg/kg	-	-	-	-	0.0028	U	0.0036	U	0.004	U	-	-	0.004	U	0.0026	U	0.18	U
1,2-Dichloroethane	0.02	3.1	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
1,1,1-Trichloroethane	0.68	100	mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
Bromodichloromethane			mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
trans-1,3-Dichloropropene			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
cis-1,3-Dichloropropene			mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
1,3-Dichloropropene, Total			mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
1,1-Dichloropropene			mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
Bromoform			mg/kg	-	-	-	-	0.0028	U	0.0036	U	0.004	U	-	-	0.004	U	0.0026	U	0.18	U
1,1,2,2-Tetrachloroethane			mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
Benzene	0.06	4.8	mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00016	J	0.023	U
Toluene	0.7	100	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Ethylbenzene	1	41	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Chloromethane			mg/kg	-	-	-	-	0.0028	U	0.0036	U	0.004	U	-	-	0.004	U	0.0026	U	0.18	U
Bromomethane			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
Vinyl chloride	0.02	0.9	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Chloroethane			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,1-Dichloroethene	0.33	100	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
trans-1,2-Dichloroethene	0.19	100	mg/kg	-	-	-	-	0.001	U	0.0013	U	0.0015	U	-	-	0.0015	U	0.00099	U	0.069	U
Trichloroethene	0.47	21	mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
1,2-Dichlorobenzene	1.1	100	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,3-Dichlorobenzene	2.4	49	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,4-Dichlorobenzene	1.8	13	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
Methyl tert butyl ether	0.93	100	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
p/m-Xylene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
o-Xylene			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Xylenes, Total	1.6	100	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
cis-1,2-Dichloroethene	0.25	100	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
1,2-Dichloroethene, Total			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Dibromomethane			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
Styrene			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
Dichlorodifluoromethane			mg/kg	-	-	-	-	0.0069	U	0.009	U	0.01	U	-	-	0.0099	U	0.0066	U	0.46	U
Acetone	0.05	100	mg/kg	-	-	-	-	0.0069	U	0.0049	J	0.01	U	-	-	0.0099	U	0.0083		0.46	U
Carbon disulfide			mg/kg	-	-	-	-	0.0069	U	0.009	U	0.01	U	-	-	0.0099	U	0.0066	U	0.46	U
2-Butanone	0.12	100	mg/kg	-	-	-	-	0.0069	U	0.009	U	0.01	U	-	-	0.0099	U	0.0066	U	0.46	U
Vinyl acetate			mg/kg	-	-	-	-	0.0069	U	0.009	U	0.01	U	-	-	0.0099	U	0.0066	U	0.46	U
4-Methyl-2-pentanone			mg/kg	-	-	-	-	0.0069	U	0.009	U	0.01	U	-	-	0.0099	U	0.0066	U	0.46	U
1,2,3-Trichloropropane			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
2-Hexanone			mg/kg	-	-	-	-	0.0069	U	0.009	U	0.01	U	-	-	0.0099	U	0.0066	U	0.46	U
Bromochloromethane			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-13-0-2"**		**SB-13-0-2"**		**SB-13-1.5-2**		**SB-13-12.5-13**		**SB-13-14.5-15**		**SB-14-0-2"**		**SB-14-1.5-2.0**		**SB-14-12.5-13.0**		**SB-14-19.5-20.0**	
SAMPLING DATE				**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**		**2/10/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**0-2"**		**1.5-2**		**12.5-13**		**14.5-15**		**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
2,2-Dichloropropane			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,2-Dibromoethane			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	U
1,3-Dichloropropane			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,1,1,2-Tetrachloroethane			mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U	-	-	0.0005	U	0.00033	U	0.023	U
Bromobenzene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
n-Butylbenzene	12	100	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.066	
sec-Butylbenzene	11	100	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.046	
tert-Butylbenzene	5.9	100	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
o-Chlorotoluene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
p-Chlorotoluene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,2-Dibromo-3-chloropropane			mg/kg	-	-	-	-	0.0021	U	0.0027	U	0.003	U	-	-	0.003	U	0.002	U	0.14	U
Hexachlorobutadiene			mg/kg	-	-	-	-	0.0028	U	0.0036	U	0.004	U	-	-	0.004	U	0.0026	U	0.18	U
Isopropylbenzene			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.032	J
p-Isopropyltoluene			mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.033	J
Naphthalene	12	100	mg/kg	-	-	-	-	0.0028	U	0.0036	U	0.004	U	-	-	0.004	U	0.0026	U	0.038	J
Acrylonitrile			mg/kg	-	-	-	-	0.0028	U	0.0036	U	0.004	U	-	-	0.004	U	0.0026	U	0.18	U
n-Propylbenzene	3.9	100	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U	-	-	0.00099	U	0.00066	U	0.16	
1,2,3-Trichlorobenzene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,2,4-Trichlorobenzene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,3,5-Trimethylbenzene	8.4	52	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
1,2,4-Trimethylbenzene	3.6	52	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.49	
1,4-Dioxane	0.1	13	mg/kg	-	-	-	-	0.055	U	0.072	U	0.08	U	-	-	0.079	U	0.053	U	3.7	U
p-Diethylbenzene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.052	J
p-Ethyltoluene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.22	
1,2,4,5-Tetramethylbenzene			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.14	
Ethyl ether			mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U	-	-	0.002	U	0.0013	U	0.092	U
trans-1,4-Dichloro-2-butene			mg/kg	-	-	-	-	0.0034	U	0.0045	U	0.005	U	-	-	0.005	U	0.0033	U	0.23	U

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL)
J:Estimated Value
E:Analyte exceeds calibration curve of intrument
PGWSCO: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RRUSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
Highlighted Blue = Exceeds NYSDEC PGWSCO
Highlighted Blue = Exceeds NYSDECRRUSCO

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-15-0-2"**		**SB-15-1.5-2.0**		**SB-15-12.5-13.0**		**SB-15-18.5-19.0**		**SB-16-0-2"**		**SB-16-1.5-2.0**		**SB-16-12.5-13.0**		**SB-16-17.5-18.0**	
SAMPLING DATE				**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**1.5-2**		**12.5-13**		**18.5-19**		**0-2"**		**1.5-2**		**12.5-13**		**17.5-18**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
Chlorinated Herbicides by GC																			
2,4-D			mg/kg	0.189	U	0.183	U	0.184	U	0.183	U	0.193	U	0.182	U	0.186	U	0.192	U
2,4,5-T			mg/kg	0.189	U	0.183	U	0.184	U	0.183	U	0.193	U	0.182	U	0.186	U	0.192	U
2,4,5-TP (Silvex)	3.8	100	mg/kg	0.189	U	0.183	U	0.184	U	0.183	U	0.193	U	0.182	U	0.186	U	0.192	U
Organochlorine Pesticides by GC																			
Delta-BHC	0.25	100	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
Lindane	0.1	1.3	mg/kg	0.00074	U	0.000708	U	0.000721	U	0.000722	U	0.000777	U	0.000714	U	0.000756	U	0.000768	U
Alpha-BHC	0.02	0.48	mg/kg	0.00074	U	0.000708	U	0.000721	U	0.000722	U	0.000777	U	0.000714	U	0.000756	U	0.000768	U
Beta-BHC	0.09	0.36	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
Heptachlor	0.38	2.1	mg/kg	0.000888	U	0.000849	U	0.000866	U	0.000866	U	0.000932	U	0.000857	U	0.000907	U	0.000921	U
Aldrin	0.19	0.097	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
Heptachlor epoxide			mg/kg	0.00333	U	0.00318	U	0.00325	U	0.00325	U	0.0035	U	0.00321	U	0.0034	U	0.00345	U
Endrin	0.06	11	mg/kg	0.00074	U	0.000708	U	0.000721	U	0.000722	U	0.000777	U	0.000714	U	0.000756	U	0.000768	U
Endrin aldehyde			mg/kg	0.00222	U	0.00212	U	0.00216	U	0.00216	U	0.00233	U	0.00214	U	0.00227	U	0.0023	U
Endrin ketone			mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
Dieldrin	0.1	0.2	mg/kg	0.00111	U	0.00106	U	0.00108	U	0.00108	U	0.00116	U	0.00107	U	0.00113	U	0.00115	U
4,4'-DDE	17	8.9	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
4,4'-DDD	14	13	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
4,4'-DDT	136	7.9	mg/kg	0.00333	U	0.00318	U	0.00325	U	0.00325	U	0.0035	U	0.00321	U	0.0034	U	0.00345	U
Endosulfan I	102	24	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
Endosulfan II	102	24	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U	0.00186	U	0.00171	U	0.00181	U	0.00184	U
Endosulfan sulfate	1000	24	mg/kg	0.00074	U	0.000708	U	0.000721	U	0.000722	U	0.000777	U	0.000714	U	0.000756	U	0.000768	U
Methoxychlor			mg/kg	0.00333	U	0.00318	U	0.00325	U	0.00325	U	0.0035	U	0.00321	U	0.0034	U	0.00345	U
Toxaphene			mg/kg	0.0333	U	0.0318	U	0.0325	U	0.0325	U	0.035	U	0.0321	U	0.034	U	0.0345	U
cis-Chlordane	2.9	4.2	mg/kg	0.00222	U	0.00212	U	0.00216	U	0.00216	U	0.00233	U	0.00214	U	0.00227	U	0.0023	U
trans-Chlordane			mg/kg	0.00222	U	0.00212	U	0.00216	U	0.00216	U	0.00233	U	0.00214	U	0.00227	U	0.0023	U
Chlordane			mg/kg	0.0148	U	0.0142	U	0.0144	U	0.0144	U	0.0155	U	0.0143	U	0.0151	U	0.0154	U
Perfluorinated Alkyl Acids by Isotope Dilution																			
Perfluorobutanoic Acid (PFBA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.000026	J	0.000077	J	0.00003	J	0.00105	U
Perfluoropentanoic Acid (PFPeA)			mg/kg	0.00109	U	0.000075	J	0.00104	U	0.000995	U	0.000175	J	0.000109	J	0.00103	U	0.00105	U
Perfluorobutanesulfonic Acid (PFBS)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorohexanoic Acid (PFHxA)			mg/kg	0.000067	J	0.000074	J	0.00104	U	0.000995	U	0.00041	J	0.000202	J	0.000074	J	0.000082	J
Perfluoroheptanoic Acid (PFHpA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.000241	J	0.000136	J	0.00103	U	0.00105	U
Perfluorohexanesulfonic Acid (PFHxS)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.000158	J	0.00052	J	0.000274	J	0.0002	J
Perfluorooctanoic Acid (PFOA)			mg/kg	0.00026	J	0.000163	J	0.00104	U	0.000995	U	0.00115		0.000579	J	0.00005	J	0.000054	J
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluoroheptanesulfonic Acid (PFHpS)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorononanoic Acid (PFNA)			mg/kg	0.000414	J	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorooctanesulfonic Acid (PFOS)			mg/kg	0.00172		0.000197	J	0.00104	U	0.000995	U	0.00236		0.000169	J	0.00103	U	0.00105	U
Perfluorodecanoic Acid (PFDA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluoroundecanoic Acid (PFUnA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorodecanesulfonic Acid (PFDS)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorooctanesulfonamide (FOSA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.02	U	0.02	U	0.00105	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorododecanoic Acid (PFDoA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorotridecanoic Acid (PFTrDA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
Perfluorotetradecanoic Acid (PFTA)			mg/kg	0.00109	U	0.00104	U	0.00104	U	0.000995	U	0.00112	U	0.000999	U	0.00103	U	0.00105	U
PFOA/PFOS, Total			mg/kg	0.00198	J	0.00036	J	0.00104	U	0.000995	U	0.00351		0.000748	J	0.00005	J	0.000054	J
Polychlorinated Biphenyls by GC																			
Aroclor 1016	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
Aroclor 1221	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
Aroclor 1232	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
Aroclor 1242	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
Aroclor 1248	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
Aroclor 1254	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
Aroclor 1260	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.00688	J	0.0352	U	0.0375	U	0.0386	U
Aroclor 1262	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
Aroclor 1268	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.0372	U	0.0352	U	0.0375	U	0.0386	U
PCBs, Total	3.2	1	mg/kg	0.0363	U	0.0352	U	0.0355	U	0.0372	U	0.00688	J	0.0352	U	0.0375	U	0.0386	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				SB-15-0-2"		SB-15-1.5-2.0		SB-15-12.5-13.0		SB-15-18.5-19.0		SB-16-0-2"		SB-16-1.5-2.0		SB-16-12.5-13.0		SB-16-17.5-18.0	
SAMPLING DATE				2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020	
SAMPLE TYPE				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)				0-2"		1.5-2		12.5-13		18.5-19		0-2"		1.5-2		12.5-13		17.5-18	
	PGWSCO	RRUSCO	Units	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Semivolatile Organics by GC/MS																			
Acenaphthene	98	100	mg/kg	0.024	J	0.055	J	0.14	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
1,2,4-Trichlorobenzene			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Hexachlorobenzene	3.2	1.2	mg/kg	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U	0.12	U
Bis(2-chloroethyl)ether			mg/kg	0.17	U	0.16	U	0.16	U	0.16	U	0.17	U	0.17	U	0.17	U	0.17	U
2-Chloronaphthalene			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
1,2-Dichlorobenzene	1.1	100	mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
1,3-Dichlorobenzene	2.4	49	mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
1,4-Dichlorobenzene	1.8	13	mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
3,3'-Dichlorobenzidine			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2,4-Dinitrotoluene			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2,6-Dinitrotoluene			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Fluoranthene	1000	100	mg/kg	2.3		1		0.11	U	0.11	U	0.14		0.026	J	0.11	U	0.12	U
4-Chlorophenyl phenyl ether			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
4-Bromophenyl phenyl ether			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Bis(2-chloroisopropyl)ether			mg/kg	0.22	U	0.22	U	0.22	U	0.22	U	0.23	U	0.22	U	0.23	U	0.23	U
Bis(2-chloroethoxy)methane			mg/kg	0.2	U	0.2	U	0.2	U	0.2	U	0.21	U	0.2	U	0.2	U	0.21	U
Hexachlorobutadiene			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Hexachlorocyclopentadiene			mg/kg	0.54	U	0.52	U	0.52	U	0.52	U	0.55	U	0.53	U	0.54	U	0.55	U
Hexachloroethane			mg/kg	0.15	U	0.15	U	0.14	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
Isophorone			mg/kg	0.17	U	0.16	U	0.16	U	0.16	U	0.17	U	0.17	U	0.17	U	0.17	U
Naphthalene	12	100	mg/kg	0.19	U	0.057	J	0.18	U	0.18	U	0.096	J	0.19	U	0.19	U	0.16	J
Nitrobenzene			mg/kg	0.17	U	0.16	U	0.16	U	0.16	U	0.17	U	0.17	U	0.17	U	0.17	U
NDPA/DPA			mg/kg	0.15	U	0.15	U	0.14	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
n-Nitrosodi-n-propylamine			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Bis(2-ethylhexyl)phthalate			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Butyl benzyl phthalate			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Di-n-butylphthalate			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Di-n-octylphthalate			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Diethyl phthalate			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Dimethyl phthalate			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Benzo(a)anthracene	1	1	mg/kg	1.4		0.5		0.11	U	0.11	U	0.077	J	0.11	U	0.11	U	0.12	U
Benzo(a)pyrene	22	1	mg/kg	1.4		0.57		0.14	U	0.15	U	0.086	J	0.15	U	0.15	U	0.15	U
Benzo(b)fluoranthene	1.7	1	mg/kg	2.4		0.7		0.11	U	0.11	U	0.12		0.11	U	0.11	U	0.12	U
Benzo(k)fluoranthene	1.7	3.9	mg/kg	0.82		0.25		0.11	U	0.11	U	0.035	J	0.11	U	0.11	U	0.12	U
Chrysene	1	3.9	mg/kg	1.5		0.48		0.11	U	0.11	U	0.09	J	0.11	U	0.11	U	0.12	U
Acenaphthylene	107	100	mg/kg	0.053	J	0.046	J	0.14	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
Anthracene	1000	100	mg/kg	0.15		0.16		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U	0.12	U
Benzo(ghi)perylene	1000	100	mg/kg	0.97		0.37		0.14	U	0.15	U	0.063	J	0.15	U	0.15	U	0.15	U
Fluorene	386	100	mg/kg	0.025	J	0.059	J	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Phenanthrene	1000	100	mg/kg	0.3		0.53		0.11	U	0.11	U	0.099	J	0.11	U	0.11	U	0.12	U
Dibenzo(a,h)anthracene	1000	0.33	mg/kg	0.3		0.093	J	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U	0.12	U
Indeno(1,2,3-cd)pyrene	8.2	0.5	mg/kg	1.2		0.4		0.14	U	0.15	U	0.066	J	0.15	U	0.15	U	0.15	U
Pyrene	1000	100	mg/kg	1.9		0.85		0.11	U	0.11	U	0.14		0.023	J	0.11	U	0.12	U
Biphenyl			mg/kg	0.43	U	0.42	U	0.42	U	0.42	U	0.44	U	0.42	U	0.43	U	0.44	U
4-Chloroaniline			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2-Nitroaniline			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
3-Nitroaniline			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
4-Nitroaniline			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Dibenzofuran	210	59	mg/kg	0.19	U	0.045	J	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2-Methylnaphthalene			mg/kg	0.22	U	0.04	J	0.22	U	0.22	U	0.073	J	0.22	U	0.23	U	0.14	J
1,2,4,5-Tetrachlorobenzene			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Acetophenone			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2,4,6-Trichlorophenol			mg/kg	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U	0.12	U
p-Chloro-m-cresol			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2-Chlorophenol			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2,4-Dichlorophenol			mg/kg	0.17	U	0.16	U	0.16	U	0.16	U	0.17	U	0.17	U	0.17	U	0.17	U
2,4-Dimethylphenol			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2-Nitrophenol			mg/kg	0.41	U	0.4	U	0.39	U	0.4	U	0.42	U	0.4	U	0.41	U	0.42	U
4-Nitrophenol			mg/kg	0.26	U	0.26	U	0.26	U	0.26	U	0.27	U	0.26	U	0.26	U	0.27	U
2,4-Dinitrophenol			mg/kg	0.9	U	0.88	U	0.88	U	0.88	U	0.92	U	0.89	U	0.9	U	0.92	U
4,6-Dinitro-o-cresol			mg/kg	0.49	U	0.48	U	0.47	U	0.48	U	0.5	U	0.48	U	0.49	U	0.5	U
Pentachlorophenol	0.8	6.7	mg/kg	0.15	U	0.15	U	0.14	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
Phenol	0.33	100	mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
2-Methylphenol	0.33	100	mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
3-Methylphenol/4-Methylphenol	0.33	100	mg/kg	0.27	U	0.26	U	0.26	U	0.26	U	0.28	U	0.27	U	0.27	U	0.28	U
2,4,5-Trichlorophenol			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Benzoic Acid			mg/kg	0.61	U	0.59	U	0.59	U	0.59	U	0.62	U	0.6	U	0.61	U	0.62	U
Benzyl Alcohol			mg/kg	0.19	U	0.18	U	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
Carbazole			mg/kg	0.084	J	0.064	J	0.18	U	0.18	U	0.19	U	0.19	U	0.19	U	0.19	U
1,4-Dioxane	0.1	13	mg/kg	0.028	U	0.027	U	0.027	U	0.028	U	0.029	U	0.028	U	0.028	U	0.029	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				SB-15-0-2"		SB-15-1.5-2.0		SB-15-12.5-13.0		SB-15-18.5-19.0		SB-16-0-2"		SB-16-1.5-2.0		SB-16-12.5-13.0		SB-16-17.5-18.0	
SAMPLING DATE				2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020	
SAMPLE TYPE				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)				0-2"		1.5-2		12.5-13		18.5-19		0-2"		1.5-2		12.5-13		17.5-18	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
Total Metals																			
Aluminum, Total			mg/kg	9560		9390		7140		3510		8110		8170		9900		4740	
Antimony, Total			mg/kg	0.663	J	1.25	J	0.686	J	0.762	J	2.92	J	0.532	J	1.13	J	0.38	J
Arsenic, Total	16	16	mg/kg	4.7		3.81		2.13		1.02		5.32		2.66		1.88		0.714	J
Barium, Total	820	400	mg/kg	55.2		53.7		51.5		25.3		60.3		48.5		66		32.5	
Beryllium, Total	47	72	mg/kg	0.389	J	0.401	J	0.458		0.131	J	0.396	J	0.367	J	0.43	J	0.163	J
Cadmium, Total	7.5	4.3	mg/kg	0.301	J	0.523	J	0.255	J	0.166	J	0.737	J	0.227	J	0.28	J	0.154	J
Calcium, Total			mg/kg	5810		6430		2550		41500		2980		1000		1460		2820	
Chromium, Total			mg/kg	16.9		15.1		25.3		7.39		15.2		14.5		21.2		11.9	
Cobalt, Total			mg/kg	7.34		7.63		8.33		3.72		6.77		6.24		8.9		4.81	
Copper, Total	1720	270	mg/kg	23.3		20.6		22.3		16.6		24.9		12.5		22.4		17.6	
Iron, Total			mg/kg	16000		16700		15900		6310		14500		13400		17300		8320	
Lead, Total	450	400	mg/kg	45.1		227		6.06		2.46	J	138		17.4		5.48		2.39	J
Magnesium, Total			mg/kg	5560		4840		3020		13700		3560		2410		4150		2990	
Manganese, Total	2000	2000	mg/kg	367		308		336		268		265		322		374		199	
Mercury, Total	0.73	0.81	mg/kg	0.076	U	0.079		0.089	U	0.086	U	0.124		0.065	J	0.091	U	0.076	U
Nickel, Total	130	310	mg/kg	15.8		15.7		16.3		8.39		15.2		11.9		18.8		11.6	
Potassium, Total			mg/kg	723		638		1100		1040		813		492		1860		1100	
Selenium, Total	4	180	mg/kg	0.451	J	1.74	U	1.76	U	1.75	U	1.84	U	1.75	U	1.75	U	1.81	U
Silver, Total	8.3	180	mg/kg	0.884	U	0.872	U	0.88	U	0.876	U	0.921	U	0.873	U	0.877	U	0.904	U
Sodium, Total			mg/kg	337		256		473		115	J	163	J	113	J	174	J	142	J
Thallium, Total			mg/kg	1.77	U	1.74	U	1.76	U	1.75	U	1.84	U	1.75	U	1.75	U	1.81	U
Vanadium, Total			mg/kg	23.4		20.8		26.7		11.5		21.6		17.3		26.4		18.6	
Zinc, Total	2480	10000	mg/kg	44.6		108		31.9		18.5		142		31.6		40.6		17.2	
Volatile Organics by EPA 5035																			
Methylene chloride	0.05	100	mg/kg	-	-	0.0055	U	0.0047	U	0.0041	U	-	-	0.0046	U	0.0045	U	5.8	U
1,1-Dichloroethane	0.27	26	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
Chloroform	0.37	49	mg/kg	-	-	0.0016	U	0.0014	U	0.0012	U	-	-	0.0014	U	0.00027	J	1.7	U
Carbon tetrachloride	0.76	2.4	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
1,2-Dichloropropane			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
Dibromochloromethane			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
1,1,2-Trichloroethane			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
Tetrachloroethene	1.3	19	mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
Chlorobenzene	1.1	100	mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
Trichlorofluoromethane			mg/kg	-	-	0.0044	U	0.0038	U	0.0033	U	-	-	0.0037	U	0.0036	U	4.6	U
1,2-Dichloroethane	0.02	3.1	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
1,1,1-Trichloroethane	0.68	100	mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
Bromodichloromethane			mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
trans-1,3-Dichloropropene			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
cis-1,3-Dichloropropene			mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
1,3-Dichloropropene, Total			mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
1,1-Dichloropropene			mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
Bromoform			mg/kg	-	-	0.0044	U	0.0038	U	0.0033	U	-	-	0.0037	U	0.0036	U	4.6	U
1,1,2,2-Tetrachloroethane			mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
Benzene	0.06	4.8	mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00027	J	1.9	
Toluene	0.7	100	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	46	
Ethylbenzene	1	41	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	110	
Chloromethane			mg/kg	-	-	0.0044	U	0.0038	U	0.0033	U	-	-	0.0037	U	0.0036	U	4.6	U
Bromomethane			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
Vinyl chloride	0.02	0.9	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
Chloroethane			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,1-Dichloroethene	0.33	100	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
trans-1,2-Dichloroethene	0.19	100	mg/kg	-	-	0.0016	U	0.0014	U	0.0012	U	-	-	0.0014	U	0.0014	U	1.7	U
Trichloroethene	0.47	21	mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
1,2-Dichlorobenzene	1.1	100	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,3-Dichlorobenzene	2.4	49	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,4-Dichlorobenzene	1.8	13	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
Methyl tert butyl ether	0.93	100	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
p/m-Xylene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	430	
o-Xylene			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	140	
Xylenes, Total	1.6	100	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	570	
cis-1,2-Dichloroethene	0.25	100	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
1,2-Dichloroethene, Total			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
Dibromomethane			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
Styrene			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
Dichlorodifluoromethane			mg/kg	-	-	0.011	U	0.0094	U	0.0082	U	-	-	0.0092	U	0.009	U	12	U
Acetone	0.05	100	mg/kg	-	-	0.011	U	0.0094	U	0.0082	U	-	-	0.0092	U	0.01		12	U
Carbon disulfide			mg/kg	-	-	0.011	U	0.0094	U	0.0082	U	-	-	0.0092	U	0.009	U	12	U
2-Butanone	0.12	100	mg/kg	-	-	0.011	U	0.0094	U	0.0082	U	-	-	0.0092	U	0.009	U	12	U
Vinyl acetate			mg/kg	-	-	0.011	U	0.0094	U	0.0082	U	-	-	0.0092	U	0.009	U	12	U
4-Methyl-2-pentanone			mg/kg	-	-	0.011	U	0.0094	U	0.0082	U	-	-	0.0092	U	0.009	U	12	U
1,2,3-Trichloropropane			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
2-Hexanone			mg/kg	-	-	0.011	U	0.0094	U	0.0082	U	-	-	0.0092	U	0.009	U	12	U
Bromochloromethane			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-15-0-2"**		**SB-15-1.5-2.0**		**SB-15-12.5-13.0**		**SB-15-18.5-19.0**		**SB-16-0-2"**		**SB-16-1.5-2.0**		**SB-16-12.5-13.0**		**SB-16-17.5-18.0**	
SAMPLING DATE				**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**1.5-2**		**12.5-13**		**18.5-19**		**0-2"**		**1.5-2**		**12.5-13**		**17.5-18**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
2,2-Dichloropropane			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,2-Dibromoethane			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	1.2	U
1,3-Dichloropropane			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,1,1,2-Tetrachloroethane			mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U	-	-	0.00046	U	0.00045	U	0.58	U
Bromobenzene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
n-Butylbenzene	12	100	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	8	
sec-Butylbenzene	11	100	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	3.8	
tert-Butylbenzene	5.9	100	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
o-Chlorotoluene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
p-Chlorotoluene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,2-Dibromo-3-chloropropane			mg/kg	-	-	0.0033	U	0.0028	U	0.0025	U	-	-	0.0028	U	0.0027	U	3.4	U
Hexachlorobutadiene			mg/kg	-	-	0.0044	U	0.0038	U	0.0033	U	-	-	0.0037	U	0.0036	U	4.6	U
Isopropylbenzene			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	8.9	
p-Isopropyltoluene			mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.00014	J	1.7	
Naphthalene	12	100	mg/kg	-	-	0.0044	U	0.0038	U	0.0033	U	-	-	0.0037	U	0.0036	U	20	
Acrylonitrile			mg/kg	-	-	0.0044	U	0.0038	U	0.0033	U	-	-	0.0037	U	0.0036	U	4.6	U
n-Propylbenzene	3.9	100	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U	-	-	0.00092	U	0.0009	U	33	
1,2,3-Trichlorobenzene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,2,4-Trichlorobenzene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
1,3,5-Trimethylbenzene	8.4	52	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	59	
1,2,4-Trimethylbenzene	3.6	52	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	190	
1,4-Dioxane	0.1	13	mg/kg	-	-	0.088	U	0.075	U	0.066	U	-	-	0.074	U	0.072	U	92	U
p-Diethylbenzene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	58	
p-Ethyltoluene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	170	
1,2,4,5-Tetramethylbenzene			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.00058	J	15	
Ethyl ether			mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U	-	-	0.0018	U	0.0018	U	2.3	U
trans-1,4-Dichloro-2-butene			mg/kg	-	-	0.0055	U	0.0047	U	0.0041	U	-	-	0.0046	U	0.0045	U	5.8	U

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL)
J:Estimated Value
E:Analyte exceeds calibration curve of intrument
PGWSCO: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 3
RRUSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCR
Highlighted Blue = Exceeds NYSDEC PGWSCO
Highlighted Blue = Exceeds NYSDECRRUSCO

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				SB-17-0-2"		SB-17-1.5-2.0		SB-17-12.5-13.0		SB-17-19.5-20.0		SB-18-0-2"		SB-18-1.5-2.0		SB-18-12.5-13.0		SB-18-19.5-20.0	
SAMPLING DATE				2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020	
SAMPLE TYPE				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)				0-2"		1.5-2		12.5-13		19.5-20		0-2"		1.5-2		12.5-13		19.5-20	
	PGWSCO	RRUSCO	Units	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Chlorinated Herbicides by GC																			
2,4-D			mg/kg	0.191	U	0.19	U	0.184	U	0.189	U	0.187	U	0.199	U	0.18	U	0.182	U
2,4,5-T			mg/kg	0.191	U	0.19	U	0.184	U	0.189	U	0.187	U	0.199	U	0.18	U	0.182	U
2,4,5-TP (Silvex)	3.8	100	mg/kg	0.191	U	0.19	U	0.184	U	0.189	U	0.187	U	0.199	U	0.18	U	0.182	U
Organochlorine Pesticides by GC																			
Delta-BHC	0.25	100	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
Lindane	0.1	1.3	mg/kg	0.000744	U	0.000738	U	0.000715	U	0.00072	U	0.00073	U	0.000802	U	0.000726	U	0.000694	U
Alpha-BHC	0.02	0.48	mg/kg	0.000744	U	0.000738	U	0.000715	U	0.00072	U	0.00073	U	0.000802	U	0.000726	U	0.000694	U
Beta-BHC	0.09	0.36	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
Heptachlor	0.38	2.1	mg/kg	0.000893	U	0.000886	U	0.000858	U	0.000865	U	0.000876	U	0.000963	U	0.000871	U	0.000833	U
Aldrin	0.19	0.097	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
Heptachlor epoxide			mg/kg	0.00335	U	0.00332	U	0.00322	U	0.00324	U	0.00328	U	0.00361	U	0.00326	U	0.00312	U
Endrin	0.06	11	mg/kg	0.000744	U	0.000738	U	0.000715	U	0.00072	U	0.00073	U	0.000802	U	0.000726	U	0.000694	U
Endrin aldehyde			mg/kg	0.00223	U	0.00221	U	0.00214	U	0.00216	U	0.00219	U	0.00241	U	0.00218	U	0.00208	U
Endrin ketone			mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
Dieldrin	0.1	0.2	mg/kg	0.00112	U	0.00111	U	0.00107	U	0.00108	U	0.0011	U	0.0012	U	0.00109	U	0.00104	U
4,4'-DDE	17	8.9	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
4,4'-DDD	14	13	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
4,4'-DDT	136	7.9	mg/kg	0.00335	U	0.00332	U	0.00322	U	0.00324	U	0.00328	U	0.00361	U	0.00326	U	0.00312	U
Endosulfan I	102	24	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
Endosulfan II	102	24	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U	0.00175	U	0.00192	U	0.00174	U	0.00167	U
Endosulfan sulfate	1000	24	mg/kg	0.000744	U	0.000738	U	0.000715	U	0.00072	U	0.00073	U	0.000802	U	0.000726	U	0.000694	U
Methoxychlor			mg/kg	0.00335	U	0.00332	U	0.00322	U	0.00324	U	0.00328	U	0.00361	U	0.00326	U	0.00312	U
Toxaphene			mg/kg	0.0335	U	0.0332	U	0.0322	U	0.0324	U	0.0328	U	0.0361	U	0.0326	U	0.0312	U
cis-Chlordane	2.9	4.2	mg/kg	0.00223	U	0.00221	U	0.00214	U	0.00216	U	0.00219	U	0.00241	U	0.00218	U	0.00208	U
trans-Chlordane			mg/kg	0.00223	U	0.00221	U	0.00214	U	0.00216	U	0.00219	U	0.00241	U	0.00218	U	0.00208	U
Chlordane			mg/kg	0.0149	U	0.0148	U	0.0143	U	0.0144	U	0.0146	U	0.016	U	0.0145	U	0.0139	U
Perfluorinated Alkyl Acids by Isotope Dilution																			
Perfluorobutanoic Acid (PFBA)			mg/kg	0.00111	U	0.00107	U	0.000023	J	0.00109	U	0.00003	J	0.00118	U	0.00101	U	0.000997	U
Perfluoropentanoic Acid (PFPeA)			mg/kg	0.000106	J	0.00107	U	0.000094	J	0.000083	J	0.000313	J	0.00118	U	0.00101	U	0.000997	U
Perfluorobutanesulfonic Acid (PFBS)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorohexanoic Acid (PFHxA)			mg/kg	0.000141	J	0.00107	U	0.000096	J	0.000097	J	0.000462	J	0.00118	U	0.000061	J	0.000061	J
Perfluoroheptanoic Acid (PFHpA)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.000073	J	0.00118	U	0.00101	U	0.000997	U
Perfluorohexanesulfonic Acid (PFHxS)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorooctanoic Acid (PFOA)			mg/kg	0.000063	J	0.00107	U	0.000985	U	0.000061	J	0.000153	J	0.00118	U	0.00101	U	0.000997	U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluoroheptanesulfonic Acid (PFHpS)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorononanoic Acid (PFNA)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorooctanesulfonic Acid (PFOS)			mg/kg	0.00784		0.00771		0.000281	J	0.000697	J	0.00108		0.00118	U	0.00101	U	0.000997	U
Perfluorodecanoic Acid (PFDA)			mg/kg	0.000107	J	0.000094	J	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)			mg/kg	0.00111	U	0.000348	J	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluoroundecanoic Acid (PFUnA)			mg/kg	0.000107	J	0.00107	U	0.000985	U	0.00109	U	0.000187	J	0.00118	U	0.00101	U	0.000997	U
Perfluorodecanesulfonic Acid (PFDS)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorooctanesulfonamide (FOSA)			mg/kg	0.000686	J	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)			mg/kg	0.000481	J	0.000635	J	0.00018	J	0.000095	J	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorododecanoic Acid (PFDoA)			mg/kg	0.00018	J	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorotridecanoic Acid (PFTrDA)			mg/kg	0.00111	U	0.00107	U	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
Perfluorotetradecanoic Acid (PFTA)			mg/kg	0.00111	U	0.000088	J	0.000985	U	0.00109	U	0.00101	U	0.00118	U	0.00101	U	0.000997	U
PFOA/PFOS, Total			mg/kg	0.0079	J	0.00771		0.000281	J	0.000758	J	0.00123	J	0.00118	U	0.00101	U	0.000997	U
Polychlorinated Biphenyls by GC																			
Aroclor 1016	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1221	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1232	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1242	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1248	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1254	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1260	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1262	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
Aroclor 1268	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U
PCBs, Total	3.2	1	mg/kg	0.0377	U	0.0371	U	0.0355	U	0.0375	U	0.0372	U	0.0399	U	0.0356	U	0.0358	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-17-0-2"**		**SB-17-1.5-2.0**		**SB-17-12.5-13.0**		**SB-17-19.5-20.0**		**SB-18-0-2"**		**SB-18-1.5-2.0**		**SB-18-12.5-13.0**		**SB-18-19.5-20.0**	
SAMPLING DATE				**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**		**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
Semivolatile Organics by GC/MS																			
Acenaphthene	98	100	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	1.5	U	1.6	U	0.14	U	0.14	U
1,2,4-Trichlorobenzene			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	0.22	J	2	U	0.18	U	0.18	U
Hexachlorobenzene	3.2	1.2	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	1.1	U	1.2	U	0.11	U	0.11	U
Bis(2-chloroethyl)ether			mg/kg	0.17	U	0.17	U	0.17	U	0.17	U	1.7	U	1.8	U	0.16	U	0.16	U
2-Chloronaphthalene			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
1,2-Dichlorobenzene	1.1	100	mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
1,3-Dichlorobenzene	2.4	49	mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
1,4-Dichlorobenzene	1.8	13	mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
3,3'-Dichlorobenzidine			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2,4-Dinitrotoluene			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2,6-Dinitrotoluene			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Fluoranthene	1000	100	mg/kg	0.11	U	0.023	J	0.11	U	0.11	U	0.56	J	0.29	J	0.11	U	0.034	J
4-Chlorophenyl phenyl ether			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
4-Bromophenyl phenyl ether			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Bis(2-chloroisopropyl)ether			mg/kg	0.22	U	0.23	U	0.22	U	0.22	U	2.2	U	2.4	U	0.21	U	0.21	U
Bis(2-chloroethoxy)methane			mg/kg	0.2	U	0.21	U	0.2	U	0.2	U	2	U	2.2	U	0.19	U	0.19	U
Hexachlorobutadiene			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Hexachlorocyclopentadiene			mg/kg	0.54	U	0.55	U	0.53	U	0.54	U	5.3	U	5.7	U	0.51	U	0.51	U
Hexachloroethane			mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	1.5	U	1.6	U	0.14	U	0.14	U
Isophorone			mg/kg	0.17	U	0.17	U	0.17	U	0.17	U	1.7	U	1.8	U	0.16	U	0.16	U
Naphthalene	12	100	mg/kg	0.19	U	0.19	U	0.19	U	0.23		1.1	J	3.4		0.069	J	12	E
Nitrobenzene			mg/kg	0.17	U	0.17	U	0.17	U	0.17	U	1.7	U	1.8	U	0.16	U	0.16	U
NDPA/DPA			mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	1.5	U	1.6	U	0.14	U	0.14	U
n-Nitrosodi-n-propylamine			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Bis(2-ethylhexyl)phthalate			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Butyl benzyl phthalate			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Di-n-butylphthalate			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Di-n-octylphthalate			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Diethyl phthalate			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Dimethyl phthalate			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Benzo(a)anthracene	1	1	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	0.42	J	0.38	J	0.11	U	0.021	J
Benzo(a)pyrene	22	1	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	1.5	U	1.6	U	0.14	U	0.14	U
Benzo(b)fluoranthene	1.7	1	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	1.1	U	1.2	U	0.11	U	0.11	U
Benzo(k)fluoranthene	1.7	3.9	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	1.1	U	1.2	U	0.11	U	0.11	U
Chrysene	1	3.9	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	1.2		0.94	J	0.11	U	0.11	U
Acenaphthylene	107	100	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	1.5	U	1.6	U	0.14	U	0.14	U
Anthracene	1000	100	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	1.1	U	1.2	U	0.11	U	0.11	U
Benzo(ghi)perylene	1000	100	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	0.27	J	1.6	U	0.14	U	0.14	U
Fluorene	386	100	mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.12	J
Phenanthrene	1000	100	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	0.4	J	1.2	U	0.11	U	0.14	
Dibenzo(a,h)anthracene	1000	0.33	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	1.1	U	1.2	U	0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	8.2	0.5	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	1.5	U	1.6	U	0.14	U	0.14	U
Pyrene	1000	100	mg/kg	0.11	U	0.022	J	0.11	U	0.11	U	0.96	J	0.54	J	0.11	U	0.049	J
Biphenyl			mg/kg	0.43	U	0.44	U	0.42	U	0.43	U	4.2	U	4.6	U	0.41	U	0.24	J
4-Chloroaniline			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2-Nitroaniline			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
3-Nitroaniline			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
4-Nitroaniline			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Dibenzofuran	210	59	mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2-Methylnaphthalene			mg/kg	0.22	U	0.23	U	0.22	U	0.78		2.2	U	0.48	J	0.21	U	9.4	E
1,2,4,5-Tetrachlorobenzene			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Acetophenone			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2,4,6-Trichlorophenol			mg/kg	0.11	U	0.12	U	0.11	U	0.11	U	1.1	U	1.2	U	0.11	U	0.11	U
p-Chloro-m-cresol			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2-Chlorophenol			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2,4-Dichlorophenol			mg/kg	0.17	U	0.17	U	0.17	U	0.17	U	1.7	U	1.8	U	0.16	U	0.16	U
2,4-Dimethylphenol			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2-Nitrophenol			mg/kg	0.4	U	0.42	U	0.4	U	0.4	U	4	U	4.3	U	0.38	U	0.38	U
4-Nitrophenol			mg/kg	0.26	U	0.27	U	0.26	U	0.26	U	2.6	U	2.8	U	0.25	U	0.25	U
2,4-Dinitrophenol			mg/kg	0.9	U	0.92	U	0.89	U	0.9	U	8.9	U	9.6	U	0.86	U	0.85	U
4,6-Dinitro-o-cresol			mg/kg	0.49	U	0.5	U	0.48	U	0.49	U	4.8	U	5.2	U	0.46	U	0.46	U
Pentachlorophenol	0.8	6.7	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U	1.5	U	1.6	U	0.14	U	0.14	U
Phenol	0.33	100	mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
2-Methylphenol	0.33	100	mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
3-Methylphenol/4-Methylphenol	0.33	100	mg/kg	0.27	U	0.28	U	0.27	U	0.27	U	2.7	U	2.9	U	0.26	U	0.092	J
2,4,5-Trichlorophenol			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Benzoic Acid			mg/kg	0.61	U	0.62	U	0.6	U	0.61	U	6	U	6.5	U	0.58	U	0.58	U
Benzyl Alcohol			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
Carbazole			mg/kg	0.19	U	0.19	U	0.19	U	0.19	U	1.9	U	2	U	0.18	U	0.18	U
1,4-Dioxane	0.1	13	mg/kg	0.028	U	0.029	U	0.028	U	0.028	U	0.28	U	0.3	U	0.027	U	0.027	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				SB-17-0-2"		SB-17-1.5-2.0		SB-17-12.5-13.0		SB-17-19.5-20.0		SB-18-0-2"		SB-18-1.5-2.0		SB-18-12.5-13.0		SB-18-19.5-20.0	
SAMPLING DATE				2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020	
SAMPLE TYPE				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)				0-2"		1.5-2		12.5-13		19.5-20		0-2"		1.5-2		12.5-13		19.5-20	
	PGWSCO	RRUSCO	Units	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Total Metals																			
Aluminum, Total			mg/kg	11000		7710		8400		6130		6240		8480		10100		3550	
Antimony, Total			mg/kg	1.63	J	1.34	J	0.541	J	0.883	J	0.485	J	0.659	J	0.99	J	4.28	U
Arsenic, Total	16	16	mg/kg	4.08		2.3		0.975		0.468	J	2.23		2.82		2.15		0.376	J
Barium, Total	820	400	mg/kg	97.6		33		48.8		30.1		27.6		52.7		71.4		51.2	
Beryllium, Total	47	72	mg/kg	0.61		0.397	J	0.31	J	0.238	J	0.296	J	0.455	J	0.424		0.222	J
Cadmium, Total	7.5	4.3	mg/kg	0.844	J	0.371	J	0.213	J	0.247	J	0.198	J	0.204	J	0.316	J	0.855	U
Calcium, Total			mg/kg	6540		3100		595		2100		11700		2210		1250		21100	
Chromium, Total			mg/kg	20.7		10.6		19.5		17		9.9		10.5		21.3		11.1	
Cobalt, Total			mg/kg	9.8		5.08		5.93		7.6		4.27		5.27		9.84		5.64	
Copper, Total	1720	270	mg/kg	30.6		15		23.7		18.8		11.6		9.72		21.8		15.1	
Iron, Total			mg/kg	20200		11000		11500		16800		9260		12900		18900		10000	
Lead, Total	450	400	mg/kg	135		11.6		3.2	J	3.92	J	21.1		7.93		5.28		3.36	J
Magnesium, Total			mg/kg	6270		2870		2480		3470		2220		2800		4390		6230	
Manganese, Total	2000	2000	mg/kg	246		147		180		129		92.5		252		413		494	
Mercury, Total	0.73	0.81	mg/kg	0.129		0.076	U	0.073	U	0.072	U	0.059	J	0.094	U	0.075	U	0.087	U
Nickel, Total	130	310	mg/kg	22.6		15.4		14.1		14.7		9.26		11		20.3		9.56	
Potassium, Total			mg/kg	2150		445		1010		1070		371		370		1930		1220	
Selenium, Total	4	180	mg/kg	0.458	J	1.76	U	1.77	U	1.77	U	1.8	U	1.86	U	1.66	U	1.71	U
Silver, Total	8.3	180	mg/kg	0.898	U	0.883	U	0.886	U	0.883	U	0.899	U	0.928	U	0.832	U	0.855	U
Sodium, Total			mg/kg	252		77.5	J	201		404		116	J	347		371		283	
Thallium, Total			mg/kg	1.8	U	1.76	U	1.77	U	1.77	U	1.8	U	1.86	U	1.66	U	1.71	U
Vanadium, Total			mg/kg	26.9		14.9		24.1		29.9		12.4		13.8		27.3		18.8	
Zinc, Total	2480	10000	mg/kg	156		55.1		22.6		20.8		49.2		30.9		43.7		18	
Volatile Organics by EPA 5035																			
Methylene chloride	0.05	100	mg/kg	-	-	0.0044	U	0.27	U	0.27	U	-	-	3	U	0.23	U	17	U
1,1-Dichloroethane	0.27	26	mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
Chloroform	0.37	49	mg/kg	-	-	0.0003	J	0.08	U	0.081	U	-	-	0.91	U	0.07	U	5.2	U
Carbon tetrachloride	0.76	2.4	mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
1,2-Dichloropropane			mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
Dibromochloromethane			mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
1,1,2-Trichloroethane			mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
Tetrachloroethene	1.3	19	mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
Chlorobenzene	1.1	100	mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
Trichlorofluoromethane			mg/kg	-	-	0.0036	U	0.21	U	0.22	U	-	-	2.4	U	0.19	U	14	U
1,2-Dichloroethane	0.02	3.1	mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
1,1,1-Trichloroethane	0.68	100	mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
Bromodichloromethane			mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
trans-1,3-Dichloropropene			mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
cis-1,3-Dichloropropene			mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
1,3-Dichloropropene, Total			mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
1,1-Dichloropropene			mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
Bromoform			mg/kg	-	-	0.0036	U	0.21	U	0.22	U	-	-	2.4	U	0.19	U	14	U
1,1,2,2-Tetrachloroethane			mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
Benzene	0.06	4.8	mg/kg	-	-	0.00028	J	0.027	U	0.027	U	-	-	0.82		0.076		54	
Toluene	0.7	100	mg/kg	-	-	0.0054		0.054	U	0.054	U	-	-	0.6	U	0.047	U	810	
Ethylbenzene	1	41	mg/kg	-	-	0.0032		0.054	U	0.022	J	-	-	27		1.5		360	
Chloromethane			mg/kg	-	-	0.001	J	0.21	U	0.22	U	-	-	2.4	U	0.19	U	14	U
Bromomethane			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
Vinyl chloride	0.02	0.9	mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
Chloroethane			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
1,1-Dichloroethene	0.33	100	mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
trans-1,2-Dichloroethene	0.19	100	mg/kg	-	-	0.0013	U	0.08	U	0.081	U	-	-	0.91	U	0.07	U	5.2	U
Trichloroethene	0.47	21	mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
1,2-Dichlorobenzene	1.1	100	mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	0.2	J	0.093	U	7	U
1,3-Dichlorobenzene	2.4	49	mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
1,4-Dichlorobenzene	1.8	13	mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
Methyl tert butyl ether	0.93	100	mg/kg	-	-	0.00045	J	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
p/m-Xylene			mg/kg	-	-	0.01		0.11	U	0.11	U	-	-	68		0.21		1200	
o-Xylene			mg/kg	-	-	0.0034		0.054	U	0.054	U	-	-	2.6		0.028	J	480	
Xylenes, Total	1.6	100	mg/kg	-	-	0.013		0.054	U	0.054	U	-	-	71		0.24	J	1700	
cis-1,2-Dichloroethene	0.25	100	mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
1,2-Dichloroethene, Total			mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
Dibromomethane			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
Styrene			mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
Dichlorodifluoromethane			mg/kg	-	-	0.0089	U	0.54	U	0.54	U	-	-	6	U	0.47	U	35	U
Acetone	0.05	100	mg/kg	-	-	0.021		0.54	U	0.54	U	-	-	6	U	0.47	U	35	U
Carbon disulfide			mg/kg	-	-	0.0089	U	0.54	U	0.54	U	-	-	6	U	0.47	U	35	U
2-Butanone	0.12	100	mg/kg	-	-	0.0089	U	0.54	U	0.54	U	-	-	6	U	0.47	U	35	U
Vinyl acetate			mg/kg	-	-	0.0089	U	0.54	U	0.54	U	-	-	6	U	0.47	U	35	U
4-Methyl-2-pentanone			mg/kg	-	-	0.0089	U	0.54	U	0.54	U	-	-	6	U	0.47	U	35	U
1,2,3-Trichloropropane			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
2-Hexanone			mg/kg	-	-	0.0089	U	0.54	U	0.54	U	-	-	6	U	0.47	U	35	U
Bromochloromethane			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-17-0-2"**		**SB-17-1.5-2.0**		**SB-17-12.5-13.0**		**SB-17-19.5-20.0**		**SB-18-0-2"**		**SB-18-1.5-2.0**		**SB-18-12.5-13.0**		**SB-18-19.5-20.0**	
SAMPLING DATE				**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**		**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
2,2-Dichloropropane			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
1,2-Dibromoethane			mg/kg	-	-	0.00089	U	0.054	U	0.054	U	-	-	0.6	U	0.047	U	3.5	U
1,3-Dichloropropane			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
1,1,1,2-Tetrachloroethane			mg/kg	-	-	0.00044	U	0.027	U	0.027	U	-	-	0.3	U	0.023	U	1.7	U
Bromobenzene			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
n-Butylbenzene	12	100	mg/kg	-	-	0.0028		0.054	U	0.0093	J	-	-	4		0.16		11	
sec-Butylbenzene	11	100	mg/kg	-	-	0.0027		0.054	U	0.054	U	-	-	2.1		0.1		5.4	
tert-Butylbenzene	5.9	100	mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.025	J	7	U
o-Chlorotoluene			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
p-Chlorotoluene			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
1,2-Dibromo-3-chloropropane			mg/kg	-	-	0.0027	U	0.16	U	0.16	U	-	-	1.8	U	0.14	U	10	U
Hexachlorobutadiene			mg/kg	-	-	0.0036	U	0.21	U	0.22	U	-	-	2.4	U	0.19	U	14	U
Isopropylbenzene			mg/kg	-	-	0.006		0.054	U	0.0076	J	-	-	6.6		0.26		18	
p-Isopropyltoluene			mg/kg	-	-	0.00019	J	0.054	U	0.054	U	-	-	2.3		0.084		2.6	J
Naphthalene	12	100	mg/kg	-	-	0.0039		0.21	U	0.22	U	-	-	7		1.3		56	
Acrylonitrile			mg/kg	-	-	0.0036	U	0.21	U	0.22	U	-	-	2.4	U	0.19	U	14	U
n-Propylbenzene	3.9	100	mg/kg	-	-	0.016		0.054	U	0.023	J	-	-	15		0.52		66	
1,2,3-Trichlorobenzene			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
1,2,4-Trichlorobenzene			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
1,3,5-Trimethylbenzene	8.4	52	mg/kg	-	-	0.0035		0.11	U	0.013	J	-	-	37		0.058	J	120	
1,2,4-Trimethylbenzene	3.6	52	mg/kg	-	-	0.0095		0.11	U	0.037	J	-	-	98		0.058	J	420	
1,4-Dioxane	0.1	13	mg/kg	-	-	0.071	U	4.3	U	4.3	U	-	-	48	U	3.7	U	280	U
p-Diethylbenzene			mg/kg	-	-	0.0046		0.012	J	0.11	U	-	-	31		0.13		80	
p-Ethyltoluene			mg/kg	-	-	0.0084		0.11	U	0.033	J	-	-	69		0.16		350	
1,2,4,5-Tetramethylbenzene			mg/kg	-	-	0.0096		0.022	J	0.019	J	-	-	7.2		0.41		21	
Ethyl ether			mg/kg	-	-	0.0018	U	0.11	U	0.11	U	-	-	1.2	U	0.093	U	7	U
trans-1,4-Dichloro-2-butene			mg/kg	-	-	0.0044	U	0.27	U	0.27	U	-	-	3	U	0.23	U	17	U

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL)
J:Estimated Value
E:Analyte exceeds calibration curve of intrument
PGWSCO: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 3
RRUSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCR
Highlighted Blue = Exceeds NYSDEC PGWSCO
Highlighted Blue = Exceeds NYSDECRRUSCO

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-19-0-2"**		**SB-19-1.5-2.0**		**SB-19-12.5-13.0**		**SB-19-19.5-20.0**		**SB-20-14.5-15**		**SB-21-18.5-19.0**	
SAMPLING DATE				**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/10/2020**		**2/12/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**		**14.5-15**		**18.5-20**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
Chlorinated Herbicides by GC															
2,4-D			mg/kg	0.183	U	0.183	U	0.178	U	0.198	U	0.181	U	0.18	U
2,4,5-T			mg/kg	0.183	U	0.183	U	0.178	U	0.198	U	0.181	U	0.18	U
2,4,5-TP (Silvex)	3.8	100	mg/kg	0.183	U	0.183	U	0.178	U	0.198	U	0.181	U	0.18	U
Organochlorine Pesticides by GC															
Delta-BHC	0.25	100	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
Lindane	0.1	1.3	mg/kg	0.000725	U	0.00071	U	0.000716	U	0.000771	U	0.000727	U	0.000707	U
Alpha-BHC	0.02	0.48	mg/kg	0.000725	U	0.00071	U	0.000716	U	0.000771	U	0.000727	U	0.000707	U
Beta-BHC	0.09	0.36	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
Heptachlor	0.38	2.1	mg/kg	0.00087	U	0.000852	U	0.00086	U	0.000925	U	0.000872	U	0.000849	U
Aldrin	0.19	0.097	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
Heptachlor epoxide			mg/kg	0.00326	U	0.00319	U	0.00322	U	0.00347	U	0.00327	U	0.00318	U
Endrin	0.06	11	mg/kg	0.000725	U	0.00071	U	0.000716	U	0.000771	U	0.000727	U	0.000707	U
Endrin aldehyde			mg/kg	0.00217	U	0.00213	U	0.00215	U	0.00231	U	0.00218	U	0.00212	U
Endrin ketone			mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
Dieldrin	0.1	0.2	mg/kg	0.00109	U	0.00106	U	0.00107	U	0.00116	U	0.00109	U	0.00106	U
4,4'-DDE	17	8.9	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
4,4'-DDD	14	13	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
4,4'-DDT	136	7.9	mg/kg	0.00326	U	0.00319	U	0.00322	U	0.00347	U	0.00327	U	0.00318	U
Endosulfan I	102	24	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
Endosulfan II	102	24	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
Endosulfan sulfate	1000	24	mg/kg	0.000725	U	0.00071	U	0.000716	U	0.000771	U	0.000727	U	0.000707	U
Methoxychlor			mg/kg	0.00326	U	0.00319	U	0.00322	U	0.00347	U	0.00327	U	0.00318	U
Toxaphene			mg/kg	0.0326	U	0.0319	U	0.0322	U	0.0347	U	0.0327	U	0.0318	U
cis-Chlordane	2.9	4.2	mg/kg	0.00217	U	0.00213	U	0.00215	U	0.00231	U	0.00218	U	0.00212	U
trans-Chlordane			mg/kg	0.00217	U	0.00213	U	0.00215	U	0.00231	U	0.00218	U	0.00212	U
Chlordane			mg/kg	0.0145	U	0.0142	U	0.0143	U	0.0154	U	0.0145	U	0.0141	U
Perfluorinated Alkyl Acids by Isotope Dilution															
Perfluorobutanoic Acid (PFBA)			mg/kg	0.00101	U	0.000038	J	0.00107	U	0.000086	J	0.000999	U	0.00103	U
Perfluoropentanoic Acid (PFPeA)			mg/kg	0.000052	J	0.000185	J	0.000064	J	0.000604	J	0.000058	J	0.00103	U
Perfluorobutanesulfonic Acid (PFBS)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorohexanoic Acid (PFHxA)			mg/kg	0.000085	J	0.000206	J	0.000094	J	0.000674	J	0.000066	J	0.00103	U
Perfluoroheptanoic Acid (PFHpA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00016	J	0.000999	U	0.00103	U
Perfluorohexanesulfonic Acid (PFHxS)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorooctanoic Acid (PFOA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.000062	J	0.000228	J	0.00103	U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluoroheptanesulfonic Acid (PFHpS)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorononanoic Acid (PFNA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorooctanesulfonic Acid (PFOS)			mg/kg	0.000772	J	0.000613	J	0.00107	U	0.00107	U	0.000797	J	0.00103	U
Perfluorodecanoic Acid (PFDA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluoroundecanoic Acid (PFUnA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorodecanesulfonic Acid (PFDS)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorooctanesulfonamide (FOSA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)			mg/kg	0.00101	U	0.00134		0.00107	U	0.00107	U	0.000105	J	0.00103	U
Perfluorododecanoic Acid (PFDoA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorotridecanoic Acid (PFTrDA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
Perfluorotetradecanoic Acid (PFTA)			mg/kg	0.00101	U	0.00101	U	0.00107	U	0.00107	U	0.000999	U	0.00103	U
PFOA/PFOS, Total			mg/kg	0.000772	J	0.000613	J	0.00107	U	0.000062	J	0.00103	J	0.00103	U
Polychlorinated Biphenyls by GC															
Aroclor 1016	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1221	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1232	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1242	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1248	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1254	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1260	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1262	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
Aroclor 1268	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U
PCBs, Total	3.2	1	mg/kg	0.0348	U	0.0355	U	0.0351	U	0.0392	U	0.0361	U	0.0364	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-19-0-2"**		**SB-19-1.5-2.0**		**SB-19-12.5-13.0**		**SB-19-19.5-20.0**		**SB-20-14.5-15**		**SB-21-18.5-19.0**	
SAMPLING DATE				**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/10/2020**		**2/12/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**		**14.5-15**		**18.5-20**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
Semivolatile Organics by GC/MS															
Acenaphthene	98	100	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
1,2,4-Trichlorobenzene			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Hexachlorobenzene	3.2	1.2	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Bis(2-chloroethyl)ether			mg/kg	0.16	U	0.16	U	0.16	U	0.18	U	0.16	U	0.16	U
2-Chloronaphthalene			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
1,2-Dichlorobenzene	1.1	100	mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
1,3-Dichlorobenzene	2.4	49	mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
1,4-Dichlorobenzene	1.8	13	mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
3,3'-Dichlorobenzidine			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
2,4-Dinitrotoluene			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
2,6-Dinitrotoluene			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Fluoranthene	1000	100	mg/kg	0.11	U	0.023	J	0.11	U	0.12	U	0.11	U	0.11	U
4-Chlorophenyl phenyl ether			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
4-Bromophenyl phenyl ether			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Bis(2-chloroisopropyl)ether			mg/kg	0.22	U	0.22	U	0.22	U	0.24	U	0.22	U	0.22	U
Bis(2-chloroethoxy)methane			mg/kg	0.2	U	0.2	U	0.2	U	0.21	U	0.2	U	0.19	U
Hexachlorobutadiene			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Hexachlorocyclopentadiene			mg/kg	0.52	U	0.53	U	0.52	U	0.56	U	0.52	U	0.52	U
Hexachloroethane			mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
Isophorone			mg/kg	0.16	U	0.16	U	0.16	U	0.18	U	0.16	U	0.16	U
Naphthalene	12	100	mg/kg	1.1		6.5		0.57		0.053	J	0.18	U	0.18	U
Nitrobenzene			mg/kg	0.16	U	0.16	U	0.16	U	0.18	U	0.16	U	0.16	U
NDPA/DPA			mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
n-Nitrosodi-n-propylamine			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Bis(2-ethylhexyl)phthalate			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Butyl benzyl phthalate			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Di-n-butylphthalate			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Di-n-octylphthalate			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Diethyl phthalate			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Dimethyl phthalate			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Benzo(a)anthracene	1	1	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(a)pyrene	22	1	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
Benzo(b)fluoranthene	1.7	1	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(k)fluoranthene	1.7	3.9	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Chrysene	1	3.9	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Acenaphthylene	107	100	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
Anthracene	1000	100	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(ghi)perylene	1000	100	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
Fluorene	386	100	mg/kg	0.18	U	0.09	J	0.18	U	0.2	U	0.18	U	0.18	U
Phenanthrene	1000	100	mg/kg	0.11	U	0.11		0.11	U	0.12	U	0.11	U	0.11	U
Dibenzo(a,h)anthracene	1000	0.33	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	8.2	0.5	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
Pyrene	1000	100	mg/kg	0.11	U	0.04	J	0.11	U	0.12	U	0.11	U	0.11	U
Biphenyl			mg/kg	0.41	U	0.17	J	0.41	U	0.45	U	0.42	U	0.41	U
4-Chloroaniline			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
2-Nitroaniline			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
3-Nitroaniline			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
4-Nitroaniline			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Dibenzofuran	210	59	mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
2-Methylnaphthalene			mg/kg	0.81		6.6		0.42		0.037	J	0.22	U	0.22	U
1,2,4,5-Tetrachlorobenzene			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Acetophenone			mg/kg	0.18	U	0.18	U	0.18	U	0.042	J	0.18	U	0.18	U
2,4,6-Trichlorophenol			mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
p-Chloro-m-cresol			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
2-Chlorophenol			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
2,4-Dichlorophenol			mg/kg	0.16	U	0.16	U	0.16	U	0.18	U	0.16	U	0.16	U
2,4-Dimethylphenol			mg/kg	0.18	U	0.18	U	0.18	U	0.2		0.18	U	0.18	U
2-Nitrophenol			mg/kg	0.39	U	0.4	U	0.39	U	0.42	U	0.39	U	0.39	U
4-Nitrophenol			mg/kg	0.25	U	0.26	U	0.25	U	0.28	U	0.25	U	0.25	U
2,4-Dinitrophenol			mg/kg	0.87	U	0.88	U	0.87	U	0.94	U	0.87	U	0.86	U
4,6-Dinitro-o-cresol			mg/kg	0.47	U	0.48	U	0.47	U	0.51	U	0.47	U	0.47	U
Pentachlorophenol	0.8	6.7	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
Phenol	0.33	100	mg/kg	0.18	U	0.18	U	0.18	U	0.11	J	0.18	U	0.18	U
2-Methylphenol	0.33	100	mg/kg	0.18	U	0.18	U	0.18	U	0.23		0.18	U	0.18	U
3-Methylphenol/4-Methylphenol	0.33	100	mg/kg	0.036	J	0.26	U	0.066	J	0.38		0.26	U	0.26	U
2,4,5-Trichlorophenol			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Benzoic Acid			mg/kg	0.59	U	0.6	U	0.59	U	0.64	U	0.59	U	0.58	U
Benzyl Alcohol			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
Carbazole			mg/kg	0.18	U	0.18	U	0.18	U	0.2	U	0.18	U	0.18	U
1,4-Dioxane	0.1	13	mg/kg	0.027	U	0.028	U	0.027	U	0.03	U	0.027	U	0.027	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				SB-19-0-2"		SB-19-1.5-2.0		SB-19-12.5-13.0		SB-19-19.5-20.0		SB-20-14.5-15		SB-21-18.5-19.0	
SAMPLING DATE				2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/10/2020		2/12/2020	
SAMPLE TYPE				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)				0-2"		1.5-2		12.5-13		19.5-20		14.5-15		18.5-20	
	PGWSCO	RRUSCO	Units	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Total Metals															
Aluminum, Total			mg/kg	7680		10800		6480		9530		5480		4370	
Antimony, Total			mg/kg	0.663	J	0.94	J	0.751	J	1.14	J	4.34	U	0.66	J
Arsenic, Total	16	16	mg/kg	3.49		3.89		1.64		2.37		2.18		1.5	
Barium, Total	820	400	mg/kg	30.8		29.7		33.8		82.2		15.6		31.8	
Beryllium, Total	47	72	mg/kg	0.318	J	0.378	J	0.28	J	0.494		0.434	U	0.2	J
Cadmium, Total	7.5	4.3	mg/kg	0.861	U	0.879	U	0.227	J	0.326	J	0.139	J	0.142	J
Calcium, Total			mg/kg	1240		969		1140		15400		178000		65700	
Chromium, Total			mg/kg	12		15		15.4		22.1		6.35		7.96	
Cobalt, Total			mg/kg	7.03		7.68		6.54		9.22		3.45		5.53	
Copper, Total	1720	270	mg/kg	29.8		15		22		21.8		2.81		15	
Iron, Total			mg/kg	14800		18800		12200		20500		3640		7180	
Lead, Total	450	400	mg/kg	13.7		7.78		3.26	J	6.82		3.41	J	2.52	J
Magnesium, Total			mg/kg	3270		2880		2310		8060		74400		25500	
Manganese, Total	2000	2000	mg/kg	343		338		521		465		136		256	
Mercury, Total	0.73	0.81	mg/kg	0.077	U	0.092	U	0.075	U	0.076	U	0.085	U	0.08	U
Nickel, Total	130	310	mg/kg	14.2		13		12.4		21.1		5.88		8.68	
Potassium, Total			mg/kg	656		410		1130		2540		312		1330	
Selenium, Total	4	180	mg/kg	1.72	U	1.76	U	1.75	U	1.86	U	0.98	J	0.342	J
Silver, Total	8.3	180	mg/kg	0.861	U	0.879	U	0.874	U	0.932	U	0.867	U	0.835	U
Sodium, Total			mg/kg	72.6	J	130	J	335		1040		1240		145	J
Thallium, Total			mg/kg	1.72	U	1.76	U	1.75	U	1.86	U	1.73	U	1.67	U
Vanadium, Total			mg/kg	17.3		19		19.4		25.8		7.51		13.2	
Zinc, Total	2480	10000	mg/kg	72.8		36.3		21.9		47.7		27.5		19.2	
Volatile Organics by EPA 5035															
Methylene chloride	0.05	100	mg/kg	-	-	0.26	U	1.2	U	0.58	U	0.0051	U	0.0047	U
1,1-Dichloroethane	0.27	26	mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
Chloroform	0.37	49	mg/kg	-	-	0.079	U	0.35	U	0.17	U	0.0015	U	0.0014	U
Carbon tetrachloride	0.76	2.4	mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
1,2-Dichloropropane			mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
Dibromochloromethane			mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
1,1,2-Trichloroethane			mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
Tetrachloroethene	1.3	19	mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
Chlorobenzene	1.1	100	mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
Trichlorofluoromethane			mg/kg	-	-	0.21	U	0.94	U	0.46	U	0.0041	U	0.0037	U
1,2-Dichloroethane	0.02	3.1	mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
1,1,1-Trichloroethane	0.68	100	mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
Bromodichloromethane			mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
trans-1,3-Dichloropropene			mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
cis-1,3-Dichloropropene			mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
1,3-Dichloropropene, Total			mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
1,1-Dichloropropene			mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
Bromoform			mg/kg	-	-	0.21	U	0.94	U	0.46	U	0.0041	U	0.0037	U
1,1,2,2-Tetrachloroethane			mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
Benzene	0.06	4.8	mg/kg	-	-	0.3		1		3.1		0.00051	U	0.00047	U
Toluene	0.7	100	mg/kg	-	-	2.1		19		17		0.001	U	0.00094	U
Ethylbenzene	1	41	mg/kg	-	-	6.3		27		2		0.001	U	0.00094	U
Chloromethane			mg/kg	-	-	0.21	U	0.94	U	0.46	U	0.0041	U	0.0037	U
Bromomethane			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
Vinyl chloride	0.02	0.9	mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
Chloroethane			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,1-Dichloroethene	0.33	100	mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
trans-1,2-Dichloroethene	0.19	100	mg/kg	-	-	0.079	U	0.35	U	0.17	U	0.0015	U	0.0014	U
Trichloroethene	0.47	21	mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
1,2-Dichlorobenzene	1.1	100	mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,3-Dichlorobenzene	2.4	49	mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,4-Dichlorobenzene	1.8	13	mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
Methyl tert butyl ether	0.93	100	mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
p/m-Xylene			mg/kg	-	-	24		99		7.4		0.002	U	0.0019	U
o-Xylene			mg/kg	-	-	4.8		29		2.9		0.001	U	0.00094	U
Xylenes, Total	1.6	100	mg/kg	-	-	29		130		10		0.001	U	0.00094	U
cis-1,2-Dichloroethene	0.25	100	mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
1,2-Dichloroethene, Total			mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
Dibromomethane			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
Styrene			mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
Dichlorodifluoromethane			mg/kg	-	-	0.53	U	2.3	U	1.2	U	0.01	U	0.0094	U
Acetone	0.05	100	mg/kg	-	-	0.53	U	2.3	U	1.2	U	0.023		0.0094	U
Carbon disulfide			mg/kg	-	-	0.53	U	2.3	U	1.2	U	0.01	U	0.0094	U
2-Butanone	0.12	100	mg/kg	-	-	0.53	U	2.3	U	1.2	U	0.01	U	0.0094	U
Vinyl acetate			mg/kg	-	-	0.53	U	2.3	U	1.2	U	0.01	U	0.0094	U
4-Methyl-2-pentanone			mg/kg	-	-	0.53	U	2.3	U	1.2	U	0.01	U	0.0094	U
1,2,3-Trichloropropane			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
2-Hexanone			mg/kg	-	-	0.53	U	2.3	U	1.2	U	0.01	U	0.0094	U
Bromochloromethane			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U

Table 1
Soil Sample Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**SB-19-0-2"**		**SB-19-1.5-2.0**		**SB-19-12.5-13.0**		**SB-19-19.5-20.0**		**SB-20-14.5-15**		**SB-21-18.5-19.0**	
SAMPLING DATE				**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/10/2020**		**2/12/2020**	
SAMPLE TYPE				**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)				**0-2"**		**1.5-2**		**12.5-13**		**19.5-20**		**14.5-15**		**18.5-20**	
	PGWSCO	**RRUSCO**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
2,2-Dichloropropane			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,2-Dibromoethane			mg/kg	-	-	0.053	U	0.23	U	0.12	U	0.001	U	0.00094	U
1,3-Dichloropropane			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,1,1,2-Tetrachloroethane			mg/kg	-	-	0.026	U	0.12	U	0.058	U	0.00051	U	0.00047	U
Bromobenzene			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
n-Butylbenzene	12	100	mg/kg	-	-	0.45		1.2		0.037	J	0.001	U	0.00094	U
sec-Butylbenzene	11	100	mg/kg	-	-	0.23		0.64		0.018	J	0.001	U	0.00094	U
tert-Butylbenzene	5.9	100	mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
o-Chlorotoluene			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
p-Chlorotoluene			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,2-Dibromo-3-chloropropane			mg/kg	-	-	0.16	U	0.7	U	0.34	U	0.003	U	0.0028	U
Hexachlorobutadiene			mg/kg	-	-	0.21	U	0.94	U	0.46	U	0.0041	U	0.0037	U
Isopropylbenzene			mg/kg	-	-	0.52		1.8		0.06	J	0.001	U	0.00094	U
p-Isopropyltoluene			mg/kg	-	-	0.18		0.37		0.12	U	0.001	U	0.00094	U
Naphthalene	12	100	mg/kg	-	-	1.6		3.8		0.19	J	0.0041	U	0.0037	U
Acrylonitrile			mg/kg	-	-	0.21	U	0.94	U	0.46	U	0.0041	U	0.0037	U
n-Propylbenzene	3.9	100	mg/kg	-	-	1.6		5.8		0.18		0.001	U	0.00094	U
1,2,3-Trichlorobenzene			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,2,4-Trichlorobenzene			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
1,3,5-Trimethylbenzene	8.4	52	mg/kg	-	-	3.8		11		0.36		0.002	U	0.0019	U
1,2,4-Trimethylbenzene	3.6	52	mg/kg	-	-	11		36		1.2		0.002	U	0.0019	U
1,4-Dioxane	0.1	13	mg/kg	-	-	4.2	U	19	U	9.2	U	0.081	U	0.075	U
p-Diethylbenzene			mg/kg	-	-	3.7		8.5		0.25		0.002	U	0.0019	U
p-Ethyltoluene			mg/kg	-	-	9.5		31		1		0.002	U	0.0019	U
1,2,4,5-Tetramethylbenzene			mg/kg	-	-	1.1		2.2		0.064	J	0.002	U	0.0019	U
Ethyl ether			mg/kg	-	-	0.1	U	0.47	U	0.23	U	0.002	U	0.0019	U
trans-1,4-Dichloro-2-butene			mg/kg	-	-	0.26	U	1.2	U	0.58	U	0.0051	U	0.0047	U

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL)
J:Estimated Value
E:Analyte exceeds calibration curve of intrument
PGWSCO: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 3
RRUSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCR
Highlighted Blue = Exceeds NYSDEC PGWSCO
Highlighted Blue = Exceeds NYSDECRRUSCO

Table 2
Soil Vapor Sample Analytical Results
4778 Broadway NY, New York
AEI Project #384736

LOCATION					SGS-1S		SGS-1D		SGS-2S		SGS-2D		SGS-3S		SGS-3D		SGS-4S		SGS-4D		SGS-5S		SGS-5D	
SAMPLING DATE					2/11/2020		2/11/2020		2/11/2020		2/11/2020		2/11/2020		2/11/2020		2/11/2020		2/11/2020		2/11/2020		2/11/2020	
SAMPLE TYPE					SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR		SOIL_VAPOR	
SAMPLE DEPTH (ft.)					3.0-5.0		11.0-13.0		3.0-5.0		11.0-13.0		3.0-5.0		11.0-13.0		3.0-5.0		11.0-13.0		3.0-5.0		11.0-13.0	
	NY-SSC-A	NY-SSC-B	NY-SSC-C	Units	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Volatile Organics in Air																								
Dichlorodifluoromethane				ug/m3	6.92		6.82		8.95		9.54		2.84		2.9		1.82		1.71		33.4		47	
Chloromethane				ug/m3	0.413	U	0.413	U	4.32		0.413	U	0.413	U	0.413	U	0.413	U	0.413	U	0.855		0.549	
Freon-114				ug/m3	1.4	U	1.4	U	8.74	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U
Vinyl chloride			6	ug/m3	0.511	U	0.511	U	3.2	U	0.511	U	0.511	U	0.511	U	0.511	U	0.511	U	0.511	U	0.511	U
1,3-Butadiene				ug/m3	0.591		0.442	U	9.49		5.02		0.442	U	0.757		0.442	U	0.442	U	6.44		14.8	
Bromomethane				ug/m3	0.777	U	0.777	U	4.85	U	0.777	U	0.777	U	0.777	U	0.777	U	0.777	U	0.777	U	0.777	U
Chloroethane				ug/m3	0.528	U	0.528	U	3.3	U	0.528	U	0.528	U	0.528	U	0.528	U	0.528	U	0.528	U	0.528	U
Ethanol				ug/m3	9.42	U	9.42	U	58.8	U	11.3		9.42	U	11.9		9.42	U	9.42	U	9.42	U	15.8	
Vinyl bromide				ug/m3	0.874	U	0.874	U	5.47	U	0.874	U	0.874	U	0.874	U	0.874	U	0.874	U	0.874	U	0.874	U
Acetone				ug/m3	8.72		6.41		14.8	U	38.7		3.97		302		2.38	U	96.4		74.4		53.4	
Trichlorofluoromethane				ug/m3	1.12	U	1.12	U	7.02	U	1.12	U	1.12	U	1.12	U	1.12	U	1.12	U	1.65		1.97	
Isopropanol				ug/m3	1.23	U	1.23	U	7.67	U	1.59		1.23	U	14.2		1.23	U	1.23	U	8.19		2.75	
1,1-Dichloroethene	6			ug/m3	0.793	U	0.793	U	4.96	U	0.793	U	0.793	U	0.793	U	0.793	U	0.793	U	0.793	U	0.793	U
Methylene chloride		100		ug/m3	1.74	U	1.74	U	10.8	U	1.74	U	1.74	U	1.74	U	1.74	U	1.74	U	1.74	U	1.74	U
3-Chloropropene				ug/m3	0.626	U	0.626	U	3.91	U	0.626	U	0.626	U	0.626	U	0.626	U	0.626	U	0.626	U	0.626	U
Carbon disulfide				ug/m3	1.6		1.1		10.1		7.07		1.65		7.97		1.38		1.82		3.64		9.31	
Freon-113				ug/m3	1.53	U	1.53	U	9.58	U	1.53	U	1.53	U	1.53	U	1.53	U	1.53	U	1.53	U	1.53	U
trans-1,2-Dichloroethene				ug/m3	0.793	U	0.793	U	4.96	U	0.793	U	0.793	U	1.27		0.793	U	0.793	U	0.793	U	0.793	U
1,1-Dichloroethane				ug/m3	0.809	U	0.809	U	5.06	U	0.809	U	0.809	U	0.809	U	0.809	U	0.809	U	0.809	U	0.809	U
Methyl tert butyl ether				ug/m3	0.721	U	0.721	U	4.51	U	0.721	U	0.721	U	0.721	U	0.721	U	0.721	U	0.721	U	0.721	U
2-Butanone				ug/m3	1.86		1.98		9.2	U	9.14		1.47	U	11.4		1.47	U	7.05		22.7		24.6	
cis-1,2-Dichloroethene	6			ug/m3	0.793	U	0.793	U	4.96	U	0.793	U	0.793	U	0.793	U	0.793	U	0.793	U	0.793	U	0.793	U
Ethyl Acetate				ug/m3	1.8	U	1.8	U	11.2	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Chloroform				ug/m3	6.2		6.79		6.1	U	2.54		1.43		0.977	U	1.05		1		2.66		3.85	
Tetrahydrofuran				ug/m3	1.47	U	1.47	U	9.2	U	1.47	U	1.47	U	4.75		1.47	U	1.47	U	1.47	U	1.47	U
1,2-Dichloroethane				ug/m3	0.809	U	0.809	U	5.06	U	0.809	U	0.809	U	0.809	U	0.809	U	0.809	U	0.809	U	0.809	U
n-Hexane				ug/m3	4.83		0.705	U	59.2		5.5		4.9		6.8		0.8		7.01		9.94		31.2	
1,1,1-Trichloroethane		100		ug/m3	1.09	U	1.09	U	6.82	U	1.09	U	1.09	U	1.09	U	1.09	U	1.09	U	1.09	U	1.09	U
Benzene				ug/m3	1.09		1.11		58.8		3.87		1.56		7.25		0.639	U	1.45		2.19		5.97	
Carbon tetrachloride	6			ug/m3	1.26	U	1.26	U	7.86	U	1.26	U	1.26	U	1.26	U	1.26	U	1.26	U	1.26	U	1.26	U
Cyclohexane				ug/m3	1.15		0.688	U	16.3		1.21		2		4.54		0.688	U	0.688	U	5.68		9.33	
1,2-Dichloropropane				ug/m3	0.924	U	0.924	U	5.78	U	0.924	U	0.924	U	0.924	U	0.924	U	0.924	U	0.924	U	0.924	U
Bromodichloromethane				ug/m3	1.34	U	1.34	U	8.37	U	1.34	U	1.34	U	1.34	U	1.34	U	1.34	U	1.34	U	1.34	U
1,4-Dioxane				ug/m3	0.721	U	0.721	U	4.5	U	2.09		0.721	U	0.721	U	0.721	U	0.721	U	0.721	U	0.721	U
Trichloroethene	6			ug/m3	1.07	U	1.07	U	6.72	U	1.07	U	1.34		1.07	U	1.07	U	1.07	U	1.07	U	1.07	U
2,2,4-Trimethylpentane				2,2,	1.49		0.934	U	1440		10.1		1.52		0.934	U	0.934	U	1.2		2.07		4.23	
Heptane				ug/m3	4.22		1.2		100		4.3		3.67		17.7		0.82	U	6.93		8.32		22.7	
cis-1,3-Dichloropropene				ug/m3	0.908	U	0.908	U	5.67	U	0.908	U	0.908	U	0.908	U	0.908	U	0.908	U	0.908	U	0.908	U
4-Methyl-2-pentanone				ug/m3	2.05	U	2.05	U	12.8	U	7.83		2.05	U	2.05	U	2.05	U	2.05	U	7.09		10.4	
trans-1,3-Dichloropropene				ug/m3	0.908	U	0.908	U	5.67	U	0.908	U	0.908	U	0.908	U	0.908	U	0.908	U	0.908	U	0.908	U
1,1,2-Trichloroethane				ug/m3	1.09	U	1.09	U	6.82	U	1.09	U	1.09	U	1.09	U	1.09	U	1.09	U	1.09	U	1.09	U
Toluene				ug/m3	4.45		5.43		445		9.42		12.7		38.4		3.09		11.3		9.27		16.4	
2-Hexanone				ug/m3	0.82	U	0.82	U	5.12	U	-	-	0.82	U	0.82	U	0.82	U	0.82	U	-	-	-	-
Dibromochloromethane				ug/m3	1.7	U	1.7	U	10.6	U	1.7	U	1.7	U	1.7	U	1.7	U	1.7	U	1.7	U	1.7	U
1,2-Dibromoethane				ug/m3	1.54	U	1.54	U	9.61	U	1.54	U	1.54	U	1.54	U	1.54	U	1.54	U	1.54	U	1.54	U
Tetrachloroethene		100		ug/m3	1.36	U	1.51		8.48	U	7.8		10.6		5.05		3.84		12.1		1.44		2.22	
Chlorobenzene				ug/m3	0.921	U	0.921	U	5.76	U	0.921	U	0.921	U	0.921	U	0.921	U	0.921	U	0.921	U	0.921	U
Ethylbenzene				ug/m3	3.43		10.9		60.8		6.34		13.1		11.1		2.47		5.08		4.33		6.6	
p/m-Xylene				ug/m3	14.6		44.7		160		24.2		55.6		32.5		11.2		18.1		16.9		24.1	
Bromoform				ug/m3	2.07	U	2.07	U	12.9	U	2.07	U	2.07	U	2.07	U	2.07	U	2.07	U	2.07	U	2.07	U
Styrene				ug/m3	0.852	U	0.852	U	5.32	U	0.852	U	0.852	U	0.852	U	0.852	U	0.852	U	0.852	U	0.852	U
1,1,2,2-Tetrachloroethane				ug/m3	1.37	U	1.37	U	8.58	U	1.37	U	1.37	U	1.37	U	1.37	U	1.37	U	1.37	U	1.37	U
o-Xylene				ug/m3	6.56		16.2		50.4		11.9		23.8		12.9		5.08		7.51		7.47		11.8	
4-Ethyltoluene				ug/m3	3.75		4.1		6.15	U	4.75		8.55		0.983	U	2.95		4.41		4.1		5.16	
1,3,5-Trimethylbenzene				ug/m3	4.4		4.6		6.39		6.83		11.6		4.77		4.56		4.33		4.83		6.34	
1,2,4-Trimethylbenzene				ug/m3	16.1		17.3		17.8		18.8		45		18.9		16.3		15.5		17.4		22	
Benzyl chloride				ug/m3	1.04	U	1.04	U	6.47	U	1.04	U	1.04	U	1.04	U	1.04	U	1.04	U	1.04	U	1.04	U
1,3-Dichlorobenzene				ug/m3	1.2	U	1.2	U	7.52	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	7.52	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U
1,2-Dichlorobenzene				ug/m3	1.2	U	1.2	U	7.52	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U
1,2,4-Trichlorobenzene				ug/m3	1.48	U	1.48	U	9.28	U	1.48	U	1.48	U	1.48	U	1.48	U	1.48	U	1.48	U	1.48	U
Hexachlorobutadiene				ug/m3	2.13	U	2.13	U	13.3	U	2.13	U	2.13	U	2.13	U	2.13	U	2.13	U	2.13	U	2.13	U
Volatile Organics in Air by SIM																								
tert-Butyl Alcohol				ug/m3	3.27		3.67		9.46	U	4.61		1.52	U	1.52	U	1.52	U	1.71		8.82		14.9	
2-Hexanone				ug/m3	-	-	-	-	-	-	3.36		-	-	-	-	-	-	-	-	6.8		6.11	

Notes:
U: Value below Method Detection Limit (MDL)
Highlighted: Exceeds respective concentration
NY-SSC-A: New York DOH Matrix A Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-B: New York DOH Matrix B Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-C: New York DOH Matrix C Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.

Table 2
Soil Vapor Sample Analytical Results
4778 Broadway NY, New York
AEI Project #384736

LOCATION					**SGS-6S**		**SGS-6D**		**SGS-7S**		**SGS-7D**		**SGS-8S**		**SGS-8D**		**SGS-9S**		**SGS-9D**	
SAMPLING DATE					**2/11/2020**		**2/11/2020**		**2/11/2020**		**2/11/2020**		**2/11/2020**		**2/11/2020**		**2/11/2020**		**2/11/2020**	
SAMPLE TYPE					**SOIL_VAPOR**		**SOIL_VAPOR**		**SOIL_VAPOR**		**SOIL_VAPOR**		**SOIL_VAPOR**		**SOIL_VAPOR**		**SOIL_VAPOR**		**SOIL_VAPOR**	
SAMPLE DEPTH (ft.)					**3.0-5.0**		**11.0-13.0**		**3.0-5.0**		**11.0-13.0**		**3.0-5.0**		**11.0-13.0**		**3.0-5.0**		**11.0-13.0**	
	NY-SSC-A	**NY-SSC-B**	**NY-SSC-C**	**Units**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**	**Results**	**Qual**
Volatile Organics in Air																				
Dichlorodifluoromethane				ug/m3	46.6		36.6		34.7		48.9		2.91	U	603	U	19.8	U	21900	U
Chloromethane				ug/m3	0.617		0.413	U	1.59	U	16.6	U	1.21	U	252	U	8.28	U	9130	U
Freon-114				ug/m3	1.4	U	1.4	U	5.38	U	56.3	U	4.11	U	853	U	28	U	30900	U
Vinyl chloride			6	ug/m3	0.511	U	0.511	U	1.97	U	20.6	U	1.5	U	312	U	10.3	U	11300	U
1,3-Butadiene				ug/m3	29.4		10.2		22.6		17.8	U	19.8		270	U	8.87	U	9780	U
Bromomethane				ug/m3	0.777	U	0.777	U	2.99	U	31.3	U	2.28	U	474	U	15.6	U	17200	U
Chloroethane				ug/m3	0.528	U	0.528	U	2.03	U	21.3	U	1.55	U	322	U	10.6	U	11700	U
Ethanol				ug/m3	9.42	U	15.5		36.2	U	381	U	27.7	U	5750	U	188	U	209000	U
Vinyl bromide				ug/m3	0.874	U	0.874	U	3.36	U	35.2	U	2.57	U	533	U	17.5	U	19300	U
Acetone				ug/m3	14.2		76.5		9.15	U	95.7	U	46.3		1450	U	47.7	U	52500	U
Trichlorofluoromethane				ug/m3	1.12	U	1.12	U	4.32	U	45.3	U	3.3	U	686	U	22.5	U	24800	U
Isopropanol				ug/m3	1.23	U	1.74		4.72	U	56.3		3.61	U	750	U	24.6	U	27300	U
1,1-Dichloroethene	6			ug/m3	0.793	U	0.793	U	3.05	U	32	U	2.33	U	484	U	15.9	U	17500	U
Methylene chloride		100		ug/m3	1.74	U	1.74	U	6.67	U	167		5.11	U	1060	U	34.7	U	38600	U
3-Chloropropene				ug/m3	0.626	U	0.626	U	2.41	U	25.2	U	1.84	U	382	U	12.6	U	13800	U
Carbon disulfide				ug/m3	3.49		4.08		94.4		25.1	U	15.8		380	U	44.2		13800	U
Freon-113				ug/m3	1.53	U	1.53	U	5.89	U	61.8	U	4.51	U	935	U	30.7	U	33900	U
trans-1,2-Dichloroethene				ug/m3	0.793	U	0.793	U	3.05	U	32	U	2.33	U	484	U	15.9	U	17500	U
1,1-Dichloroethane				ug/m3	0.809	U	0.809	U	3.11	U	32.6	U	2.38	U	494	U	16.2	U	17900	U
Methyl tert butyl ether				ug/m3	0.721	U	0.721	U	2.77	U	29.1	U	2.12	U	440	U	14.5	U	15900	U
2-Butanone				ug/m3	3.16		27.1		5.66	U	59.6	U	17.2		900	U	29.5	U	32700	U
cis-1,2-Dichloroethene	6			ug/m3	0.793	U	0.793	U	3.05	U	32	U	2.33	U	484	U	15.9	U	17500	U
Ethyl Acetate				ug/m3	1.8	U	1.8	U	6.92	U	72.8	U	5.3	U	1100	U	36	U	40000	U
Chloroform				ug/m3	0.977	U	0.977	U	3.76	U	39.4	U	5.76		596	U	19.6	U	21600	U
Tetrahydrofuran				ug/m3	1.47	U	1.47	U	5.66	U	59.6	U	4.34	U	900	U	29.5	U	32700	U
1,2-Dichloroethane				ug/m3	0.809	U	0.809	U	3.11	U	32.6	U	2.38	U	494	U	16.2	U	17900	U
n-Hexane				ug/m3	31.8		13.7		145		195		181		430	U	1150		1800000	
1,1,1-Trichloroethane		100		ug/m3	1.09	U	1.09	U	4.2	U	44	U	3.21	U	666	U	21.9	U	24100	U
Benzene				ug/m3	6.68		4.7		7.19		25.7	U	36.4		390	U	990		371000	
Carbon tetrachloride	6			ug/m3	1.26	U	1.26	U	4.84	U	50.7	U	3.7	U	767	U	25.2	U	27800	U
Cyclohexane				ug/m3	7.54		2.77		141		344		89.5		420	U	379		282000	
1,2-Dichloropropane				ug/m3	0.924	U	0.924	U	3.55	U	37.3	U	2.72	U	564	U	18.5	U	20400	U
Bromodichloromethane				ug/m3	1.34	U	1.34	U	5.15	U	54	U	3.94	U	817	U	26.9	U	29600	U
1,4-Dioxane				ug/m3	0.721	U	0.721	U	2.77	U	29	U	2.12	U	440	U	14.5	U	15900	U
Trichloroethene	6			ug/m3	1.07	U	1.07	U	4.13	U	43.3	U	3.16	U	656	U	21.6	U	23800	U
2,2,4-Trimethylpentane				2,2,	21		13.1		715		9060		551		179000		7190		5000000	
Heptane				ug/m3	10.5		11.9		33.7		59		143		500	U	338		979000	
cis-1,3-Dichloropropene				ug/m3	0.908	U	0.908	U	3.49	U	36.6	U	2.67	U	554	U	18.2	U	20100	U
4-Methyl-2-pentanone				ug/m3	2.05	U	7.09		7.87	U	82.8	U	6.02	U	1250	U	41	U	45500	U
trans-1,3-Dichloropropene				ug/m3	0.908	U	0.908	U	3.49	U	36.6	U	2.67	U	554	U	18.2	U	20100	U
1,1,2-Trichloroethane				ug/m3	1.09	U	1.09	U	4.2	U	44	U	3.21	U	666	U	21.9	U	24100	U
Toluene				ug/m3	7.2		18.2		10.3		30.4	U	66.7		460	U	132		897000	
2-Hexanone				ug/m3	0.82	U	-	-	3.15	U	33	U	2.41	U	500	U	16.4	U	18100	U
Dibromochloromethane				ug/m3	1.7	U	1.7	U	6.55	U	68.7	U	5.01	U	1040	U	34.2	U	37700	U
1,2-Dibromoethane				ug/m3	1.54	U	1.54	U	5.91	U	61.9	U	4.52	U	938	U	30.8	U	34000	U
Tetrachloroethene		100		ug/m3	1.36	U	2.62		5.21	U	54.7	U	3.99	U	827	U	27.2	U	30000	U
Chlorobenzene				ug/m3	0.921	U	0.921	U	3.54	U	37.1	U	2.71	U	562	U	18.5	U	20400	U
Ethylbenzene				ug/m3	3.4		7.77		3.83		35	U	17.8		530	U	77.3		155000	
p/m-Xylene				ug/m3	13.2		26.6		13.7		69.9	U	91.2		1060	U	216		199000	
Bromoform				ug/m3	2.07	U	2.07	U	7.95	U	83.3	U	6.08	U	1260	U	41.5	U	45700	U
Styrene				ug/m3	0.852	U	0.852	U	3.27	U	34.3	U	2.5	U	519	U	17.1	U	18800	U
1,1,2,2-Tetrachloroethane				ug/m3	1.37	U	1.37	U	5.28	U	55.3	U	4.04	U	838	U	27.5	U	30400	U
o-Xylene				ug/m3	6.12		12.2		6.47		35	U	40.2		530	U	61.2		38100	
4-Ethyltoluene				ug/m3	4.01		4.7		3.78	U	39.6	U	7.87		600	U	19.7	U	21700	U
1,3,5-Trimethylbenzene				ug/m3	5.51		5.85		4.37		39.6	U	7.33		600	U	19.7	U	21700	U
1,2,4-Trimethylbenzene				ug/m3	20.5		20.5		15.6		39.6	U	27.3		600	U	29.2		21700	U
Benzyl chloride				ug/m3	1.04	U	1.04	U	3.98	U	41.7	U	3.04	U	632	U	20.8	U	22900	U
1,3-Dichlorobenzene				ug/m3	1.2	U	1.2	U	4.62	U	48.5	U	3.54	U	733	U	24.1	U	26600	U
1,4-Dichlorobenzene				ug/m3	1.2	U	1.2	U	4.62	U	48.5	U	3.54	U	733	U	24.1	U	26600	U
1,2-Dichlorobenzene				ug/m3	1.2	U	1.2	U	4.62	U	48.5	U	3.54	U	733	U	24.1	U	26600	U
1,2,4-Trichlorobenzene				ug/m3	1.48	U	1.48	U	5.71	U	59.8	U	4.36	U	906	U	29.8	U	32800	U
Hexachlorobutadiene				ug/m3	2.13	U	2.13	U	8.2	U	86	U	6.27	U	1300	U	42.8	U	47100	U
Volatile Organics in Air by SIM																				
tert-Butyl Alcohol				ug/m3	7.49		10		7.91		70		12.2		925	U	30.3	U	33600	U
2-Hexanone				ug/m3	-	-	2.99		-	-	-	-	-	-	-	-	-	-	-	-

Notes:
U: Value below Method Detection Limit (MDL)
Highlighted: Exceeds respective concentration
NY-SSC-A: New York DOH Matrix A Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating So
NY-SSC-B: New York DOH Matrix B Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating So
NY-SSC-C: New York DOH Matrix C Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Sc

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**MW-1**		**MW-2**		**MW-3**		**MW-4**		**MW-5**	
SAMPLING DATE				**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**	
SAMPLE TYPE				**WATER**		**WATER**		**WATER**		**WATER**		**WATER**	
	NY-AWQS	**NY-PFAS SLs**	**Units**	**Results**	**Qual**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
1,4 Dioxane by 8270D-SIM													
1,4-Dioxane			ug/l	1.68		0.268	U	0.129	U	0.139	U	0.646	U
Chlorinated Herbicides by GC													
2,4-D	50		ug/l	10	U	10	U	10	U	10	U	10	U
2,4,5-T	35		ug/l	2	U	2	U	2	U	2	U	2	U
2,4,5-TP (Silvex)			ug/l	2	U	2	U	2	U	2	U	2	U
Dissolved Metals													
Aluminum, Dissolved			ug/l	10	U	10		4.7	J	4.5	J	10	U
Antimony, Dissolved	3		ug/l	1.5	J	0.78	J	0.57	J	4	U	4	U
Arsenic, Dissolved	25		ug/l	9.72		21.3		27.65		0.41	J	8.97	
Barium, Dissolved	1000		ug/l	687.3		196.1		203.3		110		2194	
Beryllium, Dissolved	3		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cadmium, Dissolved	5		ug/l	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Calcium, Dissolved			ug/l	342000		52600		34600		114000		194000	
Chromium, Dissolved	50		ug/l	0.18	J	0.33	J	1	U	0.37	J	0.2	J
Cobalt, Dissolved			ug/l	8.27		4.72		2.99		0.99		3.09	
Copper, Dissolved	200		ug/l	0.65	J	0.44	J	1	U	0.8	J	1.54	
Iron, Dissolved	300		ug/l	33600		1680		687		40.3	J	20400	
Lead, Dissolved	25		ug/l	5.88		6.73		1	U	1	U	8.14	
Magnesium, Dissolved	35000		ug/l	123000		5300		3800		41000		68600	
Manganese, Dissolved	300		ug/l	12280		727.1		323.6		116.9		4363	
Mercury, Dissolved	0.7		ug/l	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nickel, Dissolved	100		ug/l	33.63		20.32		11.49		14.92		70.06	
Potassium, Dissolved			ug/l	7930		4660		9680		11700		6920	
Selenium, Dissolved	10		ug/l	5	U	5	U	5	U	3.71	J	5	U
Silver, Dissolved	50		ug/l	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Sodium, Dissolved	20000		ug/l	374000		566000		441000		95300		1100000	
Thallium, Dissolved	0.5		ug/l	0.2	J	1	U	1	U	0.5	J	1	U
Vanadium, Dissolved			ug/l	5	U	5	U	5	U	5	U	1.71	J
Zinc, Dissolved	2000		ug/l	4	J	10	U	10	U	10	U	4.53	J
Organochlorine Pesticides by GC													
Delta-BHC	0.04		ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Lindane	0.05		ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Alpha-BHC	0.01		ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Beta-BHC	0.04		ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Heptachlor	0.04		ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Aldrin	0		ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Heptachlor epoxide	0.03		ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Endrin	0		ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
Endrin aldehyde	5		ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
Endrin ketone	5		ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
Dieldrin	0.004		ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
4,4'-DDE	0.2		ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
4,4'-DDD	0.3		ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
4,4'-DDT	0.2		ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
Endosulfan I			ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Endosulfan II			ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
Endosulfan sulfate			ug/l	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
Methoxychlor	35		ug/l	0.143	U	0.143	U	0.143	U	0.143	U	0.143	U
Toxaphene	0.06		ug/l	0.143	U	0.143	U	0.143	U	0.143	U	0.143	U
cis-Chlordane			ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
trans-Chlordane			ug/l	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
Chlordane	0.05		ug/l	0.143	U	0.143	U	0.143	U	0.143	U	0.143	U
Perfluorinated Alkyl Acids by Isotope Dilution													
Perfluorobutanoic Acid (PFBA)		0.100	ug/l	0.204		0.274		0.192		0.0271		0.392	
Perfluoropentanoic Acid (PFPeA)		0.100	ug/l	0.255		1.31		0.994		0.0532		1.98	
Perfluorobutanesulfonic Acid (PFBS)		0.100	ug/l	0.0442		0.00725		0.0167		0.0178		0.0215	
Perfluorohexanoic Acid (PFHxA)		0.100	ug/l	0.209		1.23		1.09		0.0573		1.36	
Perfluoroheptanoic Acid (PFHpA)		0.100	ug/l	0.162		0.362		0.45		0.0353		0.551	
Perfluorohexanesulfonic Acid (PFHxS)		0.100	ug/l	0.232		0.0167		0.0343		0.0258		0.0703	
Perfluorooctanoic Acid (PFOA)		0.010	ug/l	0.0841		0.105		0.172		0.0676		0.2	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		0.100	ug/l	0.0292		0.00817		0.005	U	0.00174	U	0.00346	
Perfluoroheptanesulfonic Acid (PFHpS)		0.100	ug/l	0.00201	U	0.00809	J	0.0056		0.00174	U	0.0391	
Perfluorononanoic Acid (PFNA)		0.100	ug/l	0.00191	J	0.0258		0.0182		0.0029		0.0458	
Perfluorooctanesulfonic Acid (PFOS)		0.010	ug/l	0.0173	J	0.745		1.37		0.0452		1.53	
Perfluorodecanoic Acid (PFDA)		0.100	ug/l	0.00201	U	0.00954		0.00918		0.00101	J	0.005	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		0.100	ug/l	0.00201	U	0.00435		0.005	U	0.00174	U	0.00214	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		0.100	ug/l	0.000843	J	0.00141	J	0.00208	J	0.00174	U	0.00214	U
Perfluoroundecanoic Acid (PFUnA)		0.100	ug/l	0.00201	U	0.00191	U	0.00105	J	0.00174	U	0.000504	J
Perfluorodecanesulfonic Acid (PFDS)		0.100	ug/l	0.00201	U	0.00133	J	0.005	U	0.00174	U	0.00214	U
Perfluorooctanesulfonamide (FOSA)		0.100	ug/l	0.00201	U	0.00191	U	0.017		0.00174	U	0.00214	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		0.100	ug/l	0.00201	U	0.167		0.104		0.000996	J	0.00113	J
Perfluorododecanoic Acid (PFDoA)		0.100	ug/l	0.00201	U	0.00191	U	0.005	U	0.00174	U	0.00214	U
Perfluorotridecanoic Acid (PFTrDA)		0.100	ug/l	0.00201	U	0.00191	U	0.005	U	0.00174	U	0.00214	U
Perfluorotetradecanoic Acid (PFTA)		0.100	ug/l	0.00201	U	0.00191	U	0.005	U	0.00174	U	0.00214	U
PFOA/PFOS, Total			ug/l	0.101	J	0.85		1.54		0.113		1.73	
Total PFAS		0.500	ug/l	1.239553		4.27755		4.47611		0.334206		6.199794	

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**MW-1**		**MW-2**		**MW-3**		**MW-4**		**MW-5**	
SAMPLING DATE				**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**	
SAMPLE TYPE				**WATER**		**WATER**		**WATER**		**WATER**		**WATER**	
	NY-AWQS	**NY-PFAS SLs**	**Units**	**Results**	**Qual**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Polychlorinated Biphenyls by GC													
Aroclor 1016	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1221	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1232	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1242	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1248	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1254	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1260	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1262	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Aroclor 1268	0.09		ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
PCBs, Total			ug/l	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
Semivolatile Organics by GC/MS													
1,2,4-Trichlorobenzene	5		ug/l	5	U	5	U	5	U	5	U	5	U
Bis(2-chloroethyl)ether	1		ug/l	2	U	2	U	2	U	2	U	2	U
1,2-Dichlorobenzene	3		ug/l	2	U	2	U	2	U	2	U	2	U
1,3-Dichlorobenzene	3		ug/l	2	U	2	U	2	U	2	U	2	U
1,4-Dichlorobenzene	3		ug/l	2	U	2	U	2	U	2	U	2	U
3,3'-Dichlorobenzidine	5		ug/l	5	U	5	U	5	U	5	U	5	U
2,4-Dinitrotoluene	5		ug/l	5	U	5	U	5	U	5	U	5	U
2,6-Dinitrotoluene	5		ug/l	5	U	5	U	5	U	5	U	5	U
4-Chlorophenyl phenyl ether			ug/l	2	U	2	U	2	U	2	U	2	U
4-Bromophenyl phenyl ether			ug/l	2	U	2	U	2	U	2	U	2	U
Bis(2-chloroisopropyl)ether	5		ug/l	2	U	2	U	2	U	2	U	2	U
Bis(2-chloroethoxy)methane	5		ug/l	5	U	5	U	5	U	5	U	5	U
Hexachlorocyclopentadiene	5		ug/l	20	U	20	U	20	U	20	U	20	U
Isophorone	50		ug/l	5	U	5	U	5	U	5	U	5	U
Nitrobenzene	0.4		ug/l	2	U	2	U	2	U	2	U	2	U
NDPA/DPA	50		ug/l	2	U	2	U	2	U	2	U	2	U
n-Nitrosodi-n-propylamine			ug/l	5	U	5	U	5	U	5	U	5	U
Bis(2-ethylhexyl)phthalate	5		ug/l	3	U	3	U	3	U	2	J	3	U
Butyl benzyl phthalate	50		ug/l	5	U	5	U	5	U	5	U	5	U
Di-n-butylphthalate	50		ug/l	5	U	5	U	5	U	5	U	5	U
Di-n-octylphthalate	50		ug/l	5	U	5	U	5	U	5	U	5	U
Diethyl phthalate	50		ug/l	5	U	5	U	5	U	5	U	5	U
Dimethyl phthalate	50		ug/l	5	U	5	U	5	U	5	U	5	U
Biphenyl			ug/l	2	U	2	U	2	U	2	U	2	U
4-Chloroaniline	5		ug/l	5	U	5	U	5	U	5	U	5	U
2-Nitroaniline	5		ug/l	5	U	5	U	5	U	5	U	5	U
3-Nitroaniline	5		ug/l	5	U	5	U	5	U	5	U	5	U
4-Nitroaniline	5		ug/l	5	U	5	U	5	U	5	U	5	U
Dibenzofuran			ug/l	2	U	2	U	2	U	2	U	2	U
1,2,4,5-Tetrachlorobenzene	5		ug/l	10	U	10	U	10	U	10	U	10	U
Acetophenone			ug/l	5	U	5	U	5	U	5	U	5	U
2,4,6-Trichlorophenol			ug/l	5	U	5	U	5	U	5	U	5	U
p-Chloro-m-cresol			ug/l	2	U	2	U	2	U	2	U	2	U
2-Chlorophenol			ug/l	2	U	2	U	2	U	2	U	2	U
2,4-Dichlorophenol	1		ug/l	5	U	5	U	5	U	5	U	5	U
2,4-Dimethylphenol	50		ug/l	10		72		5	U	5	U	87	
2-Nitrophenol			ug/l	10	U	10	U	10	U	10	U	10	U
4-Nitrophenol			ug/l	10	U	10	U	10	U	10	U	10	U
2,4-Dinitrophenol	10		ug/l	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-o-cresol			ug/l	10	U	10	U	10	U	10	U	10	U
Phenol	1		ug/l	6.7		6.7		5	U	5	U	49	
2-Methylphenol			ug/l	4.8	J	17		5	U	5	U	92	
3-Methylphenol/4-Methylphenol			ug/l	11		31		0.52	J	5	U	120	
2,4,5-Trichlorophenol			ug/l	5	U	5	U	5	U	5	U	5	U
Benzoic Acid			ug/l	66		59		50	U	50	U	84	
Benzyl Alcohol			ug/l	2	U	2	U	2	U	2	U	2	U
Carbazole			ug/l	2	U	2	U	2	U	2	U	2	U
Semivolatile Organics by GC/MS-SIM													
Acenaphthene	20		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
2-Chloronaphthalene	10		ug/l	2	U	2	U	0.2	U	0.2	U	2	U
Fluoranthene	50		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Hexachlorobutadiene	0.5		ug/l	5	U	5	U	0.5	U	0.5	U	5	U
Naphthalene	10		ug/l	300		380		0.72		0.08	J	260	
Benzo(a)anthracene	0.002		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Benzo(a)pyrene	0		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Benzo(b)fluoranthene	0.002		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Benzo(k)fluoranthene	0.002		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Chrysene	0.002		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Acenaphthylene			ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Anthracene	50		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Benzo(ghi)perylene			ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Fluorene	50		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Phenanthrene	50		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Dibenzo(a,h)anthracene			ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Indeno(1,2,3-cd)pyrene	0.002		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
Pyrene	50		ug/l	1	U	1	U	0.1	U	0.1	U	1	U
2-Methylnaphthalene			ug/l	69		23		0.1	U	0.1	U	15	
Pentachlorophenol	1		ug/l	8	U	8	U	0.8	U	0.8	U	8	U
Hexachlorobenzene	0.04		ug/l	8	U	8	U	0.8	U	0.8	U	8	U
Hexachloroethane	5		ug/l	8	U	8	U	0.8	U	0.8	U	8	U

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**MW-1**		**MW-2**		**MW-3**		**MW-4**		**MW-5**	
SAMPLING DATE				**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**	
SAMPLE TYPE				**WATER**		**WATER**		**WATER**		**WATER**		**WATER**	
	NY-AWQS	**NY-PFAS SLs**	**Units**	**Results**	**Qual**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Total Metals													
Aluminum, Total			ug/l	210		2060		784		3830		22	
Antimony, Total	3		ug/l	4	U	0.92	J	4	U	4	U	4	U
Arsenic, Total	25		ug/l	9.96		19.39		11.49		1.21		9.35	
Barium, Total	1000		ug/l	673		231.7		182.3		138		2251	
Beryllium, Total	3		ug/l	0.5	U	0.11	J	0.5	U	0.19	J	0.5	U
Cadmium, Total	5		ug/l	0.2	U	0.2	U	0.2	U	0.1	J	0.2	U
Calcium, Total			ug/l	343000		59000		31100		130000		194000	
Chromium, Total	50		ug/l	0.54	J	3.5		1.18		5.98		0.2	J
Cobalt, Total			ug/l	8.31		6.44		3.94		3.24		2.32	
Copper, Total	200		ug/l	1.34		10.13		3.64		11.28		2.02	
Iron, Total	300		ug/l	29900		4450		1800		4530		22700	
Lead, Total	25		ug/l	6.5		9.54		1.27		4.39		7.72	
Magnesium, Total	35000		ug/l	121000		6920		3660		45800		72700	
Manganese, Total	300		ug/l	11790		878.8		314.4		158.2		3925	
Mercury, Total	0.7		ug/l	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nickel, Total	100		ug/l	34.11		24.66		12.47		22.16		65.77	
Potassium, Total			ug/l	7830		5540		9450		11900		7120	
Selenium, Total	10		ug/l	5	U	2.45	J	5	U	4.34	J	5	U
Silver, Total	50		ug/l	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Sodium, Total	20000		ug/l	371000		642000		473000		95400		1130000	
Thallium, Total	0.5		ug/l	1	U	1	U	1	U	0.74	J	1	U
Vanadium, Total			ug/l	1.71	J	5.54		2.14	J	7.6		1.58	J
Zinc, Total	2000		ug/l	10	U	8.39	J	10	U	29.43		4.61	J
Volatile Organics by GC/MS													
Methylene chloride	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,1-Dichloroethane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Chloroform	7		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Carbon tetrachloride	5		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
1,2-Dichloropropane	1		ug/l	25	U	400	U	2.5	U	1	U	400	U
Dibromochloromethane	50		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
1,1,2-Trichloroethane	1		ug/l	38	U	600	U	3.8	U	1.5	U	600	U
Tetrachloroethene	5		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
Chlorobenzene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Trichlorofluoromethane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,2-Dichloroethane	0.6		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
1,1,1-Trichloroethane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Bromodichloromethane	50		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
trans-1,3-Dichloropropene	0.4		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
cis-1,3-Dichloropropene	0.4		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
1,3-Dichloropropene, Total			ug/l	12	U	200	U	1.2	U	0.5	U	200	U
1,1-Dichloropropene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Bromoform	50		ug/l	50	U	800	U	5	U	2	U	800	U
1,1,2,2-Tetrachloroethane	5		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
Benzene	1		ug/l	920		8000		120		0.5	U	8200	
Toluene	5		ug/l	1500		39000		490		2.5	U	34000	
Ethylbenzene	5		ug/l	2000		5300		410		2.5	U	3600	
Chloromethane			ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Bromomethane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Vinyl chloride	2		ug/l	25	U	400	U	2.5	U	1	U	400	U
Chloroethane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,1-Dichloroethene	5		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
trans-1,2-Dichloroethene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Trichloroethene	5		ug/l	12	U	200	U	1.2	U	0.5	U	200	U
1,2-Dichlorobenzene	3		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,3-Dichlorobenzene	3		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,4-Dichlorobenzene	3		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Methyl tert butyl ether	10		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
p/m-Xylene	5		ug/l	5700		16000		500		2.5	U	11000	
o-Xylene	5		ug/l	1800		6600		160		2.5	U	5100	
Xylenes, Total			ug/l	7500		23000		660		2.5	U	16000	
cis-1,2-Dichloroethene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,2-Dichloroethene, Total			ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**MW-1**		**MW-2**		**MW-3**		**MW-4**		**MW-5**	
SAMPLING DATE				**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**		**2/25/2020**	
SAMPLE TYPE				**WATER**		**WATER**		**WATER**		**WATER**		**WATER**	
	NY-AWQS	**NY-PFAS SLs**	**Units**	**Results**	**Qual**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Dibromomethane	5		ug/l	120	U	2000	U	12	U	5	U	2000	U
1,2,3-Trichloropropane	0.04		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Acrylonitrile	5		ug/l	120	U	2000	U	12	U	5	U	2000	U
Styrene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Dichlorodifluoromethane	5		ug/l	120	U	2000	U	12	U	5	U	2000	U
Acetone	50		ug/l	120	U	2000	U	12	U	5	U	2000	U
Carbon disulfide	60		ug/l	120	U	2000	U	12	U	5	U	2000	U
2-Butanone	50		ug/l	120	U	2000	U	12	U	5	U	2000	U
Vinyl acetate			ug/l	120	U	2000	U	12	U	5	U	2000	U
4-Methyl-2-pentanone			ug/l	120	U	2000	U	12	U	5	U	2000	U
2-Hexanone	50		ug/l	120	U	2000	U	12	U	5	U	2000	U
Bromochloromethane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
2,2-Dichloropropane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,2-Dibromoethane	0.0006		ug/l	50	U	800	U	5	U	2	U	800	U
1,3-Dichloropropane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,1,1,2-Tetrachloroethane	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Bromobenzene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
n-Butylbenzene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
sec-Butylbenzene	5		ug/l	62	U	1000	U	6.5		2.5	U	1000	U
tert-Butylbenzene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
o-Chlorotoluene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
p-Chlorotoluene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,2-Dibromo-3-chloropropane	0.04		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Hexachlorobutadiene	0.5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Isopropylbenzene	5		ug/l	77		1000	U	32		2.5	U	1000	U
p-Isopropyltoluene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
Naphthalene	10		ug/l	280		360	J	13		2.5	U	1000	U
n-Propylbenzene	5		ug/l	190		1000	U	71		2.5	U	1000	U
1,2,3-Trichlorobenzene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,2,4-Trichlorobenzene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
1,3,5-Trimethylbenzene	5		ug/l	380		450	J	23		2.5	U	310	J
1,2,4-Trimethylbenzene	5		ug/l	1400		1800		140		2.5	U	1300	
1,4-Dioxane			ug/l	6200	U	100000	U	620	U	250	U	100000	U
p-Diethylbenzene			ug/l	160		800	U	18		2	U	800	U
p-Ethyltoluene			ug/l	920		1400		77		2	U	1100	
1,2,4,5-Tetramethylbenzene	5		ug/l	64		800	U	40		2	U	800	U
Ethyl ether			ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U
trans-1,4-Dichloro-2-butene	5		ug/l	62	U	1000	U	6.2	U	2.5	U	1000	U

Notes:
ug/l:Micrograms per liter
U: Value below the Method Detection Limit (MDL)
J: Estimated Value
Highlighted: Exceeds respective criteria
NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 2004.
NY-PFAS SLs: Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020)

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				MW-6 (MW-4 DUP)		FIELD BLANK		TB		FB-02		TB		FIELD BLANK		TRIP BLANK	
SAMPLING DATE				2/25/2020		2/10/2020		2/10/2020		2/12/2020		2/12/2020		2/25/2020		2/25/2020	
SAMPLE TYPE				WATER		WATER		WATER		WATER		WATER		WATER		WATER	
	NY-AWQS	NY-PFAS SLs	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,4 Dioxane by 8270D-SIM																	
1,4-Dioxane			ug/l	0.134	U	0.139	U	-	-	0.15	U	-	-	0.129	U	-	-
Chlorinated Herbicides by GC																	
2,4-D	50		ug/l	10	U	10	U	-	-	10	U	-	-	10	U	-	-
2,4,5-T	35		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
2,4,5-TP (Silvex)			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
Dissolved Metals																	
Aluminum, Dissolved			ug/l	4.29	J	-	-	-	-	-	-	-	-	11.5		-	-
Antimony, Dissolved	3		ug/l	4	U	-	-	-	-	-	-	-	-	4	U	-	-
Arsenic, Dissolved	25		ug/l	0.33	J	-	-	-	-	-	-	-	-	0.5	U	-	-
Barium, Dissolved	1000		ug/l	105.2		-	-	-	-	-	-	-	-	0.55		-	-
Beryllium, Dissolved	3		ug/l	0.5	U	-	-	-	-	-	-	-	-	0.5	U	-	-
Cadmium, Dissolved	5		ug/l	0.2	U	-	-	-	-	-	-	-	-	0.2	U	-	-
Calcium, Dissolved			ug/l	112000		-	-	-	-	-	-	-	-	100	U	-	-
Chromium, Dissolved	50		ug/l	0.47	J	-	-	-	-	-	-	-	-	1	U	-	-
Cobalt, Dissolved			ug/l	1		-	-	-	-	-	-	-	-	0.5	U	-	-
Copper, Dissolved	200		ug/l	0.84	J	-	-	-	-	-	-	-	-	1	U	-	-
Iron, Dissolved	300		ug/l	46.3	J	-	-	-	-	-	-	-	-	50	U	-	-
Lead, Dissolved	25		ug/l	1	U	-	-	-	-	-	-	-	-	1	U	-	-
Magnesium, Dissolved	35000		ug/l	41700		-	-	-	-	-	-	-	-	70	U	-	-
Manganese, Dissolved	300		ug/l	77.1		-	-	-	-	-	-	-	-	1	U	-	-
Mercury, Dissolved	0.7		ug/l	0.2	U	-	-	-	-	-	-	-	-	0.2	U	-	-
Nickel, Dissolved	100		ug/l	15.66		-	-	-	-	-	-	-	-	2	U	-	-
Potassium, Dissolved			ug/l	10600		-	-	-	-	-	-	-	-	100	U	-	-
Selenium, Dissolved	10		ug/l	3.28	J	-	-	-	-	-	-	-	-	5	U	-	-
Silver, Dissolved	50		ug/l	0.4	U	-	-	-	-	-	-	-	-	0.4	U	-	-
Sodium, Dissolved	20000		ug/l	94600		-	-	-	-	-	-	-	-	100	U	-	-
Thallium, Dissolved	0.5		ug/l	0.47	J	-	-	-	-	-	-	-	-	1	U	-	-
Vanadium, Dissolved			ug/l	5	U	-	-	-	-	-	-	-	-	5	U	-	-
Zinc, Dissolved	2000		ug/l	10	U	-	-	-	-	-	-	-	-	10	U	-	-
Organochlorine Pesticides by GC																	
Delta-BHC	0.04		ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Lindane	0.05		ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Alpha-BHC	0.01		ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Beta-BHC	0.04		ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Heptachlor	0.04		ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Aldrin	0		ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Heptachlor epoxide	0.03		ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Endrin	0		ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
Endrin aldehyde	5		ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
Endrin ketone	5		ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
Dieldrin	0.004		ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
4,4'-DDE	0.2		ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
4,4'-DDD	0.3		ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
4,4'-DDT	0.2		ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
Endosulfan I			ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
Endosulfan II			ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
Endosulfan sulfate			ug/l	0.029	U	0.029	U	-	-	0.029	U	-	-	0.029	U	-	-
Methoxychlor	35		ug/l	0.143	U	0.143	U	-	-	0.143	U	-	-	0.143	U	-	-
Toxaphene	0.06		ug/l	0.143	U	0.143	U	-	-	0.143	U	-	-	0.143	U	-	-
cis-Chlordane			ug/l	0.014	U	0.014	U	-	-	0.014	U	-	-	0.014	U	-	-
trans-Chlordane			ug/l	0.014	U	0.008	JIP	-	-	0.014	U	-	-	0.014	U	-	-
Chlordane	0.05		ug/l	0.143	U	0.143	U	-	-	0.143	U	-	-	0.143	U	-	-
Perfluorinated Alkyl Acids by Isotope Dilution																	
Perfluorobutanoic Acid (PFBA)		0.100	ug/l	0.0296		0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluoropentanoic Acid (PFPeA)		0.100	ug/l	0.0588		0.00192	U	-	-	0.00186	U	-	-	0.000609	J	-	-
Perfluorobutanesulfonic Acid (PFBS)		0.100	ug/l	0.0194		0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorohexanoic Acid (PFHxA)		0.100	ug/l	0.0616		0.000421	J	-	-	0.000431	J	-	-	0.000366	J	-	-
Perfluoroheptanoic Acid (PFHpA)		0.100	ug/l	0.0386		0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorohexanesulfonic Acid (PFHxS)		0.100	ug/l	0.0284		0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorooctanoic Acid (PFOA)		0.010	ug/l	0.0685		0.00192	U	-	-	0.000297	J	-	-	0.00206	U	-	-
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluoroheptanesulfonic Acid (PFHpS)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorononanoic Acid (PFNA)		0.100	ug/l	0.00291		0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorooctanesulfonic Acid (PFOS)		0.010	ug/l	0.0455		0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorodecanoic Acid (PFDA)		0.100	ug/l	0.000989	J	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluoroundecanoic Acid (PFUnA)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorodecanesulfonic Acid (PFDS)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorooctanesulfonamide (FOSA)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorododecanoic Acid (PFDoA)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorotridecanoic Acid (PFTrDA)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
Perfluorotetradecanoic Acid (PFTA)		0.100	ug/l	0.00189	U	0.00192	U	-	-	0.00186	U	-	-	0.00206	U	-	-
PFOA/PFOS, Total			ug/l	0.114		0.00192	U	-	-	0.000297	J	-	-	0.00206	U	-	-
Total PFAS		0.500	ug/l	0.354299													

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**MW-6 (MW-4 DUP)**		**FIELD BLANK**		**TB**		**FB-02**		**TB**		**FIELD BLANK**		**TRIP BLANK**	
SAMPLING DATE				**2/25/2020**		**2/10/2020**		**2/10/2020**		**2/12/2020**		**2/12/2020**		**2/25/2020**		**2/25/2020**	
SAMPLE TYPE				**WATER**		**WATER**		**WATER**		**WATER**		**WATER**		**WATER**		**WATER**	
	NY-AWQS	**NY-PFAS SLs**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Polychlorinated Biphenyls by GC																	
Aroclor 1016	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1221	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1232	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1242	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1248	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1254	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1260	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1262	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Aroclor 1268	0.09		ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
PCBs, Total			ug/l	0.083	U	0.083	U	-	-	0.083	U	-	-	0.083	U	-	-
Semivolatile Organics by GC/MS																	
1,2,4-Trichlorobenzene	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Bis(2-chloroethyl)ether	1		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
1,2-Dichlorobenzene	3		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
1,3-Dichlorobenzene	3		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
1,4-Dichlorobenzene	3		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
3,3'-Dichlorobenzidine	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2,4-Dinitrotoluene	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2,6-Dinitrotoluene	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
4-Chlorophenyl phenyl ether			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
4-Bromophenyl phenyl ether			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
Bis(2-chloroisopropyl)ether	5		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
Bis(2-chloroethoxy)methane	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Hexachlorocyclopentadiene	5		ug/l	20	U	20	U	-	-	20	U	-	-	20	U	-	-
Isophorone	50		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Nitrobenzene	0.4		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
NDPA/DPA	50		ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
n-Nitrosodi-n-propylamine			ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Bis(2-ethylhexyl)phthalate	5		ug/l	3	U	3	U	-	-	3	U	-	-	3	U	-	-
Butyl benzyl phthalate	50		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Di-n-butylphthalate	50		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Di-n-octylphthalate	50		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Diethyl phthalate	50		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Dimethyl phthalate	50		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Biphenyl			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
4-Chloroaniline	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2-Nitroaniline	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
3-Nitroaniline	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
4-Nitroaniline	5		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Dibenzofuran			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
1,2,4,5-Tetrachlorobenzene	5		ug/l	10	U	10	U	-	-	10	U	-	-	10	U	-	-
Acetophenone			ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2,4,6-Trichlorophenol			ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
p-Chloro-m-cresol			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
2-Chlorophenol			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
2,4-Dichlorophenol	1		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2,4-Dimethylphenol	50		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2-Nitrophenol			ug/l	10	U	10	U	-	-	10	U	-	-	10	U	-	-
4-Nitrophenol			ug/l	10	U	10	U	-	-	10	U	-	-	10	U	-	-
2,4-Dinitrophenol	10		ug/l	20	U	20	U	-	-	20	U	-	-	20	U	-	-
4,6-Dinitro-o-cresol			ug/l	10	U	10	U	-	-	10	U	-	-	10	U	-	-
Phenol	1		ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2-Methylphenol			ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
3-Methylphenol/4-Methylphenol			ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
2,4,5-Trichlorophenol			ug/l	5	U	5	U	-	-	5	U	-	-	5	U	-	-
Benzoic Acid			ug/l	50	U	50	U	-	-	50	U	-	-	50	U	-	-
Benzyl Alcohol			ug/l	2	U	0.92	J	-	-	2	U	-	-	0.9	J	-	-
Carbazole			ug/l	2	U	2	U	-	-	2	U	-	-	2	U	-	-
Semivolatile Organics by GC/MS-SIM																	
Acenaphthene	20		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
2-Chloronaphthalene	10		ug/l	0.2	U	0.2	U	-	-	0.2	U	-	-	0.2	U	-	-
Fluoranthene	50		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Hexachlorobutadiene	0.5		ug/l	0.5	U	0.5	U	-	-	0.5	U	-	-	0.5	U	-	-
Naphthalene	10		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Benzo(a)anthracene	0.002		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Benzo(a)pyrene	0		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Benzo(b)fluoranthene	0.002		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Benzo(k)fluoranthene	0.002		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Chrysene	0.002		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Acenaphthylene			ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Anthracene	50		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Benzo(ghi)perylene			ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Fluorene	50		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Phenanthrene	50		ug/l	0.1	U	0.03	J	-	-	0.1	U	-	-	0.1	U	-	-
Dibenzo(a,h)anthracene			ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Indeno(1,2,3-cd)pyrene	0.002		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Pyrene	50		ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
2-Methylnaphthalene			ug/l	0.1	U	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
Pentachlorophenol	1		ug/l	0.8	U	0.8	U	-	-	0.8	U	-	-	0.8	U	-	-
Hexachlorobenzene	0.04		ug/l	0.8	U	0.8	U	-	-	0.8	U	-	-	0.8	U	-	-
Hexachloroethane	5		ug/l	0.8	U	0.8	U	-	-	0.8	U	-	-	0.8	U	-	-

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				**MW-6 (MW-4 DUP)**		**FIELD BLANK**		**TB**		**FB-02**		**TB**		**FIELD BLANK**		**TRIP BLANK**	
SAMPLING DATE				**2/25/2020**		**2/10/2020**		**2/10/2020**		**2/12/2020**		**2/12/2020**		**2/25/2020**		**2/25/2020**	
SAMPLE TYPE				**WATER**		**WATER**		**WATER**		**WATER**		**WATER**		**WATER**		**WATER**	
	NY-AWQS	**NY-PFAS SLs**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Total Metals																	
Aluminum, Total			ug/l	12.4		100	U	-	-	100	U	-	-	4.14	J	-	-
Antimony, Total	3		ug/l	4	U	50	U	-	-	8	J	-	-	4	U	-	-
Arsenic, Total	25		ug/l	0.3	J	5	U	-	-	5	U	-	-	0.5	U	-	-
Barium, Total	1000		ug/l	115.4		10	U	-	-	10	U	-	-	0.56		-	-
Beryllium, Total	3		ug/l	0.5	U	5	U	-	-	5	U	-	-	0.5	U	-	-
Cadmium, Total	5		ug/l	0.2	U	5	U	-	-	5	U	-	-	0.2	U	-	-
Calcium, Total			ug/l	114000		100	U	-	-	100	U	-	-	100	U	-	-
Chromium, Total	50		ug/l	0.46	J	10	U	-	-	10	U	-	-	1	U	-	-
Cobalt, Total			ug/l	0.94		20	U	-	-	20	U	-	-	0.5	U	-	-
Copper, Total	200		ug/l	1.26		10	U	-	-	10	U	-	-	1	U	-	-
Iron, Total	300		ug/l	127		13	J	-	-	50	U	-	-	23.6	J	-	-
Lead, Total	25		ug/l	1	U	10	U	-	-	10	U	-	-	1	U	-	-
Magnesium, Total	35000		ug/l	41500		100	U	-	-	100	U	-	-	70	U	-	-
Manganese, Total	300		ug/l	76.73		10	U	-	-	10	U	-	-	1	U	-	-
Mercury, Total	0.7		ug/l	0.2	U	0.2	U	-	-	0.2	U	-	-	0.2	U	-	-
Nickel, Total	100		ug/l	15.61		25	U	-	-	25	U	-	-	2	U	-	-
Potassium, Total			ug/l	10800		2500	U	-	-	2500	U	-	-	100	U	-	-
Selenium, Total	10		ug/l	3.86	J	10	U	-	-	10	U	-	-	5	U	-	-
Silver, Total	50		ug/l	0.4	U	7	U	-	-	7	U	-	-	0.4	U	-	-
Sodium, Total	20000		ug/l	94000		2000	U	-	-	2000	U	-	-	100	U	-	-
Thallium, Total	0.5		ug/l	0.45	J	20	U	-	-	20	U	-	-	1	U	-	-
Vanadium, Total			ug/l	5	U	10	U	-	-	10	U	-	-	5	U	-	-
Zinc, Total	2000		ug/l	10	U	50	U	-	-	50	U	-	-	10	U	-	-
Volatile Organics by GC/MS																	
Methylene chloride	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	7		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Carbon tetrachloride	5		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	1		ug/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	50		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	1		ug/l	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Tetrachloroethene	5		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichlorofluoromethane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Bromodichloromethane	50		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	0.4		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	0.4		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichloropropene, Total			ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloropropene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Bromoform	50		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,1,2,2-Tetrachloroethane	5		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Benzene	1		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Ethylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloromethane			ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Bromomethane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Vinyl chloride	2		ug/l	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	5		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Trichloroethene	5		ug/l	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	3		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,3-Dichlorobenzene	3		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dichlorobenzene	3		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl tert butyl ether	10		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
p/m-Xylene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
o-Xylene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylenes, Total			ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
cis-1,2-Dichloroethene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethene, Total			ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U

Table 3
Monitor Well Groundwater Analytical Results
4778 Broadway, New York, NY
AEI Project #384736

LOCATION				MW-6 (MW-4 DUP)		FIELD BLANK		TB		FB-02		TB		FIELD BLANK		TRIP BLANK	
SAMPLING DATE				**2/25/2020**		**2/10/2020**		**2/10/2020**		**2/12/2020**		**2/12/2020**		**2/25/2020**		**2/25/2020**	
SAMPLE TYPE				**WATER**		**WATER**		**WATER**		**WATER**		**WATER**		**WATER**		**WATER**	
	NY-AWQS	**NY-PFAS SLs**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Dibromomethane	5		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2,3-Trichloropropane	0.04		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Acrylonitrile	5		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Styrene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Dichlorodifluoromethane	5		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	50		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Carbon disulfide	60		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Butanone	50		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Vinyl acetate			ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone			ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	50		ug/l	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bromochloromethane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
2,2-Dichloropropane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dibromoethane	0.0006		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,3-Dichloropropane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,1,1,2-Tetrachloroethane	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Bromobenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
n-Butylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
sec-Butylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
tert-Butylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
o-Chlorotoluene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Chlorotoluene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dibromo-3-chloropropane	0.04		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Hexachlorobutadiene	0.5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Isopropylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Naphthalene	10		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
n-Propylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2,3-Trichlorobenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2,4-Trichlorobenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,3,5-Trimethylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2,4-Trimethylbenzene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dioxane			ug/l	250	U	250	U	250	U	250	U	250	U	250	U	250	U
p-Diethylbenzene			ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U
p-Ethyltoluene			ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,2,4,5-Tetramethylbenzene	5		ug/l	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Ethyl ether			ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
trans-1,4-Dichloro-2-butene	5		ug/l	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U

Notes:
ug/l:Micrograms per liter
U: Value below the Method Detection Limit (MDL)
J: Estimated Value
Highlighted: Exceeds respective criteria
NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria throu
NY-PFAS SLs: Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (Janua

Table 4
Soil Exceedances of Track 1 SCOs
4778 Broadway, New York,NY
AEI Project #384736

LOCATION			SB-13-0-2"		SB-13-0-2"		SB-13-1.5-2		SB-13-12.5-13		SB-13-14.5-15	
SAMPLING DATE			2/10/2020		2/10/2020		2/10/2020		2/10/2020		2/10/2020	
SAMPLE TYPE			SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)			0-2		0-2		1.5-2		12.5-13		14.5-15	
	URRUSCO	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Organochlorine Pesticides by GC												
4,4'-DDE	0.0033	mg/kg	0.0326		-	-	0.00182	U	0.00178	U	0.00177	U
4,4'-DDD	0.0033	mg/kg	0.0185		-	-	0.00182	U	0.00178	U	0.00177	U
4,4'-DDT	0.0033	mg/kg	0.424	E	0.266		0.00342	U	0.00334	U	0.00332	U
Semivolatile Organics by GC/MS												
Naphthalene	12	mg/kg	0.19	U	-	-	0.2	U	0.19	U	0.18	U
Benzo(a)anthracene	1	mg/kg	0.058	J	-	-	0.13		0.12	U	0.11	U
Benzo(a)pyrene	1	mg/kg	0.064	J	-	-	0.13	J	0.15	U	0.15	U
Benzo(b)fluoranthene	1	mg/kg	0.083	J	-	-	0.17		0.12	U	0.11	U
Benzo(k)fluoranthene	0.8	mg/kg	0.12	U	-	-	0.064	J	0.12	U	0.11	U
Chrysene	1	mg/kg	0.059	J	-	-	0.13		0.12	U	0.11	U
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	0.043	J	-	-	0.092	J	0.15	U	0.15	U
3-Methylphenol/4-Methylphenol	0.33	mg/kg	0.28	U	-	-	0.28	U	0.28	U	0.26	U
Total Metals												
Lead, Total	63	mg/kg	46.1		-	-	74		3.82	J	3.91	J
Zinc, Total	109	mg/kg	73.7		-	-	135		26.8		77.2	
Volatile Organics by EPA 5035												
Benzene	0.06	mg/kg	-	-	-	-	0.00034	U	0.00045	U	0.0005	U
Toluene	0.7	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U
Ethylbenzene	1	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U
Xylenes, Total	0.26	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U
Naphthalene	12	mg/kg	-	-	-	-	0.0028	U	0.0036	U	0.004	U
n-Propylbenzene	3.9	mg/kg	-	-	-	-	0.00069	U	0.0009	U	0.001	U
1,3,5-Trimethylbenzene	8.4	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U
1,2,4-Trimethylbenzene	3.6	mg/kg	-	-	-	-	0.0014	U	0.0018	U	0.002	U

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL
J:Estimated Value
Q: Data Qualifier
E:Analyte exceeds calibration curve of intrument
URRUSCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
Highlighted Blue = Exceeds NYSDEC URRUSCO

Table 4
Soil Exceedances of Track 1 SCOs
4778 Broadway, New York,NY
AEI Project #384736

LOCATION			SB-14-0-2"		SB-14-1.5-2.0		SB-14-12.5-13.0		SB-14-19.5-20.0	
SAMPLING DATE			2/10/2020		2/10/2020		2/10/2020		2/10/2020	
SAMPLE TYPE			SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)			0-2		1.5-2		12.5-13		19.5-20	
	URRUSCO	Units	Results	Q	Results	Q	Results	Q	Results	Q
Organochlorine Pesticides by GC										
4,4'-DDE	0.0033	mg/kg	0.00188	U	0.00183	U	0.00186	U	0.00175	U
4,4'-DDD	0.0033	mg/kg	0.00188	U	0.00183	U	0.00186	U	0.00175	U
4,4'-DDT	0.0033	mg/kg	0.00353	U	0.00344	U	0.00349	U	0.00328	U
Semivolatile Organics by GC/MS										
Naphthalene	12	mg/kg	0.19	U	0.19	U	0.19	U	0.18	U
Benzo(a)anthracene	1	mg/kg	0.024	J	0.11	U	0.11	U	0.11	U
Benzo(a)pyrene	1	mg/kg	0.16	U	0.15	U	0.15	U	0.15	U
Benzo(b)fluoranthene	1	mg/kg	0.034	J	0.11	U	0.11	U	0.11	U
Benzo(k)fluoranthene	0.8	mg/kg	0.12	U	0.11	U	0.11	U	0.11	U
Chrysene	1	mg/kg	0.035	J	0.11	U	0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	0.16	U	0.15	U	0.15	U	0.15	U
3-Methylphenol/4-Methylphenol	0.33	mg/kg	0.28	U	0.27	U	0.27	U	0.26	U
Total Metals										
Lead, Total	63	mg/kg	7.78		50		6.38		4.15	J
Zinc, Total	109	mg/kg	27.7		78.7		26.6		30.5	
Volatile Organics by EPA 5035										
Benzene	0.06	mg/kg	-	-	0.0005	U	0.00016	J	0.023	U
Toluene	0.7	mg/kg	-	-	0.00099	U	0.00066	U	0.046	U
Ethylbenzene	1	mg/kg	-	-	0.00099	U	0.00066	U	0.046	U
Xylenes, Total	0.26	mg/kg	-	-	0.00099	U	0.00066	U	0.046	U
Naphthalene	12	mg/kg	-	-	0.004	U	0.0026	U	0.038	J
n-Propylbenzene	3.9	mg/kg	-	-	0.00099	U	0.00066	U	0.16	
1,3,5-Trimethylbenzene	8.4	mg/kg	-	-	0.002	U	0.0013	U	0.092	U
1,2,4-Trimethylbenzene	3.6	mg/kg	-	-	0.002	U	0.0013	U	0.49	

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL
J:Estimated Value
Q: Data Qualifier
E:Analyte exceeds calibration curve of intrument
URRUSCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria
Highlighted Blue = Exceeds NYSDEC URRUSCO

Table 4
Soil Exceedances of Track 1 SCOs
4778 Broadway, New York,NY
AEI Project #384736

LOCATION			**SB-15-0-2"**		**SB-15-1.5-2.0**		**SB-15-12.5-13.0**		**SB-15-18.5-19.0**	
SAMPLING DATE			**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**	
SAMPLE TYPE			**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)			**0-2**		**1.5-2**		**12.5-13**		**18.5-19**	
	URRUSCO	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Organochlorine Pesticides by GC										
4,4'-DDE	0.0033	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U
4,4'-DDD	0.0033	mg/kg	0.00178	U	0.0017	U	0.00173	U	0.00173	U
4,4'-DDT	0.0033	mg/kg	0.00333	U	0.00318	U	0.00325	U	0.00325	U
Semivolatile Organics by GC/MS										
Naphthalene	12	mg/kg	0.19	U	0.057	J	0.18	U	0.18	U
Benzo(a)anthracene	1	mg/kg	1.4		0.5		0.11	U	0.11	U
Benzo(a)pyrene	1	mg/kg	1.4		0.57		0.14	U	0.15	U
Benzo(b)fluoranthene	1	mg/kg	2.4		0.7		0.11	U	0.11	U
Benzo(k)fluoranthene	0.8	mg/kg	0.82		0.25		0.11	U	0.11	U
Chrysene	1	mg/kg	1.5		0.48		0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	1.2		0.4		0.14	U	0.15	U
3-Methylphenol/4-Methylphenol	0.33	mg/kg	0.27	U	0.26	U	0.26	U	0.26	U
Total Metals										
Lead, Total	63	mg/kg	45.1		227		6.06		2.46	J
Zinc, Total	109	mg/kg	44.6		108		31.9		18.5	
Volatile Organics by EPA 5035										
Benzene	0.06	mg/kg	-	-	0.00055	U	0.00047	U	0.00041	U
Toluene	0.7	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U
Ethylbenzene	1	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U
Xylenes, Total	0.26	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U
Naphthalene	12	mg/kg	-	-	0.0044	U	0.0038	U	0.0033	U
n-Propylbenzene	3.9	mg/kg	-	-	0.0011	U	0.00094	U	0.00082	U
1,3,5-Trimethylbenzene	8.4	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U
1,2,4-Trimethylbenzene	3.6	mg/kg	-	-	0.0022	U	0.0019	U	0.0016	U

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL
J:Estimated Value
Q: Data Qualifier
E:Analyte exceeds calibration curve of intrument
URRUSCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria
Highlighted Blue = Exceeds NYSDEC URRUSCO

Table 4
Soil Exceedances of Track 1 SCOs
4778 Broadway, New York,NY
AEI Project #384736

LOCATION			SB-16-0-2"		SB-16-1.5-2.0		SB-16-12.5-13.0		SB-16-17.5-18.0	
SAMPLING DATE			2/12/2020		2/12/2020		2/12/2020		2/12/2020	
SAMPLE TYPE			SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)			0-2		1.5-2		12.5-13		17.5-18	
	URRUSCO	Units	Results	Q	Results	Q	Results	Q	Results	Q
Organochlorine Pesticides by GC										
4,4'-DDE	0.0033	mg/kg	0.00186	U	0.00171	U	0.00181	U	0.00184	U
4,4'-DDD	0.0033	mg/kg	0.00186	U	0.00171	U	0.00181	U	0.00184	U
4,4'-DDT	0.0033	mg/kg	0.0035	U	0.00321	U	0.0034	U	0.00345	U
Semivolatile Organics by GC/MS										
Naphthalene	12	mg/kg	0.096	J	0.19	U	0.19	U	0.16	J
Benzo(a)anthracene	1	mg/kg	0.077	J	0.11	U	0.11	U	0.12	U
Benzo(a)pyrene	1	mg/kg	0.086	J	0.15	U	0.15	U	0.15	U
Benzo(b)fluoranthene	1	mg/kg	0.12		0.11	U	0.11	U	0.12	U
Benzo(k)fluoranthene	0.8	mg/kg	0.035	J	0.11	U	0.11	U	0.12	U
Chrysene	1	mg/kg	0.09	J	0.11	U	0.11	U	0.12	U
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	0.066	J	0.15	U	0.15	U	0.15	U
3-Methylphenol/4-Methylphenol	0.33	mg/kg	0.28	U	0.27	U	0.27	U	0.28	U
Total Metals										
Lead, Total	63	mg/kg	138		17.4		5.48		2.39	J
Zinc, Total	109	mg/kg	142		31.6		40.6		17.2	
Volatile Organics by EPA 5035										
Benzene	0.06	mg/kg	-	-	0.00046	U	0.00027	J	1.9	
Toluene	0.7	mg/kg	-	-	0.00092	U	0.0009	U	46	
Ethylbenzene	1	mg/kg	-	-	0.00092	U	0.0009	U	110	
Xylenes, Total	0.26	mg/kg	-	-	0.00092	U	0.0009	U	570	
Naphthalene	12	mg/kg	-	-	0.0037	U	0.0036	U	20	
n-Propylbenzene	3.9	mg/kg	-	-	0.00092	U	0.0009	U	33	
1,3,5-Trimethylbenzene	8.4	mg/kg	-	-	0.0018	U	0.0018	U	59	
1,2,4-Trimethylbenzene	3.6	mg/kg	-	-	0.0018	U	0.0018	U	190	

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL
J:Estimated Value
Q: Data Qualifier
E:Analyte exceeds calibration curve of intrument
URRUSCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria
Highlighted Blue = Exceeds NYSDEC URRUSCO

Table 4
Soil Exceedances of Track 1 SCOs
4778 Broadway, New York,NY
AEI Project #384736

LOCATION			**SB-17-0-2"**		**SB-17-1.5-2.0**		**SB-17-12.5-13.0**		**SB-17-19.5-20.0**	
SAMPLING DATE			**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**	
SAMPLE TYPE			**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)			**0-2**		**1.5-2**		**12.5-13**		**19.5-20**	
	URRUSCO	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Organochlorine Pesticides by GC										
4,4'-DDE	0.0033	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U
4,4'-DDD	0.0033	mg/kg	0.00179	U	0.00177	U	0.00172	U	0.00173	U
4,4'-DDT	0.0033	mg/kg	0.00335	U	0.00332	U	0.00322	U	0.00324	U
Semivolatile Organics by GC/MS										
Naphthalene	12	mg/kg	0.19	U	0.19	U	0.19	U	0.23	
Benzo(a)anthracene	1	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(a)pyrene	1	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U
Benzo(b)fluoranthene	1	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(k)fluoranthene	0.8	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U
Chrysene	1	mg/kg	0.11	U	0.12	U	0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	0.15	U	0.15	U	0.15	U	0.15	U
3-Methylphenol/4-Methylphenol	0.33	mg/kg	0.27	U	0.28	U	0.27	U	0.27	U
Total Metals										
Lead, Total	63	mg/kg	135		11.6		3.2	J	3.92	J
Zinc, Total	109	mg/kg	156		55.1		22.6		20.8	
Volatile Organics by EPA 5035										
Benzene	0.06	mg/kg	-	-	0.00028	J	0.027	U	0.027	U
Toluene	0.7	mg/kg	-	-	0.0054		0.054	U	0.054	U
Ethylbenzene	1	mg/kg	-	-	0.0032		0.054	U	0.022	J
Xylenes, Total	0.26	mg/kg	-	-	0.013		0.054	U	0.054	U
Naphthalene	12	mg/kg	-	-	0.0039		0.21	U	0.22	U
n-Propylbenzene	3.9	mg/kg	-	-	0.016		0.054	U	0.023	J
1,3,5-Trimethylbenzene	8.4	mg/kg	-	-	0.0035		0.11	U	0.013	J
1,2,4-Trimethylbenzene	3.6	mg/kg	-	-	0.0095		0.11	U	0.037	J

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL
J:Estimated Value
Q: Data Qualifier
E:Analyte exceeds calibration curve of intrument
URRUSCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteri
Highlighted Blue = Exceeds NYSDEC URRUSCO

Table 4
Soil Exceedances of Track 1 SCOs
4778 Broadway, New York,NY
AEI Project #384736

LOCATION			SB-18-0-2"		SB-18-1.5-2.0		SB-18-12.5-13.0		SB-18-19.5-20.0		SB-18-19.5-20.0	
SAMPLING DATE			2/12/2020		2/12/2020		2/12/2020		2/12/2020		2/12/2020	
SAMPLE TYPE			SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)			0-2		1.5-2		12.5-13		19.5-20		19.5-20	
	URRUSCO	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Organochlorine Pesticides by GC												
4,4'-DDE	0.0033	mg/kg	0.00175	U	0.00192	U	0.00174	U	0.00167	U	-	-
4,4'-DDD	0.0033	mg/kg	0.00175	U	0.00192	U	0.00174	U	0.00167	U	-	-
4,4'-DDT	0.0033	mg/kg	0.00328	U	0.00361	U	0.00326	U	0.00312	U	-	-
Semivolatile Organics by GC/MS												
Naphthalene	12	mg/kg	1.1	J	3.4		0.069	J	10	E	12	
Benzo(a)anthracene	1	mg/kg	0.42	J	0.38	J	0.11	U	0.021	J	-	-
Benzo(a)pyrene	1	mg/kg	1.5	U	1.6	U	0.14	U	0.14	U	-	-
Benzo(b)fluoranthene	1	mg/kg	1.1	U	1.2	U	0.11	U	0.11	U	-	-
Benzo(k)fluoranthene	0.8	mg/kg	1.1	U	1.2	U	0.11	U	0.11	U	-	-
Chrysene	1	mg/kg	1.2		0.94	J	0.11	U	0.11	U	-	-
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	1.5	U	1.6	U	0.14	U	0.14	U	-	-
3-Methylphenol/4-Methylphenol	0.33	mg/kg	2.7	U	2.9	U	0.26	U	0.092	J	-	-
Total Metals												
Lead, Total	63	mg/kg	21.1		7.93		5.28		3.36	J	-	-
Zinc, Total	109	mg/kg	49.2		30.9		43.7		18		-	-
Volatile Organics by EPA 5035												
Benzene	0.06	mg/kg	-	-	0.82		0.076		54		-	-
Toluene	0.7	mg/kg	-	-	0.6	U	0.047	U	810		-	-
Ethylbenzene	1	mg/kg	-	-	27		1.5		360		-	-
Xylenes, Total	0.26	mg/kg	-	-	71		0.24	J	1700		-	-
Naphthalene	12	mg/kg	-	-	7		1.3		56		-	-
n-Propylbenzene	3.9	mg/kg	-	-	15		0.52		66		-	-
1,3,5-Trimethylbenzene	8.4	mg/kg	-	-	37		0.058	J	120		-	-
1,2,4-Trimethylbenzene	3.6	mg/kg	-	-	98		0.058	J	420		-	-

Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL
J:Estimated Value
Q: Data Qualifier
E:Analyte exceeds calibration curve of intrument
URRUSCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria
Highlighted Blue = Exceeds NYSDEC URRUSCO

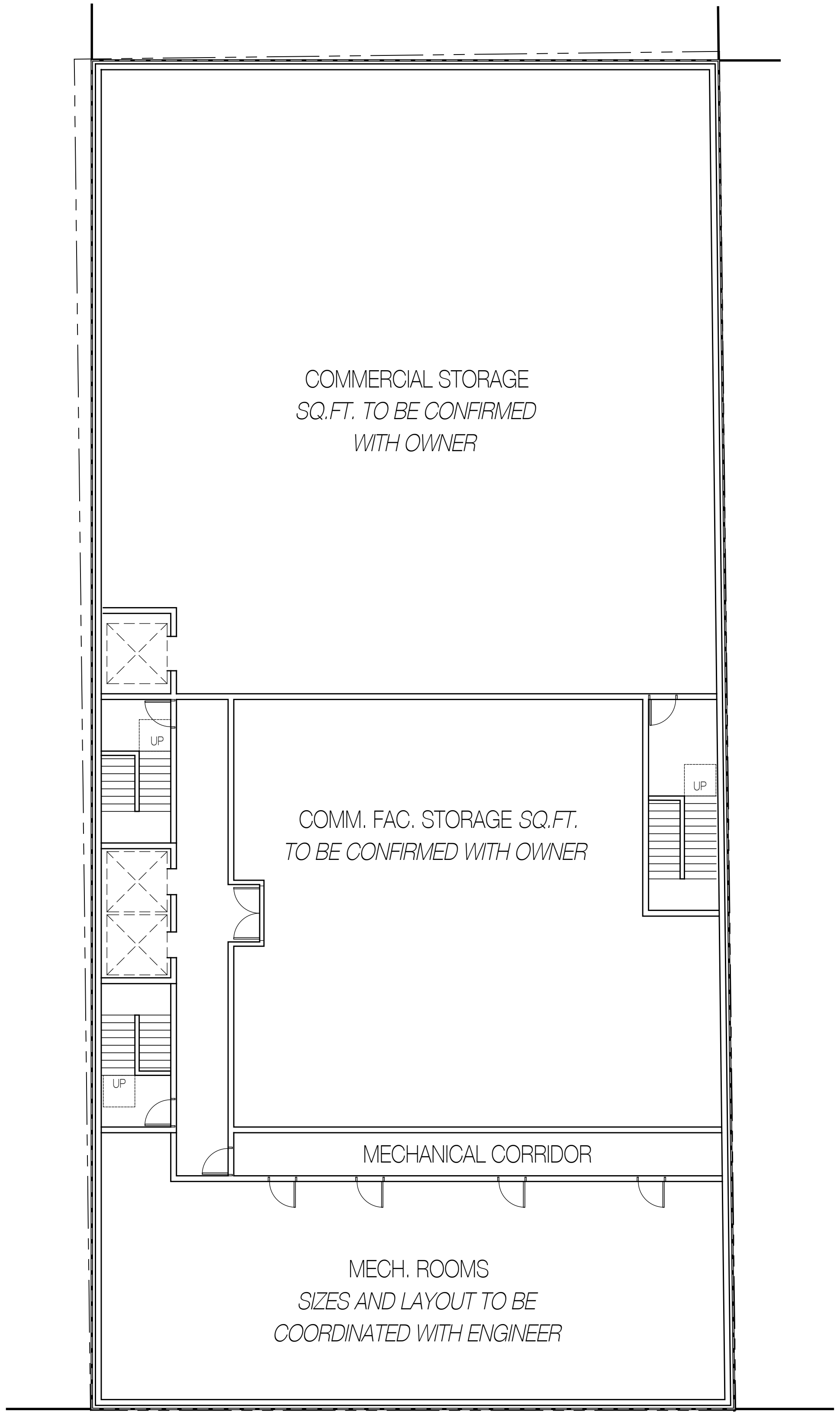
Table 4
Soil Exceedances of Track 1 SCOs
4778 Broadway, New York,NY
AEI Project #384736

LOCATION			**SB-19-0-2"**		**SB-19-1.5-2.0**		**SB-19-12.5-13.0**		**SB-19-19.5-20.0**		**SB-20-14.5-15**		**SB-21-18.5-19.0**	
SAMPLING DATE			**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/12/2020**		**2/10/2020**		**2/12/2020**	
SAMPLE TYPE			**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)			**0-2**		**1.5-2**		**12.5-13**		**19.5-20**		**14.5-15**		**18.5-20**	
	URRUSCO	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Organochlorine Pesticides by GC														
4,4'-DDE	0.0033	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
4,4'-DDD	0.0033	mg/kg	0.00174	U	0.0017	U	0.00172	U	0.00185	U	0.00174	U	0.0017	U
4,4'-DDT	0.0033	mg/kg	0.00326	U	0.00319	U	0.00322	U	0.00347	U	0.00327	U	0.00318	U
Semivolatile Organics by GC/MS														
Naphthalene	12	mg/kg	1.1		6.5		0.57		0.053	J	0.18	U	0.18	U
Benzo(a)anthracene	1	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(a)pyrene	1	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
Benzo(b)fluoranthene	1	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(k)fluoranthene	0.8	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Chrysene	1	mg/kg	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	0.14	U	0.15	U	0.14	U	0.16	U	0.14	U	0.14	U
3-Methylphenol/4-Methylphenol	0.33	mg/kg	0.036	J	0.26	U	0.066	J	0.38		0.26	U	0.26	U
Total Metals														
Lead, Total	63	mg/kg	13.7		7.78		3.26	J	6.82		3.41	J	2.52	J
Zinc, Total	109	mg/kg	72.8		36.3		21.9		47.7		27.5		19.2	
Volatile Organics by EPA 5035														
Benzene	0.06	mg/kg	-	-	0.3		1		3.1		0.00051	U	0.00047	U
Toluene	0.7	mg/kg	-	-	2.1		19		17		0.001	U	0.00094	U
Ethylbenzene	1	mg/kg	-	-	6.3		27		2		0.001	U	0.00094	U
Xylenes, Total	0.26	mg/kg	-	-	29		130		10		0.001	U	0.00094	U
Naphthalene	12	mg/kg	-	-	1.6		3.8		0.19	J	0.0041	U	0.0037	U
n-Propylbenzene	3.9	mg/kg	-	-	1.6		5.8		0.18		0.001	U	0.00094	U
1,3,5-Trimethylbenzene	8.4	mg/kg	-	-	3.8		11		0.36		0.002	U	0.0019	U
1,2,4-Trimethylbenzene	3.6	mg/kg	-	-	11		36		1.2		0.002	U	0.0019	U

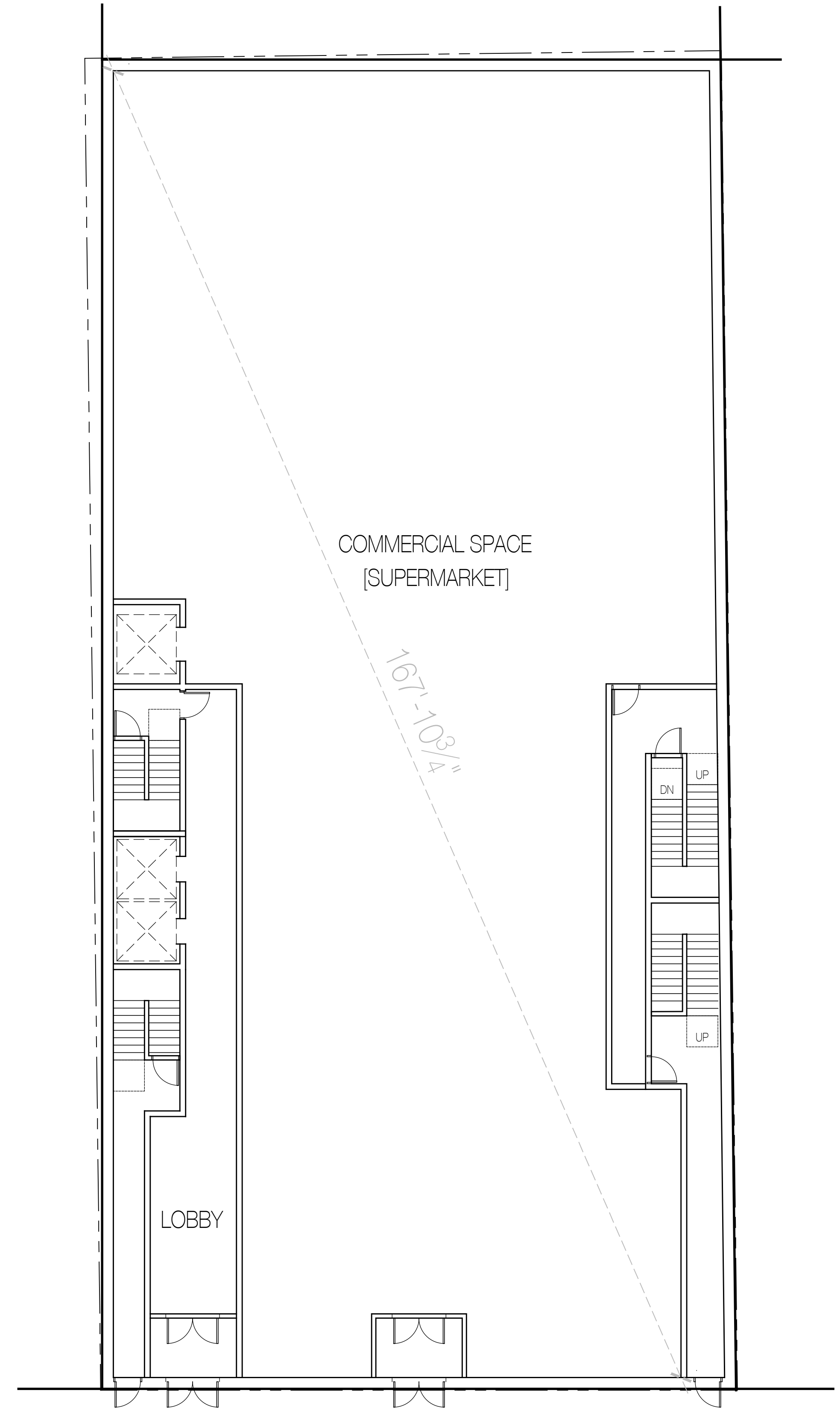
Notes:
mg/kg:Milligram/Kilogram
U:Value below Method Detection Limit (MDL
J:Estimated Value
Q: Data Qualifier
E:Analyte exceeds calibration curve of intrument
URRUSCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria
Highlighted Blue = Exceeds NYSDEC URRUSCO

APPENDIX A

PROPOSED DEVELOPMENT PLANS



CELLAR



1ST FLOOR

PROPOSED NEW DEVELOPMENT FOR:

4778

BROADWAY
NEW YORK, NY, 10034

BLOCK: 2233 LOT: 10

ARCHITECT:

AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVE.
SUFFERN, NY
INFO@AUFGANG.COM 845.368.0004

CLIENT:

AUFGANG ARCHITECTS

DATE	SUBMISSIONS / REVISIONS
02/10/20	PROGRESS SET
02/03/20	PROGRESS SET

SHEET TITLE:

CELLAR AND 1ST LEVEL FLOOR PLANS

ISSUE DATE:

PROJECT NO: P-20109

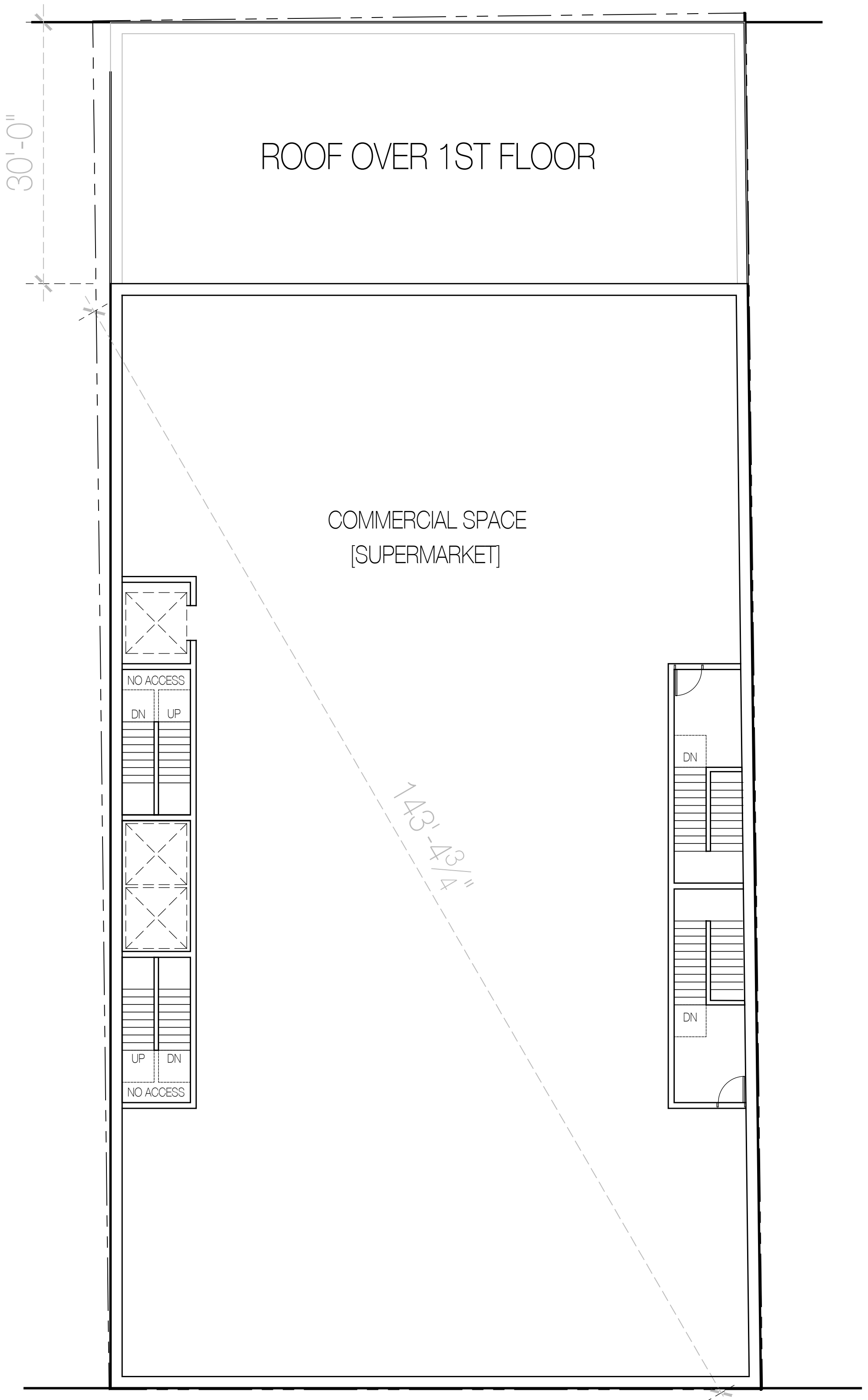
DRAWN BY:

CHECKED BY:

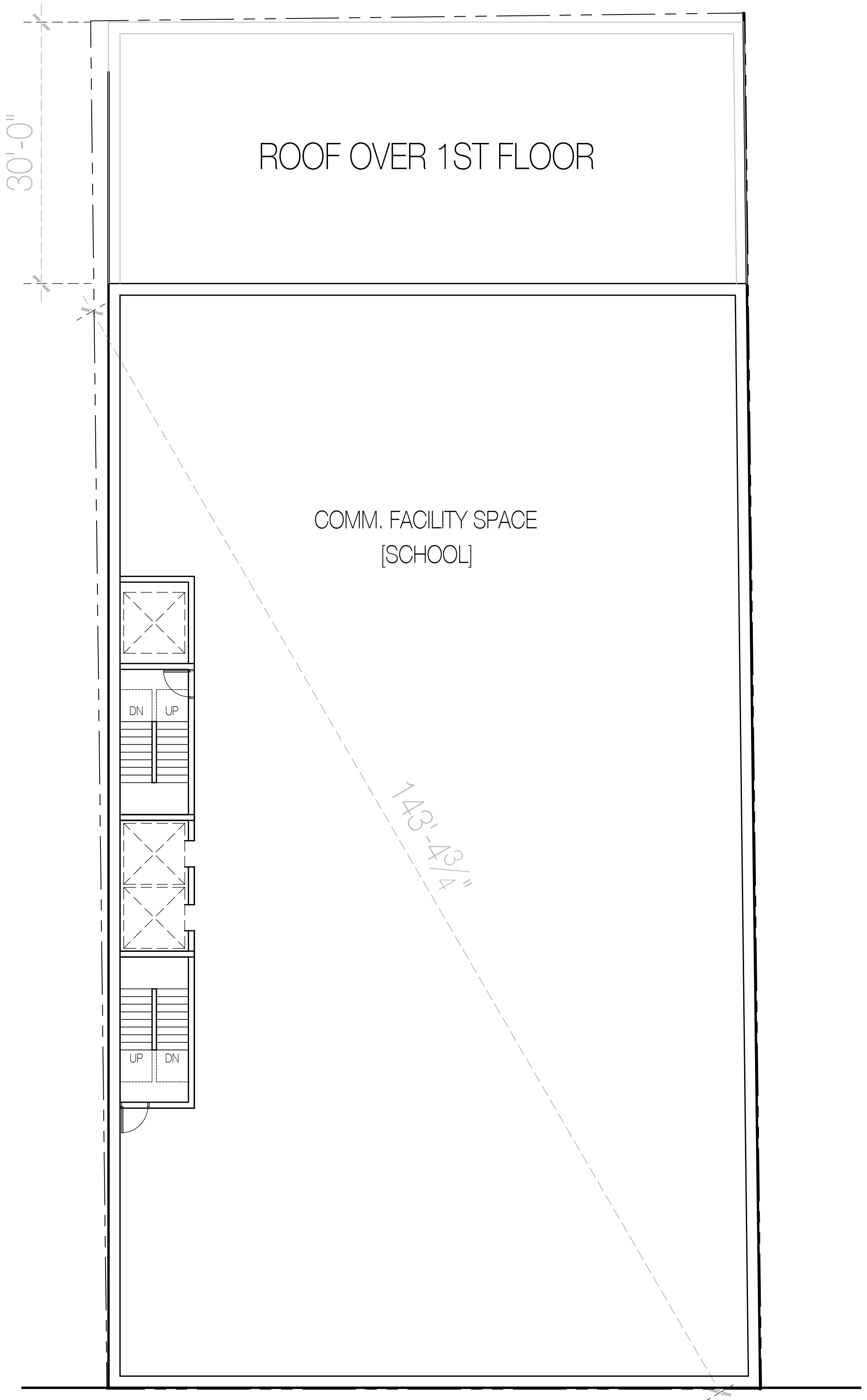
SCALE:

SHEET NO: 01 OF 03

DRAWING NO: A-100.00



2ND FLOOR



3RD - 7TH FLOORS

PROPOSED NEW DEVELOPMENT FOR:

4778

BROADWAY
NEW YORK, NY, 10034

BLOCK: 2233 LOT: 10

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVE.
SUFFERN, NY
INFO@AUFGANG.COM 845.368.0004

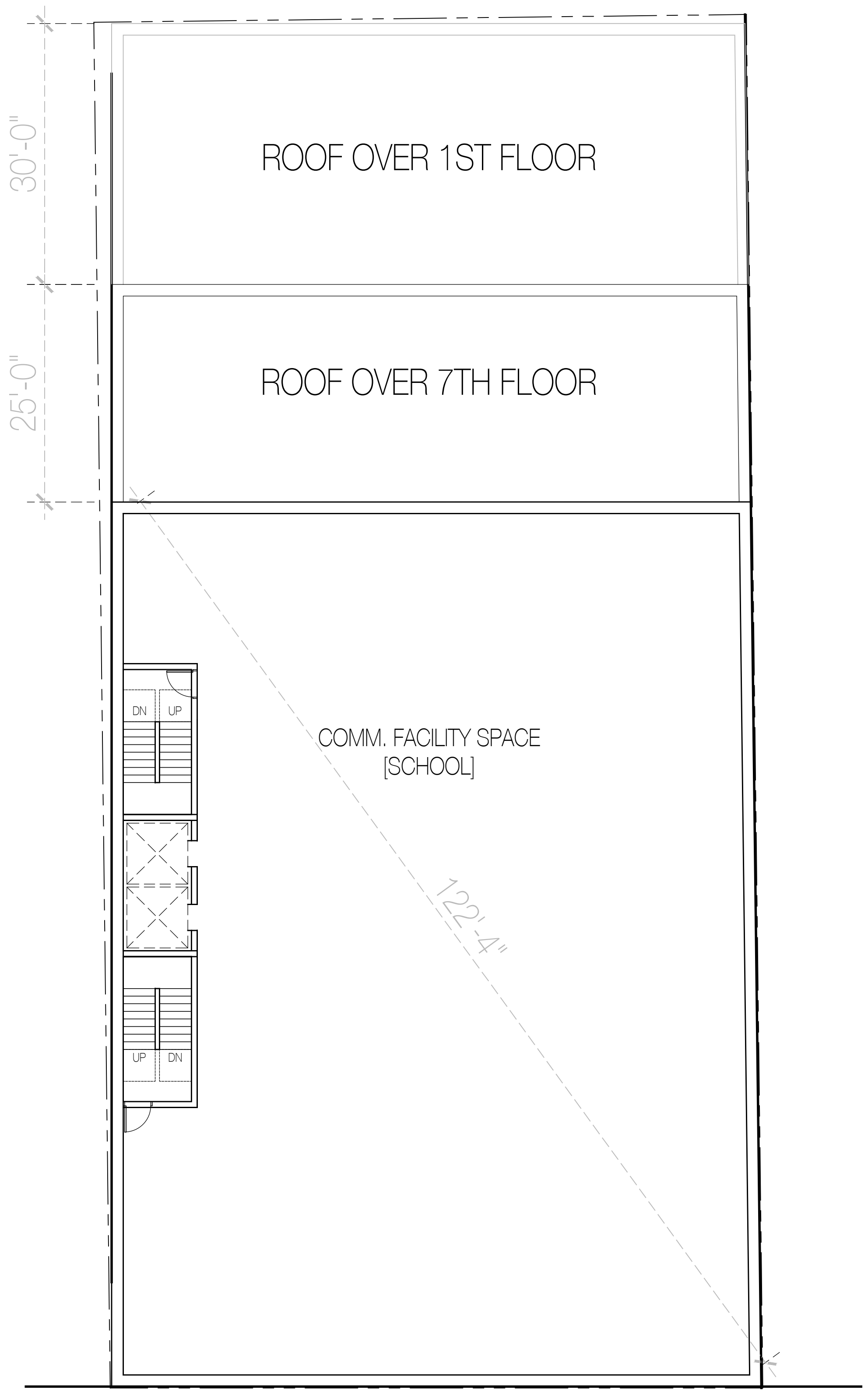
AUFGANG ARCHITECTS

CLIENT:

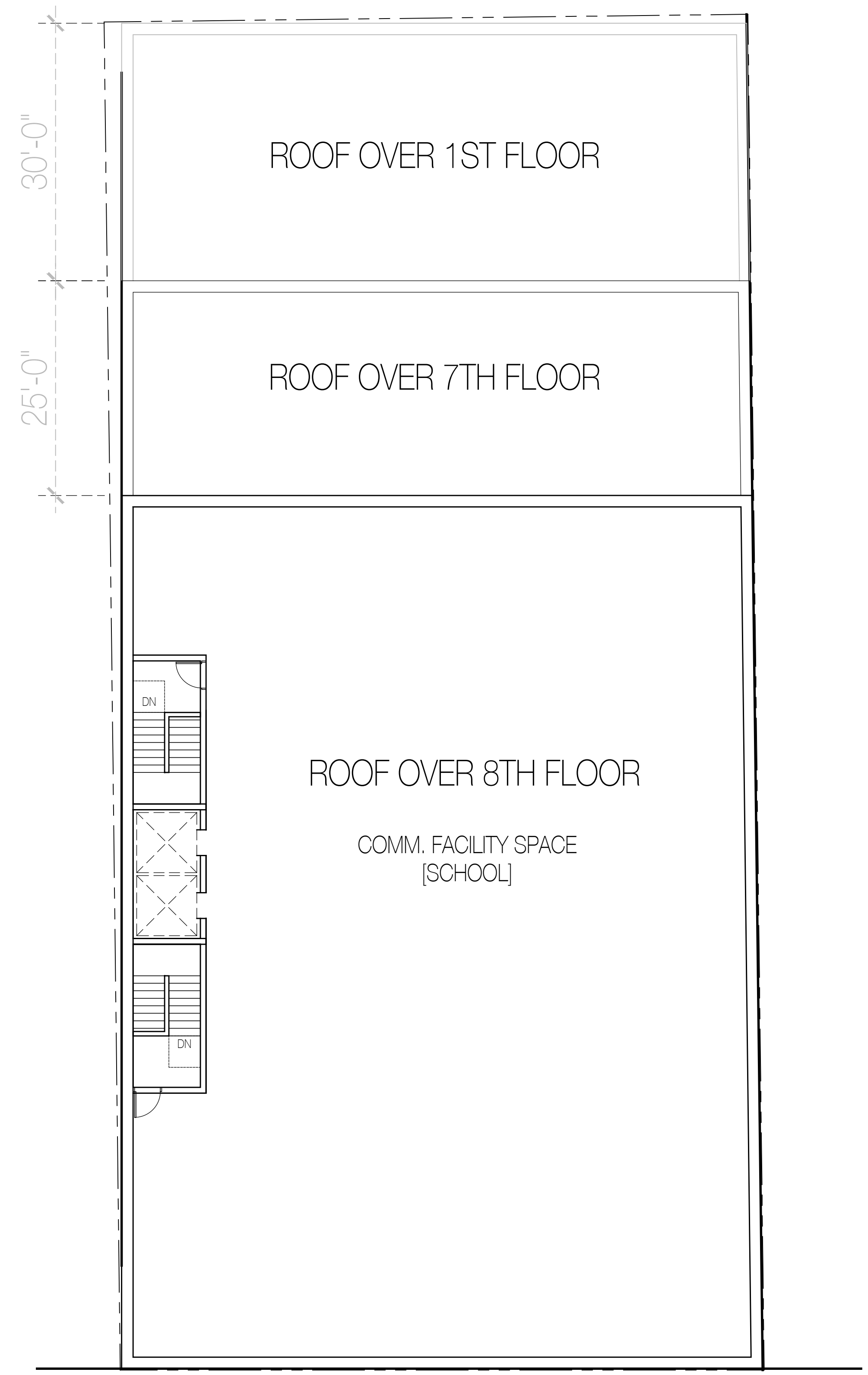
DATE	SUBMISSIONS / REVISIONS
02/10/20	PROGRESS SET
02/03/20	PROGRESS SET

SHEET TITLE:
2ND - 7TH LEVEL FLOOR PLANS

ISSUE DATE:
PROJECT NO: P-20109
DRAWN BY:
CHECKED BY:
SCALE:
SHEET NO: 01 OF 03
DRAWING NO: A-101.00



8TH FLOOR



ROOF

PROPOSED NEW DEVELOPMENT FOR:

4778

BROADWAY
NEW YORK, NY, 10034

BLOCK: 2233 LOT: 10

ARCHITECT:

AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVE.
SUFFERN, NY
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

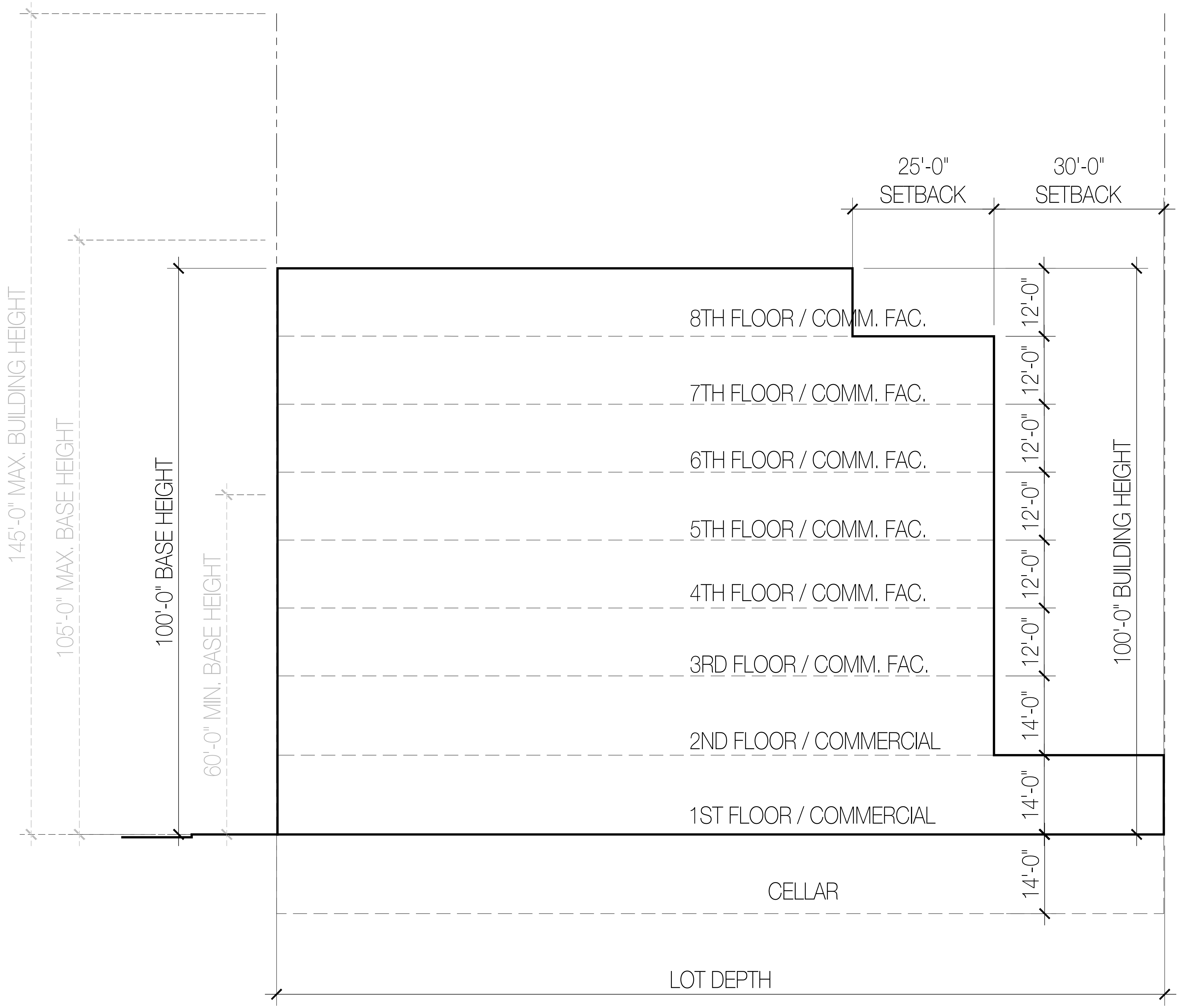
CLIENT:

DATE	SUBMISSIONS / REVISIONS
02/10/20	PROGRESS SET
02/03/20	PROGRESS SET

SHEET TITLE:

8TH LEVEL
FLOOR PLAN

ISSUE DATE:
PROJECT NO: P-20109
DRAWN BY:
CHECKED BY:
SCALE:
SHEET NO: 01 OF 03
DRAWING NO: A-102.00



SCHEMATIC HEIGHT DIAGRAM

SCALE: 1/32" = 1'-0"

PROPOSED NEW DEVELOPMENT FOR:

4778

BROADWAY
NEW YORK, NY, 10034

BLOCK: 2233 LOT: 10

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVE.
SUFFERN, NY
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

CLIENT:

DATE	SUBMISSIONS / REVISIONS
02/10/20	PROGRESS SET
02/03/20	PROGRESS SET

SHEET TITLE:

SCHEMATIC SECTION
"SPECIAL INWOOD DISTRICT"

ISSUE DATE:
PROJECT NO: P-20109
DRAWN BY:
CHECKED BY:
SCALE:
SHEET NO: 02 OF 03
DRAWING NO: Z-101.00

FLOOR	GROSS SQ.FT.	PARKING	COMM. FACILITY	COMMERCIAL	DEDUCTIONS	ZONING G.F.A.			ZONING G.F.A.
						PARKING	COMM. FACILITY	COMMERCIAL	
CELLAR	11365	0	5800	5565	0	0	5800	5565	-
1ST FLOOR	11484	0	1318	10166	0	0	1318	10166	11484
2ND FLOOR	9331	0	501	8830	0	0	501	8830	9331
3RD FLOOR	9331	0	9243	88	0	0	9243	88	9331
4TH FLOOR	9331	0	9331	0	0	0	9331	0	9331
5TH FLOOR	9331	0	9331	0	0	0	9331	0	9331
6TH FLOOR	9331	0	9331	0	0	0	9331	0	9331
7TH FLOOR	9331	0	9331	0	0	0	9331	0	9331
8TH FLOOR	7465	0	7465	0	0	0	7465	0	7465
ROOF	315	0	315	0	0	0	315	0	315
TOTAL	86615	0	61966	24649	0	0	56166	19084	75250

APPENDIX B

GEOPHYSICAL SURVEY REPORT

GEOPHYSICAL INVESTIGATION REPORT

SITE LOCATION:

4778 Broadway
Manahttan, New York

PREPARED FOR:

AEI Consultants
30 Montgomery Street, Suite 220
Jersey City, New Jersey

PREPARED BY:

Mike Mesaros
Delta Geophysics Inc.
738 Front Street
Catasauqua, PA 18032

February 21, 2020

1.0 INTRODUCTION

On February 10th, 2020 Delta Geophysics personnel performed a limited geophysical investigation at 4778 Broadway, Manhattan, New York. The area of interest was all accessible areas of the property. Particular attention was given to areas within close proximity to client proposed soil boring locations. Soil borings were located on the both interior of the building and throughout the property. Surface conditions consisted of bituminous pavement and concrete. Subsurface conditions were unknown at the time of survey.

2.0 SCOPE OF WORK

The survey was conducted to investigate the subsurface for anomalies consistent with underground storage tanks (UST) and former excavations. A secondary objective was to locate and mark detectable underground utilities in close proximity to client proposed soil boring locations.

3.0 METHODOLOGY

Selection of survey equipment is dependent site conditions and project objectives. For this project the technician utilized the following equipment to survey the area of concern:

- Geophysical Survey Systems Inc. SIR-3000 cart-mounted Ground Penetrating Radar (GPR) unit with a 400 Mhz antenna.

- Radiodetection RD7000 precision utility locator.

- Fisher M-Scope TW-6 pipe and cable locator.

Ground penetrating radar (commonly called GPR) is a geophysical method that has been developed over the past thirty years for shallow, high-resolution, subsurface investigations of the earth. GPR uses high frequency pulsed electromagnetic waves (generally 10 MHz to 1,000 MHz) to acquire subsurface information. Energy is propagated downward into the ground and is reflected back to the surface from boundaries at which there are electrical property contrasts. GPR is a method that is commonly used for environmental, engineering, archeological, and other shallow investigations.

The GSSI SIR-3000 GPR can accept a wide variety of antennas which provide various depths of penetration and levels of resolution. The 400 MHz antenna can achieve depths of penetration up to about 20 feet, but this depth may be greatly reduced due to site-specific conditions. Signal penetration decreases with increased soil conductivity. Conductive materials attenuate or absorb the GPR signal. As depth increases the return signal becomes weaker. Penetration is the greatest in unsaturated sands and fine gravels. Clayey, highly saline or saturated soils, areas covered by steel reinforced concrete, foundry slag, of other highly conductive materials significantly reduces GPR depth of penetration.

The GPR was configured to transmit to a depth of approximately 10 feet below the subsurface, but actual signal penetration was limited to approximately 2-5 feet below ground surface (bgs). The limiting factor was signal attenuation from near surface soils and reinforced concrete.

The RD7000 precision utility locator uses radio emission to trace the location of metal bearing utilities. This radio emission can be active or passive. Active tracing requires the attachment of a radio transmitter to the utility, passive tracing uses radio emissions that are present on the utility. Underground electrical utilities typically emit radio signals that this device can detect.

The TW-6 is designed to find pipes, cables and other metallic objects such as underground storage tanks. One surveyor can carry both the transmitter and receiver together, making it ideally suited for exploration type searches of ferrous metal masses. Metal detectors of this type operate by generating a magnetic field at the transmitter which causes metallic objects in the subsurface to generate a secondary magnetic field. The induced secondary field is detected by the receiver, which generates an audible tone equal to the strength of the secondary field.

4.0 SURVEY FINDINGS

Metallic / GPR Anomalies

Anomaly #1 – Anomaly #1 was located with TW-6 and confirmed with GPR. It is located partially in the asphalt and partially in the concrete in the northwest portion of the property. Approximate dimensions measure 8 feet by 5 feet. GPR transects over the area imaged a cylindrical feature at 3-4 feet bgs. The metallic anomaly is consistent with a UST.

Anomaly #2 –Anomaly #2 was detected with both the GPR and TW-6. It is located in the concrete in the northern portion of the property. Approximate dimensions measure 20 feet in width by 13 feet in length. The eastern portion of the concrete over the anomaly is reinforced preventing the use of TW-6. GPR transects over the area imaged two cylindrical features at 3 to 4 feet bgs over the western portion of the anomalous area. This is consistent with two UST's. GPR transects did not image any anomalies over the eastern portion of the anomalous area; however, Delta detected two potential gasoline and/or diesel fill pipes traversing to this area and terminating. The fill pipes are located adjacent to the western wall of the property and have been filled with concrete. Based on the location and orientation of the potential fill piping, Delta believes there is a potential for two additional UST's in this area. The approximate dimensions of the four potential UST's are 13 feet by 4.5 feet.

Anomaly #3 – Anomaly #3 was detected with GPR. It is located in the northern portion of the property adjacent to the northwest corner of the building. This area contains reinforced concrete preventing the use of TW-6. Approximate dimensions measure 12 feet in width by 7 feet in length. GPR transects over the area imaged three cylindrical features at 4-5 feet bgs. Anomaly #3 has the potential to be three UST's. Approximate dimensions of each UST are 7 feet by 4 feet.

Anomaly #4 – Anomaly #4 was detected with GPR. It is located in the northeast portion of the property north of the building. This area contains reinforced concrete preventing the use of TW-6. Approximate dimensions measure 9 feet by 4.5 feet. GPR transects over the area imaged a cylindrical feature at 3-4 feet bgs. Anomaly #4 has the potential to be a UST.

Former Excavations

GPR transects over accessible areas of the property did not detect any soil disturbances consistent with former excavations.

Utility Survey

Delta performed a utility survey across all accessible areas within close proximity to client proposed soil borings. The following utilities were identified: electrical conduits, natural gas, water, storm sewer, and sanitary sewer. All utilities were marked onsite with appropriate colors. Anomalous features, potential product piping, and unknown utilities were marked onsite in pink paint.

Site map (021020) is included with all located subsurface features.

5.0 SURVEY LIMITATIONS

GPR depth of penetration was limited to approximately 2-5 feet bgs. The limiting factor was due to conductive soils and reinforced concrete. Reinforced concrete prevented the use of TW-6 throughout the northern and northeastern portion of the property. Soil / gravel piles were present in the southern portion of the property preventing Delta from surveying some areas.

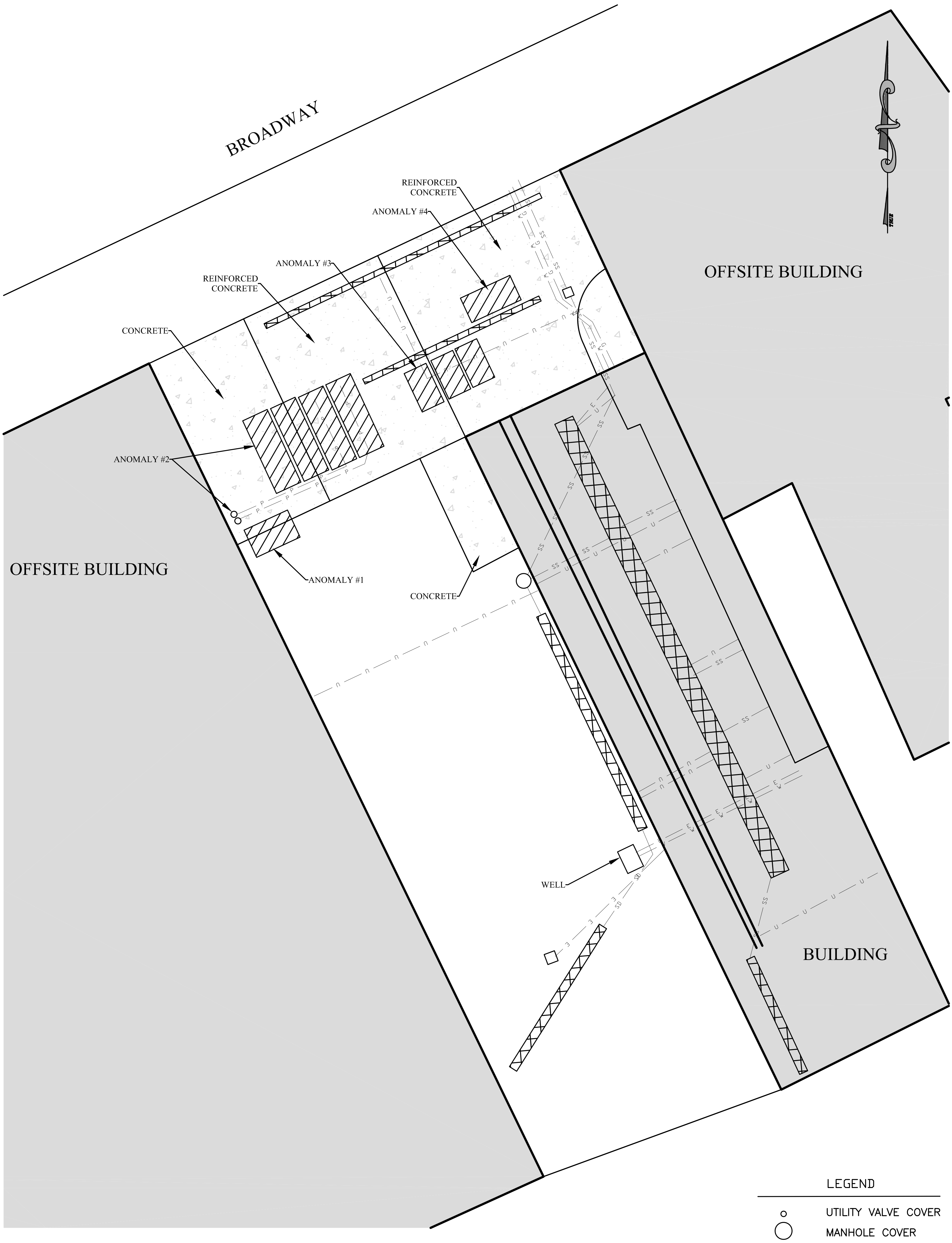
6.0 WARRANTIES AND DISCLAIMER

As with any geophysical method, it must be stressed that caution be used during any excavation or intrusive testing in proximity to any anomalies indicated in this report. In addition, the absence of detected signatures does not preclude the possibility that targets may exist. To the extent the client desires more definitive conclusions than are warranted by the currently available facts; it is specifically Delta's intent that the conclusions stated herein will be intended as guidance.

This report is based upon the application of scientific principles and professional judgment to certain facts with resultant subjective interpretations. Professional judgments expressed herein are based on the facts currently available within the limit or scope of work, budget and schedule. Delta represents that the services were performed in a manner consistent with currently accepted professional practices employed by geophysical/geological consultants under similar circumstances. No other representations to Client, express or implied, and no warranty or guarantee is included or intended in this agreement, or in any report, document, or otherwise.

This report was prepared pursuant to the contract Delta has with the Client. That contractual relationship included an exchange of information about the property that was unique and between Delta and its client and serves as the basis upon which this report was prepared. Because of the importance of the understandings between Delta and its client, reliance or any use of this report by anyone other than the Client, for whom it was prepared, is prohibited and therefore not foreseeable to Delta.

Reliance or use by any such third party without explicit authorization in the report does not make said third party a third party beneficiary to Delta's contract with the Client. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at the third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

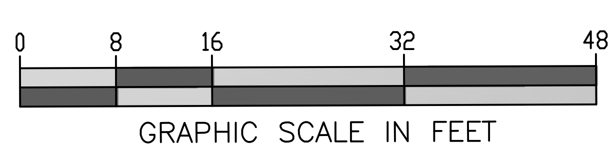


NOTES:

This site plan was produced from data positioned by differential GPS measurments collected in the field. Due to the errors normally present in DGPS data, this document is not intended or represented to be of survey precision. Caution should be used in all field measurments based on this site plan.

As with any geophysical method, it must be stressed that caution be used during any excavation or intrusive testing in proximity of any anomalies indicated in this document The absence of detected signatures does not preclude the possibility that targets exist. The geophysical data and results presented in this site plan are based upon the application of scientific principles and professional judgements to certain facts with resultant subjective interpretations. Professional judgements expressed herein are based on the facts currently available within the limits of the existing data, scope of work, budget, and schedule.

Reliance or use by any such third party without explicit authorization in the document does not make said third party a third party benificiary to Delta's contract with the client. Any such unauthorized reliance on or use of this document, including any of its information or conclusions, will be at the third party's risk. For the same reasons, no warranties or representations, expressed or implied in this document, are made to any such third party.



LEGEND

	UTILITY VALVE COVER
	MANHOLE COVER
	TRENCH DRAIN
E	ELECTRIC
G	GAS
SD	STORM SEWER
SS	SANITARY SEWER
W	WATER
U	UNKNOWN UTILITY
P	PRODUCT LINE

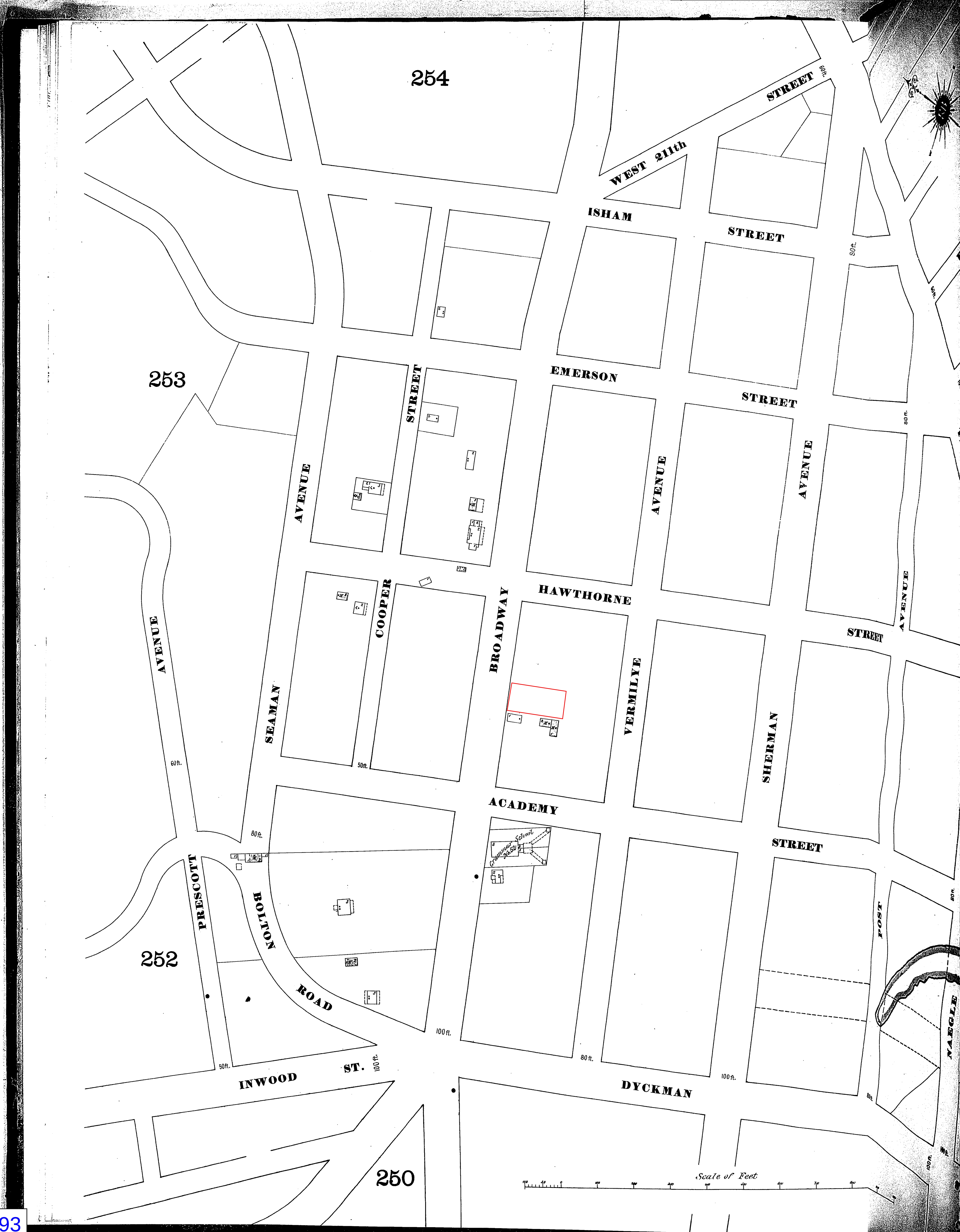
DATE	2/10/20
SCALE	1'' = 16'
DWG NO.	021020
SHT NO.	1 OF 1
PROJECT.	

GEOPHYSICAL INVESTIGATION
4778 BROADWAY, MANHATTAN, NEW YORK
FOR
AEI CONSULTANTS

DELTA Geophysics Inc.
738 Front Street, Catasauqua, PA 18032
Phone: (610) 231-73012

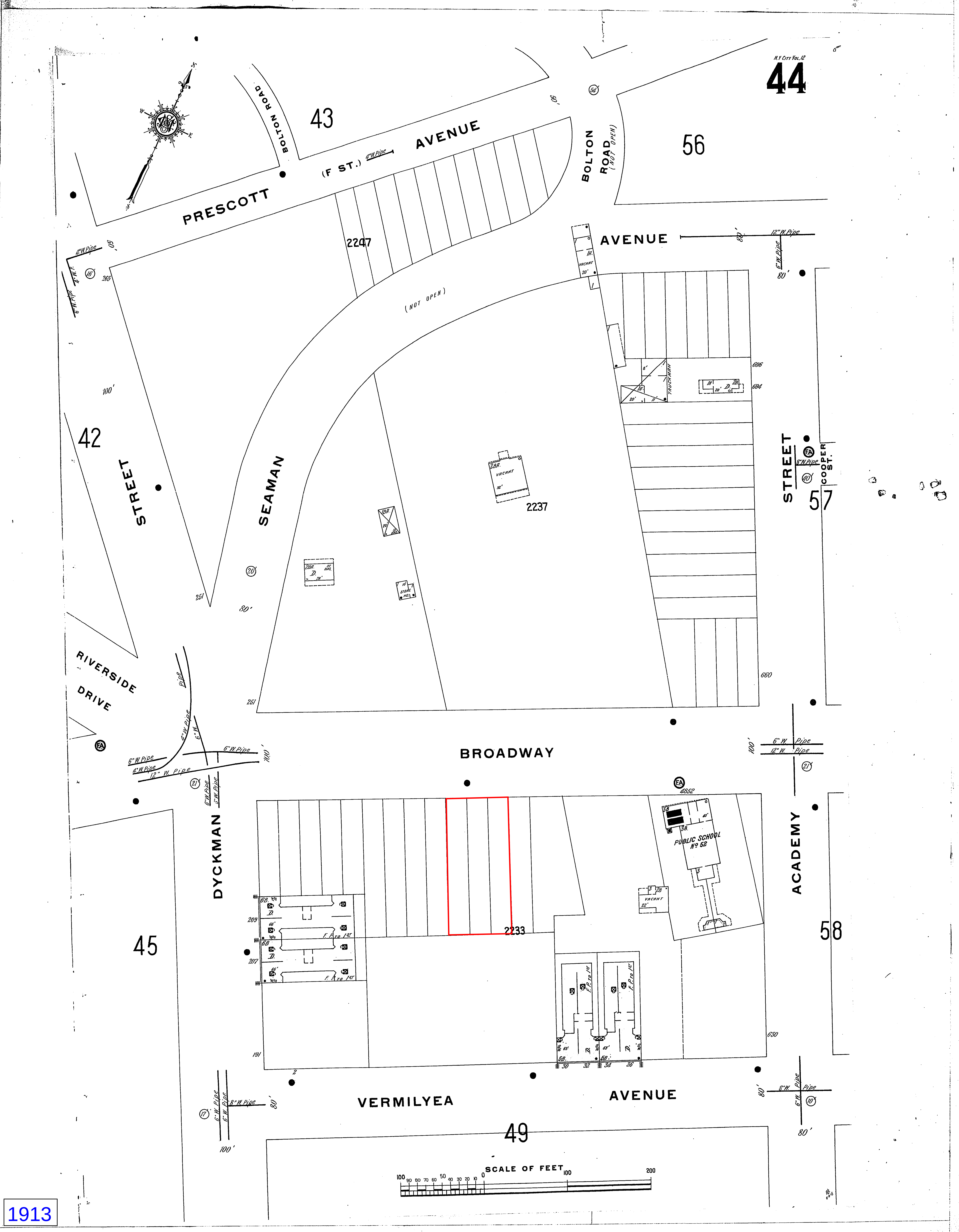
APPENDIX C

HISTORIC SANBORN MAPS


254
253
252
250
WEST 211th STREET
60 ft.
ISHAM STREET
EMERSON STREET
HAWTHORNE STREET
ACADEMY STREET
DYCKMAN
INWOOD ST.
SEAMAN AVENUE
COOPER STREET
BROADWAY
VERMILYE AVENUE
SHERMAN AVENUE
AVENUE
POST
NAEGLE
PRESCOTT
AVENUE
BOLTON ROAD
Grammar School No. 52
60 ft.
80 ft.
50 ft.
100 ft.
80 ft.
100 ft.
90 ft.
Scale of Feet

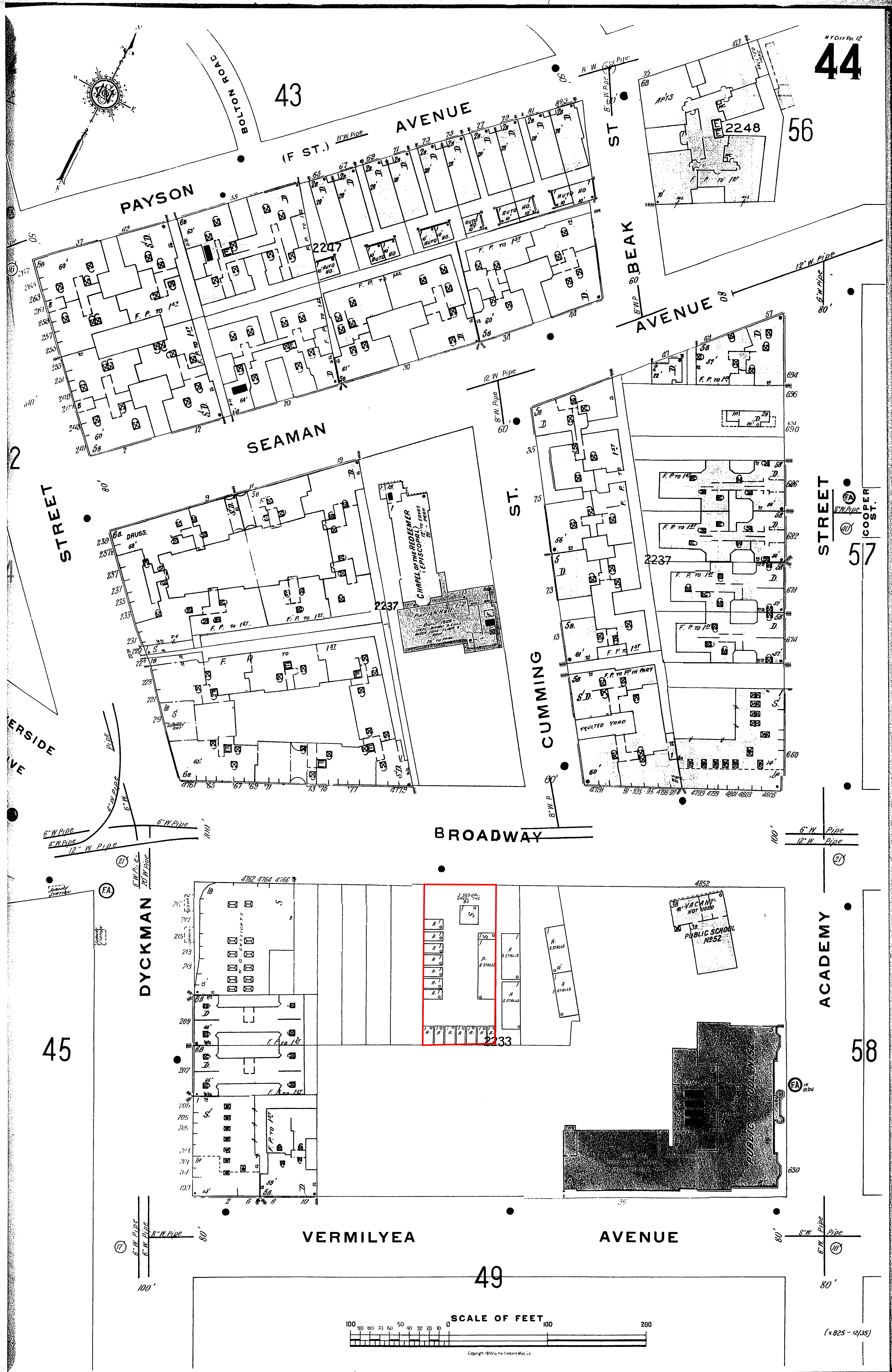
1893


13
21
22
18
16
15
14
ACADEMY STREET
DYCKMAN STREET
ELWOOD STREET
ELWOOD ST.
BROADWAY
VERMILYEA AVE.
SHERMAN AVENUE
POST AVE.
NAGLE AVENUE
NAGLE AVE.
FORT WASHINGTON AVE.
ACADEMY
DYCKMAN
2175
2174
2217
2173
2170
2171
2172
2151
2233
2224
2220
CONSOLIDATED GAS CO. WORKS
FLORIST
(SEE BELOW)
(SEE ABOVE)
Scale of Feet
100
200
300
1900



N.Y. City Vol. 12
44
43
56
42
57
45
58
49
PRESCOTT AVENUE
(F ST.)
BOLTON ROAD
BOLTON ROAD (NOT OPEN)
AVENUE
(NOT OPEN)
SEAMAN
STREET
RIVERSIDE DRIVE
BROADWAY
DYCKMAN
ACADEMY
STREET
COOPER ST.
VERMILYEA
AVENUE
PUBLIC SCHOOL Nº 52
2247
2237
2233
4852
VACANT
SCALE OF FEET

1913


44
N Y City Vol 12
43
56
57
58
45
49
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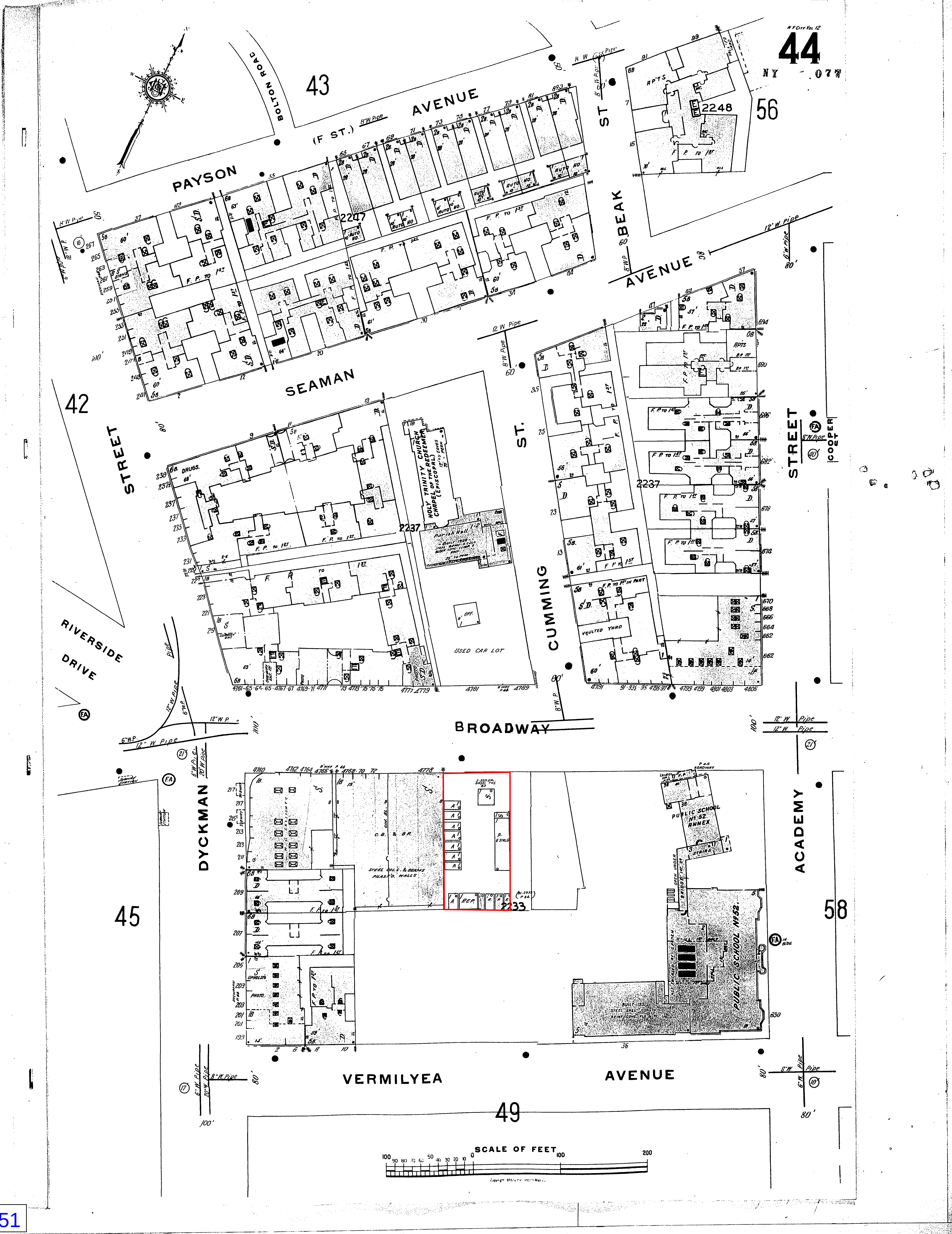

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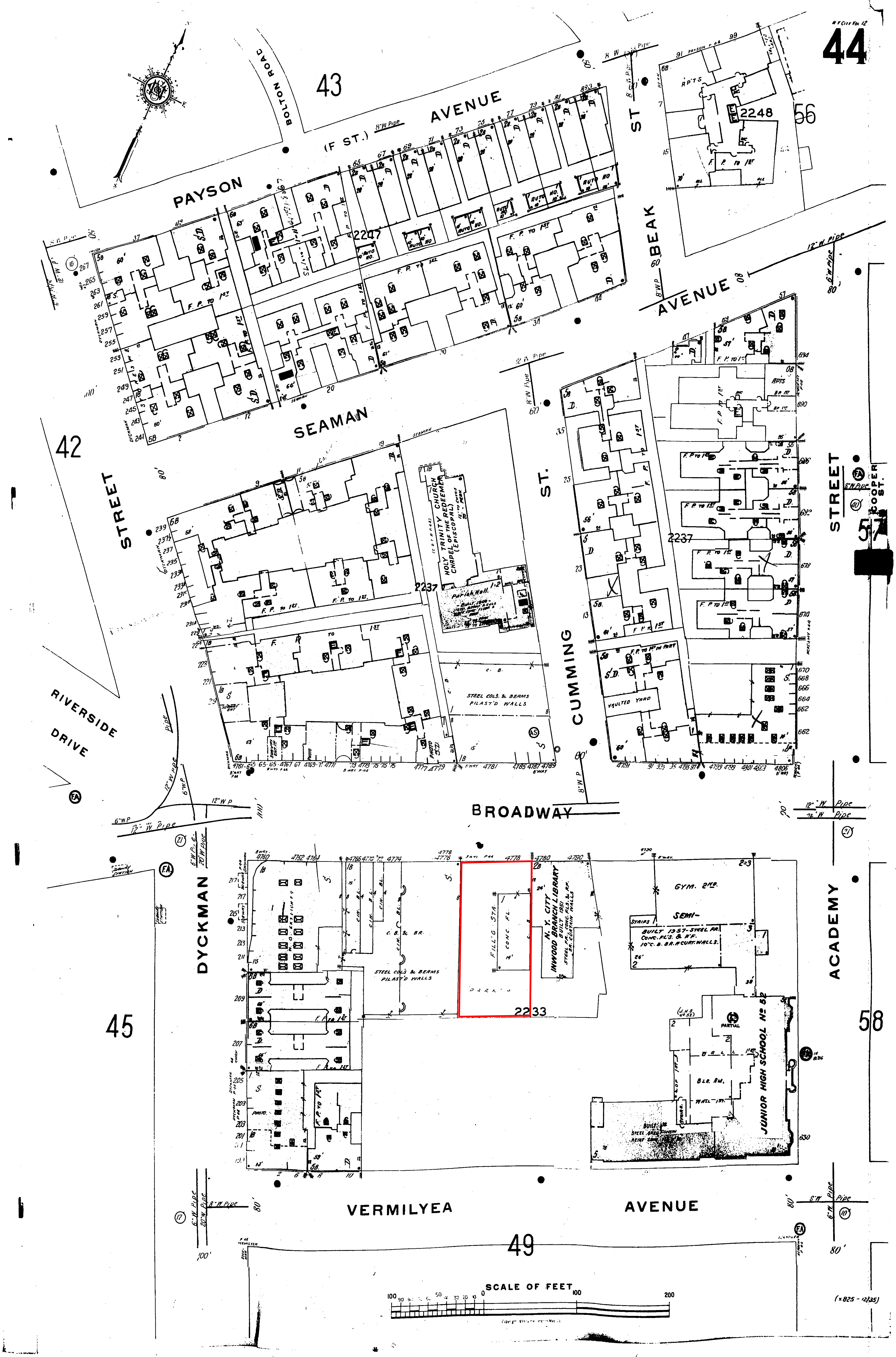
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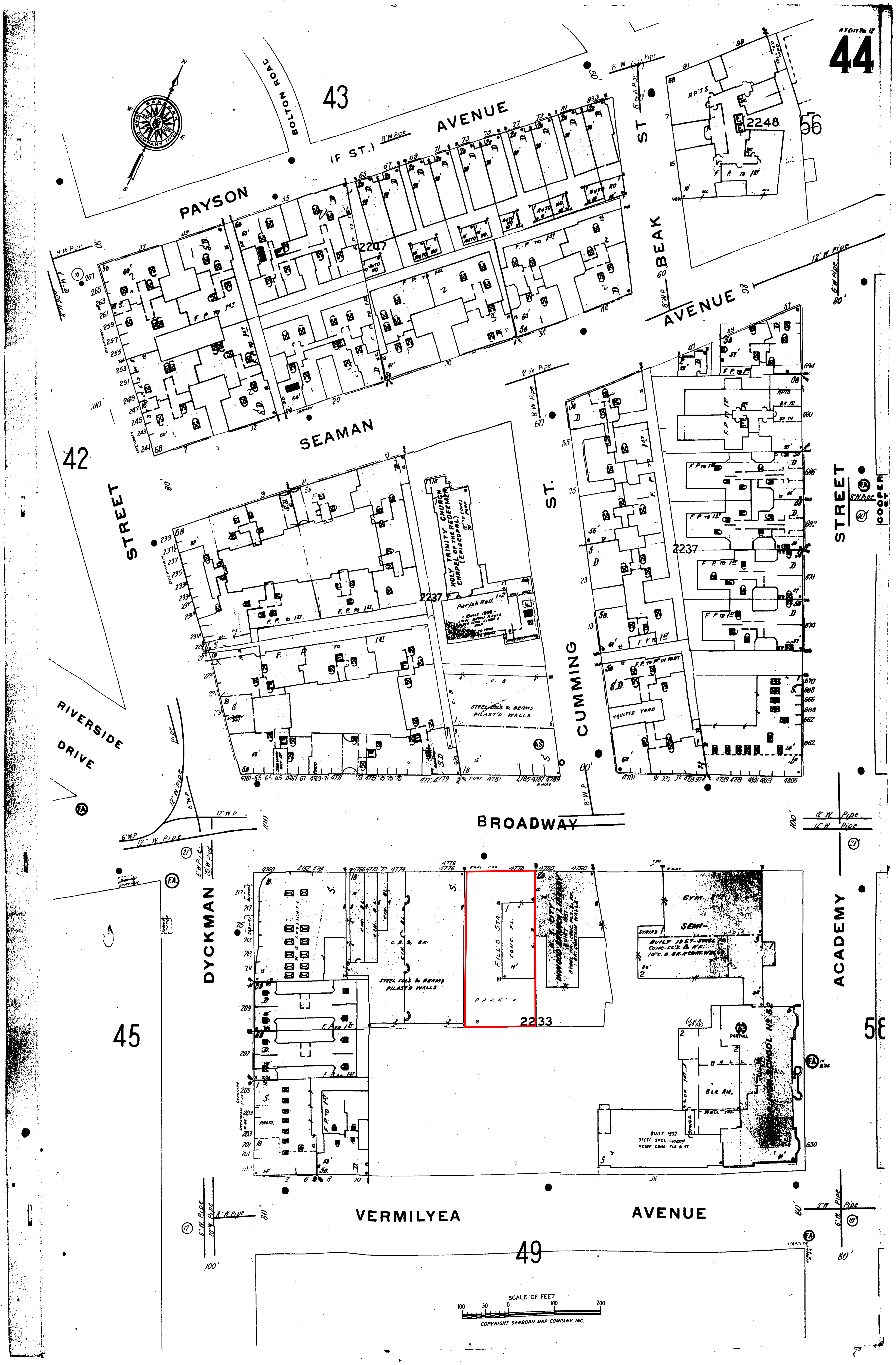
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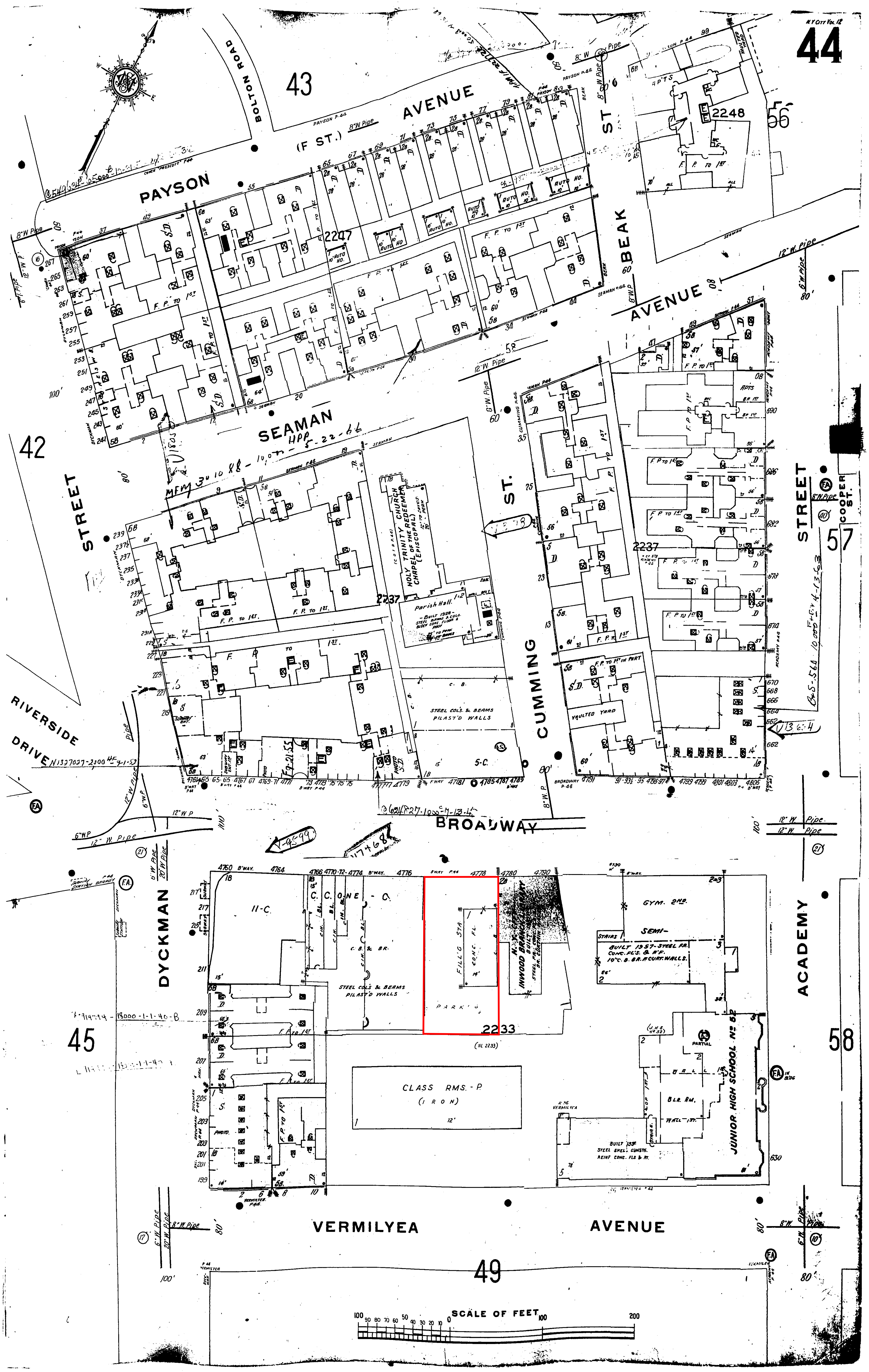
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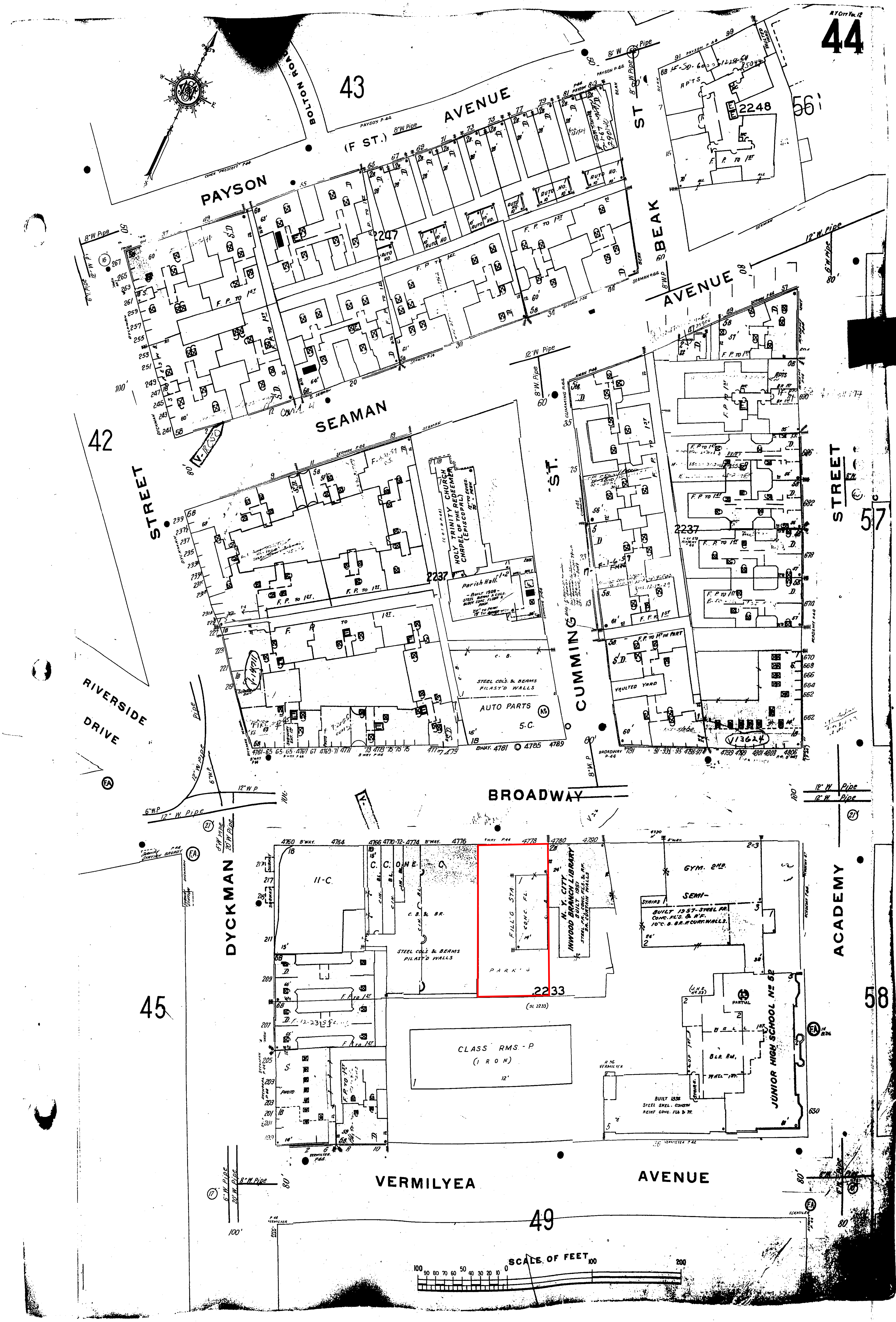
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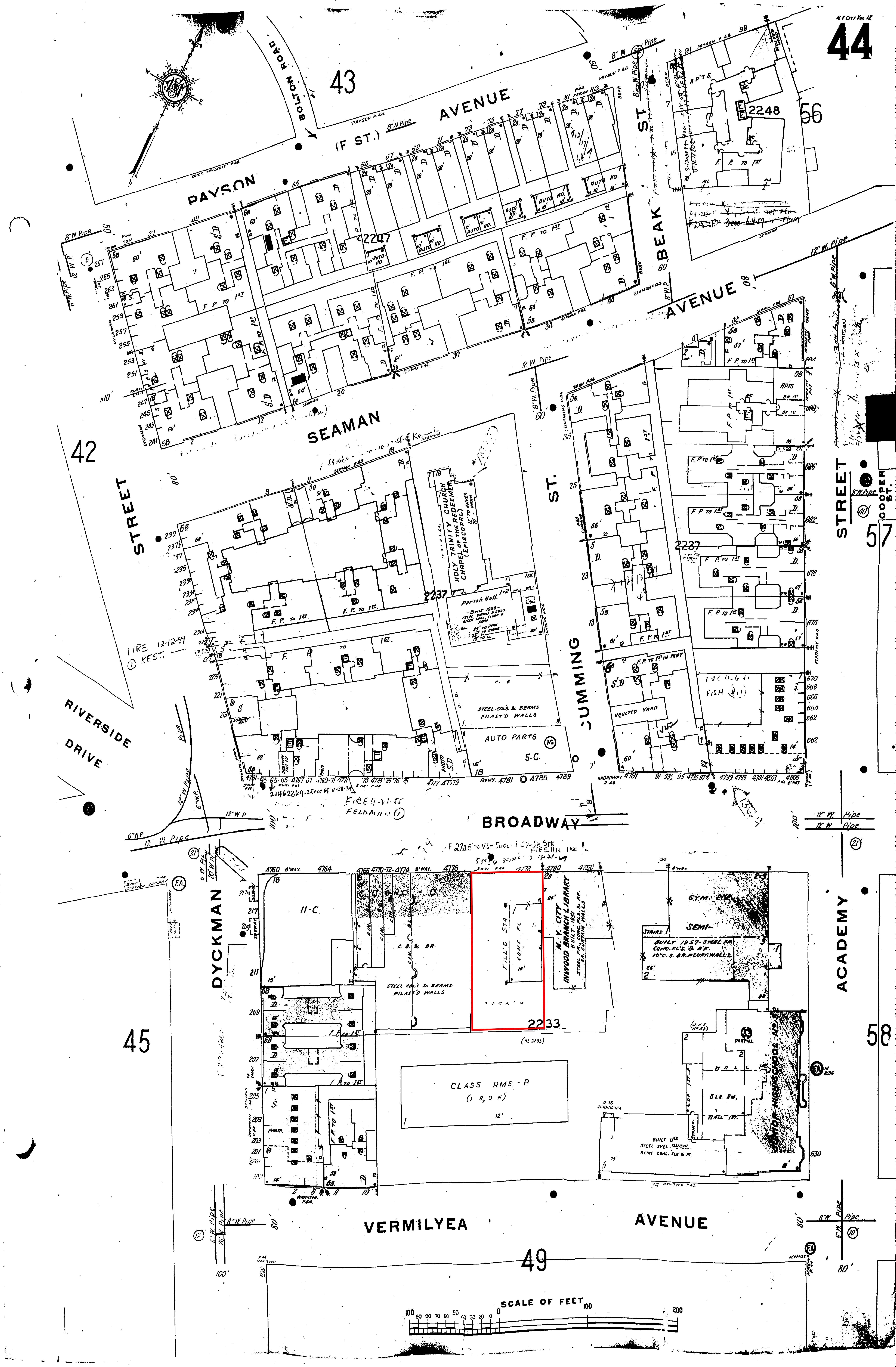
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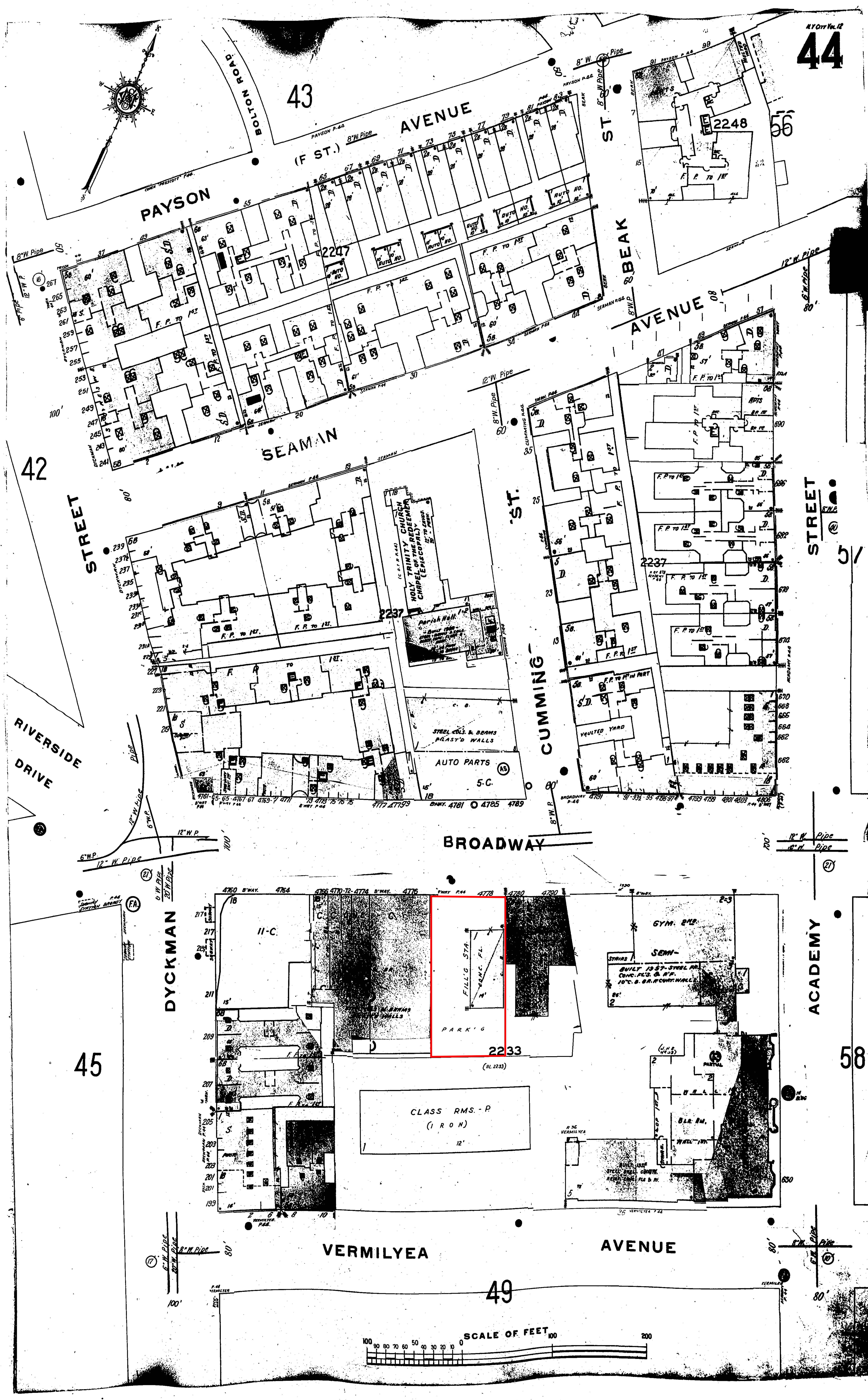
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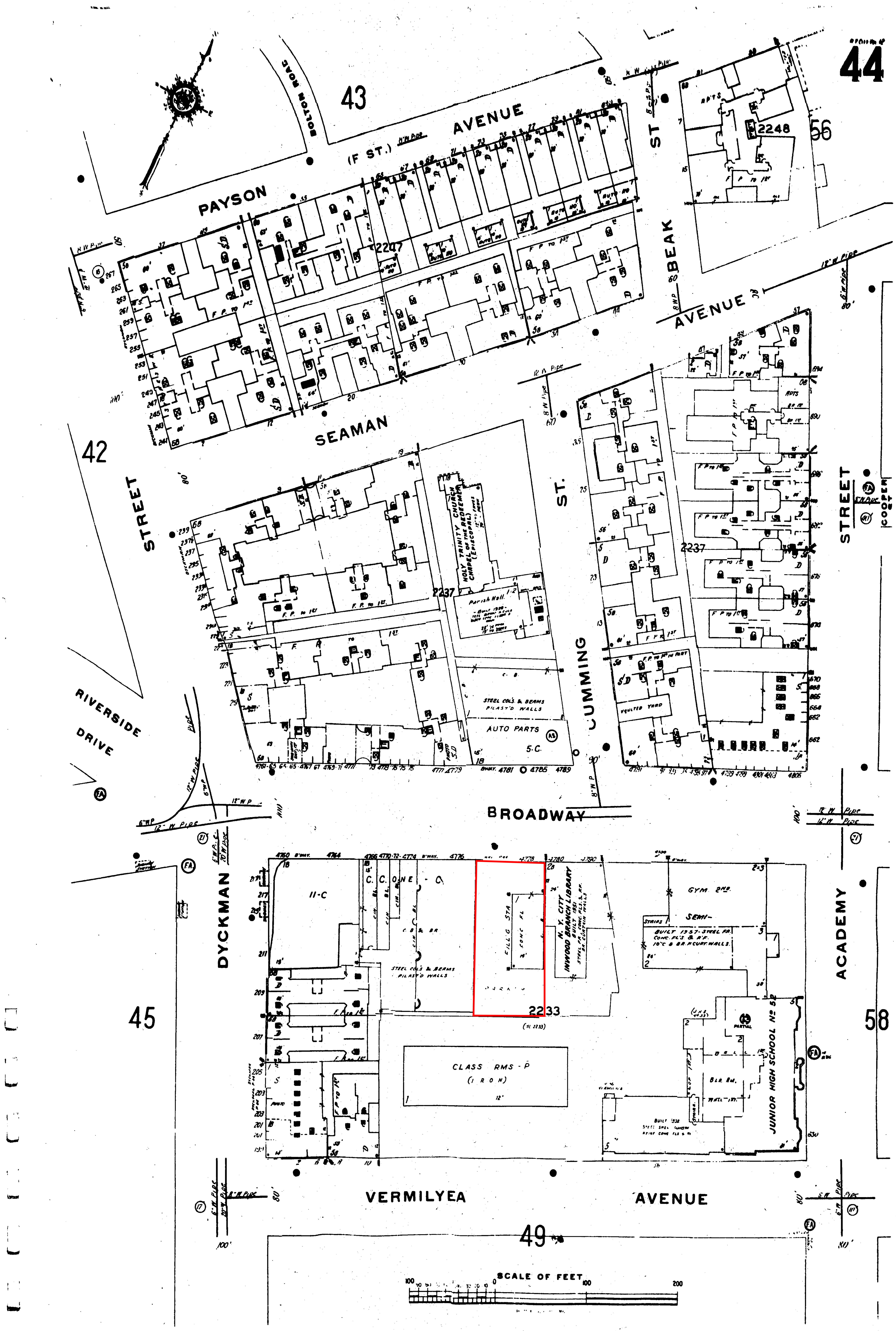

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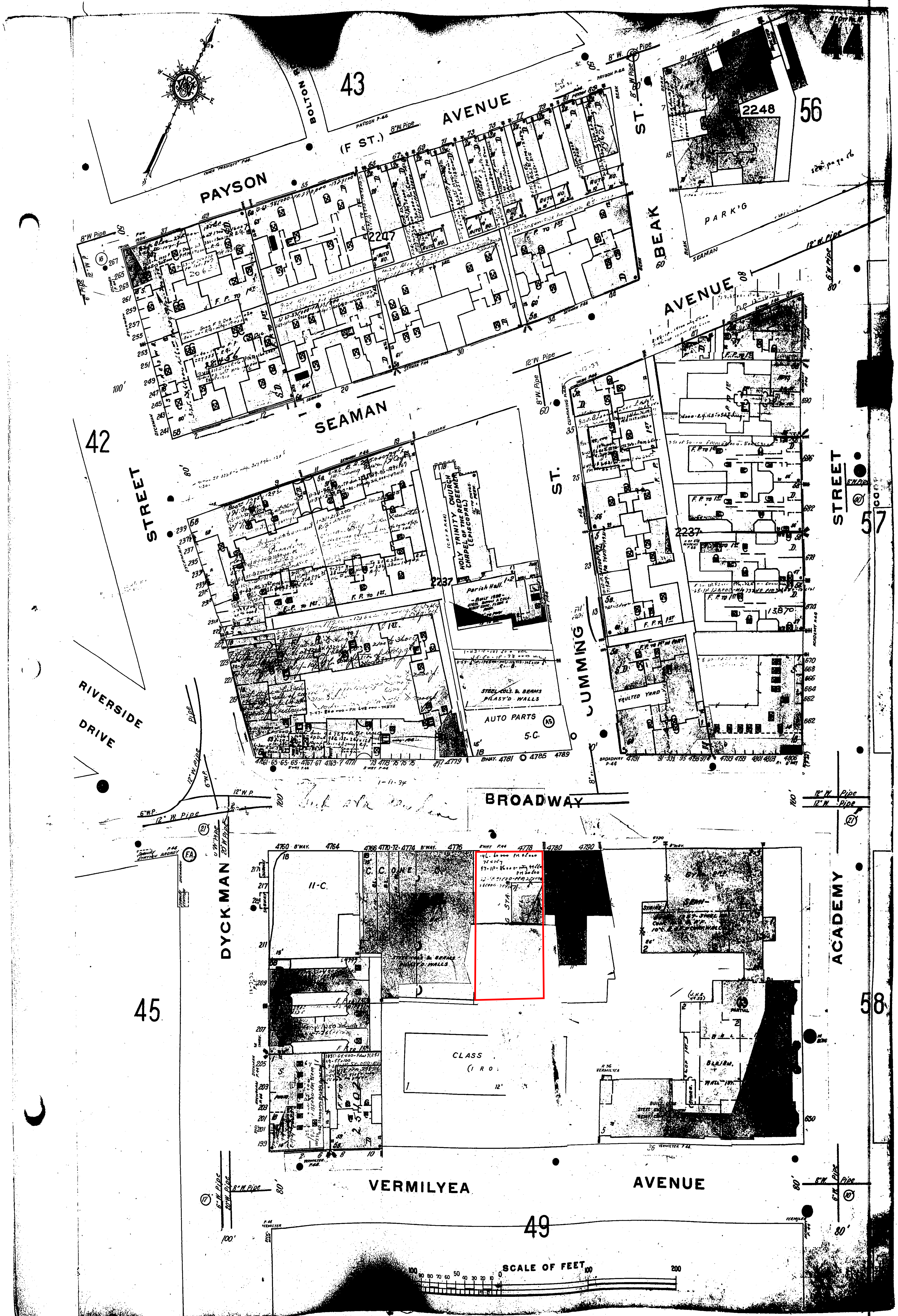

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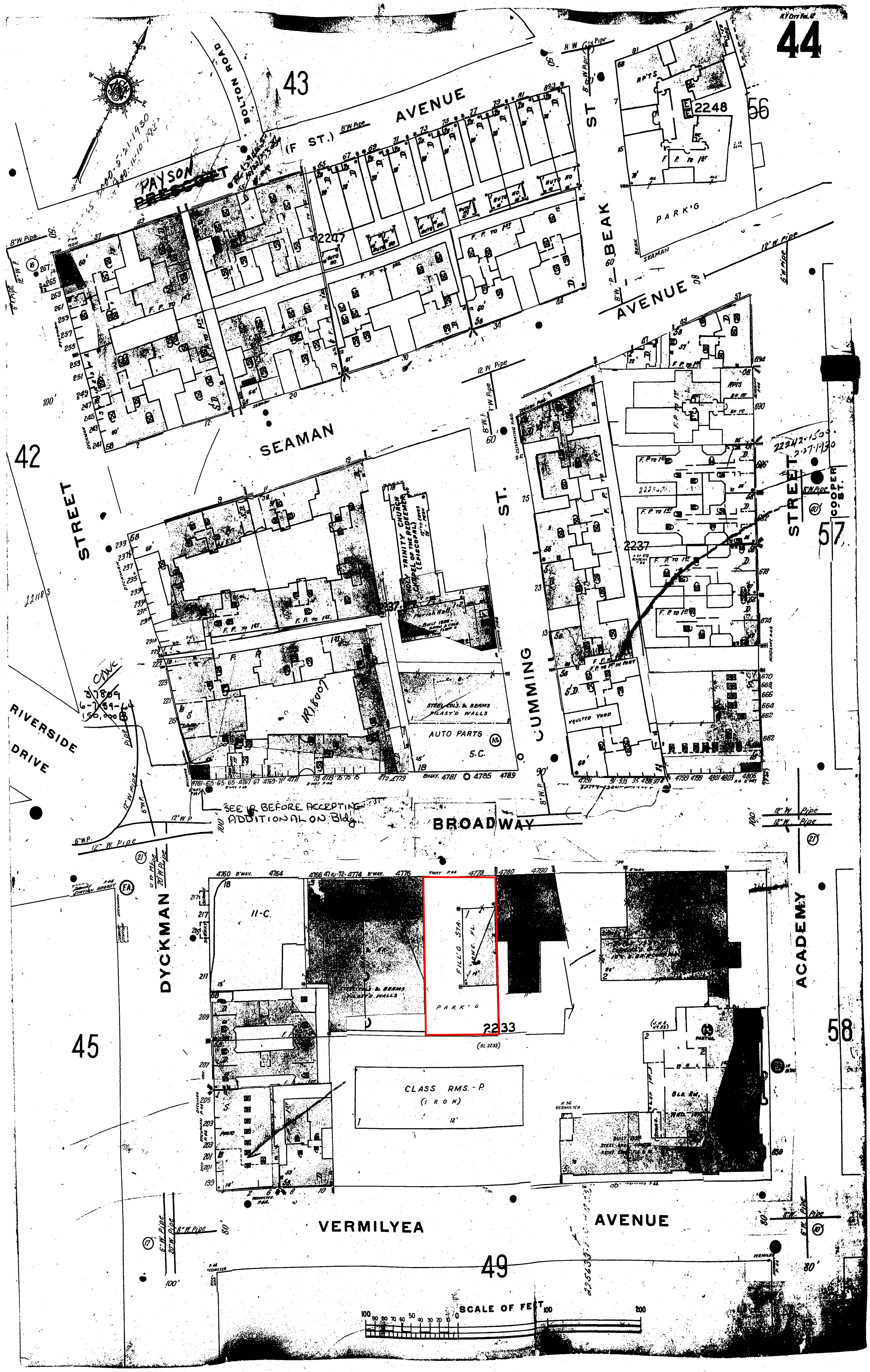
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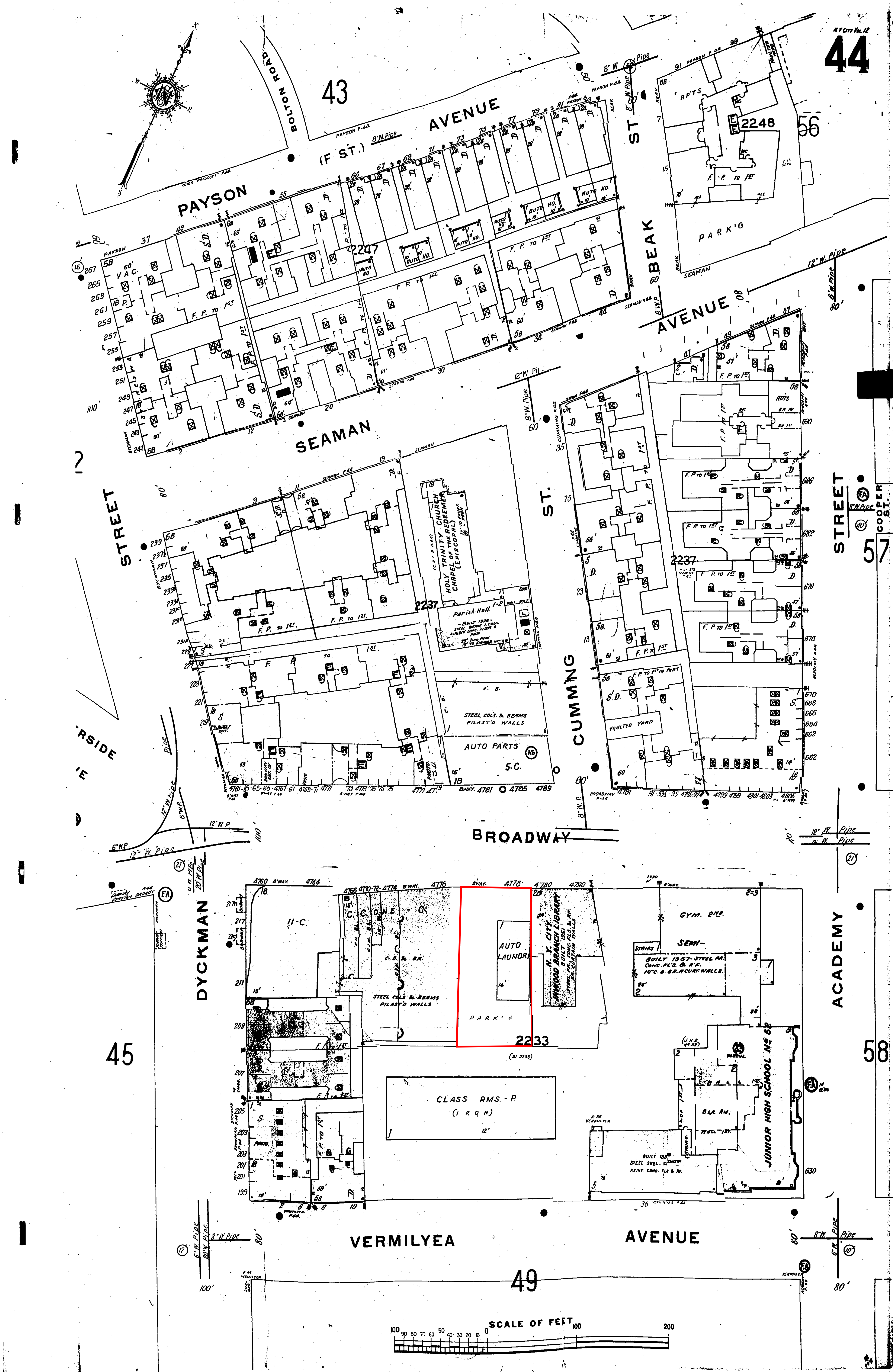
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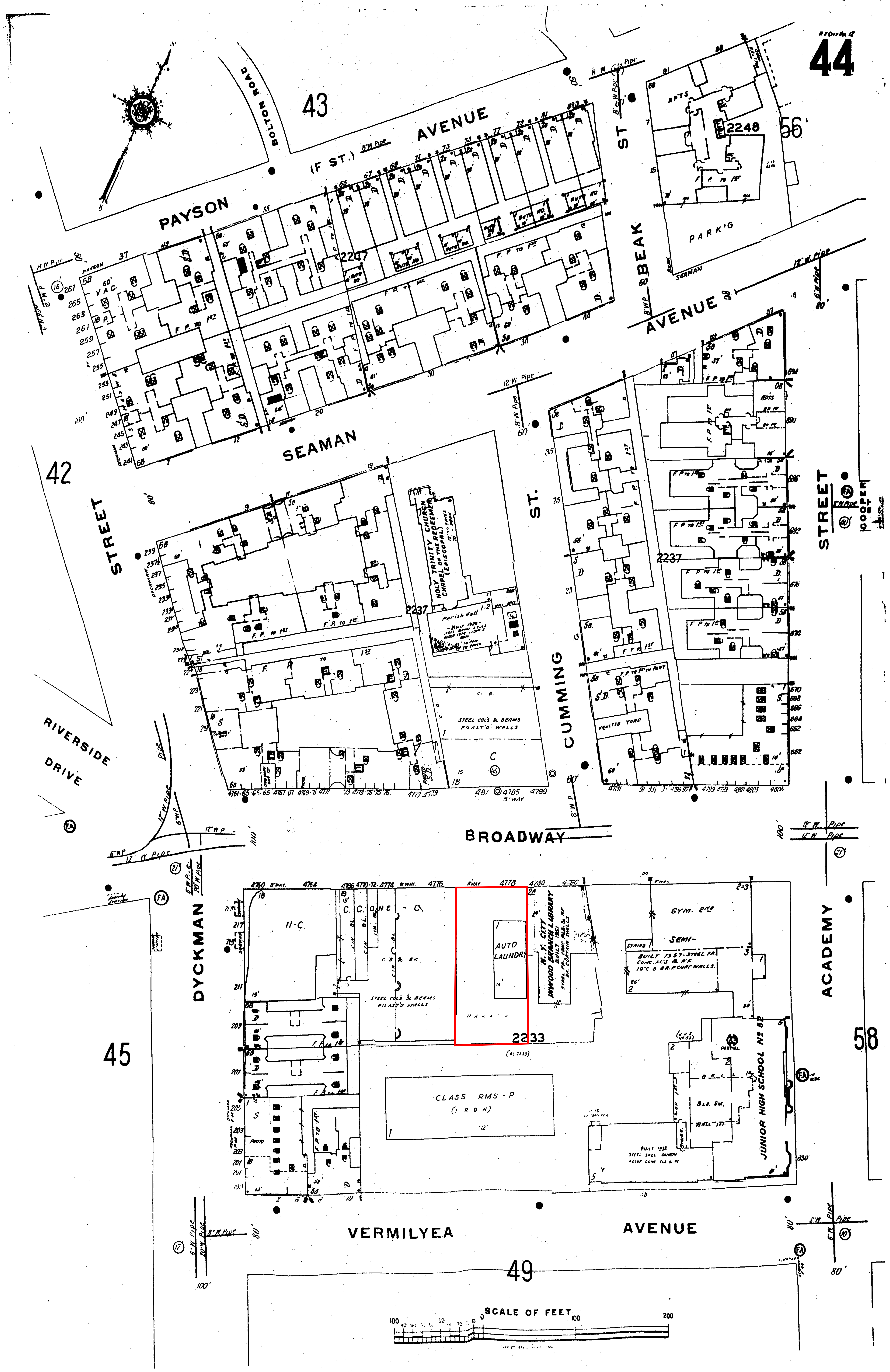

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APPENDIX D

CITIZEN PARTICIPATION PLAN

NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
M4778 Broadway LLC

December 2020

Site No. C231131
4778 Broadway

New York, NY 10034

Contents

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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.

Applicant: **M4778 Broadway LLC ("Applicant")**
Site Name: **M4778 Broadway LLC ("Site")**
Site Address: **4778 Broadway**
Site County: **New York**
Site Number: **C231131**

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 .

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:

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- 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.

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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;
- 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

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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.

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, it has been determined that the site does not pose a significant threat.

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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
http://www.dec.ny.gov/regulations/2590.html

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 • 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 • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • 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 **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 • 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 • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • 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 • 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. **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.

No major issues of public concern such as potential impacts on nearby public water supply or private water wells, restrictions on community activities, or health concerns are associated with the investigation or cleanup process of the site at this time.

A gasoline filling and service station operated at the site from as early as 1921 until 1988. The former operations at the site resulted in petroleum contamination in soil and groundwater at the site at concentrations greater than their respective NYSDEC soil cleanup objectives and ambient water quality standards. The scope of work outlined in the Remedial Investigation Work Plan will further delineate the extent of the impacts resulting from the former gasoline filling and service station. Remedial activities that will be proposed in order to remediate the contamination identified during the Remedial Investigation and to protect the community will likely include soil excavation and groundwater pumping for offsite treatment. Proposed remedial actions will depend on the findings of the completed remedial investigation.

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 a sizable Hispanic-American population nearby. Therefore, all future fact sheets will be translated into Spanish.

For additional information, visit: https://statisticalatlas.com/zip/10040/Race-and-Ethnicity

Other potential impacts may be related to noise, odor or truck-related traffic.

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4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The M4778 Broadway Site is located in an urban area on the southeast side of Broadway, between Dyckman Street and Academy Street, in Manhattan, New York. The area surrounding the site consists of mostly commercial and residential occupants. The Site is approximately 0.28 acres in size. The Site consists of a single-story former commercial car wash facility. The site is currently vacant; however, the most recent occupant was Soft Touch Car Wash, whose operations included interior and exterior automobile cleaning. In addition to the building, the site is improved with an asphalt-paved parking area on the western portion of the site.

History of Site Use, Investigation, and Cleanup

The site is currently vacant and was most recently occupied as a commercial car wash facility from approximately 1988 to 2017. From approximately 1921 to 1988, the property was occupied by a gasoline filling and service station. During this time span, multiple generations of underground storage tanks (USTs) were likely installed on the Site. It appears that the prior occupancy of the Site by a gasoline filling and service station led to on-site contamination.

An independent investigation by the previous site owner was conducted in March 2017. The results of this investigation indicated that a release of gasoline has impacted soil, and groundwater at the Site. Based on this information, the NYSDEC was notified of the release on April 24, 2017, and NYSDEC Spill #1700751 was issued.

In July of 2017, a preliminary remedial investigation was conducted by the previous site owner with oversight by the NYSDEC Spills Program. This investigation included the installation additional boring locations for soil and temporary well point groundwater samples. Following the completion of the soil and temporary well point sampling, three (3) permanent groundwater monitoring wells were installed and sampled on the site in late July and early August of 2017. Based on the findings of the remedial investigation, petroleum related contamination of onsite soil and groundwater was determined to be adequately characterized.

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No major issues of public concern such as potential impacts on nearby public water supply or private water wells, restrictions on community activities, or health concerns are associated with the investigation or cleanup process of the Site at this time.

The current owner, M4778 Broadway LLC, purchased the Site in June 2018 and subsequently elected to apply for entry into New York's Brownfield Cleanup Program.

Following entry into the Brownfield Cleanup Program and approval of the November 2019 Remedial Investigation Work Plan (RIWP) by NYSDEC and public review period, AEI mobilized to the Site in February 2020 to complete the BCP Remedial Investigation. RI field work was conducted at the Site on February 10-13th and February 25th, 2020.

The following work was completed during the RI:

- Twenty-eight (28) soil samples were collected from various depths at the seven (7) borings;
- Eighteen (18) soil vapor samples were collected, including nine (9) shallow soil vapor (3-5 feet bgs) and nine (9) deep soil vapor (collected from 12' bgs, or between one and two feet above the groundwater interface);
- Five (5) groundwater samples were collected from the two new monitoring wells and the three original monitoring wells;
- A geophysical survey conducted during the RI identified as many as nine (9) USTs onsite in the area of the former gasoline filling station.

The results of the soil sampling completed during the BCP RI indicated that Benzene, Toluene, Ethylbenzene, Xylene (BTEX), and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC Residential Restricted Use Soil Cleanup Objective (RRUSCO) and/or Protection of Groundwater Soil Cleanup Objective (PGWSCO) at various depths in boring locations on the north and northwestern portion of the Site. PAHs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable SCOs; however, the presence of these compounds is likely the result of fill material present in the subsurface. No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the soil samples at concentrations exceeding the applicable NYSDEC RRUSCOs or PGWSCOs.

The results of the soil vapor sampling completed during the BCP RI indicate that significant soil vapor concentrations of gasoline related compounds including BTEX were detected in soil vapor sample SGS-9D, located on the northern portion of the Site.
The results of the groundwater sampling completed during the BCP RI indicate that BTEX and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC AWQS in the monitoring wells MW-1, MW-2, MW-3, MW-5 onsite. The highest concentrations of petroleum-related VOCs were detected in monitoring wells,

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MW-2 and MW-5, located on the north and northwestern portion of the Site in the area of the former gasoline filling station. No VOCs were detected in MW-4 located on the southern portion of the Site.

SVOCs 2,4-Dimethylphenol, Phenol, and Naphthalene, and dissolved and total metals Arsenic, Barium, Iron, Magnesium, Manganese, Sodium, and Thallium were also detected in groundwater samples at the Site at concentrations exceeding their applicable NYSDEC AWQS.

Additionally, individual PFOA and PFOS concentrations, other individual PFAS concentrations, and combined PFAS concentrations exceeded the screening levels outlined in the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020). The highest concentrations of PFAS compounds were detected in groundwater samples from monitoring wells MW-2, MW-3, and MW-5, located on the north and northwestern portions of the Site. Based on this information, it is possible that the former onsite car wash operations and use of car-wash solutions/surfactants may have resulted in onsite PFAS groundwater impacts.

No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the groundwater samples at concentrations exceeding the applicable NYSDEC AWQS or guidance levels.

Plans for remediation of the contamination are being developed as described below.

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 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 and commercial purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup 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 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.

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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 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. NYSDEC then will issue

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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):

Steven Wu
Project Manager
NYSDEC – Region 2
Division of Environmental Remediation
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, NY 11101-5407
Email: Steven.wu@dec.ny.gov
Tel: (718) 482-6725

Thomas V. Panzone
Public Participation Specialist
NYSDEC – Region 2
Division of Environmental Remediation
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, NY 11101-5407
Email: Thomas.panzone@dec.ny.gov
Tel: (718) 482-4953

New York State Department of Health (NYSDOH):

Shaun J. Surani
New York State Department of Health
Bureau of Environmental Exposure Investigation
Empire State Plaza – Corning Tower Room
1787 Albany, NY 12237
Email: BEEI@health.ny.gov
Tel: (518) 402-7860

Locations of Reports and Information

The three (3) facilities identified below are being used to provide the public with convenient access to important project documents:

Community Board #12 –
Washington Heights/Inwood
530 West 166th Street, 6th Floor
New York, NY 10032
Attn: Ebenezer Smith
Phone: 212-568-8500
Hours: (call for appointment)

NYSDEC - Region 2
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, NY 11101-5401
Attn: Steven Wu
Phone: (718) 482-6725
Hours: M-F 8-5
(call for appointment)

The New York Public Library -
Washington Heights Branch
1000 Saint Nicholas Avenue,
New York, NY 10032
Attn: Vianela Rivas
Phone: 212-923-6054
Hours: M-Sat 11-5
(call for appointment)

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Appendix B - Site Contact List

Community/Planning Board Contacts

Organization	Representative	Address	Phone/E-mail
Community Board #12 – Washington Heights/Inwood	Mr. Ebenezer Smith – District Manager Paola Garcia – Community Coordinator	530 West 166th Street, 6th Floor New York, NY 10032	212-568-8500 / ebsmith@cb.nyc.gov pgarcia01@cb.nyc.gov
Department of City Planning	Marissa Lago - Director	120 Broadway 31st Floor New York, NY 10271	212-720-3480 / mlago@planning.nyc.gov
Manhattan Borough President	Gale A. Brewer - Borough President	431 West 125th Street New York, NY 10027	212-669-8191 / gbrewer@manhattanbp.nyc.gov

Adjacent Property Contacts

Address	Direction	Owner / Address	Phone/E-mail
New York Public Library – Inwood Branch 4790 Broadway, New York, NY 10034	Adjoining to the east	New York Public Library 4790 Broadway, New York, NY 10034	212-942-2445 / Library Manager: Danita Nichols / danitanichols@nypl.org
Harold O. Levy School 52 630 Academy Street, New York, NY 10034	Adjoining to the south	Department Of Education 630 Academy Street, New York, NY 10034	212-567-9162 / Principal: Lupe Leon
Fine Fare Supermarket - 4768 Broadway, New York, NY 10034	Adjoining to the west	4768 Broadway LLC 1185 Sixth Avenue, 10th Floor, New York, NY 10036	212-304-1858
4781 Broadway, New York, NY 10034	Adjacent to the north across Broadway	4781 Broadway, LLC C/O Steven J Goldstein, PLLC 100 Crossways Park West, Suite 312 Woodbury, New York, 11797	516-490-1240 / sgoldstein@sjgpllc.com

Local News Media

Organization	Address	Phone/E-mail
Manhattan Times Newspaper	5030 Broadway, Suite 807, New York, NY 10034	212-569-5800/ editor@manhattantimesnews.com

Public Water Supplier

Organization	Address	Phone/E-mail
NYC Department of Environmental Protection	1250 Broadway, 8th Floor New York, NY 10001	718-595-7000 / CustomerService@dep.nyc.gov

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Local Schools

Organization	Representative	Address	Phone/E-mail
Harold O. Levy School 52	Lupe Leon - Principal	630 Academy Street, New York, NY 10034	212-567-9162

Document Repositoies

Community Board #12 –
Washington Heights/Inwood
530 West 166th Street, 6th Floor
New York, NY 10032
Attn: Ebenezer Smith
Phone: 212-568-8500
Hours: (call for appointment)

NYSDEC - Region 2
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, NY 11101-5401
Attn: Steven Wu
Phone: (718) 482-6725
Hours: M-F 8-5
(call for appointment)

The New York Public Library -
Washington Heights Branch
1000 Saint Nicholas Avenue,
New York, NY 10032
Attn: Vianela Rivas
Phone: 212-923-6054
Hours: M-Sat 11-5
(call for appointment)

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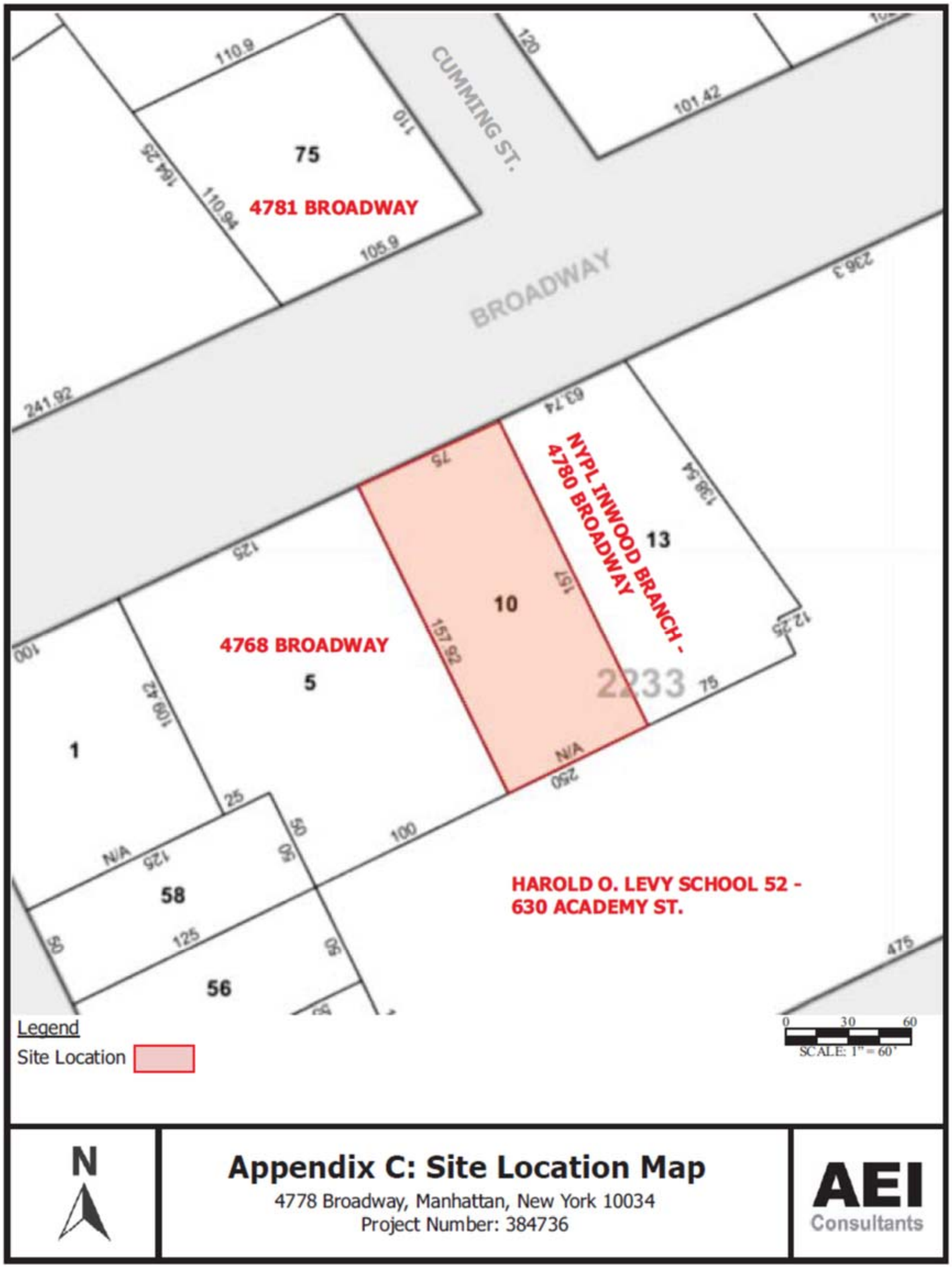
Appendix C - Site Location Map



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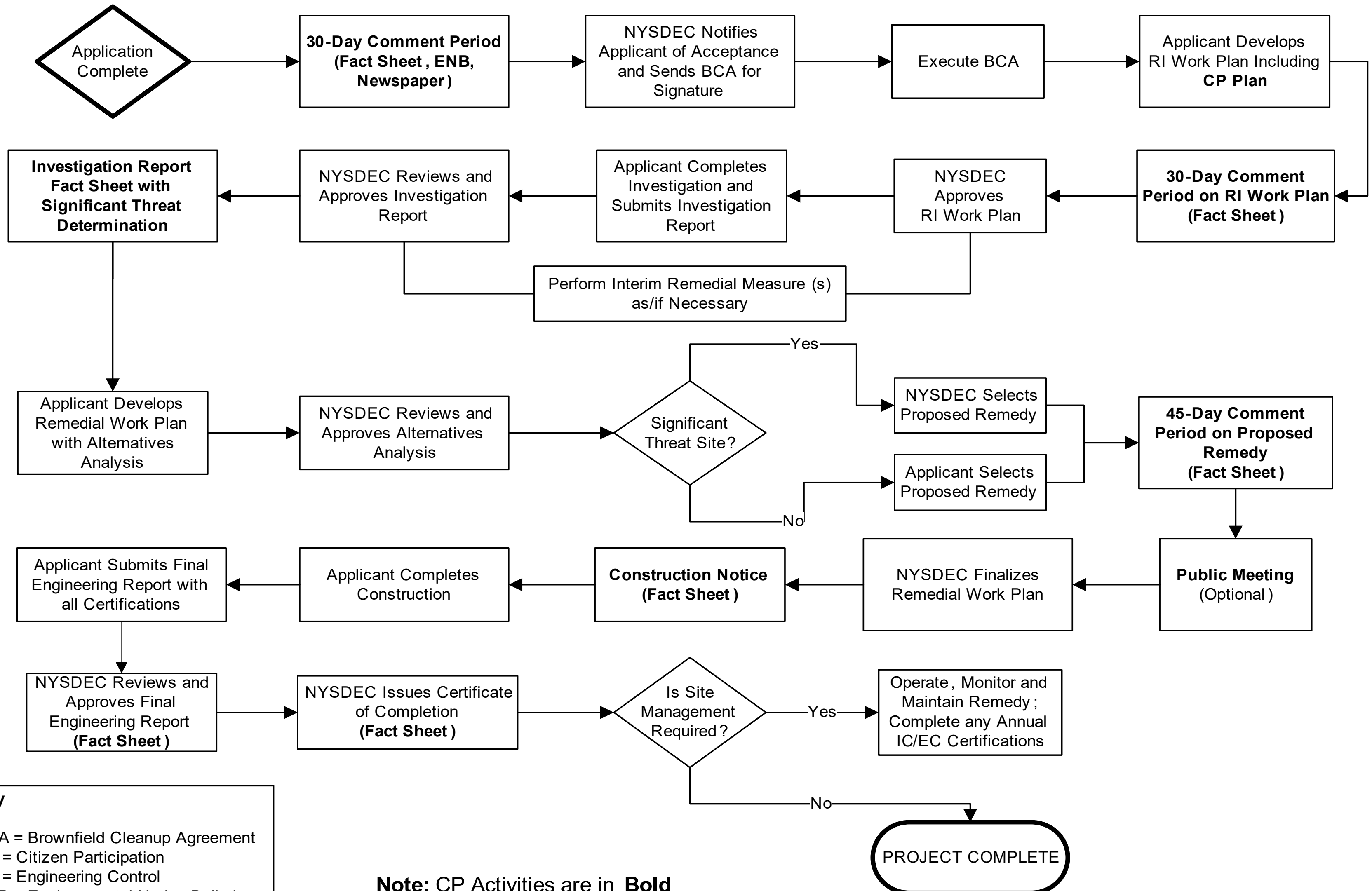
Appendix D– Brownfield Cleanup Program Process



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

Instructions

This Scoping Sheet assesses major issues of public concern; impacts of the site and its remedial program on the community; community interest in the site; information the public needs; and information needed from the public.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the site's remedial process to more effectively implement the site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the site. It can be revisited and updated anytime during the site remedial process.
- Fill in site name and other information as appropriate.
- The Scoping Sheet may be prepared by DEC or a remedial party, but must be reviewed and approved by the DER site project manager or his/her designee.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be unique or appropriate to the site and the community to help complete the five Parts of this Scoping Sheet. Identify the issue stakeholders in Parts 1 through 3 and adjust the site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (e.g. Are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we recreate (fish, hunt, hike, etc. on/around the site?)
- How and when were the site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the site remedial process?
- Who has been contacted in the community about site remedial activities?
- What has been done to this point? What happens next and when?
- The site is going to be cleaned up for restricted use. What does that mean? We don't want redevelopment on a "dirty" site.

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Part 2. List Important Information Needed From the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the site?
- Does the community have knowledge that the site may be significantly impacting nearby people, properties, natural resources, etc.?
- Are activities currently taking place at the site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Does the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated to the Community.

- Specific site investigation or remediation activities currently underway, or that will begin in the near future.
- The process and general schedule to investigate, remediate and, if applicable, redevelop the site.
- Current understanding about the site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the site's remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, site reports, site visits, "windshield surveys," other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this site? Such experiences could significantly affect public concerns and perspectives about the site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. In its remedial programs, DER seeks to integrate, and be consistent with, environmental justice principles set forth in *DEC Commissioner Policy 29 on Environmental Justice* and *DER 23 – Citizen Participation Handbook for Remedial Programs*. Is the site and/or affected community wholly or partly in an Environmental Justice (EJ) Area? Use the Search feature on DEC's public web site for "environmental justice". DEC's EJ pages define an EJ area, and link to county maps to help determine if the site and/or community are in an EJ area.

h. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.
- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public.

Individuals and organizations who need or want information and input can change during the site's remedial process. This need is influenced by real, potential, or perceived impacts of the site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial stages, or may only be interested in particular issues.

It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the site – and the issues that are important to them – will help to select and conduct appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the site. **Note: Adjust the site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage
- Current/proposed uses of site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups

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Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Site Name: M4778 Broadway LLC
Site Number: C231131
Site Address and County: 4778 Broadway, New York, NY
Remedial Party(ies): M4778 Broadway 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.**

The Site is located in an Environmental Justice Area. Therefore, all future fact sheets need to be translated into Spanish.

How were these issues and/or information needs identified?
Needs were identified using census data.

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.
NA

How were these information needs identified?
NA

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.
NA

How were these issues and/or information needs identified?
NA

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**

c. Population density around site:
☒ **High** ☐ **Medium** ☐ **Low**

d. Water supply of nearby residences:

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☒ **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:
Residents are provided with their drinking water through the NYC Department of Environmental Protection.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
NA

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: Anthony Cauterucci, AEI Consultants **Date:** 12/8/2020

Reviewed/Approved By: Click here to enter text. **Date:** Click here to enter text.

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	A	B	C	D	E	F	G	H	I	J
1										
2	Site Contact List									
3	Site #: C231131									
4	Site Name: M4778 Broadway Site			List Last Updated: 10-2-19						
5		Name, Title	Address 1	Address 2	Address 3	Street Address	City	State	Zip	Site Name (County)
6	**Local Government Officials**	Hon. Bill de Blasio	NYC Mayor			City Hall	New York	NY	10007	M4778 Broadway Site (Manhattan)
7		Hon. Scott Stringer	NYC Comptroller			1 Centre Street	New York	NY	10007	M4778 Broadway Site (Manhattan)
8		Hon. Juumane Williams	Public Advocate			1 Centre Street	New York	NY	10007	M4778 Broadway Site (Manhattan)
9		Marisa Lago	Commissioner, NYC Dept. of City Planning			120 Broadway, 31st Floor	New York	NY	10271	M4778 Broadway Site (Manhattan)
10	**Public Water Supplier**	Vincent Sapienza	Commissioner, NYC Dept. of Environmental Protection			59-17 Junction Boulevard	Flushing	NY	11373	M4778 Broadway Site (Manhattan)
11		Mark McIntyre, Director	NYC Office of Environmental Remediation			100 Gold Street - 2nd Floor	New York	NY	10038	M4778 Broadway Site (Manhattan)
12		Julie Stein	Office of Environmental Assessment & Plannin	NYC Dept. of Environmental Protection		96-05 Horace Harding Expressw	Flushing	NY	11373	M4778 Broadway Site (Manhattan)
13		Hon. Gale Brewer	Manhattan Borough President			1 Centre Street, 19th Floor	New York	NY	10007	M4778 Broadway Site (Manhattan)
14		Steven Wu	NYSDEC Project Manager			47-40 21st Street	Long Island City	NY	11101	M4778 Broadway Site (Manhattan)
15		Thomas V. Panzone	NYSDEC Public Participation Specialist			47-40 21st Street	Long Island City	NY	11101	M4778 Broadway Site (Manhattan)
16		Larry Ennist	NYSDEC			625 Broadway	Albany	NY	12233	M4778 Broadway Site (Manhattan)
17		Justin Deming	NYSDOH Public Health Specialist		Empire State Plaza	Corning Tower, Room 1787	Albany	NY	12237	M4778 Broadway Site (Manhattan)
18		Hon Charles Schumer	U.S. Senator			780 Third Avenue, Suite 2301	New York	NY	10017	M4778 Broadway Site (Manhattan)
19		Hon. Kirsten Gillibrand	U.S. Senator			780 Third Avenue, Suite 2601	New York	NY	10017	M4778 Broadway Site (Manhattan)
20		Hon. Adriano Espaillat	U.S. House of Representatives			163 West 125th Street, #508 - H	New York	NY	10027	M4778 Broadway Site (Manhattan)
21		Hon. Ydanis Rodriguez	NYC Councilmember			618 W. 177th St., Ground Floor	New York	NY	10033	M4778 Broadway Site (Manhattan)
22		Hon. Robert Jackson	NYS Senator			5030 Broadway, Suites 701	New York	NY	10034	M4778 Broadway Site (Manhattan)
23		Hon. Carmen de La Rosa	NYS Assemblymember			210 Sherman Avenue, Suite A &	New York	NY	10034	M4778 Broadway Site (Manhattan)
24	**Community Board**	Ebenezer Smith - District Manager	Manhattan Community Board 12			530 West 166th Street, 6th Floo	New York	NY	10032	M4778 Broadway Site (Manhattan)
25		Sha Ally - Chairman	Manhattan Community Board 12			530 West 166th Street, 6th Floo	New York	NY	10032	M4778 Broadway Site (Manhattan)
26		Environmental Committee Chairman	Manhattan Community Board 12			530 West 166th Street, 6th Floo	New York	NY	10032	M4778 Broadway Site (Manhattan)
27	**County Clerk**	Milton Tingling	Manhattan County Clerk			60 Centre Street, Room 161	New York	NY	10007	M4778 Broadway Site (Manhattan)
28	**Consolidated Edison**	Caroline Kretz - Director	Consolidated Edison Corporate Affairs			4 Irving Place, Room 142	New York	NY	10003	M4778 Broadway Site (Manhattan)
29	**NYPD**	Stephen Feldheim - President	34th Police Precinct Council			4295 Broadway	New York	NY	10033	M4778 Broadway Site (Manhattan)
30	**FDNY**	Engine 95 Ladder 36	FDNY			29 VERMILYEA AVENUE	New York	NY	10034	M4778 Broadway Site (Manhattan)
31	**Local Media Outlets**	Manhattan Times Newspaper	editor@manhattantimesnews.com			5030 Broadway, Suite 807	New York	NY	10034	M4778 Broadway Site (Manhattan)
32		Spectrum NY 1 News				75 Ninth Avenue	New York	NY	10011	M4778 Broadway Site (Manhattan)
33		New York Daily News				4 New York Plaza	New York	NY	10004	M4778 Broadway Site (Manhattan)
34		New York Post				1211 Avenue of the Americas	New York	NY	10036	M4778 Broadway Site (Manhattan)
35		Hoy Nueva York				1 MetroTech Center, 18th Floor	Brooklyn	NY	11201	M4778 Broadway Site (Manhattan)
36		El Diario La Prensa				1 MetroTech Center, 18th Floor	Brooklyn	NY	11201	M4778 Broadway Site (Manhattan)
37	**School and Daycare Facilities**	QUEEN OF MARTYRS HEAD START				71-91 ARDEN STREET	New York	NY	10040	M4778 Broadway Site (Manhattan)
38		Public School 176				4862 BROADWAY	New York	NY	10034	M4778 Broadway Site (Manhattan)
39		NICHOLAS CARDELL DAY CARE CENTER, INC.				84 Vermilyea Ave	New York	NY	10034	M4778 Broadway Site (Manhattan)
40		WASHINGTON HEIGHTS ACADEMY				202 SHERMAN AVENUE	New York	NY	10034	M4778 Broadway Site (Manhattan)
41		NOAH'S ARK DAY CARE CENTER				120 Vermilyea Ave	New York	NY	10034	M4778 Broadway Site (Manhattan)
42		Little Day Dreamers Daycare				103 Seaman Ave Ste C	New York	NY	10034	M4778 Broadway Site (Manhattan)
43	**Community, Civic, Religious and Other Environmental Organizations**									M4778 Broadway Site (Manhattan)
44		RAIN INWOOD NEIGHBORHOOD SENIOR CENTER				84 VERMILYEA AVENUE	New York	NY	10034	M4778 Broadway Site (Manhattan)
45		WEACT	Peggy Sheppard - Executive Director			1854 Amsterdam Avenue 2nd Fl	New York	NY	10031	M4778 Broadway Site (Manhattan)
46		Fireside Pentacostal Assembly				71 Thayer Street	New York	NY	10040	M4778 Broadway Site (Manhattan)
47		La Puerts Estrecha				161 Sherman Avenue	New York	NY	10034	M4778 Broadway Site (Manhattan)
48		Mt. Washington Presbyterian Church				84 VERMILYEA AVENUE	New York	NY	10034	M4778 Broadway Site (Manhattan)
49		Church of Jesus Christ LDS				1815 Riverside Drive	New York	NY	10034	M4778 Broadway Site (Manhattan)
50		YM/YWHA Senior Center				54 Nagle Avenue	New York	NY	10040	M4778 Broadway Site (Manhattan)
51		Comite Residente Post Avenue, Inc				210 Sherman Avenue, #12F,	New York	NY	10034	M4778 Broadway Site (Manhattan)
52		SDA Church				111-113 Vermilyea Avenue	New York	NY	10034	M4778 Broadway Site (Manhattan)
53		Good Shepherd Church				4967 Broadway	New York	NY	10034	M4778 Broadway Site (Manhattan)
54		Inwood-Manhattan Little League Baseball				647 West 207th Street A	New York	NY	10034	M4778 Broadway Site (Manhattan)
55		Dyckman Farmhouse				4881 Broadway	New York	NY	10034	M4778 Broadway Site (Manhattan)
56	**Adjacent Properties**	New York Public Library – Inwood Branch	Danita Nichols			4790 Broadway	New York	NY	10034	M4778 Broadway Site (Manhattan)
57		Harold O. Levy School 52	Principal: Lupe Leon			630 Academy Street	New York	NY	10034	M4778 Broadway Site (Manhattan)
58		Fine Fare Supermarket				4768 Broadway	New York	NY	10034	M4778 Broadway Site (Manhattan)
59		4781 Broadway, LLC				4781 Broadway	New York	NY	10034	M4778 Broadway Site (Manhattan)
60		4768 Broadway LLC				1185 Sixth Avenue, 10th Floor	New York	NY	10036	M4778 Broadway Site (Manhattan)

	A	B	C	D	E	F	G	H	I	J
61		4781 Broadway, LLC	C/O Steven J Goldstein, PLLC			100 Crossways Park West, Suite	Woodbury	NY	11797	M4778 Broadway Site (Manhattan)
62		RESIDENT/BUSINESS OWNER			4720	BROADWAY	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)
63		RESIDENT/BUSINESS OWNER			4730	BROADWAY	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)
64		RESIDENT/BUSINESS OWNER			4740	BROADWAY	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)
65		RESIDENT/BUSINESS OWNER			4754	BROADWAY	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)
66		RESIDENT/BUSINESS OWNER			200	DYCKMAN STREET	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)
67		RESIDENT/BUSINESS OWNER			190	DYCKMAN STREET	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)
68		RESIDENT/BUSINESS OWNER			184	DYCKMAN STREET	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)
69		RESIDENT/BUSINESS OWNER			180	DYCKMAN STREET	NEW YORK	NY	10040	M4778 Broadway Site (Manhattan)

APPENDIX E

HEALTH AND SAFETY PLAN

AEI Consultants

San Francisco HQ

Atlanta

Chicago

Costa Mesa

Dallas

Denver

Los Angeles

Miami

New York

Phoenix

Portland

San Jose

HEALTH & SAFETY, INJURY & ILLNESS PREVENTION PLAN

Property Identification:
M4778 Broadway LLC, C231131
4778 Broadway
Manhattan, New York County, New York 10034

BCP Site No. C231131
AEI Project No. 384736
NYSDEC Spill Case # 1700751

Prepared for:
M4778 Broadway LLC
C/O Joy Construction Corporation
40 Fulton Street, 21st Floor
New York, New York 10038

Prepared by:
AEI Consultants
20 Gibson Place, Suite 310
Freehold, NJ 07728
(732) 414-2720

National Presence
Regional Focus
Local Solutions

TABLE OF CONTENTS

APPENDICES

1.0 General Information

Client/Site Name: M4778 Broadway LLC

Site Address: 4778 Broadway, Manhattan, New York County, New York 10034

Job/Project #: 384736

Estimated Start Date: 4/1/2020 Estimated Completion Date: 2/1/21

Have Necessary Underground Utility Notifications for Subsurface Work Been Made? ☒ Yes ☐ Not Applicable
(Specify clearance dates, USA Ticket #, and other relevant information on the "Site Inspection Log")

2.0 Scope of Work

Site Description:	Vacant lot (former carwash/gas station)
Specific Tasks Performed by AEI:	Oversight of UST closures, soil excavations, post-excavation soil sampling, groundwater EFR, vapor barrier and SSDS installation
Concurrent Tasks to be Performed by AEI Subcontractors :	UST closures, soil excavations, groundwater EFR, vapor barrier and SSDS installation
Concurrent Tasks to be Performed by Others:	Site development and construction

3.0 Roles and Responsibilities

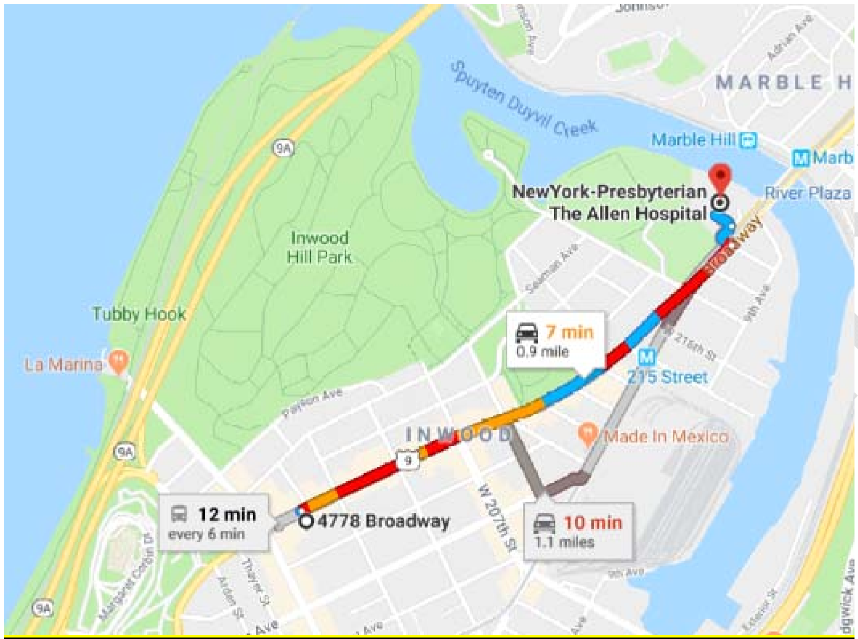
AEI Personnel

Name	Project Title/Assigned Role	Phone Numbers
Joseph Maggiulli	Field Team Leader	201-694-3957
Anthony Cauterucci	Project Manager	732-275-4719
Jack Katz	Quality Assurance Manager	732-414-2720
Phillip Clark	Senior PM/Professional Engineer	413-281-2797

Emergency Contacts [Cal/OSHA 8 CCR 5192(l)]

Emergency Information	Emergency Number	Phone Numbers
New York City Police Department	911	(212) 767-8400
NewYork-Presbyterian The Allen Hospital 5141 Broadway, New York, NY 10034	911 (map attached)	(212) 932-4000
Joseph Maggiulli	Field Team Leader	201-694-3957
Location of Nearest Phone & First Aid:	Mobile cellular telephone in the Site Safety Officer's work vehicle	

4.0 DIRECTIONS TO THE NEAREST EMERGENCY DEPARTMENT



1. Head northeast on Broadway toward Cumming St
   Pass by CTown Supermarkets (on the right in 0.3 mi)
   0.8 mi
2. Turn left onto W 220th St
   236 ft
3. Turn left
   Destination will be on the right
   164 ft

NewYork-Presbyterian The Allen Hospital
5141 Broadway, New York, NY 10034

5.0 EMERGENCY PROCEDURES [CAL/OSHA 8 CCR 5192(L)]

If an emergency arises, the on-site personnel should contact the EMT by dialing 911. Emergency communications at the site will be by means of a cellular radio and/or telephone. All work in the project area should stop and the work area should be secured, to the extent possible. The following general procedures will be followed in the case of a medical emergency at the site:

Skin Contact - Skin exposure should be treated by rinsing with soap and water. All contaminated clothing must be removed.

Eye Contact - Eye contact with chemicals should be treated by rinsing the eye with solution or water for at least 15 minutes. If symptoms persist, medical attention should be sought as soon as possible.

Ingestion - Seek immediate medical attention. Refer to MSDS.

Inhalation—Any warning symptoms such as headache, dizziness, nausea, shortness of breath, etc. necessitate that the victim leaves the immediate site area rapidly. If the victim stops breathing, assisting personnel should don breathing protection while removing them from the area. Persons trained in CPR should immediately begin initiated, while medical attention should be obtained as soon as possible.

In case of evacuation, all vehicles/equipment should be turned off and personnel should immediately leave the work area. Personnel should move to the specified meeting area located upwind of the affected area, such as the building exterior, site field office, property boundary, or other predestinated location, where all personnel will be accounted for.

IF AN EMERGENCY ARISES, THE DESIGNATED MEETING LOCATION FOR THIS PROJECT IS IMMEDIATELY IN FRONT OF THE BUILDING ON THE SUBJECT PROPERTY.

This location is located upwind of the drilling activities but is subject to change if prevailing weather conditions alter typical wind direction.

Personnel should not re-enter the work area following evacuation until all of the following conditions have been met:

1) The condition causing the emergency has been corrected.

2) All hazards have been assessed.

3) The HASP has been reviewed.

4) Personnel have been oriented on any changes in the HASP.

All emergencies should be promptly reported to the SSO.

- **Site Supervisors and Project Managers (SS/PM)**: Responsibility for compliance with AEI Health and Safety programs, policies, procedures and applicable laws and regulations is shared by all AEI management and supervisory personnel. This includes the need for effective oversight and supervision of project staff necessary to control the Health and Safety aspects of AEI on-site activities.
- **Site Safety Officers and Competent Persons (SSO):** The Site Safety Officer (SSO), as defined by OSHA 1926.20(b), is the individual "who is capable of identifying existing and predictable hazards in surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." The SSO is designated on a site-by-site basis based on the site conditions, scope-of-work, and the individual's ability to recognize site-specific hazards and take appropriate corrective actions. This individual is responsible to both project management and the designated Office Health and Safety Officer (HSO) with regard to the completion of these assigned duties.
- **Staff:** Ultimate control of Health Safety is in the hands of each individual employee. Therefore, each employee must become familiar with and comply with all Health and Safety requirements associated with their position and daily operations. Employees also have the responsibility to notify the appropriate management, SSO, and/or HSO of unsafe conditions and accidents/injuries immediately. When employees are issued respirators or any other personal protective equipment (PPE), they are responsible for ensuring that said items are used properly, cleaned as required and maintained in good working order.
- **(Sub) contractors:** (Sub) contractors should develop their own site safety plan related to their specific on-site activities. Subcontractors may use AEI's plan as an informational model. However, each Subcontractor is responsible for determining the plan's adequacy and applicability to its own activities on site. Subcontractors wishing to do so must deliver their plan in clear written form to AEI prior to the initiation of on-site activities.

6.0 PLAN ACKNOWLEDGEMENT AND APPROVALS

Approval or Acknowledgement	SSO SS/PM	HSO
Probable hazards identified on form.	X	X
Project scope accurately reflected on form.	X	
Appropriate emergency response info identified on form.	X	X
Appropriate control measures identified on form.	X	X
Hazards and control measures to be implemented on site acknowledged.	X	
Overall project scope and health and safety requirements acknowledged.	X	

7.0 SITE CONTROL MEASURES

Anthony Cauterucci has been designated to coordinate access control and security on site. All work will strictly follow OSHA guidelines and HAWOPER regulations. There will be a 10-foot boundary surrounding the work area. The boundaries are identified by orange safety cones and/or "yellow" caution or red "danger" tape. The area within this boundary is considered an exclusion zone and only qualified personnel will be allowed to enter. All personnel arriving or departing the site should log in before entering the exclusion zone. All activities on site must be cleared through the Site Manager. Additional hazards on site include heavy equipment and overhead equipment. Only 40-hour HAZWOPER trained personnel will operate equipment or perform any duties associated with this project. A hard hat and steel toed boots are mandatory for all personnel associated with the drilling operation. Nitrile gloves will be worn at all times and changed periodically (as required) during boring logging, soil and groundwater sample collection and decontamination to reduce the risk of dermal exposure.

A GENERAL PURPOSE FIRST AID KIT WILL BE AVAILABLE ONSITE. EMERGENCY SERVICES ARE AVAILABLE BY DIALING **911** ON THE TELEPHONE LOCATED IN THE SITE MANAGER'S VEHICLE, WHICH WILL BE ONSITE AT ALL TIMES.

8.0 DOCUMENTATION TO BE COMPLETED ON SITE

- A **Site Inspection Log** must be completed at the initiation of on-site activities and at least once per week thereafter until the completion of AEI on-site activities.
- A **Site Health and Safety Briefing** or "Tailgate Safety Meeting" must be completed at the initiation of on-site activities and at the beginning of site activities each day thereafter until the completion of AEI on-site activities. (Note: The actual briefing may be conducted off-site, in the office for example, if conditions preclude or render impractical its completion on site.) The corresponding **Site Orientation Record** should be completed at the initiation of on-site activities and once per week thereafter.
- The AEI Incident Investigation Form (OSHA Form 301) and the Subcontractor's Statement of Understanding Regarding Health and Safety Responsibilities Form are to be completed on an as needed basis.

9.0 PPE AND SITE CONTROLS [CAL/OSHA 8 CCR 5192(D) AND (G)(5)]

Based on an evaluation of the suspected and known hazards at the site, Level D personal protective equipment (PPE) will be required for all personnel and visitors entering the controlled portion of the site. Protective equipment for each level of protection is summarized below. Both Level C and D PPE should be available on-site at all times during all phases of the project, as conditions may change and require additional PPE. Work should be conducted in Level D as long as breathing zone vapor concentrations remain at background or below 10 ppm, no breathing protection will be required. Engineering controls, such as forced air ventilation, will be used when feasible to reduce respiratory hazards. If on-site personnel find that breathing zone concentrations exceed 10 ppm, then the SSO or PM will make a determination if work shall continue in Level C PPE.

At this time, all work in the affected area should be suspended until a decision is made. Implementation of Level C PPE will be required if work continues during elevated breathing zone concentrations. Donning and use of respirators shall be performed in accordance with manufacturer specifications. Replacement of respirator cartridges shall be performed in accordance with manufacturer specifications. All respirators and cartridges shall be stored in air tight bags while not in use.

Personal Protective Equipment - Level D	**Personal Protective Equipment - Level C**
☒ Hearing Protection (as needed near loud equipment) ☒ Hardhat ☒ Outer Gloves Type: Kevlar or Leather (as needed) ☒ Inner Gloves Type: Nitrile ☒ Steel Toe Boots: ☐ Coveralls Type: ☐ Outer Boots Type: ☒ Eye Protection: Safety Glasses ☐ Others:	☒ Respirator Type: Full-Face Air Purifying Respirator ☒ Cartridge Type: Organic Vapor w/ P100 ☐ Assigned Protection Factor: 50 ☐ Others:
Monitoring Equipment[1]	**Other Equipment & Gear[2]**
☒ PID Type: RAE Systems ppbRAE 3000 or MiniRAE Lite ☐ PID Lamp Energy: 10.6 eV ☒ Calibration Gas: Isobutylene 10 ppmv / 100 ppmv ☐ FID Type: ☐ LEL/O_2 Meter ☐ Others:	☒ 10-lb ABC Fire Extinguisher ☒ "Caution" and "Danger" Tape ☒ Traffic Cones or Delineators ☒ Warning Signs or Placards ☒ Decontamination Equipment ☒ First Aid Kit ☐ Others:

Notes:

1. All direct reading instruments should be calibrated onsite once per day using the appropriate calibration gas standards and in accordance with the manufacturer's instructions.

2. A 10-foot work zone / exclusion zone is required wherever available to control access to heavy equipment and/or hazardous exposure situations. Only authorized persons will be allowed to enter work zone / exclusion zone.

10.0 COMMUNITY AIR MONITORING PLAN (CAMP)

A CAMP is included as Appendix G of this RAWP.

11.0 PERMISSIBLE EXPOSURE LIMITS FOR CHEMICAL CONTAMINANTS

Chemical Name (CAS #)	Molecular Weight[1]	Vapor Pressure (mm-Hg)[1]	Ionization Potential (eV)[1]	OSHA PEL (ppmv)[1]	Cal-OSHA PEL (ppmv)	NIOSH REL (ppmv)[1]	ACGIH TLV (ppmv)
Benzene* (71-43-2)	78.1	75	9.24	TWA 1ppm STEL 5ppm	0.0004-0.0015ppm	TWA 0.1ppm STEL 1ppm	TWA 0.5ppm STEL 2.5ppm
Toluene (108-88-3)	92.1	21	8.82	TWA 200ppm C 300ppm	0.19ppm	TWA 100ppm STEL 150ppm	TWA 20ppm
Ethylbenzene (100-41-4)	104.2	5	8.40	TWA 100ppm C 200ppm	TWA 100ppm	TWA 100ppm STEL 125ppm	TWA 100ppm STEL 125ppm
o-Xylene (95-47-6)	106.2	7	8.56	TWA 100ppm	TWA 100ppm	TWA 100ppm STEL 150ppm	TWA 100ppm STEL 150ppm
m-Xylene (108-38-3)	106.2	9	8.56	TWA 100ppm	TWA 100ppm	TWA 100ppm STEL 150ppm	TWA 100ppm STEL 150ppm
p-Xylene (106-42-3)	106.2	9	8.44	TWA 100ppm	TWA 100ppm	TWA 100ppm STEL 150ppm	TWA 100ppm STEL 150ppm
Gasoline (8006-61-9)	110	38 - 300	---	---	500ppm (15-minutes)	TWA 300ppm STEL 500ppm	TWA 300ppm STEL 500ppm
Diesel (Not Applicable)	---	---	---	---	--	---	TWA 15ppm (vapor)
Waste Oil (Not Applicable)	---	---	---	---	---	---	TWA 5 mg/m3 (fumes)
Lead* (7439-92-1)	207.2	0	---	TWA 0.05 mg/m3	TWA 50 µg/m3	TWA 0.05 mg/m3	TWA 0.05 mg/m3

1) Source: National Institute for Occupational Safety and Health (NIOSH), 2004. "NIOSH Pocket Guide to Chemical Hazards", February 2004.

PEL = permissible exposure limit REL = recommended exposure limit TLV = threshold limit value

C = ceiling concentration TWA = time-weighted average STEL = short-term exposure limit

IDLH = immediately dangerous to life or health

^NIOSH recommendation is to "minimize workplace exposure concentrations" (see Appendix A of the NIOSH Pocket Guide to Chemical Hazards).

*** Asterisk indicates that the chemical is known to the State of California to cause cancer per the Proposition 65 list of chemicals and the Safe Drinking Water and Toxic Enforcement Act of 1986 (*revised December 2, 2005*)**

Atmospheric vapor concentrations will be monitored via a photo-ionization detector (PID) with lamp energy appropriate for the contaminants of interest or equivalent to determine appropriate action levels. The PID will be calibrated daily by AEI personnel prior to use. Calibration will be performed in accordance with the manufacturer specifications and recorded in a log book kept with the instrument. Ambient breathing space measurements should be collected every 5 to 15 minutes (minimum) during drilling and other field activities.

12.0 Decontamination Procedures [Cal/OSHA 8 CCR 5192(k)]

All down-hole soil and groundwater sampling equipment (e.g., split spoons, hand augers, probe rods, discrete samplers, etc.), hand tools, purge pumps, water level indicators, etc. will be decontaminated before, between, and after use with Alconox or an equivalent phosphate-free detergent solution to reduce the risk of cross-contamination.

Decontamination of all sampling equipment will consist of submerging the equipment in a detergent solution bath and scrubbing it with dedicated brushes. The equipment will then be placed in a rinse bath and agitated. A second rinse bath will be used as needed.

13.0 Employee Training [Cal/OSHA 8 CCR 5192(e)]

All personnel working onsite must have had at a minimum the required 24 or 40-hour OSHA training for HAZWOPER with current annual 8-hour refresher, which includes the use of respirators and PPE. Annual individualized respirator fit testing is required for all applicable AEI employees working at the site.

During the daily Site Health and Safety Briefing or "Tailgate Safety Meeting", at a minimum the following should be discussed:

1) Scope of work, including personnel project responsibilities.

2) A description of the levels of personal protection at the site and the steps taken to select each level.

3) Emergency procedures. Identify Emergency gathering location.

4) Nature of the known or anticipated hazards, including the location of the Material Safety Data Sheets (MSDS) for the chemicals at the site.

5) Review safe work practices and identify any prohibited or forbidden practices.

6) Permissible smoking location. (aware of city/local ordinances for smoking)

Attendance at the Site Health and Safety Briefing or "Tailgate Safety Meeting" will be mandatory and all personnel coming on-site following the initial daily meeting will be subject to their own Site Health and Safety Briefing prior to entering the site. All personnel will be required to sign the Health and Safety Briefing/Site Orientation Record to signify understanding and adherence to AEI's HASP.

14.0 Site Hazard Assessment

(☒ = Applies, or required item(s) available. ☐ = Not Applicable.)

Hazard Assessment: Physical Hazards and Related Concerns [Cal/OSHA 8 CCR 5192]

☐ **Confined Space Entry (CSE)**. Confined space entry means the *potentially hazardous* entry into any space which, by design, has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include but are not limited to storage tanks, compartments of ships, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines. Other environments which must be treated as confined spaces include *test pits, and basements, garages, warehouses and other indoor areas where mechanical (i.e., diesel, propane, gasoline or similarly powered) equipment must be operated for drilling or test pitting purposes*. Confined space entry should be allowed only when absolutely necessary, and then only when all requirements of AEI's Confined Space Entry Control Program, and/or CSE Program Supplement for Indoor Drilling (and Similar Operations) and/or Trench and

Excavation Safety and Health Guide (and CSE Program Supplement), contained in the Health and Safety Program Manual, have been satisfied.

☒ **Construction Hazards, Drill Rigs, Backhoes, etc.** The use of drill rigs, backhoes and other heavy equipment represent potentially serious construction hazards. Whenever such equipment is used, personnel in the vicinity should be limited to those who must be there to complete their assigned duties. All personnel must avoid standing within the turning radius of the equipment or below any suspended load. Job sites must be kept as clean, orderly and sanitary as possible. When water is used, care must be taken to avoid creating muddy or slippery conditions.

Never turn your back to operating machinery. Never wear loose clothing jewelry, hair or other personal items around rotating equipment or other equipment that could may catch or ensnare loose clothing, jewelry, hair or other personal items. Always stand far enough away from operating machinery to prevent accident contact which may result from mechanical or human error.

Additionally, the following basic personal protective measures must be observed: **Hardhats** must be worn to protect against bumps or falling objects. **Safety glasses** must be worn when necessary to protect against chemicals or other hazards. **Steel-toed safety shoes or boots** are also required. The shoes must be chemically resistant or protected with appropriately selected boots/coverings where necessary. Unless otherwise specified, normal **work clothes** must be worn. Gloves are also required whenever necessary to protect against hazardous contact, cuts, abrasions or other possible skin hazards.

☒ **Drums and Buried Drums**. As a precautionary measure, personnel must assume that *labeled* and *unlabeled drums* encountered during field activities contain hazardous materials until their contents can be confirmed and characterized. Personnel should recognize that drums are frequently mislabeled, particularly drums that are reused.

Only trained and authorized personnel should be allowed to perform drum handling. Prior to any handling, drums must be visually inspected to gain as much information as possible about their contents. Trained field personnel must look for signs of deterioration such as corrosion, rust or leaks, and for signs that the drum is under pressure such as swelling or bulging. Drum-type and drumhead configuration may provide the observer with information about the type of material inside, (i.e., a removable lid is designed to contain solids, while the presence of a bung indicates liquid storage).

Although not usually anticipated, buried drums can be encountered when digging test pits. Therefore, the following provisions must be observed if drums are encountered. Machine excavation (i.e., backhoe) should cease immediately anytime a drum is encountered. The appropriate management personnel should be notified immediately. All AEI personnel should be instructed to immediately leave the work area.

☒ **Fire and Explosion**. The possibility of flammable materials being encountered during field activities must be recognized and the appropriate steps necessary to minimize fire and explosion must be observed. This includes situations where *excessive organic vapors or free product* are encountered. When this occurs, monitoring with a combustible gas indicator (CGI), is required.

Excessive organic vapors, for the purposes of initiating the use of a CGI, are defined as sustained readings (i.e., continuous for at least five minutes) at or above 250 units or as an instantaneous reading at or above 1,000 units on the PID or FID, in close proximity (within 1 foot or less) of the borehole, test pit, sampling location or other area of potential exposure.

In situations where hexane, methanol are needed for field activities, the following precautions must be observed: keep flammable and combustible materials away from heat, sparks and open flames; do not smoke around flammable or combustible materials; and keep all flammable and combustible liquids in approved and properly labeled safety containers.

☐ **Landfill/Methane Hazards**. Fire and explosion should be regarded as one of, if not the, most significant potential hazards associated with drilling operations and other intrusive work conducted at a landfill. Accordingly, all sources of ignition must be fully controlled. Failure to control ignition sources could result in fire, explosion and pose a serious threat to life and health. Control methods may include forced ventilation and/or filling the borehole with enough water to inhibit the release of methane and other gases which would otherwise escape through the top of the borehole.

If forced (mechanical) ventilation is to be used, all such equipment must be approved for Class I, Division I hazardous atmospheres. The blower must be positioned to blow across the top of the borehole so that gases and vapors may be diluted as they exit the borehole. Do not attempt to suck out the gases or vapors. Blowers, all other mechanical equipment, and tools which could release sparks or static electricity must be bonded and grounded.

Regardless of the gas/vapor control method used, the atmosphere surrounding the borehole must be frequently monitored using direct reading instruments approved for Class I, Division I hazardous atmospheres. Monitoring should be conducted within 1 to 2 feet of the top of the borehole. Do not insert sampling devices into the borehole. Never approach the auger or drill shaft while it is in operation.

Regardless of actual instrument readings, if all sources of ignition can not be controlled, operations should be immediately shut down if readings equal or exceed 10% of LEL and the area evacuated until ignition sources have been eliminated.

Ignition sources include, but are not limited to: smoking, static electricity, lighting, open flames, spontaneously ignitable substances, frictional heat or sparks, hot surfaces, radiant heat, electrical sparks, stray currents, cutting and welding, and ovens, furnaces and heating equipment.

☒ **Heat and Cold Stress**. Overexposure to temperature extremes can represent significant risks to personnel if simple precautions are not observed. Typical control measures designed to prevent **heat stress** include dressing properly, drinking plenty of the right fluids, and establishing an appropriate work/break regimen. Typical control measures designed to prevent **cold stress** also include dressing properly, and establishing an appropriate work/break regimen.

☒ **Moving Vehicles, Traffic Safety**. All vehicular traffic routes which could impact worker safety must be identified and communicated. Whenever necessary, barriers or other methods must be established to prevent injury from moving vehicles. This is particularly important when field activities are conducted in parking lots, driveways, ramps or roadways

☒ **Noise**. Noise exposure can be affected by many factors including the number and types of noise sources (continuous vs. intermittent or impact), and the proximity to noise intensifying structures such walls or building which cause noise to bounce back or echo. The single most important factor effecting total noise exposure is distance from the source. The closer one is to the source the louder the noise. The operation of a drill rig, backhoe or other mechanical equipment can be sources of significant noise exposure. In order to reduce the exposure to this noise, personnel working in areas of excessive noise must use hearing protectors (ear plugs or ear muffs).

Rule-of-Thumb: Wherever actual data from sound level meters or noise dosimeters is unavailable and it is necessary to raise one's voice above a normal conversational level to communicate with others within 3 to 5 feet away, hearing protection should be worn.

☒ **Overhead Utilities and Hazards**. Overhead hazards can include low hanging structures which can cause injury due to bumping into them. Other overhead hazards include *falling objects, suspended loads, swinging loads and rotating equipment*. Hardhats must be worn by personnel in areas were these types of physical hazards may be encountered. Barriers or other methods must also be used to exclude personnel from these areas were appropriate. Electrical wires are another significant overhead hazard. According to OSHA (29 CFR 1926.550), *the minimum clearance which must be maintained from overhead electrical wires is 10 feet* from an electrical source rated $\leq$ 50 kV. Sources rated > 50 kV require a minimum clearance of 10 feet plus 0.4 inch per kV above 50 kV.

☒ **Pedestrian Traffic**. The uncontrolled presence of pedestrians on a drilling or excavation site can be hazardous to both pedestrians and site workers. The site should be surveyed to determine if, when and where pedestrian may gain access. This includes walkways, parking lots, gates and doorways. Barriers or caution tape should be used to exclude all pedestrian traffic. *Exclusion of pedestrian traffic is intended to prevent injury to the pedestrians and eliminate distractions which could cause injury to AEI personnel or other site workers*.

☒ **Test Pit and/or other Excavations**. All provisions of the OSHA trenching and excavation standard (29 CFR 1926.650-652) must be followed during excavation activities. This includes *all test pit excavation and sampling activities*. The estimated location of utility installations, such as sewer, telephone, electric, water lines and other underground installations that may reasonably be expected to be encountered during excavation work, must be determined prior to opening an excavation.

A ladder or similar means of egress must be located in excavations greater than 4 feet in depth so as to require no more than 25 feet of lateral travel for employees. *No person should be allowed to enter an excavation greater than 5 feet in depth unless the walls of the excavation have been protected using an approved shield (trench box), an approved shoring system, or the walls have been sloped back to an angle of 34 degrees, and the excavation is free of accumulated water*. If personnel enter an excavation, the spoils pile and all materials must be placed at least 2 feet from the edge of the excavation to prevent the materials from rolling into the excavation. *Personnel must remain at least 2 feet away from the edge of the excavation at all times*. Upon completion of a test pit exploration, the excavation should be backfilled and graded. Excavation should never be left open unless absolutely necessary, and then only with proper barricading and controls to prevent accidental injury.

☒ **Underground Utilities and Hazards**. The identification of underground storage tanks (USTs), pipes, utilities and other underground hazards is critically important prior to all drilling, excavating and other intrusive activities. In accordance with OSHA 29 CFR 1926.650, *the estimated location of utility installations, such as sewer, telephone, electric, water lines and other underground installations that may reasonably be expected to be encountered* during excavation work, *must be determined* prior to opening an excavation. The same requirements apply to drilling operations and the use of soil-gas probes. Where public utilities may exist, the utility agencies or operators must be contacted directly or through a utility-sponsored service such as *Dig-Safe*. Where other underground hazards may exist, reasonable attempts must be made to identify their locations as well. *Failure to identify underground hazards can lead to fire, explosion, flooding, electrocution or other life threatening accidents.*

☐ **Water Hazards and Boat Sampling**. The collection of water or sediment samples on or immediately adjacent to a body of water can pose significant hazards. In addition to the slip, trip and fall hazards associated with wet surfaces, the potential for drowning accidents must be recognized. These hazards can be intensified by the use of some PPE, particularly if respiratory protection is worn.

HAZARD ASSESSMENT: CHEMICAL HAZARDS AND RELATED CONCERNS [CAL/OSHA 8 CCR 5192]

☒ **Chemicals Subject to OSHA Hazard Communication**. All chemicals used in field activities such as solvents, reagents, decontamination solutions, or any other hazardous chemical must be accompanied by the required labels, Material Safety Data Sheets (MSDS), and employee training documentation (OSHA 1910.1200). For additional information refer to **AEI's Hazard Communication Program** contained in the Health and Safety Program manual.

☐ **Asbestos**. Disturbance of building materials in buildings built prior to 1980 must be evaluated for the presence of asbestos-containing materials by an accredited AEI inspector. The inspection and/or removal of asbestos-based or asbestos-containing building materials are regulated by some major cities and several states. Regulations require individuals who conduct building inspections for the presence of asbestos or collect samples of asbestos containing materials to be licensed or certified. AEI employees must determine the applicability of these regulations prior to any activities involving asbestos. The primary health effects of asbestos exposure include asbestosis (a scarring of the lungs), lung cancer, mesothelioma and other forms of cancer. Exposure to asbestos is regulated by a comprehensive OSHA standard (29 CFR 1910.1001).

☒ **BTEX Compounds**. Exposure to the vapors of **benzene, ethyl benzene, toluene** and **xylenes** above their respective permissible exposure limits (PELs), as defined by the Occupational Safety and Health Administration (OSHA), may produce irritation of the mucous membranes of the upper respiratory tract, nose and mouth. Overexposure may also result in the depression of the central nervous system. Symptoms of such exposure include drowsiness, headache, fatigue and drunken-like behavior. Benzene has been determined to be carcinogenic, targeting blood-forming organs and bone marrow. The odor threshold for benzene is higher than the PEL and employees may be overexposed to benzene without sensing its presence, therefore, detector tubes must be utilized to evaluate airborne concentrations.

The vapor pressures of these compounds are high enough to generate significant quantities of airborne vapor. On sites where high concentrations of these compounds are present, a potential inhalation hazard to the field team during subsurface investigations can result. However, if the site is open and the anticipated quantities of BTEX contamination are small (i.e., part per million concentrations in the soil or groundwater), overexposure potential will also be small.

☐ **Carbon Monoxide**. Carbon monoxide (CO) is a gas usually formed by the incomplete combustion of various fuels. Welding, cutting and the operation internal combustion engines can produce significant quantities of CO. Amounts of CO can quickly rise to hazardous levels in poorly ventilated areas. CO is odorless and colorless. It cannot be detected without appropriate monitoring equipment. LEL/O_2 meters and H-Nu/PIDs are <u>not</u> appropriate for the detection of CO. A direct reading instrument, calibrated for CO, should be used. Common symptoms of overexposure include pounding of the heart, a dull headache, flashes before the eyes, dizziness, ringing in the ears and nausea. These symptoms must not be relied upon in place of an appropriately calibrated monitoring instrument. Exposures should not exceed 15 ppm. Exposures above 15 ppm require the use of supplied air respirators. Air purifying respirators are not approved for protection against CO.

☐ **Chlorinated Organic Compounds**. Exposure to the vapors of many chlorinated organic compounds such as vinyl chloride, tetrachloroethene, 1,1,1-trichloroethane, trichloroethene and 1,2-dichloroethene above their respective permissible exposure limits (PELs) will result in similar symptoms. The actual PELs as set by the Occupational Safety and Health Administration (OSHA) vary depending on the specific compound.

Overexposure to the vapor of these compounds can cause irritation of the eyes, nose and throat. The liquid, if splashed in the eyes, may cause burning irritation and damage. Repeated or prolonged skin contact with the liquid may cause dermatitis. Acute overexposure to chlorinated hydrocarbons depresses the central nervous system exhibiting such symptoms as drowsiness, dizziness, headache, blurred vision, in-coordination, mental confusion, flushed skin, tremors, nausea, vomiting, fatigue and cardiac arrhythmia. Alcohol may make symptoms of overexposure worse. If alcohol has been consumed, the overexposed worker may become flushed. Some of these compounds are considered to be potential human carcinogens. Exposure to *vinyl chloride* is regulated by a comprehensive OSHA standard (29 CFR 1910.1017).

☐ **Chromium Compounds**. Hexavalent chromium compounds, upon contact with the skin can cause ulceration and possibly an allergic reaction. Inhalation of hexavalent chromium dusts is irritating and corrosive to the mucous membranes of the upper respiratory tract. Chrome ulcers and chrome dermatitis are common occupational health effects from prolonged and repeated exposure to hexavalent chromium compounds. Acute exposures to hexavalent chromium dusts may cause coughing or wheezing, pain on deep inspiration, tearing, inflammation of the conjunctiva, nasal itch and soreness or ulceration of the nasal septum. Certain forms of hexavalent chromium have been found to cause increased respiratory cancer among workers.

Trivalent chromium compounds (chromic oxide) are generally considered to be of lower toxicity, although dermatitis may occur as a result of direct handling.

☐ **Cutting Oils**. Cutting oils may produce a condition known as "cutting oil acne," a specific dermatosis associated with prolonged and repeated direct contact. Other problems associated with continued occupational exposure to cutting fluids include allergic skin sensitization, folliculitis and squamous cell carcinoma, due to the presence of nitrosamines.

☐ **Fuel Oil**. See Petroleum Hydrocarbons (PHC)

☒ **Gasoline**. See BTEX Compounds, and Tetraethyl and Tetramethyl Lead.

☐ **Herbicides**. Some of the commonly used herbicides present a low toxicity to man. However, other herbicides pose more serious problems. Organophosphorus and carbamate herbicides, if inhaled or ingested can interfere with the functioning of the central nervous system. Many herbicides can be readily absorbed through the skin to cause systemic effects. In addition to being absorbed through the skin, many herbicides, upon contact with the skin, may cause discoloring, skin irritation or dermatitis. Contaminants of commercial preparations of chlorinated phenoxy herbicides such as 2,4,5-T include 2,3,7,8-tetrachlorodibenzo-p-dioxin (dioxin). Dioxin is a known mutagen and a suspect carcinogen.

☐ **Hydrogen Sulfide (H_2S)**. Hydrogen sulfide, characterized by its "rotten egg" odor, is produced by the decomposition of sulfur-containing organic matter. It is found in many of the same areas where methane is found such as landfills, swamps, sewers and sewer treatment facilities. An important characteristic of H_2S is its ability to cause a decrease in ones ability to detect its presence by smell. So although one may no longer be able to smell it, it could still be present in harmful concentrations.

The symptoms of over exposure include headache, dizziness, staggering and nausea. Severe over exposure can cause respiratory failure, coma, and death. The current OSHA PEL is 10 ppm as an 8-hour TWA. The ACGIH TLV is the same.

☐ **Lead Paint**. The inspection and/or removal, sanding, grinding, etc. of lead-based or lead-containing paints is now strictly regulated by OSHA. States may require individuals who conduct lead paint inspections or collect samples of lead paint to be licensed or certified. AEI employees must determine the applicability of these regulations prior to any activities involving lead paint. For additional health information, see Metal Compounds.

☒ **Metal Compounds**. Overexposure to metal compounds has been associated with a variety of local and systemic health hazards, both acute and chronic in nature, with chronic effects being most significant. Direct contact with the dusts of some metal compounds can result in contact or allergic dermatitis. Repeated contact with arsenic compounds may result in hyperpigmentation. Cases of skin cancer due to the trivalent inorganic arsenic compounds have been documented. The moist mucous membranes, particularly the conjunctivae, are most sensitive to the irritating effects of arsenic. Copper particles embedded in the eye result in a pronounced foreign body reaction with a characteristic discoloration of eye tissue.

Inhalation of copper and zinc dusts and fumes above their established PELs may result in flu-like symptoms known as "metal fume fever." Prolonged and repeated inhalation of the dusts of inorganic arsenic compounds above the established PEL may result in weakness, loss of appetite, a sense of heaviness in the stomach and vomiting. Respiratory problems such as cough, hoarseness and chest pain usually precede the gastrointestinal problems. Chronic overexposure to the dusts of inorganic arsenic may result in lung cancer.

The early symptoms of lead poisoning are usually nonspecific. Symptoms include sleep disturbances, decreased physical fitness, headache, decreased appetite and abdominal pains. Chronic overexposure may result in severe colic and severe abdominal cramping. The central nervous system (CNS) may also be adversely effected when lead is either inhaled or ingested in large quantities for extended periods of time. The peripheral nerve is usually affected. "Wrist drop" is peculiar to such CNS damage. Lead has also been characterized as a male and female reproductive toxin as well as a fetotoxin. Exposure to lead (Pb) is regulated by a comprehensive OSHA standard (29 CFR 1910.1025).

☐ **Methane**. Methane is an odorless, colorless, tasteless, gas that cannot be detected by an H-Nu or similar PID. When present in high concentrations in air, methane acts primarily as a simple asphyxiant without other significant physiologic effects. Simple asphyxiants dilute or displace oxygen below that required to maintain blood levels sufficient for normal tissue respiration.

Methane has a lower explosive limit (LEL) of 5 percent and an upper explosive limit (UEL) of 15 percent. The LEL of a substance is the minimum concentration of gas or vapor in air below which the substance will not burn when exposed to a source of ignition. This concentration is expressed in percent by volume. Below this concentration, the mixture is "too lean" to burn or explode. The UEL of a substance is the maximum concentration of gas or vapor in air above which the substance will not burn when exposed to a source of ignition. Above this concentration, the mixture is "too rich" to burn or explode. The explosive range is the range of concentrations between the LEL and UEL where the gas-air mixture will support combustion. For methane this range is 5 to 15 percent.

☒ **MTBE**. Methyl tertiary butyl ether (MTBE) is a volatile, flammable and colorless liquid that is relatively soluble in water. MTBE has a typical odor reminiscent of diethyl ether, leading to unpleasant taste and odor in water. MTBE is almost exclusively used as a fuel component in motor gasoline. The EPA has concluded that available data are not adequate to estimate potential health risks of MTBE at low exposure levels in drinking water, but that the data support the conclusion that MTBE is a potential human carcinogen at high doses. The ACGIH has recommended an exposure limit of 40 parts of MTBE per million parts of air (40 ppm) for an 8-hour workday, 40-hour workweek.

☐ **Pesticides**. Pesticides can be grouped into three major categories: organophosphates, carbonate and chlorinated hydrocarbons. The actual PELs as set by the OSHA, vary depending on the specific compound. Organophosphates, including Diazinon, Malathion and Parathion, are quickly absorbed into the body by inhalation, ingestion and direct skin contact. The symptoms of exposure include headache, fatigue, dizziness, blurred vision, sweating, cramps, nausea and vomiting. More severe symptoms can include tightness of the chest, muscle spasms, seizures and unconsciousness. It should also be noted that the Malathion and Parathion PELs both carry the *Skin* notation, indicating that these compounds adversely effect or penetrate the skin. OSHA specifies that skin exposure to substances carrying this designation be prevent or reduced through the use of the appropriate PPE.

Chlorinated Hydrocarbons such as Chlordane, DDT and Heptachlor can cause dizziness, nausea, abdominal pain and vomiting. The more severe symptoms include epileptic like seizures, rapid heart beat, coma and death. These compounds also carry the OSHA *Skin* notation. The symptoms of exposure to carbamate such Carbaryl (also known as Sevin) are similar to those described for the organophosphates. However, the OSHA exposure limit for Carbaryl *does not* carry the Skin notation.

☒ **Petroleum Hydrocarbons (PHCs)**. Petroleum Hydrocarbons such as fuel oil are generally considered to be of low toxicity. Recommended airborne exposure limits have not been established for these vapors. However, inhalation of low concentrations of the vapor may cause mucous membrane irritation. Inhalation of high concentrations of the vapor may cause pulmonary edema. Repeated or prolonged direct skin contact with the oil may produce skin irritation as a result of defatting. Protective measures, such as the wearing of chemically resistant gloves, to minimize contact are addressed elsewhere in this plan. Because of the relatively low vapor pressures associated with PHCs, an inhalation hazard in the outdoor environment is not likely.

☐ **Polychlorinated Biphenyls (PCBs)**. Prolonged skin contact with PCBs may cause the formation of comedones, sebaceous cysts, and/or pustules (a condition known as chloracne). PCBs are considered to be suspect carcinogens and may also cause reproductive damage.

The OSHA permissible exposure limits (PELs) for PCBs are as follows:

Compound	*PEL (8-hour time-weighted average)*
Chlorodiphenyl (42% Chlorine)	1 mg/m^3 - Skin
Chlorodiphenyl (54% Chlorine)	0.5 mg/m^3 - Skin

It should be noted that PCBs have extremely low vapor pressures (0.001 mm Hg @ 42% Chlorine and 0.00008 mm Hg @ 54% Chlorine). This makes it unlikely that any significant vapor concentration (i.e., exposures above the OSHA PEL) will be created in the ambient environment. This minimizes the potential for any health hazards to arise due to inhalation unless the source is heated or generates an airborne mist. If generated, vapor or mists above the PEL may cause irritation of the eyes, nose, and throat. The exposure limits noted above are considered low enough to prevent systemic effects but it is not known if these levels will prevent local effects. It should also be noted that both PELs carry the *Skin* notation, indicating that these compounds adversely effect or penetrate the skin. OSHA specifies that skin exposure to substances carrying this designation be prevented or reduced through the use of the appropriate personal protective equipment (PPE).

☒ **Polycyclic Aromatic Hydrocarbons (PAHs)**. Due to the relatively low vapor pressure of PAH compounds, vapor hazards at ambient temperatures are not expected to occur. However, if site conditions are dry, the generation of contaminated dusts may pose a potential inhalation hazard. Therefore, dust levels should be controlled with wetting if necessary. Repeated contact with certain PAH compounds has been associated with the development of skin cancer. Contact of PAH compounds with the skin may cause photosensitization of the skin, producing skin burns after subsequent exposure to ultraviolet radiation. Protective measures, such as the wearing of chemically resistant gloves, are appropriate when handling PAH contaminated materials.

☒ **Tetraethyl and Tetramethyl Lead**. Both compounds are used as anti-knock ingredients in gasoline. The inhalation of tetraethyl lead dusts may result in irritation of the respiratory tract. This dust, when in contact with moist skin or eye membranes, may cause itching, burning and transient redness.

The direct absorption of a sufficient quantity of tetraethyl lead, whether briefly at a high rate, or for prolonged periods at a low rate, may cause acute intoxication of the central nervous system. Mild degrees of intoxication may cause headache, anxiety, insomnia, nervous excitation and minor gastrointestinal disturbances.

☒ **Volatile Organic Compounds (VOCs)**. See BTEX compounds and Chlorinated Organic Compounds.

☐ **Waste Oil**. See Petroleum Hydrocarbons (PHCs) and Cutting Oil.

HAZARD ASSESSMENT: BIOLOGICAL HAZARDS AND RELATED CONCERNS [CAL/OSHA 8 CCR 5192]

☒ **Insects**. Insects represent significant sources (vectors) of disease transmission. Therefore, precautions to avoid or minimize potential contact should be considered prior to all field activities. Disease or harmful effects can be transmitted through bites, stings or through direct contact with insects or through ingestion of foods contaminated by certain insects. Examples of disease transmitted by insect bites include encephalitis and malaria from contaminated mosquitoes, lyme disease and spotted fever from contaminated ticks. Stinging insects, such as bees and wasps, are prevalent throughout the country, particularly during the warmer months. The stings of these insects can be painful, and cause serious allergic reactions to some individuals.

☐ **Lyme Disease**. Lyme disease is an infection caused by the bite of certain ticks, primarily deer, dog and wood ticks. The symptoms of Lyme disease usually start out as a skin rash then progress to more serious symptoms. The more serious symptoms can include lesions, headaches, arthritis and permanent damage to the neurological system. If detected early the disease can be treated successfully with antibiotics. The following steps are recommended for prevention of lyme disease and other diseases transmitted by ticks: a) Beware of tall grass, bushes, woods and other areas where ticks may live; b) Wear good shoes, long pants tucked into socks, a shirt with a snug collar, good cuffs around the wrists and tails tucked into the pants. Insect/tick repellents may also be useful; c) Carefully monitor for the presence of ticks. Carefully inspect clothes and skin when undressing. If a tick is attached to the skin, it should be removed with fine tipped tweezers. You should be alert for early symptoms over the next month or so. If you suspect that you have been bitten by a tick, you should contact a physician for medical advice.

☒ **Medical Wastes and Bloodborne Diseases**. Any field activity where exposure to medical wastes or other sources of bloodborne pathogens can be reasonably anticipated must be conducted in accordance with the OSHA (29 CFR 1910.1030) *Bloodborne Pathogens* standard. According to the OSHA definition, Bloodborne Pathogens means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include but are not limited to *hepatitis B virus (HBV) and human immunodeficiency virus (HIV)*. Wherever there is a potential for employee skin, eye, mucous membrane, or parenteral (skin or membrane piercing) contact with blood or other potentially infectious sources, *employers must develop a Written Exposure Control Plan*.

☐ **Poisonous Plants**. The possible presence of poisonous plants should be anticipated for field activities in wooded or heavily vegetated areas. *Poison ivy* is a climbing plant with alternate green to red leaves (arranged in threes) and white berries. *Poison oak* is similar to poison ivy and *sumac* but its leaves are oak-like in form. The leaves of these poisonous plants produce an irritating oil which causes an intensely itching skin rash and characteristic blister-like lesions. Contact with these plants should be avoided.

☒ **Rats, Snakes and Other Vermin**. Certain animals, particularly those that feed on garbage and other wastes, can represent significant sources (vectors) of disease transmission. Therefore, precautions to avoid or minimize potential contact with (biting) animals (such as rats) or animal waste (such as pigeon droppings) should be considered prior to all field activities. Rats, snakes and other wild animals can inflict painful bites. The bites can poisonous (as in the case of some snakes), or disease causing (as in the case of rabid animals). Avoidance of these animals is the best protection.

☐ **Waste Water and Sewage**. Sewage and waste water contaminated with raw, untreated sewage can represent significant sources of bacterial, viral or fungal contamination. Adverse effects, due to contact, can range from mild skin reactions or rashes to life threatening diseases. Diseases are easily transmitted by accidental ingestion or through skin contact, particularly if the skin is broken. Avoidance of direct contact and good personal hygiene are the best protection from these hazards.

Cal/OSHA Forms
Injury and Illness Incident Report

This *Injury and Illness Incident Report* (Form 301) is one of the first forms you must fill out when a recordable work related injury 929 CFR 1904.7(b)(1) - death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, loss of conscious, injury or illness diagnosed by a physician or other licensed health professional0 has occurred. Together with accompanying *Annual Summary* (Form 300 and 300A) these forms help the employer and Cal/OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the instructions and information asked for on this form.

According to CCR Title 8 Section 14300.33 Cal/OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes. See CCR Title 8 14300.29(b)(6) to (10).

Appendix A: CAL/OSHA Form 301

Information about the employee		
Full name:		
Address:		
Date of birth:		
Date hired:		
	Male: ☐	Female: ☐

Information about the physician or other health care professional		
Name of physician or other health care professional		
If treatment was given away from the worksite, where was it given?		
Facility:		
Address:		
Was employee treated in an emergency room?	Yes: ☐	No: ☐
Was employee hospitalized overnight as an in-patient?	Yes: ☐	No: ☐

Information about the case		
Case number from the log *(Transfer the case number from the Log after you record the case.)*		
Date of injury or illness:		
Time employee began work:	AM:	PM:
Time of event:	AM:	PM:
Check if time cannot be determined:		

What was the employee doing just before the incident occurred?

Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific.

Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."

What happened? **Tell us how the injury occurred.** *Examples:* "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."
What was the injury or illness? **Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore."** *Examples:* "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."
What object or substance directly harmed the employee? *Examples:* "concrete floor"; "chlorine"; "radial arm saw."
If the employee died, when did death occur? Date of death:

Completed By (Full Name):	
Title:	
Phone:	
Date:	

Appendix B: AEI Incident Evaluation Form

Discuss the cause of the incident and future preventative measures	
Why did the accident occur (Root cause)?	
How can we avoid this from happening again (Solution)?	
Date of Implementation:	
Approved By: (Name and Title)	

Appendix C: Site Inspection Log

PROJECT NAME:	**LOCATION:**
PROJECT NUMBER:	**DATE:**
PROJECT MANAGER:	**COMPLETED BY:**

SITE DESCRIPTION AND NATURE OF WORK:

HAZARD COMMUNICATION
[ ] Chemical hazards identified
[ ] All containers properly labeled
[ ] MSDS/workplace notebook on site
[ ] Site safety briefing completed and documented

ACCIDENTS/EMERGENCY INFO
[ ] First aid personnel identified
[ ] Hospital location identified-
[ ] Police/Fire/Ambulance phone numbers available
[ ] Incident investigation forms available
[ ] Fire extinguisher present

SANITATION
[ ] Washing facilities available
[ ] Toilet facilities available
[ ] Approved trash receptacle available
[ ] Water/refreshments available

STORAGE
[ ] Tools/Drill tooling/supplies safely stacked to prevent rolling or collapse
[ ] Work areas and passage ways kept clear

HOUSEKEEPING
[ ] Work areas clean and orderly
[ ] Storage areas clean and orderly
[ ] Combustible scrap/debris removed regularly
[ ] Waste containers of flammable or toxic materials covered

OVERHEAD HAZARDS
[ ] 15^{ft} minimum clearance maintained
[ ] All sources of falling objects/swinging loads/ rotating equipment identified
[ ] Barriers or other methods in place to prevent injury due to overhead hazards

POSTING
[ ] Emergency phone/contact info posted
[ ] OSHA poster displayed

UNDERGROUND HAZARDS
[ ] All underground hazards identified and communicated to workers on site
[ ] Utility/USA clearance confirmed
[ ] Clearance dates: ________________
[ ] Clearance ID#: __________________

EXCAVATIONS and TRENCHES
[ ] All personnel and storage at least 2^{ft} from top edge of excavation
[ ] Ladder in place
[ ] Guarding/barriers in place

VEHICULAR TRAFFIC
[ ] All vehicular traffic routes which could impact worker safety identified and communicated
[ ] Barriers or other methods established to prevent injury from moving vehicles

PEDESTRIAN TRAFFIC/SITE CONTROL
[ ] All walkways which could be impacted by site activities identified and communicated
[ ] Barriers or other methods established to prevent pedestrian injury from site activities

ENVIRONMENTAL HAZARDS
[ ] Poisonous plants, stinging or biting insects, vermin, sewage, etc. identified and communicated

COMMENTS/OTHER HAZARDS__________________________________
____
____
____
____
____
____
____

√ = OK *NA = Not Applicable*

Appendix D: Health and Safety Briefing/Site Orientation Record

This is to verify that I, the undersigned, have been provided with a site (orientation) briefing regarding the safety and health considerations at 4778 Broadway, New York, New York 10034. I agree to abide by my employer's site-specific safety and health plan and other safety or health requirements applicable to the site.

NAME (PRINT)	SIGNATURE	COMPANY	DATE

Site (orientation) Briefing Conducted By: ________________________________ Date: ____________________

Appendix E: Subcontractor's Statement of Understanding Regarding Health and Safety Responsibilities

Project Name: M4778 Broadway LLC   Project Number: 384736

In accordance with generally accepted practices, each Subcontractor engaged by AEI is responsible for all matters relating to the health and safety of its personnel and equipment in performance of the work. This includes recognition of the potential health and safety hazards associated with the work. AEI will establish a health and safety plan or program (HASP) applicable to its own employees and its own activities on site. AEI will make its HASP available to each subcontractor for informational purposes only. Each subcontractor must establish a HASP applicable to its own employees and its own activities on site.

Subcontractors who use AEI's HASP as a model for their own HASP are responsible for determining its adequacy and applicability to its own employees and its own activities on site. Subcontractors must establish their own HASP applicable to subcontractor employees and/or activities, even if modeled after AEI's HASP and deliver this HASP in clear written form to AEI prior to the initiation of on-site activities. Submittal of the subcontractor's HASP to AEI will be for informational purposes only. Review of the subcontractor's HASP by AEI shall in no way constitute approval or endorsement by AEI of the subcontractor's HASP. It is understood that protective measures specified in the Subcontractor's HASP are minimum requirements for the work.

Subcontractor warrants that all its employees that are permitted to engage in operations that could expose them to hazardous wastes, hazardous substances, or safety or health hazards have obtained the necessary health and safety training and medical surveillance as specified in the applicable provisions of OSHA

1926.59 Hazard Communication;
1926.52 Occupational Noise Exposure;
1926.103 Respiratory Protection;
1926.65 Hazardous Waste Operations and Emergency Response;

as well as any other applicable portion of the OSHA General Industry (29 CFR 1910) and Construction Industry (29 CFR 1926) Standards. Subcontractor shall provide AEI with evidence of the necessary certification before beginning hazardous waste work subject to OSHA 1926.65 on the project site.

Should AEI become aware of subcontractor activities on site which appear to violate OSHA or other applicable safety regulations or otherwise pose an immediate and serious threat to the safety of AEI employees, subcontractor employees, other individuals on site, or members of the public, AEI may notify the subcontractor verbally and/or in writing regarding the need for corrective action. Failure to comply with either general safety practices or health and safety practices as described above may be grounds for breach and prompt contract termination. The safety requirements of the work as described above apply without regard to time, place, or presence of an AEI representative.

THE PRESENCE OF AEI PERSONNEL ON THE SITE CARRYING OUT PROFESSIONAL ACTIVITIES DOES NOT MEAN THAT AEI UNDERTAKES TO OVERSEE THE SUBCONTRACTOR'S COMPLIANCE RESPONSIBILITIES.

The undersigned agrees that he is authorized to execute this statement of understanding on behalf of their firm:

Firm: ____

Name (Print): ______________________________ Title: ________________

Signature: ______________________________ Date: ________________

MISCELLANEOUS SITE CONTROL PROCEDURES

PLAN SIGN-OFF

(Please sign and date. See page 5 for Plan Acknowledgement and Approvals scope.)

SSO/CP:______________________ SS/PM:______________________

H&S Representative:____________________

Attach additional information as required

APPENDIX F

QUALITY ASSURANCE PROJECT PLAN

AEI Consultants

QUALITY ASSURANCE PROJECT PLAN

Property Identification:
M4778 Broadway LLC
4778 Broadway
Manhattan, New York County, New York 10034

BCP Site No. C231131
AEI Project No. 384736
NYSDEC Spill Case #1700751

December 2020

Prepared for:
M4778 Broadway LLC
C/O Joy Construction Corporation
40 Fulton Street, 21st Floor
New York, New York 10038

Prepared by:
AEI Consultants
20 Gibson Place, Suite 310
Freehold, New Jersey 07728
(732) 414-2720

TABLE OF CONTENTS

Introduction

The Quality Assurance Project Plan (QAPP) was prepared by All Environmental Inc (AEI) with oversight by HCS Civil & Environmental Engineering, LLC for the M4778 Broadway LLC site, at the property located at 4778 Broadway, Manhattan, New York County, New York 10034, the "Site".

The purpose of this QAPP is to ensure that scientific data are acquired according to established methods and procedures designed to obtain results that are objective, true, repeatable, and of known accuracy. Specifically, this QAPP provides guidance and specifications to ensure that RI activities are planned and executed in a manner consistent with the Quality Assurance Objectives (QAO's) stated below:

- Field determinations and analytical results are valid through adherence to New York State Department of Environmental Conservation (NYSDEC) field procedures, NYSDEC-approved analytical protocols, and calibration and preventive maintenance of equipment;
- Samples are identified and controlled through sample tracking systems and chain of custody procedures;
- Records are retained as documentary evidence of field activities and observations;
- Samples are collected, and analytical data are validated in accordance with the NYSDEC requirements; and
- Evaluations of the data are accurate, appropriate, and consistent throughout the project

The contents of this QAPP are based on the NYSDEC requirements as stated in the EPA Requirements for Quality Assurance Project Plans (QA/R-5) (May 2006). This QAPP includes the following components:

- Problem Definition/Background;
- Project/Task Description;
- Project/Task Organization;
- Data Quality Objectives and Criteria for Measurement Data;
- Historical and Secondary Information/Data;
- Investigative Process Design;
- Field Instrumentation/Equipment Calibration and Frequency;
- Inspection/Acceptance of Supplies and Consumables;
- Sample Handling and Custody Requirements;
- Field Storage and Transport Procedures;
- Sample Containers, Preservation, and Holding Times;
- Analytical Methods Summary Table;
- Project Compounds and Analytical Summary;
- Analytical Quality Control;
- Laboratory Deliverables;
- Data and Records Management;
- Data Verification and Usability; and
- Corrective Action Processes.

As specific conditions and additional information warrant, this QAPP will be amended or revised to include site-specific quality assurance/quality control procedures.

1. Project Definition / Background

A commercial gasoline filling and/or service station formerly operated at 4778 Broadway, New York, New York (the Site). The Site is defined on the New York City Department of Finance records as Block 2233, Lot 10.

The Site was most recently occupied by an automobile laundry/car wash from approximately 1988 to 2017. Based on a review of historical sources, the Site was developed with a gasoline filling and/or service station from as early as 1921 until 1988. During this time span, multiple generations of tanks were likely installed on the Site. Three (3) gasoline tanks were labeled on Sanborn maps from 1935 and 1951 and according to state agency and regulatory records, additional tanks were installed in 1951 during the redevelopment of the Site.

A Phase II was conducted at the Site in March/April 2017 for the previous owner. The results of this investigation indicated that a release of gasoline has impacted soil, groundwater, and soil vapor at the Site. Based on this information, the NYSDEC was notified of the release on April 24, 2017, and NYSDEC Spill #1700751 was issued.

After the March/April 2017 Phase II, the former Site owner and AEI were notified by the NYSDEC that a Remedial Investigation (RI) would be required to delineate and characterize the magnitude and extent of the soil and groundwater impacts at the Site.

In July of 2017, a RI including the installation of eight (8) additional boring locations for soil and temporary well point groundwater samples was conducted. Following the completion of the soil and temporary well point sampling, three (3) permanent groundwater monitoring wells were installed and sampled on the Site in late July and early August of 2017. Based on the findings presented in an October 2017 Remedial Investigation Report, the NYSDEC determined the onsite contamination was adequately characterized and they requested that a Remedial Action Work Plan be submitted.

The current owner, M4778 Broadway LLC, purchased the Site in June 2018, and has since entered into the NYSDEC BCP. Following entry into the Brownfield Cleanup Program and approval of the November 2019 Remedial Investigation Work Plan (RIWP) by NYSDEC and public review period, AEI mobilized to the Site in February 2020 to complete the BCP Remedial Investigation. RI field work was conducted at the Site on February 10-13th and February 25th, 2020.

The following work was completed during the RI:

- Twenty-eight (28) soil samples were collected from various depths at the seven (7) borings;
- Eighteen (18) soil vapor samples were collected, including nine (9) shallow soil vapor (3-5 feet bgs) and nine (9) deep soil vapor (collected from 12' bgs, or between one and two feet above the groundwater interface);

- Five (5) groundwater samples were collected from the two new monitoring wells and the three original monitoring wells;
- A geophysical survey conducted during the RI identified as many as nine (9) USTs onsite in the area of the former gasoline filling station.

The soil recovered in the borings advanced during the RI generally consisted of grey to brown silt and reddish-brown silty sand with weathered gravel. Refusal was generally encountered due to the presence of weathered bedrock at approximately 20 feet bgs. Based on the monitoring well survey conducted at the Site, it is evident that weathered bedrock is present at approximately 4-10 feet AMSL. Published geologic information indicates that the site is underlain by bedrock of the Inwood Marble Formation interlayered with Fordham Gneiss Formations. The Inwood Marble Formation consists of dolomitic marble and the Fordham Gneiss Formation consists of gneiss and schist.

The results of the soil sampling completed during the BCP RI indicated that Benzene, Toluene, Ethylbenzene, Xylene (BTEX), and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC Residential Restricted Use Soil Cleanup Objective (RRUSCO) and/or Protection of Groundwater Soil Cleanup Objective (PGWSCO) at various depths in boring locations on the north and northwestern portion of the Site. PAHs were also detected in a shallow soil sample at the Site at concentrations exceeding applicable SCOs; however, the presence of these compounds is likely the result of fill material present in the subsurface. No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the soil samples at concentrations exceeding the applicable NYSDEC RRUSCOs or PGWSCOs.

The results of the soil vapor sampling completed during the BCP RI indicate that significant soil vapor concentrations of gasoline related compounds including BTEX were detected in soil vapor sample SGS-9D, located on the northern portion of the Site.

The results of the groundwater sampling completed during the BCP RI indicate that BTEX and other petroleum-related VOCs are present at concentrations in exceedance of the applicable NYSDEC AWQS in the monitoring wells MW-1, MW-2, MW-3, MW-5 onsite. The highest concentrations of petroleum-related VOCs were detected in monitoring wells, MW-2 and MW-5, located on the north and northwestern portion of the Site in the area of the former gasoline filling station. No VOCs were detected in MW-4 located on the southern portion of the Site.

SVOCs 2,4-Dimethylphenol, Phenol, and Naphthalene, and dissolved and total metals Arsenic, Barium, Iron, Magnesium, Manganese, Sodium, and Thallium were also detected in groundwater samples at the Site at concentrations exceeding their applicable NYSDEC AWQS.

Additionally, individual PFOA and PFOS concentrations, other individual PFAS concentrations, and combined PFAS concentrations exceeded the screening levels outlined in the Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (January 2020). The highest concentrations of PFAS compounds were detected in groundwater samples from monitoring wells MW-2, MW-3, and MW-5, located on the north and northwestern portions of the Site. Based on this information, it is possible that the former onsite car wash operations and use of car-wash solutions/surfactants may have resulted in onsite PFAS groundwater impacts.

No other significant VOCs, SVOCs, PCBs, Metals, Pesticides, Herbicides, 1,4-Dioxane, or PFAS were detected in any of the groundwater samples at concentrations exceeding the applicable NYSDEC AWQS or guidance levels.

Based upon the investigations conducted to date, the primary contaminants of concern for the Site are gasoline related Volatile Organic Compounds (VOCs). The overall project goal and objective of the current RAWP is to remediate the Site as follows:

Soil remediation via excavation and in-situ chemical oxidation of soil exceeding the NYSDEC Restricted Residential Soil Cleanup Objective is planned in an effort to 1) Prevent ingestion/direct contact with contaminated soil, 2) Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil, and 3) Prevent migration of contaminants that would result in groundwater contamination.

Groundwater remediation via source soil removal and EFR dewatering from collection sumps in an effort to 1) Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater, 2) Remove the source of groundwater contamination, 3) Bulk reduction in groundwater contamination to asymptotic levels.

Soil vapor remediation via a vapor barrier and SSDS is being implemented in order to 1) Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the Site.

Post-remedial sampling data shall be used to determine if soil, groundwater, and soil vapor remedial activities were successful. These decisions shall be made following receipt of all analytical data associated with the investigation. Data users for the project include the person responsible for conducting the remediation, the environmental consultant, the Professional Engineer (PE), and ultimately the NYSDEC and NYSDOH.

These findings will be summarized in a Final Engineering Report (FER) that will be submitted to the NYSDEC for review and approval. Institutional, engineering controls, and a site management plan will also be developed for the Site to limit potential exposure pathways on a long-term basis.

2. Project Summary

The work that is planned to be conducted includes remediation of soil, groundwater, and soil vapor.

All of the data shall be collected through soil, groundwater, soil vapor and indoor air sampling and laboratory analysis. No data shall be collected from other sources.

The sample results shall be compared to the applicable NYSDEC the Restricted Residential Use Soil Cleanup Objectives (RRUSCOs) and the Protection of Groundwater SCOs (PGWSCOs) for soil and the NYSDEC Ambient Water Quality Standards (AWQSs) for groundwater, the Guidance for Evaluating Soil Vapor Intrusion in the State of New York, with updates (New York State SVI Guidance) for soil vapor, and a conclusion shall be made, based on the comparison, as to whether contamination exists that requires further investigation/delineation or if no further investigation is required, and remedial action can be commenced.

The anticipated project schedule from initiation to final report is included as Section 12 of the RAWP. The applicable regulatory quality standards are: RRUSCOs and PGWSCOs for soil, the NYSDEC AWQSs for groundwater, and the sub-slab vapor matrices as outlined in the New York State SVI Guidance for soil vapor.

3. Project / Task Organization

Project Team

- All remedial phases of work for this project are under the direction of the certifying remedial engineer and Senior Project Manager, Mr. Philip Clark, P.E., of HCS Civil & Environmental Engineering, LLC.
- The NYSDEC Project Manager (Mr. Steven Wu) will be responsible for reviewing and approving this work plan, coordinating approval of requested modifications, and providing guidance on regulatory requirements.
- AEI Quality Assurance Officer (Jack M. Katz, Ph.D.) will confirm the quality of work associated with the project is in accordance with all project plans.
- AEI Project Manager (Anthony Cauterucci) will be responsible for the day-to-day project management, task leadership, and project engineering support and for the planning and implementation of RA activities. The Project Manager is responsible for ensuring that the requirements of this RAWP are implemented. The project manager will also act as the Site Health and Safety Manager (HSM).
- AEI Field Team Leader (Joseph Maggiulli) will be responsible for sample collection, oversight of subcontractor personnel, and coordination of daily field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan.
- A NYSDOH ELAP certified laboratory (Alpha Analytical Laboratories of Westborough, Massachusetts ELAP ID 11148 and 11627) will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B

Deliverables, which will allow for data validation.

- An independent third-party data validator (Ms. Jeri Rossi) will be contracted to perform data validation and prepare a Data Usability Summary Report (DUSR).
- The General Contractor, Joy Construction, along with subcontractors will perform remedial work at the direction of the Field Team Leader in accordance with this work plan.

Resumes for the project team are included as Appendix H of this RAWP.

Special Training Needs/Certification

Training needs and certifications of field oversight include requirements to have completed the OSHA 40- Hour training with annual 8-hour refresher training in accordance with 29 CFR 1910.120 (Hazardous waste operations and emergency response).

4. Data Quality Objectives and Criteria for Measurement Data

Data quality objectives ("DQOs") are qualitative and quantitative statements that are developed in the first six (6) steps of the DQO process. DQOs define the purpose of the data collection effort, clarify what the data should represent to satisfy this purpose, and specify the performance requirements for the quality of information to be obtained from the data.

The development of the data quality criteria can be developed through the formal DQO process described in the EPA document titled "Guidance for the Data Quality Objectives Process", EPA/600/R-96/055. For most projects, however, a less iterative process is normally used to develop the project-specific DQOs.

Data of Known Quality Protocols ("DKQP") describe specific laboratory quality assurance and quality control procedures which, if followed, will provide data of known and documented quality (i.e. scientific reproducible and reliable data). When data of known quality ("DKQ") is obtained, an evaluation of the data with respect to its intended purpose can be made. To this end, a NY-certified laboratory must be used to analyze samples whenever possible.

Typical DQOs are often expressed in terms of data quality indicators ("DQIs") including precision, accuracy, representativeness, comparability, completeness and sensitivity (also known as the "PARCCS" parameters). These measures of performance are discussed in detail below.

Precision

Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar testing conditions. The investigator will determine the precision of the data by:

- Using the same analytical methods to perform repeated analyses on the same sample (laboratory or matrix duplicates);
- Collection of a field duplicate and submittal of both to evaluate the precision from sample collection, for sample handling, preservation and storage and

analytical measurements

Precision for laboratory and field measurements can be expressed as the relative percent difference ("RPD") between two duplicate determinations or percent relative standard deviation ("%RSD") between multiple determinations.

Acceptance criteria for field precision shall be assessed through the splitting of a sample in the field and submitting both to the laboratory. Field duplicates will be collected at a frequency of one (1) per twenty (20) investigative samples per matrix per analytical parameter. Precision will be measured through the calculation of RPD. The resulting information will be used to assess sample homogeneity, spatial variability at the site, sample collection reproducibility, and analytical variability.

Accuracy

Accuracy is the degree of agreement of a measured value and an accepted reference or true value. The difference between the measured value and the reference or true value includes components of both systematic error (bias) and random error (precision). It should be noted that precise data may not be accurate data. Accuracy can be expressed as a percent recovery or percent deviation of the measurement with respect to its known or true value.

The accuracy will be determined through establishing acceptance criteria for spike recoveries (e.g., surrogate recoveries, laboratory control sample recoveries, matrix spike recoveries, reference material recoveries etc.) or allowable deviations for calibration (e.g., % RPD for calibration verification). Acceptance criteria for matrix spike measurements are expressed as a percent recovery and are usually specified in the analytical method (or laboratory SOP, as applicable). Various blank samples (laboratory or field) may also be used to assess contamination of samples that may bias results high. Accuracy in the field shall be assessed through the adherence to sample collection, handling, preservation, and holding time requirements.

Representativeness

Representativeness is a qualitative measurement that describes the extent to which analytical data represent the site conditions. In almost every project, the investigator will not be able to measure the whole system, process, or situation of interest. Instead, the investigator will choose sample locations, quantities, and analyses in order to capture a sufficiently broad and/or weighted view of the situation.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times. Following the detailed requirements outlined in the EPA methods and the laboratory SOPs will maximize the representativeness of the laboratory data.

Comparability

Comparability is a qualitative term that expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Comparability is defined as the extent to which data from one data set can be compared directly to similar or related data sets and/or decision-making standards.

Historical data should be evaluated to determine whether they may be combined with data being collected in present time. Comparability should discuss comparisons of sample collection and handling methods, sample preparation, and analytical procedures, holding times, stability issues and QA protocol.

Comparability in the laboratory is dependent on the use of recognized methods and approved laboratory SOPs. Comparability in the field is dependent upon adherence to the sampling methodology and that the proper preservation techniques are used.

Completeness

Completeness is a measure of the amount of usable data collected compared to the amount of data expected to be obtained. Three measures of completeness are defined as:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Sensitivity

Sensitivity refers to the ability of an analytical procedure to quantify an analyte at a given concentration. The sensitivity requirements should be established such that the laboratory method Reporting Limits ("RLs") are at or below the relevant and applicable regulatory limits for each Contaminant of Concern ("COC") for the project. For the purpose of this project:

- The RL for a specific substance when determining the extent and degree of polluted soil from a release. For the purpose of this document, the RL is defined as:
  - Organics, the lowest initial calibration standard as adjusted for the dilution factor, sample weight/volume, and moisture content;
  - Inorganics, the concentration of that analyte in the lowest level check standard (which could be the lowest calibration standard in a multi-point calibration curve).

Methods for analysis have been chosen to meet the sensitivity requirements for a project (e.g., compound- specific and matrix-specific). If however, the laboratory RLs exceed the project sensitivity requirements (i.e., the RL is above the relevant and applicable regulatory standard), the analytical methods may need to be adjusted (e.g., analysis conducted using a more sensitive method or sample preparation and analysis features adjusted to gain sensitivity) and/or the project objectives may need to be adjusted (i.e., certain COCs may not be able to be screened out during this phase of the evaluation).

Due to the low regulatory limits, it will be ensured that laboratory reporting limits for PFAS in groundwater and soil are to be 2 nanograms per liter (ng/L) (ppt) and 1 microgram per kilogram (ug/kg) (ppb), respectively.

The method detection limit for 1,4-dioxane in groundwater and soil will not exceed 0.35 micrograms per liter (ug/L) and 0.1 milligram per kilogram (mg/kg) in soil.

5. Historical and Secondary Information / Data

The potential sources of data for any project include both historical data (i.e., data not collected by the current investigator) and secondary data (i.e., data that were collected for a different purpose than that for which they are now being used). Historical data should be evaluated for applicability to current project objectives. Secondary data should be assessed to determine if the quality of the data is sufficient for the current project objectives and meets comparability criteria (it is not sufficient that the secondary data were produced by a reliable source or a known environmental monitoring project with an approved QAPP).

Historical data and secondary data are not known to exist in association with the media being investigated at the current Site.

6. Investigation Process Design

A description and justification of the investigation design should include, for each area of interest:

- The COCs or other parameters of interest
- The number of anticipated investigation points and how and why they will be selected including a site map depicting proposed sample locations
- Method of obtaining/determining locational information (such as the use of GPS instrumentation)
- Factors which could affect the variability of the data such as physical obstructions, seasonal variations, tidal influences, soil profile changes, weather-related variation, and process variation within the source
- Design basis (i.e., probability based or judgment based)
- Results comparison (i.e., versus previous data, regulatory standards, reference population, etc.) Matrices to be monitored including any special sampling requirements
- Monitoring frequency (if applicable)
- Heterogeneity or homogeneity of the matrix
- Appropriateness of composite samples
- Required quality control samples

The investigative process design is based generally on the following:

- NYSDEC DER-10 / Technical Guidance for Site Investigation and Remediation
- Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006) with updates

7. Field Quality Control

Field quality control activities, along with their frequency, acceptance criteria, and corrective actions to be taken are provided for each DQI in the following tables.

Analyte(s)	DQI	Data Quality Element	Frequency of Collection	Acceptance Criteria	Corrective Action(s)
-VOCs+TICs per Method 8260C -SVOCs+TICs by Method 8270D	Sensitivity	Samples reported to RL	For each target analyte	Analyte specific	Qualify sample data
-VOCs+TICs per Method 8260C -SVOCs+TICs by Method 8270D	Accuracy	Laboratory Control Samples (LCS)	One (1) per preparatory batch of 20 samples	Analyte specific	Reanalyze all samples in the batch
-VOCs+TICs per Method 8260C -SVOCs+TICs by Method 8270D	Precision	Laboratory Duplicates	One (1) per preparatory batch of 20 samples	RPD≤ 25%	Qualify sample data
-VOCs+TICs per Method 8260C -SVOCs+TICs by Method 8270D	Accuracy	Method Blanks	One (1) per preparatory batch of 20 samples	No target analytes concentrations ≥ RL	Investigate the source of contamination and document and reanalyze all samples processed
-VOCs per Method TO-15	Accuracy and precision	Leak Check	Every soil vapor/indoor air sample	<10% helium in sample probe	Purge tubing and reseal annular space at surface

* Target Compound List (TCL) VOCs, including Tentatively Identified Compounds (TICs); Semi-volatile organic compounds.

Equipment to be decontaminated during the project may include tools, monitoring equipment, and sample collection equipment.

Contaminated tools and sampling equipment will be dropped into a plastic pail, tub or other container. The tools will be brushed off, rinsed, and transferred into a second pail to be carried to further decontamination stations where they will be washed with detergent and water solution, rinsed with clean potable water, and finally rinsed with deionized water.

Any direct or obvious contamination on monitoring equipment will be brushed or wiped with a disposable paper wipe. The units will then be wiped off with damp disposable wipes and dried. The units will be checked, standardized, and recharged, as necessary, for the next day's operation. They will then be prepared with new protective coverings.

Sample containers will be wiped clean at the sample site, taken to the decontamination area to be further cleaned, as necessary, and transferred to a clean carrier. The samples will be checked off against the COC record. The samples will then be stored on ice in a secure area prior to shipment. Sample handling areas will be cleaned/wiped down daily using disposable wipes. Disposable wipes will not be used on any equipment that comes in contact with samples. For final cleanup, all equipment will be disassembled and decontaminated. Any equipment which cannot be satisfactorily decontaminated will be disposed (e.g., glassware, covers for surfaces).

Analysis of an equipment/field blank sample shall be conducted for the COCs being remediated and sampled that day with that equipment.

8. Sampling Methods and Techniques

Post-Excavation Endpoint Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Confirmation samples will be collected from the base of the excavation, at locations to be determined by NYSDEC. To evaluate attainment of Track 2 SCOs, analytes will include those for which SCOs have been developed, including VOCs and SVOCs, according to the analytical methods described above. End point sampling frequency will be conducted per requirements of NYSDEC DER 10 Section 5.4; one sample from the bottom of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area. Based on the anticipated size of the Site excavation (12,000 square feet), 14 post-excavation bottom soil samples are planned to be collected and based on the dimensions of the Site (160' by 75'), 16 post-excavation sidewall samples are planned to be collected, for a total of 30 post-excavation samples. All field work will be recorded in a field log book.

Each soil sample will be a direct grab sample from a 6-inch interval and will be transferred into laboratory supplied glassware and placed into a cooler with ice.

Analysis will be performed for VOCs+TICs, SVOCs+TICs. The sample results shall be compared to the applicable NYSDEC Restricted Residential and Protection of Groundwater SCOs, with the goal of remediating to the RRUSCOs.

The following NYSDEC special precautions for trace contaminant sampling will also be utilized based on review of Section 5.2.9 of the NYSDEC's Sampling Guidelines and Protocols (NYSDEC, 1992):

- A clean pair of new, disposable nitrile gloves will be worn each time a different point or location is sampled
- Sample containers shall be placed into separate re-sealable polyethylene plastic bags immediately after collection and labeling.

All soil samples will be collected in laboratory supplied sample bottles in accordance with protocols for analysis shown in the table above. Appropriate QA/QC samples will be collected for the soil sampling event including one trip blank, one field duplicate sample, one matrix spike sample, and one matrix spike duplicate sample will be collected at a frequency of 1 per day. After sample collection, the groundwater samples will be placed in an ice-filled shipping cooler and transported under chain-of-custody to a NY-certified analytical laboratory.

Monitoring Well Installation

There are currently five (5) permanent groundwater monitoring wells present on-Site. The five (5) existing groundwater monitoring wells onsite will be completely excavated during remediation and development of the Site. New monitoring wells will be installed within the basement level of the planned building in similar locations to the current monitoring well network for use in post-remedial monitoring.

The replacement permanent groundwater monitoring wells will be installed to the surface of the bedrock underlying the Site (approximately 20 feet bgs). A minimum 5-foot long section of PVC screen will be set at the base of the well, and the well extended to basement slab using solid-walled PVC casing. A silica sand pack will be placed a minimum of one foot above the top of the well screen, using media appropriately sized based on Site-specific geologic conditions (tentatively 0.010-slot screen and 20-40 silica sand).

The annular space of the wells will be sealed to ground surface using cement-bentonite grout. The top of the wells installed will be finished with a lockable, water-tight cap and flush-mount steel cover. The newly installed monitoring wells will be developed by purging and/or pumping the water in the well to loosen and remove suspended fines. Measurements of the water volume removed and water quality parameters including temperature, pH, conductivity, and turbidity will be recorded at regular intervals throughout the development process. Development will continue until the NYSDEC standard of 50 Nephelometric Turbidity Unit (NTU) is measured with a nephelometer and water is visibly free of sediment. The top of the PVC casing for each new well will be surveyed by a NY-licensed surveyor and depth to groundwater measurements will be recorded in each well. The wells will be sampled as described below.

Groundwater Sampling and Testing

Groundwater sampling will be conducted as per the groundwater guidance in DER-10 Section 3.7.2. It is expected that performance of post excavation groundwater monitoring from five (5) shallow-zone groundwater monitoring wells for a minimum of eight (8) quarters will be conducted. Prior to collecting each groundwater sample, the well will be gauged for groundwater depth/NAPL using a decontaminated oil-water interface probe. The groundwater samples will be collected from each well with low-flow sampling techniques using dedicated non-teflon lined high density polyethylene (HDPE) and silicon tubing and a peristaltic pump to purge and collect samples for laboratory analysis. During purging, groundwater field parameters including pH, specific conductivity, temperature, turbidity, and dissolved oxygen will be measured using a calibrated water quality meter equipped with a flow-through cell. Depending on the yield of the well, a minimum of three well volumes will be removed prior to sample collection. Analytical samples will be collected when water quality parameter measurements have stabilized. Each well will be sampled for analysis listed in the table above.

The following NYSDEC special precautions for trace contaminant sampling will also be utilized based on review of Section 5.2.9 of the NYSDEC's Sampling Guidelines and Protocols (NYSDEC, 1992):

- A clean pair of new, disposable nitrile gloves will be worn each time a different point or location is sampled
- Sample containers shall be placed into separate re-sealable polyethylene plastic bags immediately after collection and labeling.

All groundwater samples will be collected in laboratory supplied sample bottles in accordance with protocols for analysis shown in the table above. Appropriate QA/QC samples will be collected for the groundwater sampling event including the following: duplicate, MS/MSD samples will be collected with a frequency of 1 in every 20 samples, and trip blanks will be collected for VOCs at a frequency of 1 per cooler. After sample collection, the groundwater samples will be placed in an ice-filled shipping cooler and transported under chain-of-custody to a NY-certified analytical laboratory.

Indoor Air Sampling

Following completion of the development of the proposed building and prior to occupancy of the building, performance of post-development indoor air sampling to ensure the effectiveness of the vapor barrier and SSDS in eliminating vapor intrusion into the onsite building will be conducted.

The indoor air samples will be analyzed for VOCs using EPA method TO-15. The number and frequency of indoor air sample collection will be determined by NYSDEC and NYSDOH following the completion of the development of the proposed building and sampling results will be submitted to NYSDEC and NYSDOH

9. Field Instrumentation / Equipment Calibration and Frequency

Field instrumentation/equipment that will require calibration includes a photo ionization detector (PID), a peristaltic pump, a U-50 Multiparameter Water Quality Meter and flow through cell, a helium detector, and flow regulators for Summa canisters. Calibration of PID will be conducted using isobutylene gas at the beginning at each day of field work. The U-50 Multiparameter Water Quality Meter calibration record will be provided by Pine Environmental Services, Inc. upon request. Alpha Laboratory will provide all calibration records on the flow regulators upon request.

10. Inspection / Acceptance of Supplies and Consumables

Critical supplies or consumables are planned for use in soil, groundwater, and indoor air sampling events. All consumables must be unused and dedicated specifically to this project.

The soil and groundwater samples will be collected into laboratory-supplied bottleware. The indoor air samples will be collected into laboratory-supplied Summa canisters. Summa canisters shall be batch certified as clean from the laboratory.

11. Sample Handling and Custody Requirements

Sample containers will be wiped clean at the sample site, taken to the decontamination area to be further cleaned, as necessary, and transferred to a clean carrier. The samples will be checked off against the chain of custody (COC) record. The samples will then be stored on ice in a secure area prior to shipment. At the time samples are obtained, the following must be recorded by the sampler in the field logbook and/or on sample data sheets:

- Sample location
- Sample type
- Date and time of sampling
- Project and sample designations
- Sample identification
- Analyses requested

Sample handling areas will be cleaned/wiped down daily using disposable wipes. Disposable wipes will not be used on any equipment that comes in contact with samples. For final cleanup, all equipment will be disassembled and decontaminated. Any equipment which cannot be satisfactorily decontaminated will be disposed (e.g., glassware, covers for surfaces). Samples shall be maintained on-site for no more than two (2) consecutive days and shall be delivered to the laboratory within one (1) day of shipment from the field.

The following COC protocol will be followed by the sampling crews:

- Documenting procedures and reagents added to the sample during sample preservation
- Recording sampling locations, sample bottle identification, and specific sample collection procedures on the appropriate forms
- Using sample labels that contain all information necessary for effective sample tracking
- Completing standard field data records to establish analytical sample custody in the field before sample shipment.

Prepared labels are normally developed for each sample to be collected. Each label is numbered to correspond with the appropriate sample(s) to be collected.

The COC record is used to document sample-handling information (i.e., sample location, sample identification, and number of containers corresponding to each sample number). The following information is recorded on the COC record:

- Project reference
- The site location code, sample identification number, date of collection, time of collection, sample bottle number, preservation, and sample type, number of containers, sample matrix
- The names of the sampler(s) and the person shipping the samples
- Serial number of custody seals and shipping cases (if applicable)
- The date and time that the samples were delivered for shipping
- Analyses required

• The names of those responsible for receiving the samples at the laboratory.

COC Forms may be obtained from the subcontractor laboratory or from AEI. A copy of the COC is sent with the analytical samples to the laboratory; another is kept by the sample crew leader and maintained in the project file. When this shipment is received by the laboratory, the COC is signed by the laboratory and returned with the test results as part of the data package submittal.

12. Field Storage and Transport Procedures

Samples shall remain in direct sight and in the custody of field personnel at all times until transfer to the laboratory.

13. Sample Containers, Preservation, and Holding Times

Sample containers, preservation, and holding times are specified on Table 1.

14. Analytical Methods Summary Table

Analytical methods are summarized on Table 1.

15. Project Compounds and Analytical Summary

Volatile organic compounds (VOCs), specifically benzene, toluene, ethylbenzene, and xylene are the COCs for the soil, groundwater, soil vapor, and indoor air at the Site. The project action limits are the NYSDEC RRUSCOs and NYSDEC PGWSCOs for soil and the NYSDEC AWQSs for groundwater. Soil vapor concentrations will be evaluated to determine if there is a likelihood for future indoor air levels of petroleum compounds to exceed typical values identified in Appendix C of the New York State SVI Guidance. The analytical methods chosen can meet the DQOs of the project.

Analytical sensitivity requirements include the use of instruments or methods to detect the contaminants of concern at or below the action limits. The RLs are expected to be below the applicable regulatory standards. NYSDEC and EPA methods were selected to achieve the action limits. Laboratories may need to adjust RLs based on dilutions, sample sizes, extract/digestate volumes, percent solids and cleanup procedures. Sensitivity will be maximized by following the NYSDEC and EPA methods or laboratory SOPs utilizing experienced, trained laboratory personnel and by conducting laboratory audits.

16. Analytical Quality Control

Quality assurance and quality control ("QA/QC") requirements for analysis are specified in the most recent version of the document titled "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", prepared by EPA. The laboratory may also have QA/QC procedures in addition to those specified by the test method.

17. Laboratory Deliverables

The laboratory deliverable format to be used for this project shall be the Analytical Services Protocols (ASP) Category B full laboratory data deliverable. The laboratory shall also generate spreadsheets of the analytical results.

18. Data and Records Management

The recording media for the project will be both paper and electronic. The project will implement proper document control procedures for both. For instance, hand-recorded data records will be taken with indelible ink, and changes to such data records will be made by drawing a single line through the error with an initial by the responsible person. The Project Manager will have ultimate responsibility for all changes to records and documents. Similar controls will be put in place for electronic records.

The Quality Assurance Coordinator shall retain all updated versions of the QAPP and be responsible for distribution of the current version of the QAPP. The Quality Assurance Coordinator/Project Manager will approve periodic updates. The Project Manager shall retain copies of all management reports, memoranda, and all correspondence between the parties identified in Section 3.

Project data shall be stored in the Project Manager's office.

19. Data Verification and Usability

The data package will be evaluated for accuracy and precision of the analytical results. A DUSR will be prepared to describe the compliance of the analyses with the analytical method protocols detailed in the NYSDEC ASP.

The DUSR will provide a determination of whether the data meets the project-specific criteria for data quality and data use. The validation effort will be completed in accordance with NYSDEC Division of Environmental Remediation DUSR guidelines.

The procedure for review (verification and usability procedures) including data assessment versus stated data quality objectives of the investigation is specified in the NYSDEC's DER-10.

The data validator for this project will be Ms. Veronica Champagne. Ms. Champagne’s resume is included as an attachment to this QAPP.

20. Corrective Action Processes

Corrective action in the field may be needed when the work plan is modified (i.e., number or locations of samples) or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. The corrective action may be implemented at the time the determination is made in the field or may be implemented later, depending on the circumstances. Any corrective actions taken shall be documented in the field logbook and in the technical report.

Corrective actions in the laboratory may be needed when Non-Conformances occur. The laboratory shall implement and document corrective actions in accordance with the laboratory SOP.

TABLE 1 Analytical Methods/Quality Assurance Summary Table 4778 Broadway, New York, New York 10034						
Matrix Type	Number of Samples	Analytical Parameters	Analytical Methods	Sample Preservation	Sample Container & Volume	Permissible Holding Time
Soil	30[1]	TCL VOCs+TICs TCL SVOCs+TICs	8260C 8270D	0-6 °C 0-6 °C	(3) Encore samplers 4 oz amber glass	48 Hours 14 Days[2]
Groundwater	40[3]	TCL VOCs+TICs TCL SVOCs+TICs	8260C 8270D	HCL 0-6 °C	(3) 40 ml VOA amber glass (2) 1000 ml amber glass	14 days 7 Days[4]
Indoor Air	TBD	VOCs	EPA TO-15	Ambient temperature	Summa Canister; 6-liter	30 days

1. Includes 30 field samples, 1 duplicate, 1 MS/MSD, 1 field blank, and 1 trip blank (duplicate, MS/MSD samples will be collected with a frequency of 1 in every 20 samples, trip blanks will be collected for VOCs at a frequency of 1 per cooler).
2. Permissible holding time for SVOCs+TICs, in soil is 14 days to extract and 40 days to analyze.
3. Includes 5 field samples for 8 rounds (40 total), 1 duplicate, 1 MS/MSD, 1 field blank, and 1 trip blank per round of sampling (duplicate, MS/MSD samples will be collected with a frequency of 1 in every 20 samples, trip blanks will be collected for VOCs at a frequency of 1 per cooler)
4. Permissible holding time for SVOCs+TICs in groundwater is 7 days to extract and 40 days to analyze.

APPENDIX G

COMMUNITY AIR MONITORING PLAN

Community Air Monitoring Plan (CAMP)

M4778 Broadway LLC
BCP Site No. C231131
4778 Broadway
Manhattan, New York 10034

The following Community Air Monitoring Plan (CAMP) will be implemented during the Site Characterization Work Plan to be performed at the M4778 Broadway LLC site (Site). Air monitoring will be conducted in accordance with the New York State Department of Health (NYSDOH) *Generic Community Air Monitoring Plan (CAMP).* All air monitoring will be conducted on a real-time basis, using both hand-held field instruments and perimeter air monitoring stations, for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area.
Continuous monitoring will be performed for all ground intrusive activities including boring installations, the break-up and removal of concrete foundations and the excavation of contaminated soil. Periodic monitoring for VOCs and particulates will be required during non-intrusive activities (if required) such as the collection of soil samples from stockpiles or the placement of clean backfill or cover materials.

This CAMP is not intended for use in establishing action levels for worker respiratory protection that shall be described in the site-specific HASP prepared by the Contractor for the proposed excavations. Rather, its intent is to provide a measure of protection for the downwind community (i.e. off-site receptors including residences and businesses) from potential airborne contaminant releases as a direct result of the proposed remedial work activities. Reliance on this CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, this CAMP will help prevent the remedial construction activities from spreading contamination off-site through the air.

Particulate Monitoring, Response Levels, and Actions

Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) 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/m3 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/m3 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/m3 of the upwind level and in preventing visible dust migration.

3. CAMP data summary tables will be provided to the NYSDEC and NYSDOH on a weekly basis, at a minimum, and the Departments will be notified immediately (within 24 hours) of any exceedances and corrective measures taken. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will 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 will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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 will be recorded and be available for State (DEC and NYSDOH) personnel to review if requested. Instantaneous readings, if any, used for decision purposes will also be recorded.

ATTACHMENT 1: SPECIAL CAMP REQUIREMENTS

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

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

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 ug/m^3 (micrograms per cubic meter), work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 ug/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.

APPENDIX H

PROJECT TEAM RESUMES

Anthony Cauterucci, CHMM **Location: Freehold, NJ**

EDUCATION:

Montclair State University, B.A. Geography w/ conc. in Environmental Studies, May 2009

LICENSES & CERTIFICATIONS:

Certified Hazardous Materials Manager, IHMM
OSHA 40-Hour HAZWOPER Certification
OSHA 10-Hour Construction Safety Certification

EXPERIENCE SUMMARY:

Mr. Cauterucci has over 9 years of experience as an environmental consultant, including managing and executing environmental site investigation and remediation projects throughout the Northeast US and under various state regulatory programs. Project experience includes performance and review of remedial investigations and remediations of Brownfield Cleanup sites; oversight of tank removals, soil excavation and disposal; real estate transfer assessments, hydrogeological site assessments involving petroleum hydrocarbons and chlorinated solvents; the preparation of ASTM Phase I and Phase II site investigation reports, and the design, implementation and operation of sub-slab depressurization systems for the purpose of vapor intrusion mitigation.

Mr. Cauterucci currently serves as Site Mitigation Department Manager for the New York and New Jersey region of AEI's Site Mitigation Department.

REPRESENTATIVE EXPERIENCE

- **Lawrence Shopping Center, Lawrence, NJ.** Project manager in charge of Site Investigation (SI), Remedial Investigation (RI), Remedial Action Work Plan (RAWP), Receptor Evaluations (RE), and Remedial Action (RA), of a shopping center with contaminated soil and groundwater due to a former auto repair operation and current dry cleaning operation. Work conducted through the New Jersey Department of Environmental Protection (NJDEP) under the oversight of a Licensed Site Remediation Professional (LSRP). Site work included the removal of over 600 tons of impacted soil, the installation and monitoring of more than 20 groundwater monitoring wells for horizontal and vertical contaminant delineation, a Membrane Interface Probe (MIP) assessment of chlorinated VOCs, and a Vapor Intrusion (VI) investigation. Remedial Action of chlorinated VOC groundwater contamination through Monitored Natural Attenuation (MNA) with a Classification Exception Area (CEA) along with Remedial Action Outcomes (RAOs) issued for Areas of Concern (AOCs) related to the former auto repair operation.

- **True Value Hardware, Swedesboro, NJ.** Project manager in charge of SI, RI, RAWP, RE, and RA, and post-remedial groundwater monitoring at a former Standard Oil bulk petroleum terminal. Work conducted through the NJDEP under the oversight of a LSRP. Site work included the removal of over 500 tons of impacted soil and 500 linear feet of sub-surface piping, post-excavation soil sampling, and installation and monitoring of onsite and offsite monitoring wells.

- **Gwynedd Valley Technology Center, Lansdale, PA.** Onsite project manager for a vapor intrusion and indoor air investigation and mitigation of a 650,000+ square foot commercial/ industrial building that was formerly an electronics manufacturing facility in Lansdale, Pennsylvania. Vapor intrusion investigation included extensive sub-slab soil vapor and indoor air sampling in a grid pattern throughout the building, with ambient air sampling conducted for comparison purposes. Results from this investigation indicated that elevated VOCs existed beneath the building slab and indoor air levels of chlorinated VOCs were above the EPA screening levels. Responsible for providing oversight of a pilot study in the building to determine the potential area of influence for each vapor extraction point, installation of a Sub-Slab Depressurization (SSD) system consisting of 59 vapor extraction points throughout the interior of the building, and sealing of joints and cracks within the building slab to prevent any preferential pathways from allowing the sub-slab air into the building. Conducts monthly operation and maintenance (O&M) check-ups on the SSD system to ensure it is properly operating. Vapor mitigation contract exceeded $1 million dollars.

- **Sunoco Gas Station, Fairfield, CT.** Project manager in charge of a SI of an operating gas station and auto repair with multiple fueling underground storage tanks (USTs), underground hydraulic lifts, a heating oil UST, closed-in-place waste oil UST, and historic surface spills. Conducted soil and groundwater evaluation of numerous AOCs, installation and monitoring of multiple groundwater monitoring wells, report writing, and preparation of a remedial budget for a potential buyer.

- **Unregulated Heating Oil UST Closure, Mount Olive, NJ.** Project manager in charge of a Phase II in the area of a closed-in-place heating oil UST at a vacant restaurant building in Mount Olive, NJ. Exceedances of NJDEP extractable petroleum hydrocarbon (EPH) standards prompted the removal of the UST and impacted soil, followed by a groundwater investigation in the area of the UST. Prepared Remedial Action Report (RAR) for submittal to the NJDEP Unregulated Heating Oil Tank (UHOT) program and received a No Further Action (NFA) letter for the case.

- **Puratos Industrial Warehouse, Pennsauken, NJ.** Project manager in charge of a Preliminary Assessment (PA) and SI at an industrial warehouse in Pennsauken, NJ. Work was conducted as a requirement of a property transaction under Industrial Site Recovery Act (ISRA) regulations through the NJDEP and under the oversight of a LSRP. Site investigation included the collection of shallow soil samples along an onsite rail line and offsite regional rail line. The AOC related to the rail line and the site received an RAO based on elevated regional rail line contamination and continued use of rail for product shipment and delivery.

Joseph M. Maggiulli – Project Scientist

B.A. – Geography with a concentration in Environmental studies, minor in Geoscience
Montclair State University, Montclair State University, New Jersey

Registrations: OSHA 30 Hour Construction Health and Safety training
OSHA 40 Hour HAZWOPR (Hazardous Waste Operations and Emergency Response training)
Heavy Equipment Operator

Mr. Maggiulli has over 6 years of experience in the environmental investigation/remediation field. His scope of project related work includes numerous aspects of Phase II subsurface investigation, remedial investigation, and remedial action based projects. He is proficient in many field sampling and reporting procedures needed to successfully complete a Phase II or a remedial investigation. He is also familiar with a wide range of remedial action methods including excavation, pump and treat systems and sub slab depressurization systems and their proper set up and function.

Previously, while working for an international consulting firm, Mr. Maggiulli was the lead geologist/ field team leader on the largest hazardous waste removal excavation in the state of New Jersey. Duties included sampling, direction of excavation activities, and the coordination of multiple entities and personnel to perform the excavation while under direct oversight from NJDEP personnel.

Jack M. Katz, Ph.D. – Director, Site Mitigation-Eastern Region

Education:

Ph.D., Environmental Science, Rutgers University, New Brunswick, New Jersey, 1989.
M.S., Environmental Science, Rutgers University, New Brunswick, New Jersey, 1986.
B.S., Chemistry, Upsala College, East Orange, New Jersey, 1982.

OSHA 40-Hour HAZWOPER Training
OSHA 8-Hour Annual Refresher Course
OSHA 8-Hour HAZWOPER Site Supervisor
OSHA 10-Hour Construction Safety

Summary of Experience:

Dr. Katz has over 28 years of significant experience in Environmental Site Assessments, Site Investigations, Remedial Investigations, Underground Storage Tank management/closures, Litigation Support, and the implementation of Cleanup Plans for both public sector and private group clients throughout the United States. He has a comprehensive knowledge of regulations pertaining to the New Jersey - Industrial Site Recovery Act (ISRA) and a strong knowledge of environmental regulations in the States of New York, Pennsylvania, Connecticut, Colorado, Georgia, Illinois, Maryland, North Carolina, Florida, Tennessee, Texas, and Washington.

Dr. Katz is a published author of peer-reviewed articles involving the fate and movement of pollutants in soil and aquifer systems.

Dr. Katz' current duties include senior project management, remedial investigations and cleanup activities for AEI's Eastern Region. His professional experience includes:

- **Shore Gas & Oil, Oakhurst, New Jersey.** Senior Project Manager for a $2 million environmental cleanup of a former oil and gasoline storage and distribution facility. The project involved the removal/closure of nine existing underground storage tanks in accordance with the New Jersey Department of Environmental Protection – Bureau of Underground Storage Tank (NJDEP-BUST) requirements. Remedial activities included the excavation and off-site disposal of 16,000 tons of petroleum hydrocarbon impacted soils, collection of post-excavation samples in accordance with NJDEP requirements to document remaining soil quality, free product removal utilizing vacuum trucks to collect product from within the open excavations during soil excavation activities, and backfilling / site restoration activities.

- **Private Developer, Emeryville, California.** Senior Project Manager responsible for the investigation and cleanup of a polychlorinated biphenyl (PCB) release involving both concrete and soil, and the preparation of a PCB Completion Report. The site experienced two vandalism events within a transformer room located in a basement that resulted in approximately 120 gallons of PCB hydraulic transformer oil being released. Based upon the completed delineation of PCBs in the concrete floor and walls, those areas of the concrete floor and walls to be disposal as a Toxic Substances Control Act (TSCA) regulated waste versus non-TSCA PCB impacted concrete were defined. Additionally, the area of PCB impacted soil to be removed was defined based upon the soil delineation work. The USEPA determined that the PCB cleanup at the site was conducted in a manner consistent with their conditional approval of the Revised PCB Notification and Self-Implementing Cleanup Plan, the Revised PCB Cleanup Work Plan, and with the applicable TSCA regulations (40 CFR 761.61(a)). Based on this determination, the USEPA approved the PCB Cleanup Completion Report.

- **Confidential Client, Brooklyn, New York**. Senior Project Manager involving litigation support and cost allocation expertise for one of the 33 potentially responsible parties (PRP's) in the Gowanus Canal Superfund case. In April 2009, the Gowanus Canal was proposed for inclusion on the National Priorities List (NPL) pursuant to the Superfund law at the request of the New York State Department of Environmental Conservation (NYSDEC). Following the proposal for inclusion on the NPL, EPA commenced a remedial investigation (RI). On March 2, 2010, EPA placed the Gowanus Canal on the NPL and estimated a cleanup cost of $506 million dollars. Directed the project team in the development a detailed description of historic operations in an attempt to ascertain if potential contaminants generated on the site or present as a result of activities formerly conducted on the site are consistent with those contaminants identified by the EPA as contaminants of concern in the Gowanus Canal. Based upon this analysis, developed a fair and reasonable allocation share for this PRP.

- **Oakmont Industrial Group, Elizabeth, New Jersey**. Project Manager responsible for the conduct of Phase I Environmental Site Assessments (ESAs) and Phase II Site Investigations at four properties located in Elizabeth, New Jersey related to a prospective purchase and redevelopment of the properties. Each of the properties was used for a combination of office, warehouse and manufacturing operations with three of the four properties involved with some degree of environmental cleanup and remedial actions in order to comply with New Jersey Department of Environmental Protection (NJDEP) regulations. A Deed Notice was previously established to address a small portion of one property where base/neutral compounds, arsenic and lead were found above their applicable Soil Remediation Standards. The Phase I ESAs were conducted to identify potential areas of environmental concern at each of the subject properties. Based upon the findings of the Phase I ESAs, Phase II Site Investigation activities included the performance of geophysical survey work, soil and groundwater investigations were completed. As a result of the Phase II investigations, an unknown gasoline underground storage tank (UST) was discovered. Remedial activities were subsequently performed that included the removal of the UST, the excavation and off-site disposal of 2,100 tons of petroleum hydrocarbon impacted soils, collection of post-excavation samples in accordance with NJDEP requirements to document remaining soil quality, backfilling and site restoration activities. Worked closely with the Licensed Site Remediation Professional (LSRP) retained for the project who subsequently issued an Unrestricted Use Response Action Outcome (RAO).

- **Dry Cleaner, Edison, New Jersey**. Senior Project Manager responsible for the investigation and soil remediation associated with a former dry cleaner located within a strip mall. Delineation of soil impacted by chlorinated volatile organic compounds was completed via a number of remedial investigations. Remedial activities involved the excavation an off-site disposal of impacted soil and the collection of post-excavation samples in proximity to one area where prior vertical delineation had not been completed. The excavation was backfilled with certified clean fill and compaction of the soil performed. Site restoration activities involving the replacement of the sidewalk, replacement of shrubs and general landscaping and the reconnection/replacement of the section of the sprinkler system. A Remedial Investigation Report / Remedial Action Report and the associated New Jersey Department of Environmental Protection (NJDEP) forms were subsequently prepared for review by the previously retained Licensed Site Remediation Professional (LSRP). A Response Action Outcome was subsequently issued by the LSPR for this case.

- **Prudential Real Estate Investors**, **multiple states.** Phase I Environmental Site Assessments / Multiple Sites. Project Manager for the conduct of thirty-four (34) Phase I Environmental Site Assessments of shopping center properties located in Kentucky, New Mexico, Nevada and Washington in accordance with the American Society of Testing and Materials, ASTM E 1527-00. This work was performed as part of a multi-billion dollar deal involving properties in the above noted states as well as other shopping center properties located throughout the United States.

- **Avis Rent-A-Car System, Newark, New Jersey**. Senior Project Manager for a $1 million investigation and cleanup at a rental car facility site located at Newark Liberty International Airport, Newark, New Jersey. In addition to the gasoline release at this site, spills and/or releases of petroleum hydrocarbons have occurred at two other rental car companies adjacent to the site. Subsurface evaluations were performed to (1) assess the hydrology of the site; (2) complete the delineation of soil and groundwater contamination; (3) assess the impacts to an adjacent wetlands area; and (4) assess the impacts of free product to sediment within an adjacent surface water body. As part of the overall site assessment process, GC fingerprinting and additional forensic analysis were performed on free product samples collected from monitoring wells located on both the site and adjacent facilities to assess whether the petroleum hydrocarbons found in the wetlands area and near a portion of the property boundary consisted of co-mingled petroleum hydrocarbon plumes. A soil vapor extraction (SVE) system had already been installed on-site by another consultant to remediate both soil and groundwater contamination. Since extensive free-floating product was present on the site and in the area of the adjacent wetland area, the existing SVE system was converted to a dual phase extraction (bioslurping) system along with the installation of additional recovery/extraction wells to remove free product. A total of 343 tons of excavated soil/sediment was removed for off-site disposal. Post-excavation sediment samples were subsequently collected from within and immediately surrounding the excavated sediment as well as upstream locations to document the remaining sediment quality. Quarterly groundwater and surface water sampling were also conducted as part of the on-going monitoring programs.

- **Mill Creek Residential Trust, Hempstead, New York.** Senior Project Manager responsible for the investigation of various USTs, floor drains, pits, sumps, hydraulic lifts and drywells present at an automobile car dealership located in Hempstead, New York. As a result of soil being found to contain constituents above the New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use Soil Cleanup Objectives, directed the excavation and disposal of both petroleum impacted soil and soil containing RCRA hazardous constituents (lead and 1,4 dichlorobenzene). Additionally, obtained closure of the various dry well structures regulated under the USEPA - Underground Injection Control (UIC) program.

- **Seaboard Service, Long Branch, New Jersey**. Senior Project Manager for the investigation and cleanup of a former coal and oil distribution site. Areas of concern consisted of three 50,000-gallon above-ground storage tanks (ASTs), a 275-gallon fuel oil AST, a 550-gallon diesel AST, a former truck scale, an adjacent brook/storm water drainage channel and site groundwater. Historic fill has also been documented at the site. A Remedial Investigation Work Plan (RIWP) was prepared to address the comments/additional requirements raised by the NJDEP in response to a prior Remedial Investigation Report (RIR) submitted by another environmental consulting firm. Petroleum hydrocarbon impacted soils were delineated, excavated and disposed off-site as non-hazardous petroleum impacted soil. Site restoration activities were accomplished upon completion of the soil remediation activities. The existing monitoring well network was supplemented with the installation of five additional monitoring wells following by two rounds of groundwater sampling from the entire monitoring well network as required by NJDEP. A Deed Notice to address soils containing base/neutral compounds and/or metals above their respective Soil Remediation Standards was also prepared. Since the results of the groundwater investigation revealed no volatile organic or base/neutral compounds above the NJDEP Class II-A standards, No Further Action was proposed for groundwater at the site.

- **Wilmad Glass Company, Buena, New Jersey**. Senior Project Manager for a New Jersey ISRA case located in the New Jersey Pinelands that involved the removal of hexavalent chromium impacted soil beneath a site building. This impacted soil was the source of chromium being detected above regulatory levels in the groundwater which had also migrated off-site. Specific activities included: 1) razing a portion of a site building to expose the chromium impacted soil; 2) installation of underpinning piers at selected locations along portions of two adjacent buildings to support the foundations these buildings; 3) removal of chromium contaminated soil via mass excavation; 4) backfilling and compaction testing of the excavation area; and 5) assisted with the construction of a new building at the same location of the former building.

- **Coastal Oil Eagle Point Refinery, West Deptford, New Jersey**. Senior Project Specialist involved in the preparation of a Biodegradation Plan at an Oil Company Waste Land Treatment Unit (Landfarm). Responsibilities included an evaluation of past and current landfarm soils data and a review of current literature regarding the landfarming of petroleum waste. Based on this review, prepared a report outlining the conditions required to optimize the degradation, transformation and immobilization of previously applied petroleum waste.

- **New York State Energy Research and Development Authority, Malta, New York**. Senior Project Manager for the Malta Rocket Fuel Area Superfund Site located in the towns of Malta and Stillwater, Saratoga County, New York. Assisted in the evaluation of historical data, past and present activities/investigations performed at the site and analytical data generated to date. Specific activities included: 1) Evaluation of the Literature Search prepared by another consultant for the site and identification of data gaps and issues which needed further clarification with respect to past operations at the site; 2) Oversight activities associated with the current RI/FS investigation being conducted by one of the PRP's consultants. Oversight activities include a site wide soil gas survey, test pit excavations, soil sampling and monitoring well installation programs; 3) Evaluation and interpretation of data obtained from a variety of sampling programs; and 4) preparation of reports summarizing the assessment of field activities being conducted at the site as well as the evaluation of data generated from the different sampling programs.

- **Confidential Client – Litigation Support, Pittman, New Jersey**. Project Manager/technical consultant for a litigation support project involving the Lipari Landfill CERCLA site located in Pittman, New Jersey. The client had been designated as a Potentially Responsible Party (PRP) at this site. Responsibilities included a review of technical reports/documents prepared by both USEPA and outside consultants, Records of Decision (ROD) and analytical data generated as part of the investigative process. Additional tasks included conducting chemical reactivity analyses of client' "target" chemicals with other chemicals known to have been deposited at the site and the preparation of a report presenting our conclusions/recommendations regarding the need for a cleanup.

Selected Publications/Presentations:

- Ahlert, W.K., J Katz and C.G. Uchrin, 1987. "On the Validity of Partition Coefficients." Presented at the "Third Annual Groundwater Technology Meeting," CUNY, September, 1987, published as Chapter 9 in Pollution, Risk Assessment, and Remediation in Groundwater Systems (R.M. Khanbilvardi and J. Philos, Eds.), Scientific Publications Co., Washington, D.C., pp. 295-320.

- Gee, J.R., C.G. Uchrin, S.G. Williams, J.M. Griffith, K. Haus, J.M. Katz, T. Maldonato, and B.C. Williams, "Evaluation and design of soil flushing for site remediation", Proceedings "Aquifers Reclamation and Source Control Conference," NJIT, Woodbridge, N.J., November 1990.

- Katz, J., and C.G. Uchrin, 1984. "Sorption Kinetics of Toxic and Hazardous Organic Substances on New Jersey Coastal Plain Aquifer Solids, "Proceedings, "Second

International Conference on Groundwater Quality Research, "Tulsa, OK, March 26-29, 1984, pp. 44-46.

- Katz, J., R.T. Mueller and C.G. Uchrin, "Transport and Fate of a Synthetic Gasoline Mixture in a New Jersey Aquifer Material," presented at the 32nd Annual Meeting, New Jersey Academy of Science, West Long Branch, April, 1987, abstract in Bull. New Jersey Acad. Sci. 32:41, 1987.
- Uchrin, C.G. and J. Katz, 1985. Reversible and Resistant Components of Hexachlorocyclohexane (Lindane) Sorption To New Jersey Coastal Plain Aquifer Solids. Journal of Environmental Science and Health, A20:205-218.
- Uchrin, C.G. and J. Katz, 1991. "Transportation of a BTEX Mixture In A Groundwater Aquifer Material," Bull. Environ. Contam. Toxicol., 46:534-541.
- Uchrin, C.G., K. Haus, J. Katz and T. Sabatino, 1992. "Physical and Mathematical Simulation of Gasoline Component Migration In Groundwater Systems," Journal of Exposure Analysis and Environmental Epidemiology, Vol. 2, No. 1, pp. 117-131.

HCS CIVIL & ENVIRONMENTAL ENGINEERING, LLC
169 Upper Valley Road
Washington, Massachusetts 01223
413-281-2797
philip.clark@hcscepc.com

Philip G. Clark, PE, LSP
President

- Licensed Professional Engineer (Massachusetts, New York, Connecticut, Vermont)
- Licensed Site Professional (Massachusetts Oil and Hazardous Materials Program)
- Licensed Asbestos Designer (New York)

GENERAL PROFESSIONAL QUALIFICATIONS

Consulting engineering for municipal, industrial /commercial, and private clients in the following areas:

- Hazardous waste assessment and remediation
  - Landfill assessment and remediation
  - Hydrocarbon assessment and remediation
  - Industrial facility assessment and remediation
  - Property assessment
  - Asbestos inspection and abatement
  - Indoor air quality assessment
  - Building demolition assessment
- Civil land site design and development
  - Municipal building development and design
  - Commercial and manufacturing building development and design
  - Private property development
  - Bridge replacement design
  - Landfill site assessment
  - Water treatment facility design
- Water supply design
  - Water system rehabilitation
  - Water treatment and distribution system improvements
  - Groundwater supply well improvements
  - Surface water supply evaluation
  - Water supply operations improvements
- Wastewater/stormwater assessment and design
  - Combined sewer overflow assessment and improvements
  - Wastewater district formation design
  - Industrial wastewater treatment plant improvements
  - Wastewater system design

REPRESENTATIVE PROJECTS

HAZARDOUS WASTE ASSESSMENT AND REMEDIATION

Basement Fuel Oil Above Ground Storage Tank Release (Private Residence)

- Developed response action work plan for excavation and disposal of impacted soils
- Observed, documented and coordinated transportation and disposal of impacted soils
- Developed soil and groundwater subsurface investigation program
- Developed construction plan for installation of sub-slab soil venting system
- Conducted baseline and post remediation indoor air sampling program
- Evaluated sub-slab vapor venting system performance
- Retained and supervised all remediation and building restoration work
- Prepared final closure report, including risk assessment analysis, for submission to Regulatory Agency

Underground Storage Tank (UST) Fuel Oil Release Remediation – Manufacturing Firm

- Initiated Remedial Response Actions and Development of Work Plan
- Interviewed Client Representatives and UST Removal Contractor
- Conducted indoor air sampling program, including preparation of initial site conditions
- Retained remediation contractor and documented impacted soil excavation and removal of liquid water/petroleum
- Developed and executed subsurface soil and groundwater investigation program
- Developed building structural modifications plan to facilitate excavation of impacted soils beneath building
- Conducted basement sub-slab soil vapor evaluation
- Developed sub-slab soil vapor venting system as a risk reduction measure
- Evaluated sub-slab vapor venting system performance
- Prepared final closure report, including risk assessment analysis, for submission to Regulatory Agency

Landfill Remediation – Drum Assessment & Disposal

- Field assessed location of 40 drums containing unknown materials.
- Performed residual sampling and analysis to determine chemical characteristics
- Observed and documented staging of drums and coordinated disposal options
- Prepared closure reports

Hydrocarbon Assessment and Remediation – Major Petroleum Distribution Company

- Environmental and hydrogeologic assessment of site conditions and development of remedial measures for product recovery and groundwater treatment.
- Design, construction and operation of deep-well recovery systems.

- Environmental assessment and remediation of gasoline service stations related to underground storage tank replacement programs.
- Geologic and hydrogeologic assessment of service station sites related to residual hydrocarbon vapors. Included design, construction and operation of vapor recovery and treatment systems.

Industrial Facility Assessment and Remediation – Plastics Manufacturing Division Sale
- Environmental and hydrogeologic assessment of site conditions and development of remedial measures for product recovery and groundwater treatment.
- Implemented design/build remedial measures.

Industrial Facility Assessment
- Assessed historic PCB uses and developed initial site evaluation reports, including work plans for comprehensive site assessment activities.
- Evaluated historic uses of private properties for disposal of PBC fill material and development of field investigation work plans. Assessed field private property field conditions and developed evaluation reports.
- Evaluated river conditions related to PCB contamination and assessed potential natural resource damage claims.

Private Client Property Assessment
- Developed agency-ordered remedial work plan for removal of numerous drums from a 20-acre lake. Retained and supervised subcontractors activities related to identification, removal sampling and disposal of drums found in lake.
- Developed and implemented field sampling program to assess PCB contamination.
- Performed risk evaluation and assessment work associated with residual PCB contamination.

Municipal Client Landfill Assessment
- Developed and implemented agency-ordered environmental assessment of two sanitary landfills. Assessment included evaluation of ambient air, soil gas, soils, surface water and sediment media.
- Performed risk analysis and developed basis of design for risk reduction remedial measures.

Jeri L. Rossi

Sr. Environmental Chemist

Ms. Rossi has over 30 years of experience in the environmental industry and is a Certified Environmental Analytical Chemist through the National Registry of Certified Chemists. Ms. Rossi has extensive experience in the data review process having examined data for a variety of matrices for compliance with state and federal validation guidelines. She has over seven years experience preparing NYSDEC DUSRs and assisting in the preparation of EDDs for submittal. Her background includes sample preparation and analysis, method development, analytical data review and reduction, data validation, and project management. She has prepared and analyzed samples of various matrices in a laboratory setting. Her experience as a quality assurance/quality control (QA/QC) director coupled with her experience as an analyst has provided her with a thorough understanding of the entire laboratory process - six years as Quality Assurance/Quality Control Director for two laboratories as well as over 15 years in the laboratory as both Manager and analyst. She has extensive experience in reviewing data from the perspective of both an analyst and QA/QC Director. As a Project Manager, she has managed all aspects of client projects from coordinating sampling events through reporting results.

Professional Experience:

Sr. Environmental Chemist

Performed validation of analytical data for samples analyzed pursuant to the U.S. EPA Contract Laboratory Program Statement of Work (CLP), U.S. EPA SW-846, and various other EPA methodologies. Thoroughly understands the U.S. EPA Functional Guidelines for data validation, as well as various regional and other agency guidelines. She has performed data validation for numerous projects.
Actively providing data validation and evaluation services for sites located in Connecticut, California, Florida, Pennsylvania, and New Jersey. Activities include coordination of laboratory analyses, data review, comparison of results with historical data to determine trends, and preparation of validation and evaluation reports.

QA/QC Director

Implemented and maintained Quality System for entire laboratory. Strong emphasis placed on meeting State regulations as well as complying with NELAC standards. Performed internal audits on each department to confirm compliance with method requirements and laboratory quality standards. Implemented Corrective Action procedures based on results of internal audits. Reviewed and updated Standard Operating Procedures (SOPs) on an annual basis. Developed and implemented ethics training program. Ensured laboratory compliance with current State and Federal regulations. Evaluated laboratory compound lists and limits against various States' cleanup standards. Reviewed and approved all client QAPPs. Performed technical review of final reports prior to release to client. Resolved all client data inquiries. Maintained excellent relations with clients as well as State agencies through ongoing communication.

Authored technical memorandum delineating the analytical requirements for various agency regulatory programs. Used internally and as a resource for clients, these documents were created to ensure the laboratory analytical process complied with agency requirements.

Education

BS, Environmental Science, Cook College, Rutgers University - New Brunswick, NJ - 1993

Professional Affiliations

CIANJ – Environmental Business Roundtable

NJ LSRPA – member

TNI – The NELAC Institute – member. Mentoring Subcommittee member.

NEMC - National Environmental Monitoring Conference – session chair.

Chair, Environmental Laboratory Advisory Committee (ELAC) 2011.

Secretary, Environmental Laboratory Advisory Committee (ELAC) 2009-2010.

Certifications

Certified Environmental Analytical Chemist with the National Registry of Certified Chemists.

40-Hour OSHA Hazardous Waste Safety Training

Jeri L. Rossi

Assisted with development, installation, and implementation of air analysis at the analytical level. Tasks included a comparative review of laboratory Standard Operation Procedures (SOPs) and agency approved methodologies, a review of method detection limits (MDLs), and coordination of the analyst-specific demonstration of capabilities necessary for certification. In addition, assisted with establishing analysis programs, reviewed data packages, and resolved client inquiries.

Reviewed project-specific QAPPs to confirm the laboratory's ability to achieve project goals. Verified QC tables, required reporting limits, and parameter lists. Identified QC requirements that could not be met by the lab and confirmed that the laboratory held the necessary certifications. Summarized project QAPP for use internally, identifying any anomalies affecting the sample preparation and analysis.

Prepared and presented technical seminars to clients detailing changes which had the potential to impact project needs. Topics included modifications to analytical methods, technical rules, and NELAC standards.

Chair/Secretary - New Jersey Environmental Laboratory Advisory Committee
Ms. Rossi held the positions of Chair (1yr) and Secretary (2yrs) of the New Jersey ELAC committee. During this time she actively contributed to the development and implementation of the NJ EPH method. She also co-chaired an analytical sub-committee that evaluated and recommended alternate methods for the analysis of 1,4-Dioxane. This effort led to the DEP offering certification for 1,4-Dioxane analysis by Method 8270 using isotopic dilution.

Project Manager
Managed projects for over 25 clients. Reviewed QAPPs to ensure laboratory met project and client needs. Efforts concentrated on coordinating sampling events with the laboratory, serving as technical resource for clients, meeting turn-around times and review and release of technically sound data.

Analyst/Manager
Performed analysis on various matrices for Volatile Organics, Semi-Volatile Organics, Total Petroleum Hydrocarbons and Petroleum Fingerprinting. Managed Volatile Organic and Semi-Volatile Organic departments. Ensured analyses were method compliant and were performed in accordance with project-specific requirements. Developed, implemented and trained laboratory personnel in laboratory-specific Standard Operating Procedures, focusing on good lab practices. Performed routine and non-routine maintenance of analytical instrumentation.

Professional Publications/Presentations:

"Uncertainty Associated with Field and Laboratory Activities"; CIANJ EBC Spring Conference presentation, May 2015.

"Final Data Interpretation/Usability: What's the Next Step?'; NJ LSRPA Fall 2017 Seminar.

Jeri L. Rossi

"Data Interpretation"; NJ Site Remediation Conference, January 2018.

Continuing Education/Specialized Training:

'New Jersey DEP/Stroud Center Macroinvertebrate Fall Stream School, Rutgers University, October 2016.

"Advanced Petroleum Forensics", Rutgers University, October 2013.

"Interpretation of Mass Spectra," conducted by Environmental Analytical Consulting, Inc., Edison, New Jersey, March 1990.

APPENDIX I

DISPOSAL FACILITY CONDITIONAL APPROVAL LETTERS

We Bring the World to New Jersey

November 24, 2020

Soil Managers
47 Warren Road
West Orange, NJ 07052

RE: Conditional Approval Determination for 4778 Broadway, New York, NY 10034 (Block 2233 Lot 10)

Landfill: Keegan Landfill, 437 Bergen Avenue, Kearny, NJ 07032

Estimated Volume: 2,000 cubic yards (approximately 112 Loads)

Dear Mr. Sarett:

The New Jersey Sports and Exposition Authority (NJSEA) owns the Keegan Landfill (Keegan) which was a permitted construction and demolition waste landfill located in Kearny, Hudson County. NJSEA has reviewed the documents listed below and conditionally approves of up to 112 loads of material from the south portion of the property for use as shaping material and/or intermediate cover prior to the placement of a final geomembrane cap. This Conditional Approval was based on our initial review of the information contained in the list of documents below.

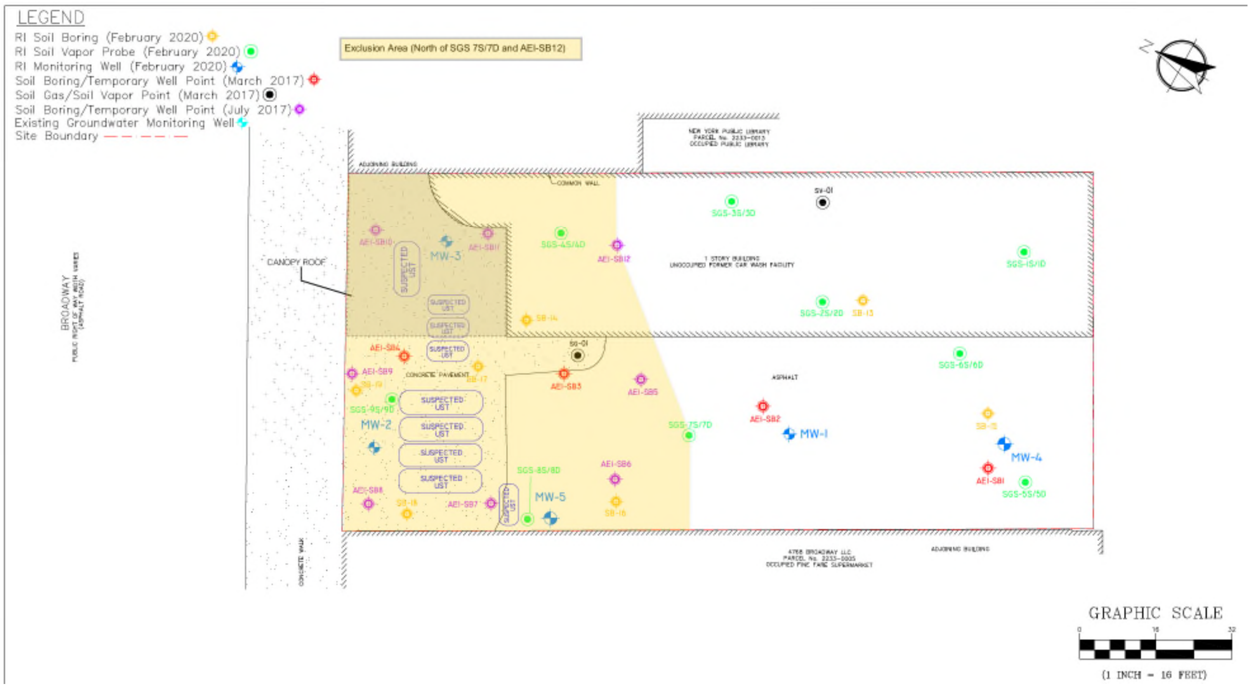
Final approval will be based on submittal of subsequent waste classification sampling that meets our acceptance criteria and submittal of signed Material Characterization Report. The investigation documents and data that were provided indicate that USTs still exist, and petroleum impacted the soil and groundwater in the northern portion of the property. At this point we will only consider material from the southern portion of the property, that shows no signs of petroleum impact (including odor) and meets our chemical and physical requirements.

List of Documents	
1	13900 - MRCE Geotechnical Report
2	April 24, 2017 AEI PHASE 2 ENVIRONMENTAL - 4778 broadway
3	384736 Remedial Investigation Report - 4778 Broadway, NYC - April 2020 041720 - Final
4	RIR Sample Loc Map Figure 3
5	RI Lab Data - L2006193_ddp - Feb 10, 2020 - Soil

6	RI Lab Data - L2006205_pdf - Feb 11, 2020 - Soil Vapor
7	RI Lab Data - L2006445_ddp - Feb 12, 2020 - Soil
8	RI Lab Data - L2008377_ddp - Feb 25, 2020 - Groundwater
9	384736 RIWP Appendices

Material not being considered for approval (see Exclusion Area Figure) is highlighted in Yellow. This is based on historic sampling and strong indications of petroleum impact and odor.

Exclusion Area Figure:



Please be advised that NJSEA/Keegan Landfill issues scale tickets only and does not sign manifests or any other shipping documents (i.e. Uniform Non-Hazardous Waste Manifest 8700-22). Keegan Landfill charges by the load and does not weigh inbound trucks. This material is being charged our normal rate. Please let us know how where to send the manifests and how many you will need. Manifests must be purchased in advance and any unused manifests will be refunded in full. Please allow 48 hours to receive the manifest.

Keegan Landfill has strict weight limitation requirements and overweight loads can be assessed a penalty of two landfill tickets or complete rejection from the facility.

Since the soil is being used as cover material it must be one foot minus with no objectionable or deleterious material. Unsuitable material will be rejected from the facility and no further trucks will be allowed to enter and dump until we are sure that the inbound material is acceptable.

NJSEA wishes to thank you for allowing us to handle your disposal needs. If you have any questions, please contact me.

Very truly yours,

Thomas Marturano, P.E., P.P.
Director, Solid Waste & Natural Resources

Hazleton Creek Properties, LLC

282 South Church Street | Hazleton, PA 18201
570-501-5050

November 19, 2020

Soil Managers
47 Warren Road
West Orange, NJ 07052

Subject: Conditional Approval Letter – Regulated Fill

Project: 4778 Broadway, New York, NY 10034 (Block 2233 Lot 10)

Hazleton Creek Properties, LLC (HCP) conditionally approves of the material from the project listed above. This proposed new source of regulated fill has submitted documentation that has been reviewed and found to be a good candidate for acceptance under Permit Number WMGR096NE001 for beneficial use at the Hazleton Reclamation Project Site. The following documents were provided by Soil Managers as part of the Request for Conditional Approval:

	List of Documents
1	13900 - MRCE Geotechnical Report
2	April 24, 2017 AEI PHASE 2 ENVIRONMENTAL - 4778 broadway
3	384736 Remedial Investigation Report - 4778 Broadway, NYC - April 2020 041720 - Final
4	RIR Sample Loc Map Figure 3
5	RI Lab Data - L2006193_ddp - Feb 10, 2020 - Soil
6	RI Lab Data - L2006205_pdf - Feb 11, 2020 - Soil Vapor
7	RI Lab Data - L2006445_ddp - Feb 12, 2020 - Soil
8	RI Lab Data - L2008377_ddp - Feb 25, 2020 - Groundwater
9	384736 RIWP Appendices

The data that has been provided to date was done for investigation purposes which is a good indication of the chemical concentration that are in the material, however all samples were discrete and PA Management of Fill Policy requires composite samples for all but the VOCs. It's our understanding that Soil Managers will be taking waste classification samples in the next few weeks. Based on the information provided, HCP offers this Conditional Approval letter to accept approximately 7,000 cubic yards of regulated fill material for beneficial use and placement at the Hazleton Creek Properties facility in Hazleton, PA originating from the 4778 Broadway, NY, NY property.

Final approval will be based on our review and approval of the following documents:

- Completed and signed Hazleton Creek Properties Material Characterization Report
- Complete analytical data in accordance with PA Management of Fill Policy and the HCP Permit Requirements.
- Approval by PADEP

HCP reserves the right to re-sample and analyze material that is received at the Hazleton facility. Any material that does not meet the acceptance criteria and specifications of the Pennsylvania Department of Environmental Protection (PADEP) Management of Fill Policy will be rejected/reloaded and returned to the site of origin. All associated transportation fees and facility handling costs that may be incurred due to non-acceptance of material will be the client's responsibility.

If you have any further questions, please contact Matt Petrie with Tunnel Hill Partners, L.P. (201-957-5657 or jkopyta@tunnelhillpartners.com).

Sincerely,

HAZLETON CREEK PROPERTIES, LLC

Jeff Kopyta
Territory Manager
Tunnel Hill Partners, L.P.

December 4, 2020

Soil Safe

Mr. Todd Sarett
47 Warren Rd
West Orange NJ 07052

RE: 4778 Broadway New York Project Analysis Review

Todd:

I have received and reviewed several of the reports and some of the data regarding the 4778 Broadway project upon your request. The Documents I have reviewed are as follows:

Remedial Investigation Report (April 2020) Final
Remedial Investigation Report 4778 Broadway NYC April 2020 041720 Final + Lab Results
344060 NYC BY – Si-RIR 101017 – No Lab Data
Phase 2 Environmental – 4778 Broadway

While the sampling techniques are not within our protocol, I can give you an opinion that the material may be appropriate for recycling at our Logan facility. The VOCs levels are too high for consideration at our Metro12 facility.

This has not been an exhaustive review and would need additional documentation (MCR, lab packs, waste characterization analysis, etc.) and sampling that meet our frequency requirements and methods. This is not intended to provide or indicate an approval in any way, as the data that meets our protocol with the proper documentation will have to be formally reviewed by our Compliance department.

I hope this helps.

Sincerely,

Jim

Jim Grant
Vice President – Sales

Soil Safe, a GFL Environmental Company
CC: File

APPENDIX J

REQUEST TO IMPORT/REUSE FILL MATERIAL FORM

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). Use of this form is not a substitute for reading the applicable 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 would pass a size 80 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 5.5 (other material), no chemical testing needed.

Revised August 2014

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:

The information provided on this form is accurate and complete.

__________________________________ ________________

Signature Date

____

Print Name

____

Firm

APPENDIX K

WATERPROOFING/VAPOR BARRIER PRODUCT SPECIFICATIONS

PREPRUFE® 300R & 160R

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

Description

Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.

Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe bond to concrete prevents ingress or migration of water around the structure.

The Preprufe R System includes:

- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R—**thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe Tape LT—**for covering cut edges, roll ends, penetrations and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C)).
- **Preprufe Tape HC**—as above for use in Hot Climates (minimum 50°F (10°C)).
- **Bituthene® Liquid Membrane—**for sealing around penetrations, etc.

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted sand or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor® fluid applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

Advantages

- **Forms a unique continuous adhesive bond to concrete poured against it**—prevents water migration and makes it unaffected by ground settlement beneath slabs
- **Fully-adhered watertight laps** and detailing
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **BBA Certified** for basement Grades 2, 3, & 4 to BS 8102:1990
- **Zero permeance** to moisture
- **Solar reflective**—reduced temperature gain
- **Simple and quick to install**—requiring no priming or fillets
- **Can be applied to permanent formwork**—allows maximum use of confined sites
- **Self protecting**—can be trafficked immediately after application and ready for immediate placing of reinforcement
- **Unaffected by wet conditions—**cannot activate prematurely
- Inherently waterproof, non-reactive system:
  - not reliant on confining pressures or hydration
  - unaffected by freeze/thaw, wet/dry cycling
- **Chemical resistant**—effective in most types of soils and waters, protects structure from salt or sulphate attack

BBA BRITISH BOARD OF AGREMENT CERTIFICATE No. 97/3325

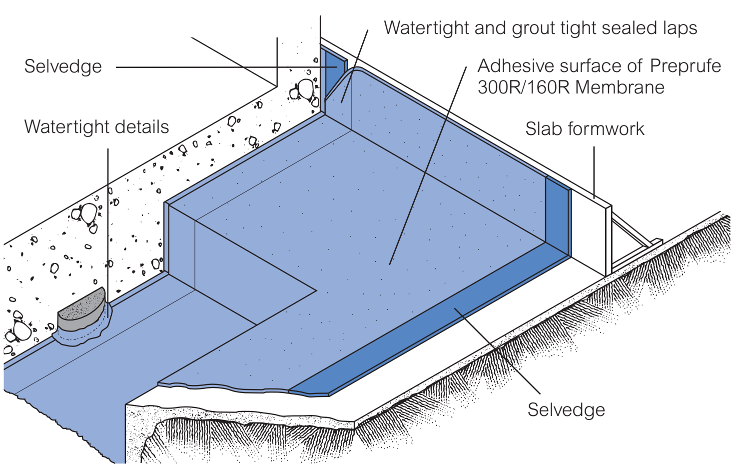
Installation

The most current application instructions, detail drawings and technical letters can be viewed at www.graceconstruction.com. Technical letters are provided for the following subjects to assist in the installation of Preprufe:

- Chemical Resistance
- Minimizing Concrete Shrinkage and Curling
- Rebar Chairs on Preprufe 300R Membrane
- Removal of Formwork Placed Against Preprufe Membranes
- Winter Lap Sealing and the use of Preprufe Tape LT

For other technical information contact your local Grace representative.

Preprufe 300R & 160R membranes are supplied in rolls 4 ft (1.2 m) wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe Membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.



Drawings are for illustration purposes only.
Please refer to www.graceconstruction.com for specific application details.

Substrate Preparation

All surfaces—It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability (see Figure 1).

Horizontal—The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. The surface does not need to be dry, but standing water must be removed.

Vertical—Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment.

Membrane Installation

Preprufe can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application.

Horizontal substrates—Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed (see Figure 2).

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

Refer to Grace Tech Letters for information on suitable rebar chairs for Preprufe.

Vertical substrates—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or similar 2 in. (50 mm) below the top edge (see Figure 3). Fastening can be made through the selvedge so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner. Any additional fasteners must be covered with a patch of Preprufe Tape (see Figure 4).

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal.

Roll ends and cut edges—Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap and roll firmly. Immediately remove printed plastic release liner from the tape.

Details

Refer to Preprufe Field Application Manual, Section V Application Instructions or visit www.graceconstruction.com. This Manual gives comprehensive guidance and standard details for:

- internal and external corners
- penetrations
- tiebacks
- columns
- grade beam pilecaps
- tie-ins
- terminations

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by jet washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Repair small punctures (0.5 in. (12 mm) or less) and slices by applying Preprufe Tape centered over the damaged area and roll firmly. Remove the release liner from the tape. Repair holes and large punctures by applying a patch of Preprufe membrane, which extends 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with Preprufe Tape, remove the release liner from the tape and roll firmly. Any areas of damaged adhesive should be covered with Preprufe Tape. Remove printed plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe R Membrane and Tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 1500 psi (10 N/mm²) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

As a guide, to reach the minimum compressive strength stated above, a structural concrete mix with an ultimate strength of 6000 psi (40 N/mm²) will typically require a cure time of approximately 6 days at an average ambient temperature of 25°F (-4°C), or 2 days at 70°F (21°C).

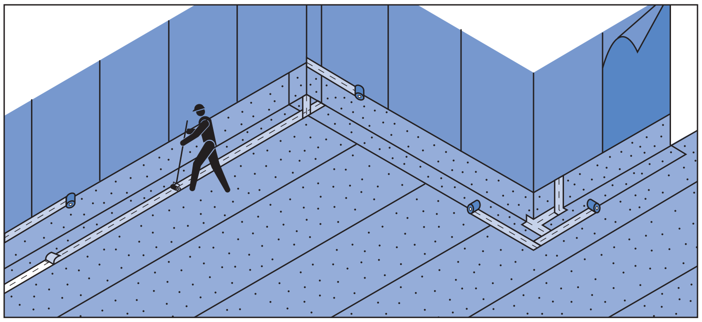


Figure 1

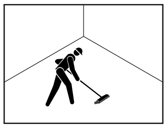


Figure 2

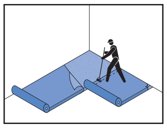
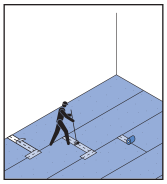


Figure 3

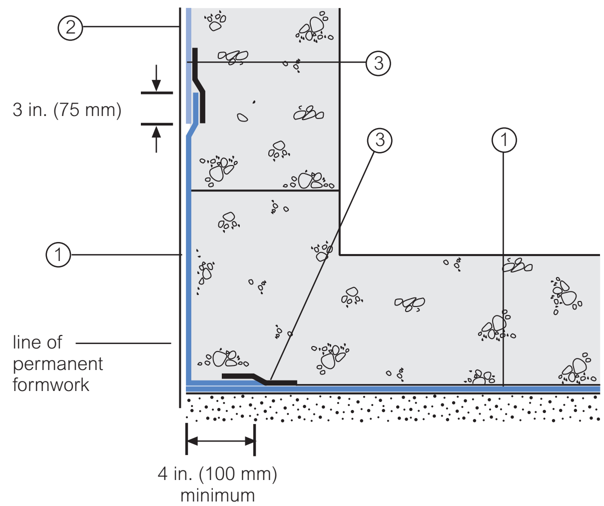
Figure 4



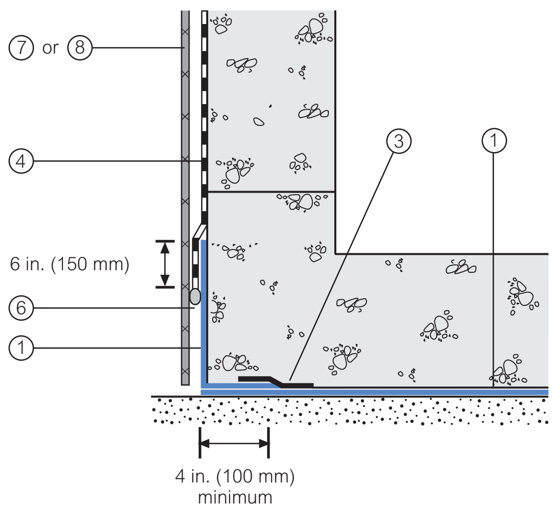
Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at www.graceconstruction.com. For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

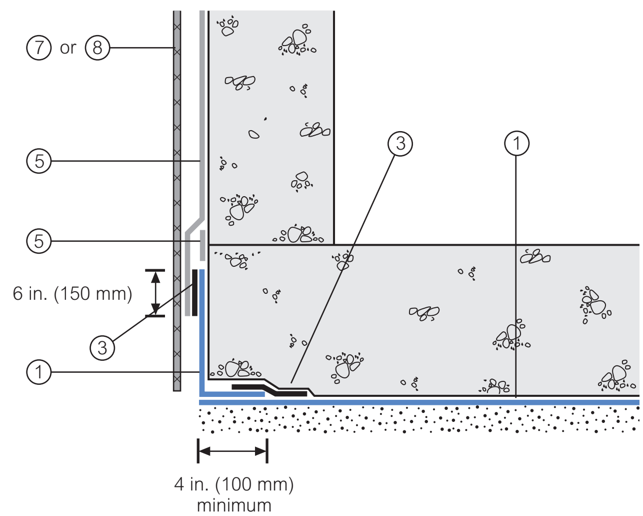
Wall base detail against permanent shutter



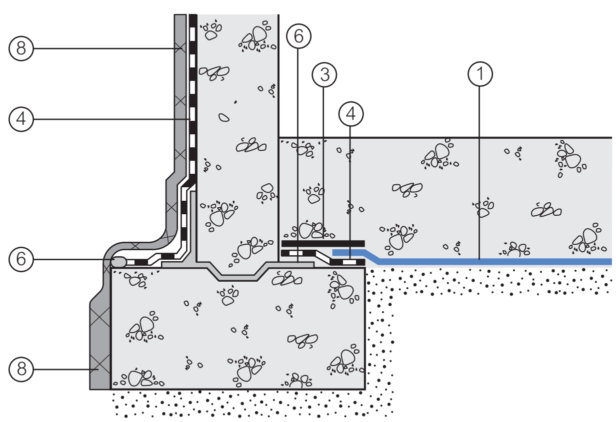
Bituthene wall base detail (Option 1)



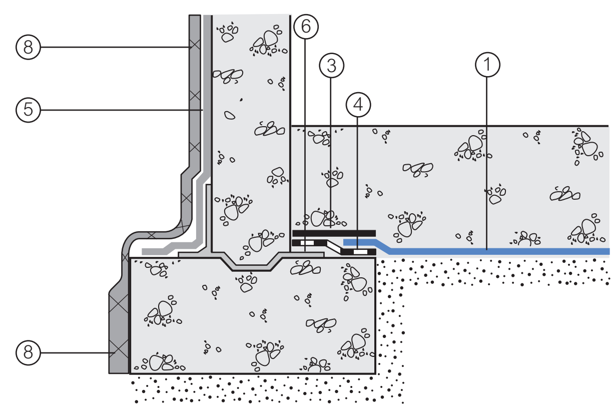
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



1 Preprufe 300R
2 Preprufe 160R

3 Preprufe Tape
4 Bituthene

5 Procor
6 Bituthene Liquid Membrane

7 Protection
8 Hydroduct®

Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft^2 (36 m^2)	460 ft^2 (42 m^2)	
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)	4.3 lbs (2 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)
* LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C)) HC denotes Hot Climate (50°F (>+10°C))			
Ancillary Products			
Bituthene Liquid Membrane—1.5 US gal (5.7 liter) or 4 US gal (15.1 liter)			

Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm) nominal	0.032 in. (0.8 mm) nominal	ASTM D3767
Low temperature flexibility	Unaffected at -10°F (-23°C)	Unaffected at -10°F (-23°C)	ASTM D1970
Resistance to hydrostatic head, minimum	231 ft (70 m)	231 ft (70 m)	ASTM D5385, modified[1]
Elongation, minimum	300%	300%	ASTM D412, modified[2]
Tensile strength, film, minimum	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -10°F (-23°C), 100 cycles	Unaffected	Unaffected	ASTM C836
Puncture resistance, minimum	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete, minimum	5.0 lbs/in. (880 N/m) width	5.0 lbs/in. (880 N/m) width	ASTM D903, modified[3]
Lap peel adhesion	2.5 lbs/in. (440 N/m) width	2.5 lbs/in. (440 N/m) width	ASTM D1876, modified[4]
Permeance to water vapor transmission, maximum	0.01 perms (0.6 ng/(Pa × s × m^2))	0.01 perms (0.6 ng/(Pa × s × m^2))	ASTM E96, method B
Water absorption, maximum	0.5%	0.5%	ASTM D570
Methane permeability	9.1 mls/m^2/day	N/A	University of London, QMW College[3]
Permeability[5] (hydraulic conductivity)	K=<1.4 x 10^{-11}cm.s^{-1}	K=<1.4 x 10^{-11}cm.s^{-1}	ASTM D5084-90

Footnotes:
1. Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
2. Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
3. Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
4. The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute at 25°F (-4°C).
5. Result is lower limit of apparatus. Membrane therefore considered impermeable.

Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions.

Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor with Preprufe.

Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

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APPENDIX L

MRCE GEOTECHINCAL REPORT

GEOTECHNICAL REPORT
4778 Broadway
New York, New York

M4778 Broadway, LLC
c/o Joy Construction
15 Verbana Avenue, Suite 200
Floral Park, NY 11001

November 4, 2020

MRCE
built on firm foundations

NEW YORK CITY | WASHINGTON, DC

MRCE
built on firm foundations

November 4, 2020

M4778 Broadway LLC
15 Verbena Avenue, Suite 200
Floral Park, NY 11001
c/o: Joy Construction

Attn: Mr. Robert Morseman

Re: Geotechnical Report
4778 Broadway
New York, NY
MRCE File 13900

Dear Mr. Morseman:

In accordance with our proposal dated February 14, 2020 and revised May 4, 2020, Mueser Rutledge Consulting Engineers (MRCE) has completed a subsurface investigation for the proposed structure at the 4778 Broadway site in the Borough of Manhattan, New York. This report presents the results of the field investigations and provides foundation recommendations for the proposed development.

Very truly yours,
MUESER RUTLEDGE CONSULTING ENGINEERS

Adam M. Dyer
Adam M. Dyer, PE

Walter E. Kaeck
Walter E. Kaeck, PE

1.0 LIST OF EXHIBITS

The following exhibits and appendices are attached:

Figure	Description
Figure 1	Site Location Plan
Figure 2	Geologic Map
Figure 3	1874 Viele Historical Map
Figure 4	Comparison of Historic Maps – 1 of 2
Figure 5	Comparison of Historic Maps – 2 of 2
Figure 6	FEMA Flood Insurance Map

Drawing	Description
Drawing B-1	Boring Location Plan
Drawing GS-R	Geotechnical Reference Standards
Drawing RC-1	Rock Core Classification Criteria
Drawing GS-1	Geologic Section A-A

Appendix	Description
Appendix A	Boring Logs

1.0 DATUMS

Elevations referenced in this report refer to the North American Vertical Datum of 1988 (NAVD88).

For ease of reference in this report, Broadway is assumed to run east-west with project North taken as the direction looking toward the front of the site (toward Broadway).

2.0 SITE DESCRIPTION

The project site is at 4778 Broadway (Block 2233 Lot 10) in the Inwood neighborhood of Manhattan, New York, as shown on Figure 1. The site is bounded by Broadway to the north, a 2-story New York City Public Library structure with a rear asphalt parking lot (Lot 13) to the east, athletic fields of NYC Junior High School 52 (Lot 20) to the south, and a 1-story commercial structure (Fine Fare Grocery Store on Lot 5) to the west.

A 1-story car wash building occupies the western half of the site. Asphalt paving covers the remainder of the site. Ground surface across the site is relatively level, at about Elev. +25. However, street grade rises rapidly to the northwest as bedrock becomes shallower as evidenced by multiple bedrock outcrops visible in parks and roadway cuts near the site.

The New York City Transit (NYCT) Dyckman Street A Train Subway Station and tunnel run below ground under Broadway immediately adjacent to the site. The bottom of the subway tunnel is at depth of about 25 feet below street surface, or about Elev. -2. The relative position of the subway tunnel to the site is shown in plan and cross-section on Drawing B-1 and Drawing GS-1, respectively.

3.0 PROJECT DESCRIPTION

The proposed development involves construction of a nine-story school building with one cellar occupying 12,000 square feet at ground floor level. Top of cellar slab is proposed at Elev. +11 with foundations expected to bear at least several feet below the cellar slab. Cellar construction will therefore require excavation to a depth of about 15 feet.

The site abuts two buildings, the NYC Public Library to the east and the Fine Fare grocery store to the west. To the south, the site is adjacent to a running track and athletic fields of a NYC public high school. The NYC Building Code requires protection of these adjacent structures during construction including monitoring of potential vibrations and deformations caused by construction activities.

4.0 AVAILABLE INFORMATION

We used the following information to assist in our development of subsurface investigations and preparation of this report:

1. Drawings for the NYCT A train tunnel. The plans include the Alignment and Grades, Roof Plan, and Cross-sections. This information is satisfactory for the development of our subsurface investigation and SOE.
2. Schematic Plans, 8 Story Commercial Building dated March 20, 2020 prepared by Aufgang Architects.
3. Map of “City and County of New York” by Julius Bien & Co. dated 1890.
4. “Central Park Quadrangle Topographic Map” published by the United States Geological Survey, dated 1947, 1956, 1995, and 2019.
5. Limited Phase II Subsurface Investigation Report dated April 24, 2017 documenting the results of an environmental investigation performed at the site by AEI Consultants.

5.0 REGIONAL GEOLOGY

An overview of the regional geology is provided since a familiarity with the soil and rock formations and their geological origin is helpful in understanding the descriptions and findings of the various subsurface explorations that follow.

Published geologic information indicates that the site is underlain by bedrock of the Inwood Marble Formation interlayered with Fordham Gneiss Formations. The Inwood Marble Formation consists of dolomitic marble and the Fordham Gneiss Formation consists of gneiss and schist. Typically, where two rock types meet, the rock quality can vary greatly. The Baskerville geologic map of Manhattan, reproduced in Figure 2, indicates that the top of rock ranges from about Elev. 0 to Elev. +20 at the project site and slopes down to the southeast. The site is also located near the foot of a slope in between two historic water courses, as shown on Figure 3. The presence of the historic watercourses is a likely indication that soil conditions may change rapidly across the site and the underlying bedrock may be of variable quality.

6.0 SITE HISTORY

A review of historic maps of the area indicates that the existing car wash structure was built on the site in the 1950s and was later expanded in footprint. The site was first developed in the early 1900s with structures likely consisting of wood frame buildings with rubble stone foundations. Lot 20 to the south was developed as a public school facility in 1932. The lots to the west were originally developed as one-story warehouses in 1948 and later combined into one lot (Lot 5). Lot 13 to the east of the site was developed as a public library in 1952. Select historic maps of the area are presented on Figures 4 and 5.

7.0 SUBSURFACE INVESTIGATIONS

A geotechnical subsurface investigation was planned and implemented to provide sufficient subsurface data for foundation design and to satisfy the New York City Building Code (NYCBC) requirements for subsurface exploration.

7.1 Prior AEI Environmental Investigation

An environmental subsurface investigation was performed by AEI Consultants in the summer and fall of 2017. A total twelve (12) geoprobe soil borings were advanced at the site to characterize overburden soils for chemical analysis and ten (10) monitoring wells were installed at the site to investigate groundwater level and water quality.

Information available from the environmental investigaton was used to plan the geotechnical site investigation and supplement the collected subsurface data.

7.2 MRCE Geotechnical Subsurface Investigation

MRCE planned and implemented a subsurface investigation consisting of 4 borings (MR-01 through MR-04) and two (2) test pits. he borings were drilled by Craig Test Boring Co., Inc. (Craig) of Mays Landing, New Jersey. All work was performed on October 9, 2020 and October 14, 2020 under the continuous inspection of our engineer, Ms. Dorothy Ullrich. Test pit excavation was deferred until completion of existing building demolition. As-drilled boring and proposed test pit locations were tape measured from existing permanent structures by our engineer and are shown on the Boring Location Plan, Drawing B-1. Ground surface elevations at boring locations were estimated from the site survey plan.

7.2.1 Borings:

MR-series borings were drilled within the site and were typically advanced to a minimum of 10 feet below the top of rock. Borings were drilled using a truck-mounted drill rig. In general, soil samples were obtained at 2.5 feet on center until bedrock was encountered and sampled by coring. The borings were advanced with mud-rotary drilling techniques using a combination of casing and bentonite-slurry or water to maintain an open borehole. Upon completion, all borings except Boring MR-02P were backfilled with soil cuttings. Boring MR-02P included installation of an open-standpipe piezometer at boring completion to facilitate monitoring of groundwater levels during and after the subsurface investigation. Logs of the MR-series borings are provided in Appendix A.

7.2.1.1 MRCE Sampling Techniques

Split-spoon soil samples were obtained in general 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 automatic hammer free–falling 30 inches. Hammer type used in the individual borings is denoted on the last page of each boring log. The number of hammer blows required to advance the sampler through each of four, six inch drive intervals was recorded. Where soils were too dense for the sampler to penetrate a full six inches, or where gravel, cobbles, boulders, or obstructions were encountered, the sampler was driven until 100 blows were applied and the actual penetration of the sampler was measured and recorded. The Standard Penetration Test (SPT) resistance, expressed in blows per foot (bpf), also termed N-value, is an indication of the relative density of the material sampled and is determined by summing the blows from the second and third six inch drive intervals. Soil samples were classified in accordance with the Unified Soil Classification System (USCS) and placed in jars and sealed with lids for preservation. A summary of the USCS criteria is provided on Drawing GS-R, Geotechnical Reference Standards.

Rock core was obtained in general conformance with ASTM D2113 – *"Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation"* using a NX sized double tube core barrel with a diamond bit. Rock core samples were described in accordance with the classification criteria shown on Drawing RC-1, Rock Core Classification Criteria, and were placed in wooden boxes for preservation. Our Field Engineer logged each core run, sketched the jointing and other features, and measured core recovery (REC) and rock quality designation (RQD). RQD is the sum of the lengths of intact rock core pieces over four inches in length expressed as a percentage of the total core run.

7.2.1.2 Open-Standpipe Piezometers

An open-standpipe piezometer was installed in Boring MR-02P to monitor the groundwater levels. The piezometer consists of a 2 inch inner diameter PVC standpipe extending to a depth of 25 feet below grade with the bottom 10 feet slotted. The standpipe is surrounded by No. 2 Morie filter sand to allow free water flow without movement of soil particles with a bentonite seal placed near the ground surface to prevent surface water infiltration. A steel cap flush with the surrounding ground surface was installed at each well for protection and to facilitate future readings. Following installation, proper operation of each piezometer was confirmed by performing a falling head test by filling the standpipe and measuring the stabilization of the water level in the piezometer with time. Piezometer construction details and water level readings are provided on the Piezometer Record accompanying the boring logs in Appendix A.

8.0 LABORATORY TESTING

All soil and rock samples were delivered to the MRCE soil mechanics laboratory for review of field classifications and testing. Laboratory testing consisted of water content determinations of fine grained (silt and clay) soil samples. Measured water contents are reported on the boring logs. Field descriptions were revised as needed based on the results of our reclassification and laboratory testing. Final sample descriptions are shown on the typed logs in Appendix A.

9.0 SUBSURFACE CONDITIONS

Our interpretation of general subsurface conditions encountered in the borings is illustrated on Geologic Section A-A shown on Drawings GS-1. Boring information shown on the geologic section includes sample number and position, sampler penetration resistance (SPT N-value), and USCS group symbol for soil samples. SPT N-values summarized herein and shown on the geologic section are field values and are uncorrected for hammer energy efficiency. For rock cores, boring information includes core number and position, REC, and RQD.

9.1 Stratum F – Fill (NYCBC Class 7)

The site is covered by a miscellaneous, predominantly granular fill (Stratum F) placed to level ground during initial site development. Stratum F consists of loose to very compact black and brown gravelly fine to coarse sand, trace silt grading to silty fine to coarse sand with local accumulations of brick, metal, wood, and concrete. Stratum F ranges from 4 to 10 feet in thickness and is generally thickest (extending to greater depth) in the southern part of the site. Measured SPT N-values ranged from 2 blows per foot (bpf) to 51 bpf with a median of about 21 bpf. Abandoned rubble stone, concrete, and/or brick foundations are expected.

9.2 Stratum S –Sand (NYCBC Class 3 and 4)

Natural sand (Stratum S) underlies Stratum F throughout the site. Stratum S is comprised predominantly of loose to compact brown fine to coarse sand, some to trace silt, trace to some clay, trace gravel with lenses and pockets of clay and clayey silt. Stratum S generally ranges from 13 to 17 feet in thickness. N-values average about 28 bpf and typically vary from 2 to 100 bpf. Water content of fine grained silt and clay soils are 23% and 28%.

9.3 Stratum DR – Decomposed Rock (NYCBC Class 1d)

Decomposed rock (Stratum DR) is present beneath the Stratum S sand in two of the borings (MR-03 and MR-04) as pockets or seams at the top of the underlying more competent bedrock. Stratum DR consists of brown fine to coarse sand, some gray silty fine to medium sand, trace clay, rock fragments. This stratum can be sampled by split spoon soil samplers and is expected to behave as a soil-like material. Where present, its thickness ranges from 2 feet to 6 feet. Some samples exhibited a relict rock structure.

9.4 Stratum R – Rock (NYCBC Class 1c to 1b):

Bedrock of variable quality underlies the Stratum S sand or Stratum DR decomposed rock where present. Stratum R consists of medium-hard to intermediate un-weathered to moderately weathered light gray marble, blocky to jointed with weathered and iron-stained joints. Core recovery ranges from 70 to 100% and RQD ranges from 60% to 100%. Experience in underground construction at other sites in the project vicinity indicates areas of lesser rock quality (weathered rock and even decomposed rock) can be expected interlayered with harder rock and also dispersed throughout the site. Intervals of lower rock recovery in the borings are likely indications of zones of lesser quality rock (NYCBC Class 1d).

The top of Stratum R rock encountered in the borings ranges from Elev. +1.8 to Elev.+ 4.8 and generally slopes downward to the southeast.

9.5 Groundwater

The observed groundwater level in open-standpipe piezometer MR-02P was at about Elev. +10.6. Observed groundwater levels reported in the prior site Environmental Investigation by AEI indicate a seasonal fluctuation in groundwater levels from about Elev. +9 in the late summer to about Elev. + 11.5 in late winter/early spring. Groundwater levels are expected to vary seasonally throughout the year depending on the precipitation and surface water infiltration. As such, the groundwater level at the time of construction may be different from levels observed at the time of the field investigation.

10.0 DESIGN PARAMETERS

10.1 Soil and Rock

Recommended soil and rock design parameters are provided in Table 1.

Table 1 – Soil and Rock Design Parameters

Soil Stratum	Total Unit Weight, γ (pcf)	Effective Friction Angle, ϕ (°)
F – Fill	120	30
S – Sand	125	32
DR – Decomposed Rock	130	36
R –Rock	135	--

10.2 Design Groundwater and Flood Levels

Limited groundwater level observations in the geotechnical and environmental subsurface investigations indicate a seasonal variation of groundwater at the site from about Elev. +9 to Elev. +11.5. However, higher groundwater levels may be possible due to variations in groundwater recharge and climatic conditions in the future. On that basis, we recommend a design hydrostatic groundwater level at Elev. +13.5.

Design should also account for groundwater in an extreme event at the ground surface due to localized flooding from water main breaks or other unexpected events in the street or within the site. The use of elevated stress levels in design may be appropriate under such temporary loading conditions.

The most recent Flood Insurance Rate Maps, reproduced on Figure 6, by the Federal Emergency Management Agency, indicate that the site is within a zone of minimal flood hazard (Zone X), above the 100-year and 500-year flood levels.

11.0 SEISMIC DESIGN PARAMETERS

The NYCBC requires an assessment of the liquefaction potential of site soils under the NYCBC specified seismic event and evaluation of the seismic Site Class to determine seismic design parameters.

11.1 Liquefaction Potential

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. Groundwater observations indicate that the depth to groundwater is approximately 15 feet below grade.

Liquefaction susceptibility of soils below the groundwater level was assessed using the NYCBC Liquefaction Assessment Diagram (Figure 1813.1), which compares field measured SPT N-values corrected to an equivalent transferred energy of 60%, termed N60, with specified liquefaction “screening lines”. The Code screening diagram indicates that the natural Stratum S sands below the groundwater table are not expected to liquefy in a seismic event.

11.2 Seismic Site Class

Seismic design parameters were derived in accordance with NYCBC using the results of the borings and the anticipated cellar level at about Elev. +11. For an Occupancy Category (OC) II/III structure, the seismic design parameters are shown below in Table 2.

Table 2 – Seismic Design Parameters

Site Class	D
Design Short Period Spectral Response, S_{DS} (g)	0.29
Design 1-Section Period Spectral Response, S_{D1} (g)	0.12
Seismic Design Category	B

12.0 FOUNDATION RECOMMENDATIONS

Foundation recommendations are provided based on the results of the subsurface investigation and our understanding of the current project/building design as described herein. Our recommendations should be reviewed if the scope of the proposed construction changes significantly.

12.1 Foundations

As shown on the geologic section on Drawing GS-1, soils at the proposed cellar level consist primarily of medium compact Stratum S sands. However, the borings indicate the presence of lenses and pockets of looser sand and clay within Stratum S. On that basis, we recommend supporting the proposed structure on a mat foundation to provided better distribution of applied loads across potential looser or softer zones within Stratum S. Soils of Stratum S in undisturbed condition are suitable for an allowable bearing pressure of 3 tons per square foot (tsf). At the recommended bearing pressure, settlement of properly sized mats bearing on undisturbed Stratum S should result in differential settlement between columns of less than ½ inch.

The structural design of a mat is typically performed using Winkler springs to represent the load-deformation response of subgrade soils. Such springs are characterized by coefficients of subgrade reaction or subgrade modulus. The selected values of subgrade modulus used in the analysis of a mat must be compatible with the deformation characteristics of the subgrade including any time dependent soil response such as from consolidation. The use of a single constant subgrade modulus is usually not appropriate and can produce misleading results. Mat design therefore requires an iterative analysis wherein the computed mat deflections by the structural engineer are compared to the subgrade response (mat settlements) predicted by the geotechnical engineer for the range of loads and loading conditions applied to the mat. The effects of geometry and applied loads on the mat deformation must be carefully evaluated, and the subgrade modulus distribution modified accordingly for the structural analysis. Analysis is continued by adjusting the subgrade modulus based on mat contact pressures until computed mat deflections are reasonably compatible with predicted settlements.

To initiate mat design, we recommend using an allowable bearing pressure of 3 tsf with a variable subgrade modulus of 50 tons per cubic foot (tcf) in the mat center and 25 tcf along a strip around the mat perimeter equal to one-sixth of the least mat dimension. These values of subgrade modulus account for groundwater position and mat size assuming the mat will cover the entire site with a least dimension (east to west) of about 100 feet. Mat design should be performed in accordance with ACI 336.2R and the initial values of subgrade modulus refined using an iterative analysis between structural and geotechnical engineers as described above.

12.2 Cellar Slab Uplift Protection

The cellar slab at Elev. +11 is just below the observed range in groundwater levels (Elev. + 9 to Elev. +11.5) and several feet below the design groundwater table of Elev. +13.5. Groundwater will produce an uplift pressure that must be resisted by the dead load of the structure or other positive measures provided to resist or relieve the excess uplift pressure.

We recommend using a factor of safety of at least 1.2 in evaluating uplift resistance under the design water level. Uplift resistance should be calculated using only the dead weight of the structure in place. Live load 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 or the slab design cannot accommodate the full uplift pressure, tiedown anchors, tension piles or other positive measures provided to resist the excess uplift pressures.

Alternatively, if the thickness of the mat slab is not sufficient to resist water pressure at the design groundwater elevation, a drainage system could be installed below the slab with gooseneck riser pipes set at or near the slab level to allow overflow and pressure relief during a temporary rise in groundwater levels above the observed normal range in groundwater fluctuation. 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 foundation subgrade to prevent soil fines from migrating into and potentially clogging the underdrain system.

12.3 Foundation Walls

Permanent foundation walls must withstand long-term, at-rest earth pressure, surcharge pressure, and water pressure consistent with NYCBC requirements. From ground surface to top of bedrock, we recommend calculation of at-rest earth pressures using an equivalent fluid pressure of 65 pounds per square foot (psf) per foot of depth above the design groundwater level and 95 psf per foot of depth below the design groundwater level. The design surcharge pressure should be in accordance with the NYCBC considering the greater of either a “static” (e.g.: crane load) or “seismic surcharge”.

Foundation walls must also accommodate a temporary rise in groundwater level to the ground surface such as may occur due to a water main break. The use of elevated stress levels is appropriate in the design of foundation walls for these temporary load conditions.

12.4 Waterproofing

We recommend damp proofing of cellar walls as a minimum to mitigate moisture infiltration in below grade space. Membrane waterproofing of the mat slab and foundation walls is recommended below the design groundwater level and should be considered for the full height of the cellar wall (above and below the groundwater level) to provide a dry cellar and limit dampness if the cellar will serve as high quality or habitable space. We recommend waterstops at construction joints. The waterproofing system must be carefully designed and detailed, and construction inspection is vital to provide proper quality control.

12.5 NYCT Review and Foundation Construction Requirements

The presence of the adjacent subway will require NYCT review of the proposed foundation and support of excavation (SOE). We anticipate that NYCT will require that all foundations gain bearing below the influence line of the NYCT structure shown on Drawing GS-1. As shown on Drawing GS-1, based on a proposed cellar level at Elev. +11 built up to the property line, foundations will bear below the NYCT influence zone and deep foundations for building support should not be required by NYCT.

13.0 CONSTRUCTION CONSIDERATIONS

Cellar construction requires excavation in soil to depths of 15 to 20 feet below existing site grades. Temporary works including excavation support, dewatering, and monitoring systems are therefore required to facilitate this below grade construction.

13.1 Earthwork

Earthwork at the site will entail excavation to about 15 to 20 feet below existing ground surface and several feet below the static groundwater level.

13.1.1 Excavation:

The subsurface profile consists of a granular fill stratum overlying a natural sand stratum that is underlain by bedrock at a depth of about 20 to 22 feet across the site. Excavation of site soils can be accomplished using conventional earthwork equipment. Existing intact foundations that may be present in the fill stratum and may require using pneumatic hammers for removal.

13.1.2 Subgrade Protection:

Subgrade for foundations should be inspected by an Engineer licensed in New York to confirm natural subgrade is undisturbed and meets the requirements of Code Class 3b Soil or better. Foundation subgrade should be cleaned of loose material, inspected and protected immediately following approval with a lean concrete mud slab to provide a level surface for waterproofing installation and slab construction.

13.1.3 Backfill:

Construction documents must define classes of fill, such as select fill and common fill based on purpose and desired engineering characteristics. Select fill should consist of relatively clean, well-graded sands or sand-gravel mixtures (SP or SP-SM) with a maximum of 10% passing the No. 200 sieve. The percentage passing the No. 200 sieve should be based on the fraction passing the No. 4 sieve. Common fill should consist of granular soils (SP, SP-SM, SM and SC) with no more than 35% fines and maximum liquid limit of 25 and plasticity index of 6.

Select fill is recommended for use beneath structures and as backfill adjacent to below grade walls. Select fill should be placed in loose lifts not exceeding 12 inches (six inches where hand operated equipment is used) and compacted to a minimum of 95% of the Modified Proctor maximum dry density (ASTM D 1557). Common fill may be used to raise grades beneath roadways and surrounding structures. The top 12 inches of backfill against structures should consist of a compacted sand-clay mixture to minimize surface water infiltration and be sloped to drain away from structures. Common fill should be placed in loose lifts not exceeding 12 inches and compacted to a minimum of 90% of the Modified Proctor maximum dry density (ASTM D 1557). Lift thicknesses in confined areas, such as utility trenches should be limited to six inches.

Granular soils on site may be suitable for reuse as fill pending environmental characterization and provided that they meet the above gradation requirements; are free of organic or other deleterious materials; particles larger than 4 inches are removed; and moisture content is suitable for compaction. 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 control density tests prior to use to determine if they meet the specified backfill requirements.

Soils with fines content greater than 10% or plastic 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 must factor the costs of such manipulation and impacts on productivity in selection of backfill sources and scheduling of backfill placement.

13.2 Dewatering and Groundwater Control

Cellar construction is anticipated to require excavation below the water table. Dewatering is therefore required to provide and maintain dry, undisturbed subgrades for foundation construction. The dewatering system should be designed to lower and maintains water levels a minimum of 2 feet below excavation subgrade during excavation and until the building has sufficient load to resist the design groundwater levels. All dewatering effluent must be characterized for disposal and treated/discharged in accordance with governing regulations.

The dewatering system, including performance monitoring, should be designed by a Professional Engineer experienced in this work. The NYC Department of Environmental Protection (NYCDEP) requires discharge permits for groundwater extracted from temporary, construction-related sources.

13.3 Support of Excavation

Excavations should be sloped as necessary for safety and stability or supported by sheeting and bracing in accordance with Code and OSHA regulations. Open-cut excavation is permissible for shallow excavations removed from the influence of adjacent utilities and structures provided groundwater is properly controlled in advance of excavation. Where space permits, the excavations sides can be sloped no steeper than 1V:1.5H. If sloped excavation sides are not practical, temporary shoring is required.

We recommend using a soldier pile and lagging wall for excavation support for general excavation to foundation subgrade along the north and south sides of the site. Drilled soldier piles are recommended to limit vibrations and settlement of adjacent structures . Drilled soldier piles should be advanced through overburden using wash rotary drilling maintaining external flush throughout advancement. Use of forced air drilling should only be employed to advance through obstructions and be terminated upon penetrating through the obstruction. Lateral bracing should consist of either steel rakers/corner braces or drilled tiebacks (if permission for installation beneath neighboring properties is obtained). Raker/corner braces are required along the north side of the site due to the presence of the subway beneath Broadway.

SOE systems must be carefully installed in advance of excavation and designed by a Professional Engineer to have sufficient stiffness and stability so that lateral movements do not lead to subsidence or damage to adjacent structures or completed work and to have sufficient embedment to permit stable excavation to the required excavation subgrade. Appropriate surface surcharge pressures per the NYCBC must also be considered such as from adjacent roadways and temporary construction loads.

13.4 Underpinning and Protection of Adjacent Structures

The site is abutted by existing buildings along the east and west property lines as shown on Drawing B-1. The public library to the east has a basement with foundations expected to bear at a depth of about 12 to 15 feet. The grocery store building to the west has no basement space and is expected to have foundations bearing at depth of about 3 to 5 feet. Depth of adjacent foundations should be confirmed by test pits prior to producing final foundation and support of excavation design drawings. In comparison, the proposed cellar construction will require excavation to a depth of 15 feet or more. Underpinning of the adjacent foundations is therefore expected.

Conventional pit underpinning methods are viable for underpinning provided groundwater is properly controlled. Pit underpinning involves the sequenced excavation of small pits beneath the existing foundation. Individual pits are excavated and shored by hand to just below the new foundation depth. The pit is then filled with concrete leaving a 2 to 3-inch gap at the top for future load transfer using steel plates and wedges with drypack. Subsequent pits are excavated and constructed in a sequenced manner to prevent instability and form a continuous wall. Given the anticipated depth of underpinning, lateral bracing of underpinning pits is likely required. Bracing can consist of tiebacks or internal bracing such as inclined rakers, if permission to install tiebacks beneath adjacent properties is not obtained.

Alternatively, if underpinning is not desired, the cellar level can be stepped in from the property line to avoid underpinning of adjacent structures and the perimeter walls supported on deep foundations or designed to cantilever from interior foundations.

13.5 Monitoring and Instrumentation

Condition surveys of all structures within 50 feet of the work should be performed to document existing conditions prior to construction. Surveys should consist of a written report with photographs of defects and a plan indicating location of defects and the corresponding photographs.

Monitoring should include control points on adjacent structures and roadways to monitor and alert of potential vertical and lateral movement caused by construction. Control points should also be established at regular intervals along excavation support systems for similar movement monitoring. Monitoring should also include seismographs in adjacent structures to monitor vibrations caused by excavation and demolition of remnant foundations.

14.0 GEOTECHNICAL REVIEW OF FOUNDATION DESIGN AND CONSTRUCTION

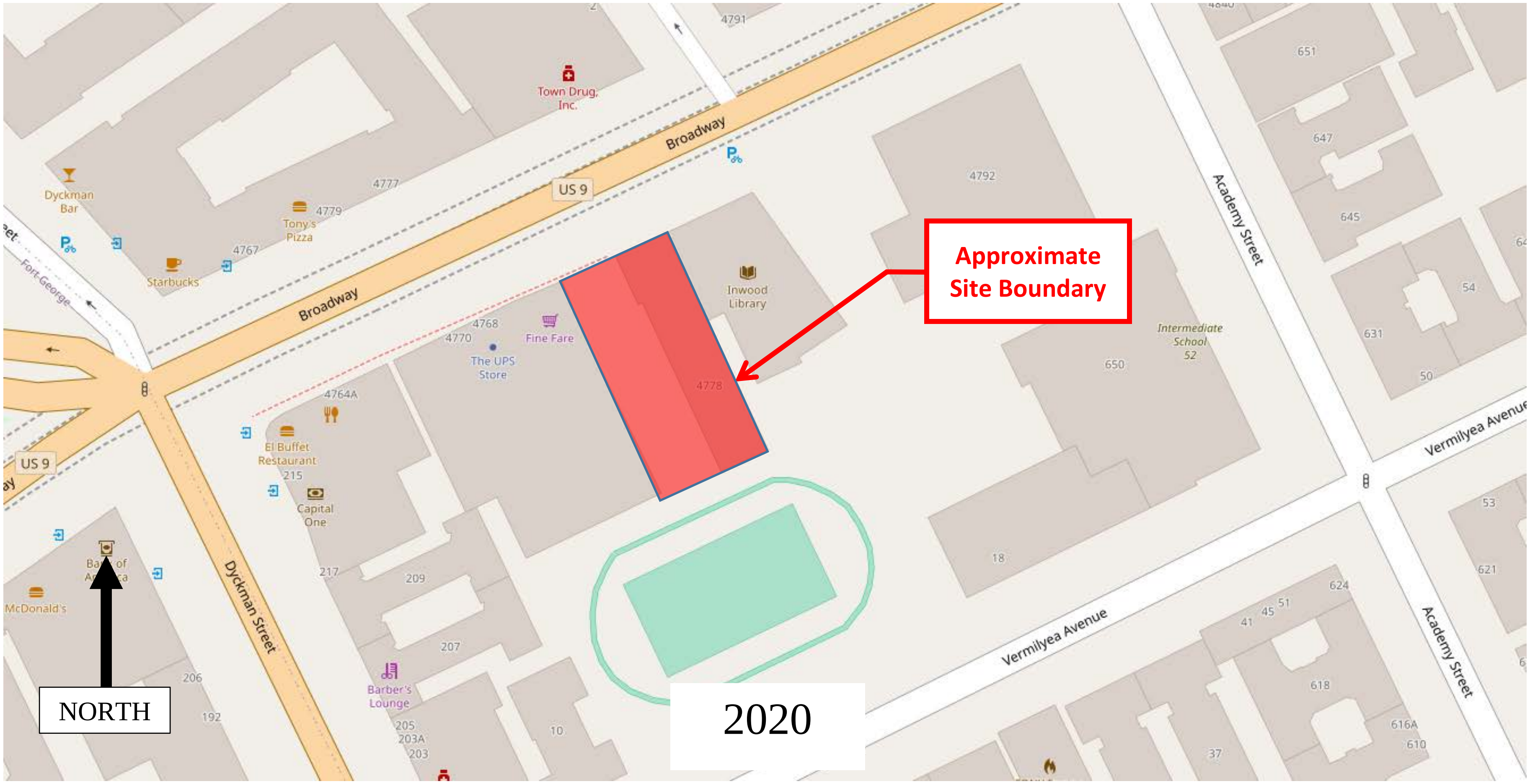
Interaction between the geotechnical and structural engineer is essential as foundation design progresses to optimize building foundations and provide adequate building performance under the range in service loading conditions. Geotechnical review and assistance in preparation of foundation plans and specifications for below grade work is also recommended so that foundation and construction recommendations provided herein are properly interpreted and implemented in the design.

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 and observed at the time of our subsurface exploration. The nature and extent of variations between borings may not become evident until exposed during 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 a qualified geotechnical engineer in accordance with Code requirements including inspection of pile installation and testing, support of excavation, and placement of controlled fill beneath and around structures.

15.0 CLOSURE

This report summarizes the results of subsurface investigations performed at the project site and our foundation recommendations for the proposed development as described herein. The borings made as part of these investigations provide adequate subsurface data for foundation design and meet the intent of subsurface exploration requirements per NYCBC.

FIGURES



4778 Broadway			
NEW YORK			NEW YORK
MUESER RUTLEDGE CONSULTING ENGINEERS PLLC			
14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122			
SCALE	MADE BY: MJ	DATE: 10-26-20	FILE No.
N/A	CH'KD BY: AMD	DATE: 10-29-20	13900
SITE LOCATION PLAN			FIGURE 1

NOTES:

1. Source: Open Street Map (www.openstreetmap.org), accessed on October 26, 2020.

EXPLANATION OF MAP UNITS

GEOLOGIC UNITS AND LITHOLOGIC DESCRIPTORS

This map is intended chiefly for use by engineers and other non-geologists to whom stratigraphic correlation and nomenclature are of little concern. For this reason the geologic units from sheet 1 are represented by lithologic descriptors—lowercase letters that describe the dominant lithology of a unit—as defined in the following table. The three categories of terms in the table are separated by slashes in the lithologic descriptors; for example, w/cd/m on the map represents white calcite-dolomite marble. The principal minerals indicated are generally abundant key minerals and are easily recognized in hand specimens of the rock.

Color (prefix)	Principal minerals	Rock name (suffix)
bw, black and white	b, biotite	am, amphibolite
dg, dark gray	c, calcite	g, gneiss
g, gray	d, dolomite	gr, granite
gb, greenish black	g, garnet	m, marble
p, pink	h, hornblende	s, schist
w, white	m, muscovite	q, quartzite
	mi, microcline	
	p, plagioclase	
	q, quartz	
	s, sillimanite	
	t, tourmaline	

GEOLOGIC UNITS COMBINED ACCORDING TO SIMILAR ENGINEERING CHARACTERISTICS

The major common attribute of engineering significance used in the grouping of these units is similarity of rock type, which should give rise to reasonably uniform strength characteristics for intact rock (rock without faults or other discontinuities). Intact-rock strength decreases with an increase in discontinuity frequency and in weathering (Farmer, 1983). Parenthetically following the descriptor definitions are the formal geologic-unit names.

g/smt/s Gray sillimanite-muscovite-tourmaline schist (Manhattan Schist)
g/pqm/s Gray plagioclase-quartz-muscovite schist (Walloomsac Formation)

w/cd/m White calcite-dolomite marble (Inwood Marble and marbles interlayered with units of the Fordham Gneiss)

w/q White quartzite (Lowerre Quartzite)

p/qpb/g Pink quartz-plagioclase-biotite gneiss (Yonkers Gneiss)

p/mbp/g Pink muscovite-biotite-plagioclase gneiss (Fordham Gneiss, member A)
dg/hbq/g Dark-gray hornblende-biotite-quartz gneiss (Fordham Gneiss, member D)
bw/gpb/g Black and white garnet-plagioclase-biotite gneiss (Fordham Gneiss, member B)
g/qbp/s Gray quartz-biotite-plagioclase schist (Fordham Gneiss, member C)

w/qmim/gr White quartz-microcline-muscovite granite
g/bmq/s Gray biotite-muscovite-quartz schist
g/mbq/s Gray muscovite-biotite-quartz schist
g/spm/s Gray sillimanite-plagioclase-muscovite schist
gb/am Greenish-black amphibolite
(Hartland Formation)
g/sgmi/g Gray sillimanite-garnet-microcline gneiss (Ravenswood Granodiorite)

g/gps/g Gray garnet-plagioclase-sillimanite gneiss
g/spb/g Gray sillimanite-plagioclase-biotite gneiss
g/bh/g Gray biotite-hornblende gneiss
(Hartland Formation, Pelham Bay Member)

am Amphibolite (same rock as gb/am, but outcrops are large enough to show separately on map)

EXPLANATION OF MAP SYMBOLS

SUBSURFACE ENGINEERING STRUCTURES

Old and New Croton Aqueducts—Former is shown incomplete north of Major Deegan Expressway because it currently is not in use

City Water Tunnels No. 1, 2 or 3

Subway and (or) railroad tunnel

Consolidated Edison Company gas tunnel

Sewer tunnel

FORMER DRAINAGE AND SHORELINE

Former drainage and shoreline—In blue. Shown only where different from present drainage and shoreline. Areas formerly under water are shown by dot pattern. Where extremely small, former ponds are labelled "p." Straight line segments probably are furrows and ditches built to lower the water table

Former swamp or marsh—In blue. Dashed line defines where swamp or marsh adjoins higher ground. Extremely small occurrences are labelled "s"

GEOLOGY—SURFACE AND SUBSURFACE

Contact between geologic units—Dashed where approximately located; dotted where under water; queried where uncertain. Where shown solid under water, was located by test borings and tunnel data

Fault—Paired arrows show relative movement; U, upthrown side; D, downthrown side. Dashed where approximately located; dotted where under water; queried where uncertain. Where seen in tunnel, arrow shows inclined dip, and short line normal to fault trace shows vertical dip

Thrust fault—Sawteeth on upper plate. Dashed where approximately located; dotted where under water. Where seen in tunnel is shown solid. Alternating solid and open sawteeth indicate thrust faults coincident in map view (near Roosevelt [Welfare] Island; see sheet 1)

Overturned thrust fault—Sawteeth are on lower plate, but point in direction of movement of overturned upper plate; bars are on upper plate (see sheet 1, cross section *A–A'*)

Crush or shear zone encountered in underground workings—Shows dip where known

Contours on the bedrock surface—Based on same datum as topographic contours. Closed, hachured areas indicate depressions. Contour interval 10 ft

Single outcrop or area of closely spaced outcrops

NOTES:

1. Source: Source: Baskerville, Bedrock and Engineering Geologic Maps of Bronx County and Parts of New York and Queens Counties, New York, 1992.

4778 Broadway			
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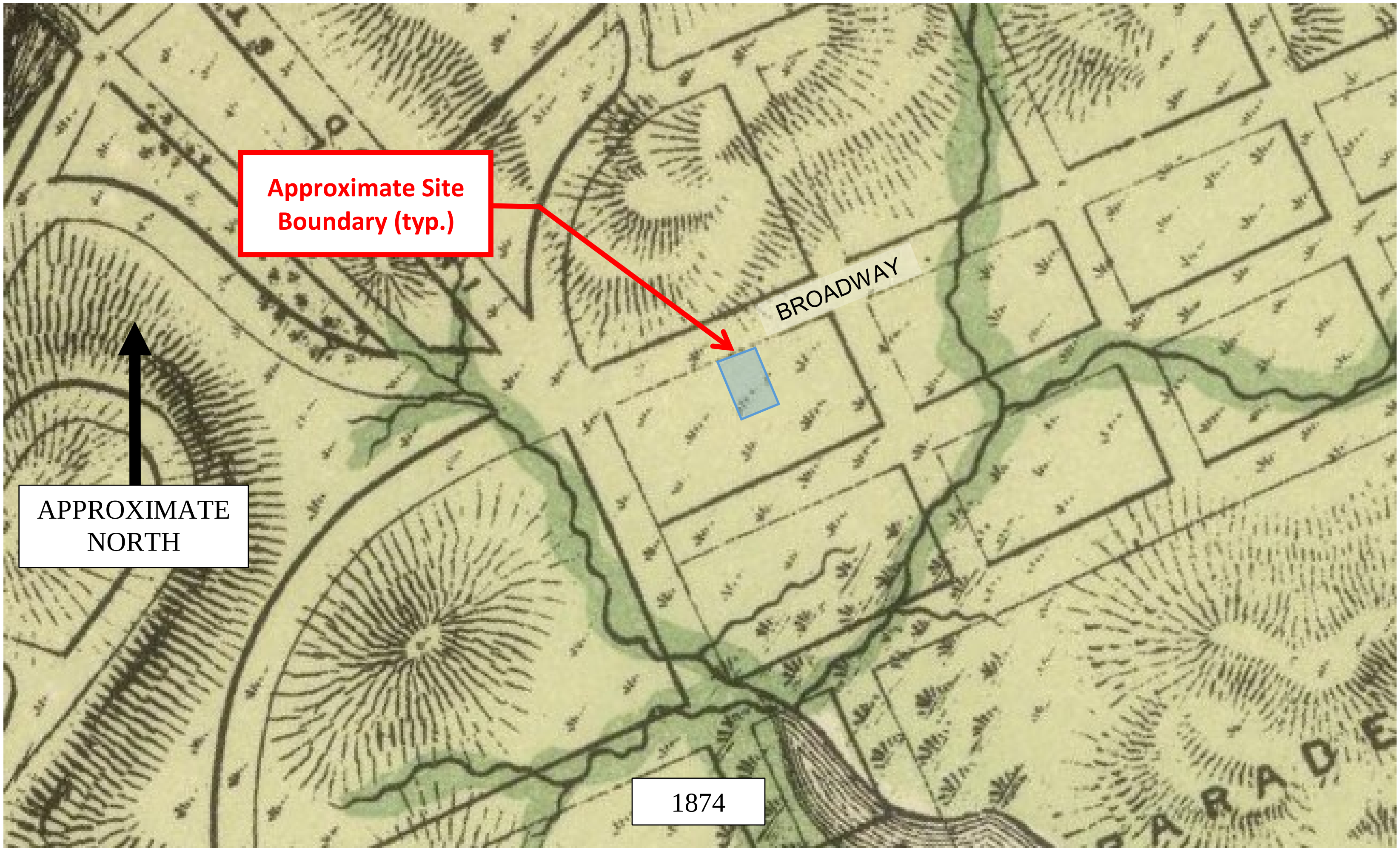
N/A	CH'KD BY: AMD	DATE: 10-29-20	13900
GEOLOGIC MAP			FIGURE 2



NOTES:

1. Egbert L. Viele, Topographical Atlas of the City of New York, 1874.

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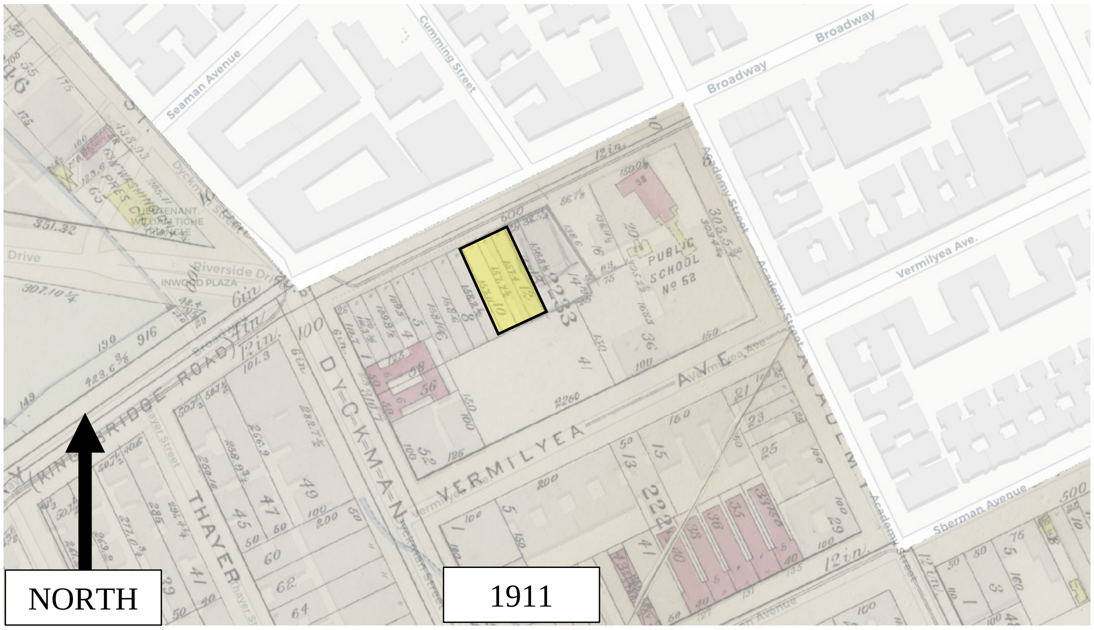
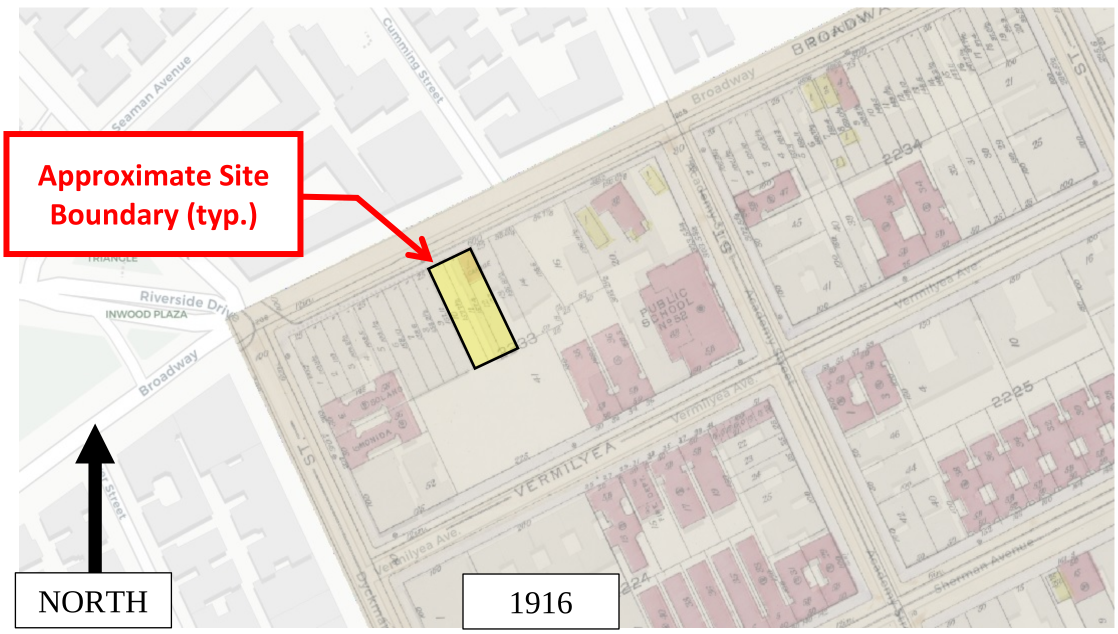
VIELE HISTORICAL MAP OF WATERWAYS			FIGURE 3





NOTES:

1. Lionel Pincus and Princess Firyal Map Division, The New York Public Library. "Plate 48" The New York Public Library Digital Collections. 1911.
2. Lionel Pincus and Princess Firyal Map Division, The New York Public Library. "Plate 184" The New York Public Library Digital Collections. 1916.

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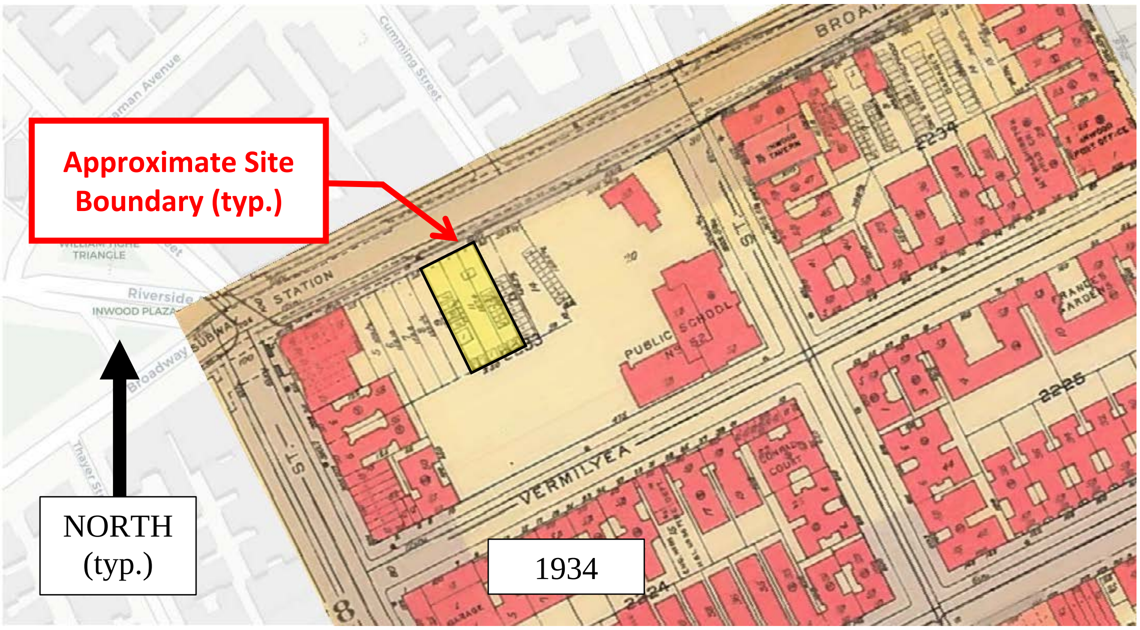
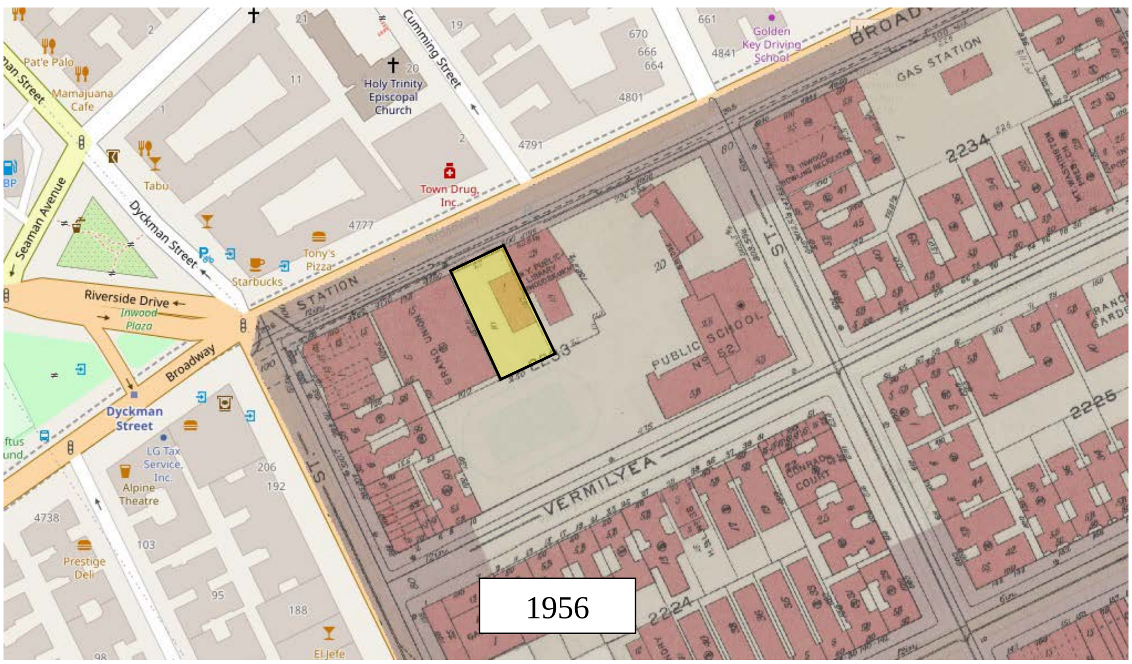
N/A	CH'KD BY: AMD	DATE: 10-29-20	13900
HISTORIC SITE MAP 1 OF 2			FIGURE 4





NOTES:

1. Manhattan Land Book, G.W. Bromley & Company. "Plate 184" The City of New York. 1934.
2. Lionel Pincus and Princess Firyal Map Division, The New York Public Library. "Plate 183, Part of Section 8" The New York Public Library Digital Collections. 1955 - 1956.

4778 Broadway

NEW YORK — NEW YORK

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14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

SCALE	MADE BY: MJ	DATE: 2020-10-26	FILE No.
N/A	CH'KD BY: AMD	DATE: 2020-11-03	13900

HISTORIC SITE MAP 2 OF 2	FIGURE 5

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

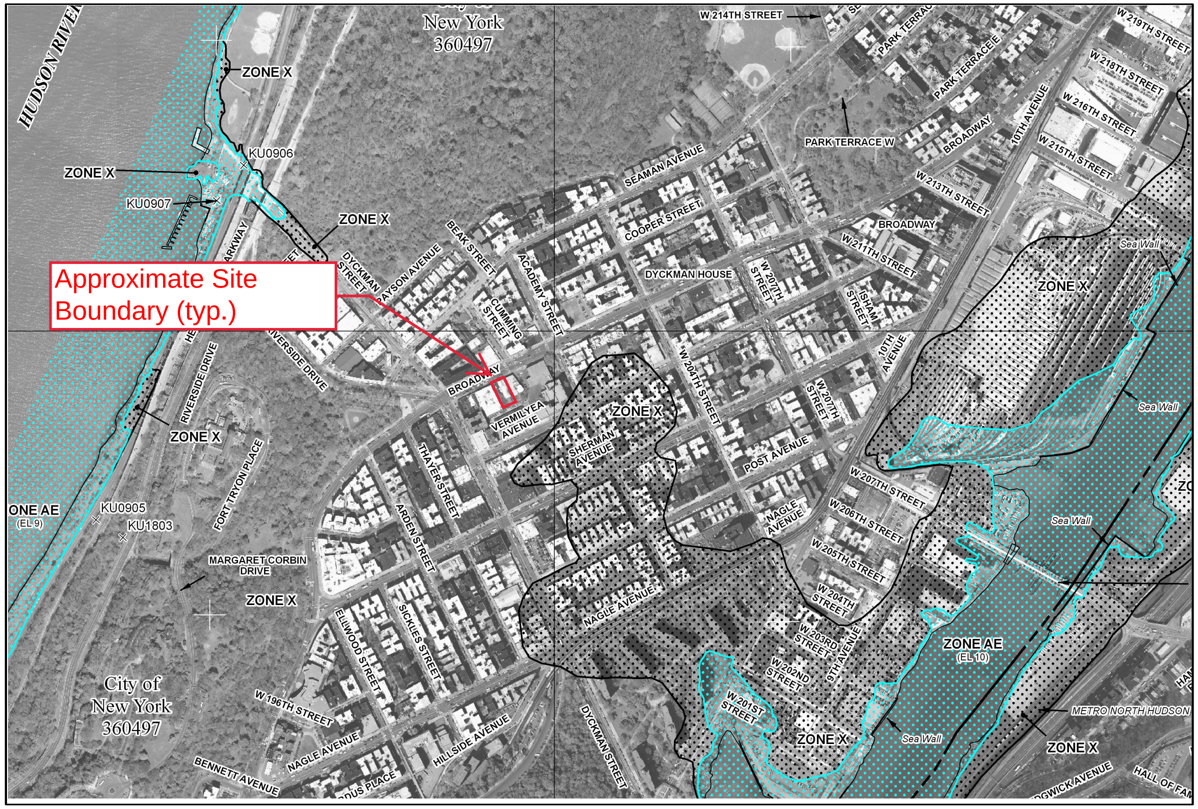
OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the National Geodetic Vertical Datum of 1929

(A)———(A)	Cross section line
(23)- - - - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
[24]76[000m]N	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks: New York State Plane coordinate system, Long Island zone (FIPSZONE 3104), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile



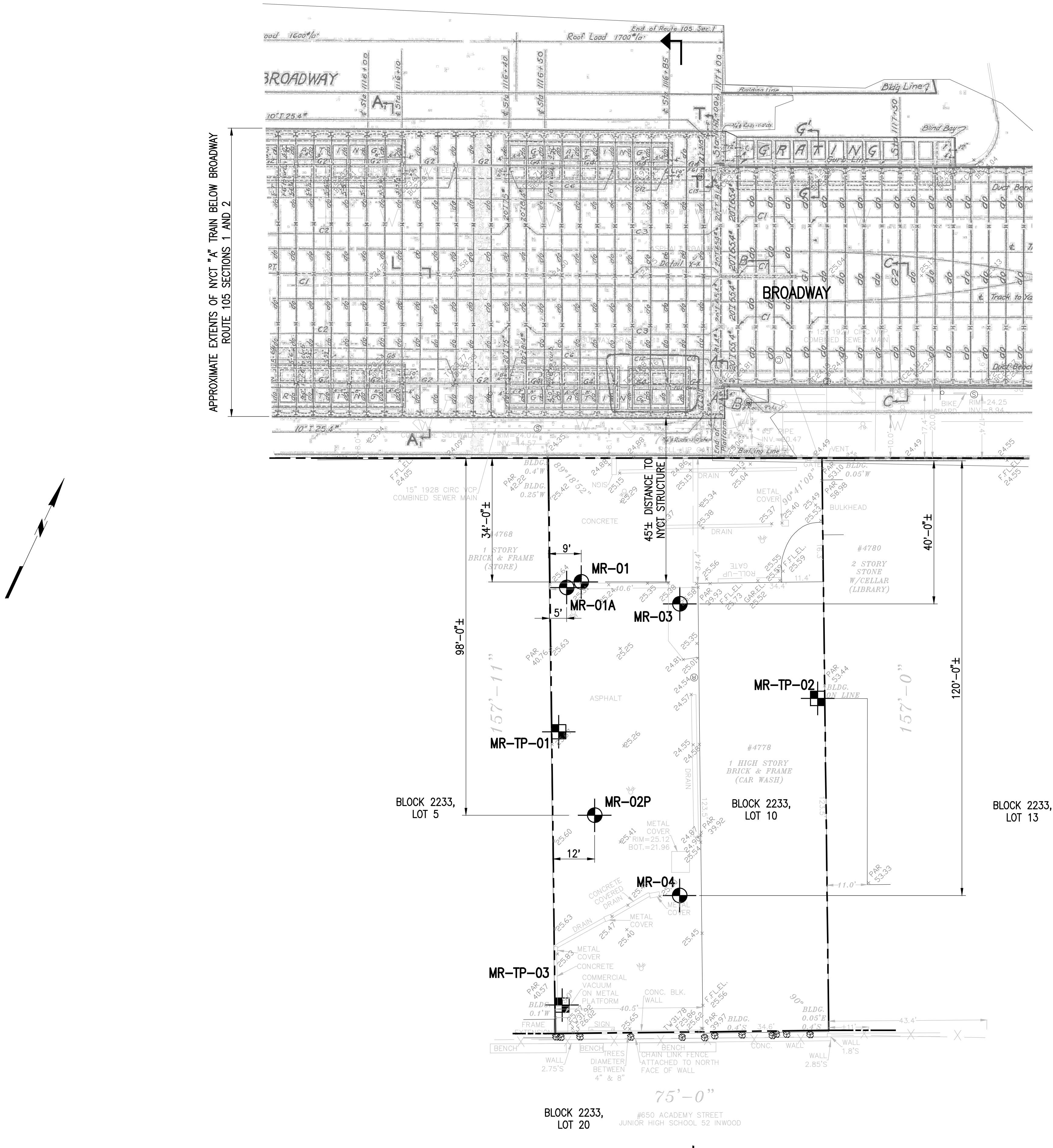
NORTH

NOTES:

1. Source: Flood Insurance Rate Map (FIRM), City of New York, by Federal Emergency Management Agency, dated September 5, 2007.
2. All elevations refer to NGVD 29, where Elev. 0 corresponds to Elev. 1.1 in NAVD 88.

4778 Broadway					
NEW YORK					NEW YORK
MUESER RUTLEDGE CONSULTING ENGINEERS PLLC					
14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122					
SCALE	MADE BY: MJ		DATE:	11-26-20	FILE No.
N/A	CH'KD BY:		DATE:		13900
FEMA FLOOD INSURANCE RATE MAP					FIGURE 6

DRAWINGS



PLAN

SCALE: 1"=16'-0"

A
B-1 GS-1

LEGEND:

MR-01
- 2020 MRCE BORING LOCATION
- P DENOTES OPEN-STANDPIPE PIEZOMETER

MR-TP-01
- 2020 MRCE PROPOSED TEST PIT LOCATION

NOTES:

1. BASE PLAN ADAPTED FROM:
   A. TOPOGRAPHICAL SURVEY PREPARED BY AREK SURVEYING, P.C. DATED MARCH 1, 2020.
   B. NEW YORK CITY TRANSIT (NYCT) RECORD DRAWINGS:
      B.A. ROUTE 105 SECTION 1 – FILE NO. 6201, DRAWING NO. 333: WASHINGTON HEIGHTS LINE BROADWAY AT DYCKMAN ST. DYCKMAN STREET STATION STA. 1113+85 TO STA. 1114+00 AND STA. 1114+85 TO STA. 1117+00 ROOF & PASSAGEWAY PLANS.
      B.B. ROUTE 105 SECTION 2 – FILE NO. 6202, DRAWING NO. 307: WASHINGTON HEIGHTS LINE BROADWAY–CUMMINGS ST. TO ACADEMY ST. STA. 1117+00 TO STA. 1122+75 STRUCTURAL PLANS ROOF PLAN.
2. ELEVATIONS SHOWN ARE IN FEET AND REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. BORINGS MR-01 TO MR-04 WERE MADE BY CRAIG DRILLING AND TESTING IN OCTOBER 2020 UNDER CONTINUOUS INSPECTION BY MUESER RUTLEDGE CONSULTING ENGINEERS (MRCE).
4. BORING LOCATIONS REPRESENT ACTUAL AS-DRILLED LOCATIONS AS MEASURED BY MRCE INSPECTOR.
5. PROPOSED TEST PIT LOCATIONS SHOWN ARE APPROXIMATE. DETERMINE FINAL LOCATIONS IN THE FIELD TO CLEAR UTILITIES AND OBSTRUCTIONS.
6. FOR GEOLOGIC SECTION A-A, SEE DRAWING GS-1.

REV.	DATE	BY	DESCRIPTION
01	10-27-20	J.A.B.	AS-DRILLED BORING LOCATIONS

4778 BROADWAY

NEW YORK NEW YORK

JOY CONSTRUCTION

NEW YORK NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS PLLC
14 PENN PLAZA – 225 WEST 34TH STREET, NEW YORK, NY 10122

SCALE			FILE NUMBER
AS NOTED	MADE BY: A.M.D.	DATE: 09-22-2020	13900
	CH'KD BY: W.E.K.	DATE: 09-22-2020	DRAWING NUMBER
INVESTIGATION LOCATION PLAN			B-1

Printed by: Adam Dyer
Printed on: Wednesday, Nov 04, 2020 – 12:48:44 PM
Last saved by: adyer on Wednesday, Nov 04, 2020 – 7:05:51 AM
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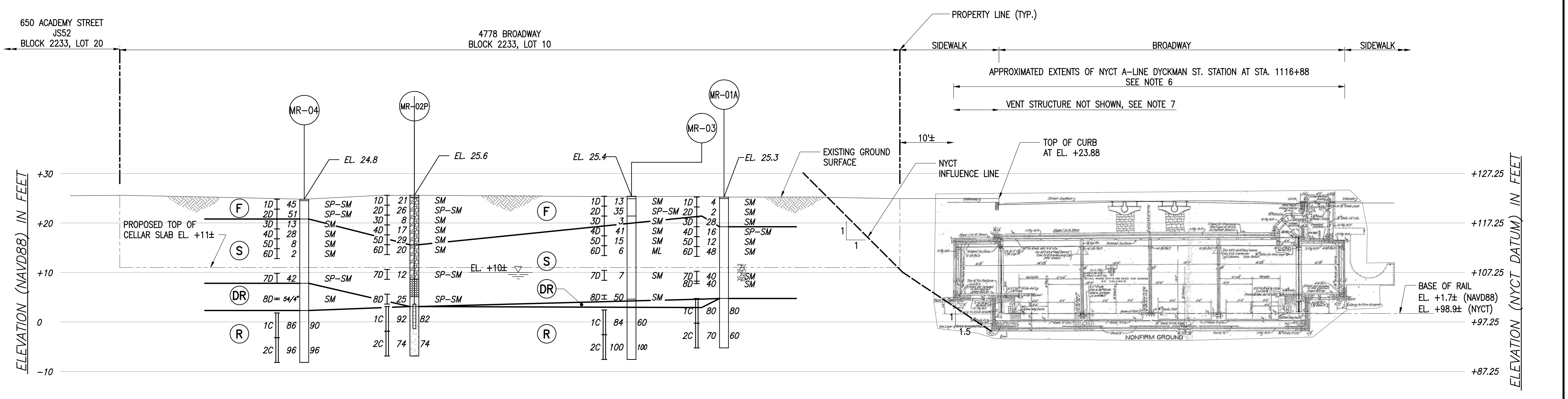


SECTION A
SCALE: 1"=10'-0"
B-1 | GS-1

NOTES:

1. FOR GENERAL NOTES, SEE DRAWING B-1.
2. FOR BORING LEGEND, SEE DRAWING GS-R.
3. FOR ROCK CORE CLASSIFICATION CRITERIA, SEE DRAWING RC-1.
4. ELEVATIONS SHOWN ARE IN FEET AND REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. STRATIFICATIONS SHOWN ARE BASED ON NECESSARY INTERPOLATIONS STRATIFICATIONS SHOWN ARE BASED ON NECESSARY INTERPOLATIONS BETWEEN BORINGS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.
6. NYCT STRUCTURE SHOWN IS TAKEN FROM RECORD DRAWING: ROUTE 105 SECTION 1 – FILE NO. 6201, DRAWING NO. 334: WASHINGTON HEIGHTS LINE BROADWAY AT DYCKMAN ST. DYCKMAN STREET STATION STA. 1110+25 TO STA. 1117+00 STRUCTURAL PLANS TYPICAL SECTION A-A. NON-FIRM GROUND HAS BEEN ASSUMED.
7. NYCT VENT STRUCTURE BELOW NOT SHOWN ON RECORD DRAWING FOR TYPICAL SECTION A-A.

GENERAL STRATA DESCRIPTIONS:

(F) **FILL** – LOOSE TO VERY COMPACT BLACK AND BROWN GRAVELLY FINE TO COARSE SAND, TRACE SILT GRADING TO SILTY FINE TO COARSE SAND WITH LOCAL ACCUMULATIONS OF BRICK, METAL, WOOD, AND CONCRETE

(S) **SAND** – LOOSE TO COMPACT BROWN FINE TO COARSE SAND, WITH VARYING AMOUNTS OF SILT AND CLAY, TRACE GRAVEL

(DR) **DECOMPOSED ROCK** – BROWN FINE TO COARSE SAND, SOME GRAY SILTY FINE TO MEDIUM SAND, TRACE CLAY, ROCK FRAGMENTS, AND RELICT ROCK STRUCTURE

(R) **ROCK** – MEDIUM-HARD TO INTERMEDIATE UN-WEATHERED TO MODERATELY WEATHERED LIGHT GRAY MARBLE, BLOCKY TO JOINTED WITH WEATHERED AND IRON-STAINED JOINTS

REV.	DATE	BY	DESCRIPTION
01	10-27-20	J.A.B.	AS-DRILLED BORINGS

4778 BROADWAY
NEW YORK — NEW YORK

JOY CONSTRUCTION
NEW YORK — NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS PLLC
14 PENN PLAZA – 225 WEST 34TH STREET, NEW YORK, NY 10122

SCALE	MADE BY: A.M.D.	DATE: 09-16-2020	FILE NUMBER
AS NOTED	CH'KD BY: W.E.K.	DATE: 09-22-2020	13900

GEOLOGIC SECTION

DRAWING NUMBER
GS-1

APPENDIX A – BORING LOGS

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

BORING LOG

BORING NO. MR-01
SHEET 1 OF 2
FILE NO. 13900
SURFACE ELEV. +25.25
RES. ENGR. DOROTHY ULLRICH

PROJECT: 4778 BROADWAY
LOCATION: NEW YORK, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
11:00	1D	0.0	8-4	Brown fine to coarse sand, trace silt, gravel,	**	0.3		**Asphalt from 0' to 0.3'
10-09-20		2.0	3-3	asphalt (Fill) (SP-SM)	F			Spoon bouncing at
Fri., Sunny	2D	2.0	5-11	Do 1D (Fill) (SP-SM)		3		offset. Offset boring to
65°F, 11:15		3.0						Boring MR-01A.
						5		End of Boring at 3'.
						10		
						15		
						20		
						25		
						30		
						35		
						40		
						45		
						50		

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

BORING NO. MR-01
SHEET 2 **OF** 2

PROJECT	4778 BROADWAY	**FILE NO.**	13900
LOCATION	NEW YORK, NEW YORK	**SURFACE ELEV.**	+25.25
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	NAVD88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG MAKE AND MODEL: / **TYPE OF FEED DURING CORING** / **CASING USED** [ ] YES [X] NO

TRUCK	CME-75	MECHANICAL		DIA., IN.		DEPTH, FT. FROM	TO
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
CORE BIT
DRILL RODS NWJ

DRILLING MUD USED [ ] YES [X] NO
DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD

AUGER USED [ ] YES [X] NO
TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. AVERAGE FALL, IN.
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): 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.

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.	3	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 TEST BORING
DRILLER KEITH PARENT **HELPERS** SEAN CLEARY
REMARKS OBSTRUCTION AT 3'; OFFSET BORING TO MR-01A.
RESIDENT ENGINEER DOROTHY ULLRICH **DATE** 10-09-20
CLASSIFICATION CHECK: YESID ORDONEZ **TYPING CHECK:** YESID ORDONEZ

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

BORING LOG

BORING NO.	MR-01A
SHEET 1 OF	3
PROJECT:	4778 BROADWAY
LOCATION:	NEW YORK, NEW YORK
FILE NO.	13900
SURFACE ELEV.	+25.25
RES. ENGR.	DOROTHY ULLRICH

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
11:15	1D	0.0	4-2	Brown fine to coarse sand, some silt, trace	**	0.3	DRILLED	**Asphalt from 0' to 0.3'
10-09-20		2.0	2-2	gravel, asphalt (Fill) (SM)			AHEAD	
Friday	2D	2.0	3-1	Brown black fine to coarse sand, some silt,			4"	2D-6D: Petroleum
Sunny		4.0	1-1	trace gravel, clay, landscape fabric (Fill) (SM)	F			odor.
65°F	3D	4.0	4-22	Brown fine to coarse sand, some silt, trace		5		
		6.0	6-4	gravel, concrete (Fill) (SM)		6		
	4D	6.0	8-10	Gray brown fine to coarse sand, trace silt,				
		8.0	6-4	gravel, mica (SP-SM)				
	5D	8.0	6-6	Brown fine to coarse sand, some silt, gray clay				
		10.0	6-5	pockets, trace gravel (SM)		10		
	6D	10.0	27-23	Brown fine to coarse sand, some silt, trace				
		12.0	25-34	gravel (SM)				
					S			
						15		
	7D	15.0	16-18	Gray brown fine to coarse sand, some silt, trace				
		17.0	22-21	gravel (SM)				
	8D	17.0	40/5"	Brown fine to coarse sand, some silt, gravel				
		17.5		(SM)				
						20		
	1C	20.5	REC=80%	Medium hard unweathered to slightly weathered		20.5		Casing refusal at 20.5'.
		25.5	RQD=80%	light gray marble, jointed to moderately jointed,			2*	*Coring time in
				weathered joints			3*	minutes per foot.
							2*	
						25	2*	
	2C	25.5	REC=70%	Medium hard slightly weathered to moderately	R		2*	
		30.5	RQD=60%	weathered light gray marble, jointed, weathered			2*	
				joints			2*	
							2*	
14:00						30	2*	
						30.5	2*	End of Boring at 30.5'.
						35		
						40		
						45		
						50		

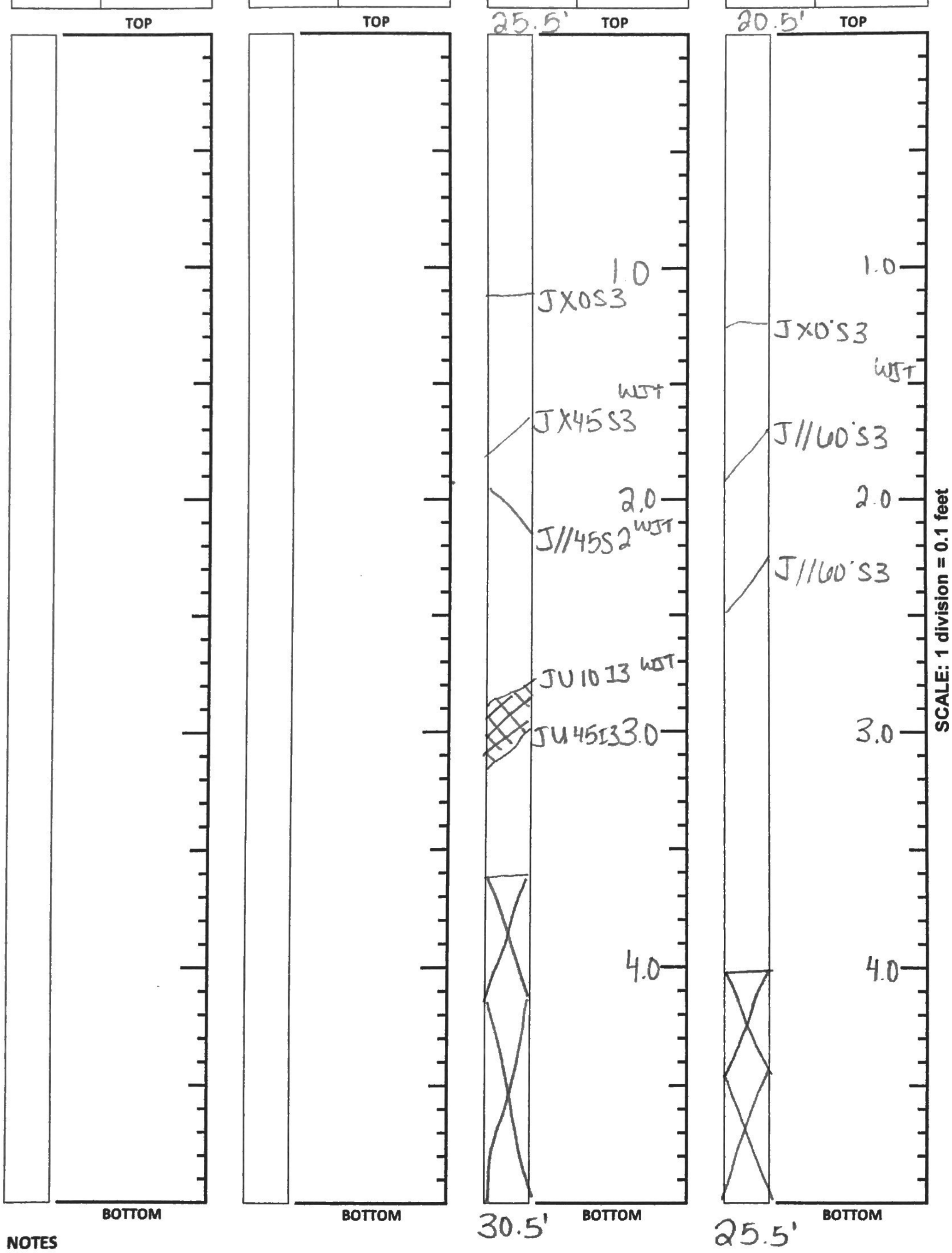
BORING NO. MR-01A

ROCK CORE SKETCH

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

PROJECT:	4478 Broadway
LOCATION:	Manhattan, NY
TEST/INSP. EQUIPMENT	
REF. CODES/STANDARDS	
BORING NO.	MF-01A
SHEET	2 OF 3
FILE NO.	13900
SURFACE ELEV.	
RES ENGR.	D. Ullrich

Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD
				2C	REC=70% RQD=60%	1C	REC=80% RQD=80%



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

NOTES

MRCE built on firm foundations

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

BORING NO. MR-01A
SHEET 3 **OF** 3
FILE NO. 13900
SURFACE ELEV. +25.25
DATUM NAVD88

PROJECT 4778 BROADWAY
LOCATION NEW YORK, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

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	20.5
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. AVERAGE FALL, IN.
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): 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.

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.	20.5	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.	10	OTHER:	

BORING CONTRACTOR CRAIG TEST BORING
DRILLER KEITH PARENT **HELPERS** SEAN CLEARY
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER DOROTHY ULLRICH **DATE** 10-09-20
CLASSIFICATION CHECK: YESID ORDONEZ **TYPING CHECK:** YESID ORDONEZ

MRCE Form BS-1 **BORING NO.** MR-01A

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

BORING LOG

BORING NO.	MR-02P
SHEET 1 OF	5
FILE NO.	13900
SURFACE ELEV.	+25.60
RES. ENGR.	DOROTHY ULLRICH

PROJECT: 4778 BROADWAY
LOCATION: NEW YORK, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
07:30	1D	0.0	30-12	Brown fine to coarse sand, some silt, trace	**	0.3	DRILLED	**Asphalt from 0' to 0.3'
10-09-20		2.0	9-9	gravel, concrete, asphalt, clay pckts (Fill) (SM)			AHEAD	
Friday	2D	2.0	14-14	Black fine to coarse sand, some gravel, trace			4"	
Sunny		4.0	12-13	silt, asphalt (Fill) (SP-SM)				
65°F	3D	4.0	8-5	Brown fine to coarse sand, some silt, trace		5		
		6.0	3-3	gravel (Fill) (SM)	F			
	4D	6.0	6-7	Brown fine to coarse sand, some silt, trace				
		8.0	10-6	gravel, concrete (Fill) (SM)				
	5D	8.0	15-13	Do 4D (Fill) (SM)				
		10.0	16-11			10		
	6D	10.0	16-12	Brown fine to coarse sand, some silt, trace gray				
		12.0	8-9	clay pockets, gravel (SM)				
						15		
	7D	15.0	5-6	Brown fine to coarse sand, trace silt, gravel				No recovery at 1st
		17.0	6-6	(SP-SM)	S			attempt; 3" sent down.
								7D: Petroleum odor.
						20		
	8D	20.0	8-13	Brown fine to coarse sand, trace silt, gravel,				Petroleum odor casing
		22.0	12-20	clay (SP-SM)				refusal at 22.5'.
	1C	22.5	REC=92%	Medium hard unweathered to slightly weathered		22.5	2*	*Coring time in
		27.5	RQD=82%	light gray marble, jointed to moderately jointed,			1*	minutes per foot.
				iron stained joints		25	1*	
							1*	
							1*	
	2C	27.5	REC=74%	Medium hard unweathered to moderately	R		1*	
		32.5	RQD=74%	weatheredlight gray marble, jointed to closely			1*	
				jointed, iron stained joints		30	1*	
							1*	
11:00							1*	
						32.5		End of Boring at 32.5'.
						35		
						40		
						45		
						50		

M|R|C|E
built on firm foundations

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

ROCK CORE SKETCH

BORING NO. MR-02P
SHEET 2 OF 5
FILE NO. 13900
SURFACE ELEV.
RES ENGR. D. Ullrich

PROJECT: 4778 Broadway
LOCATION: Manhattan, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD
				2C	REC=74% ROD=71%	1C	REC=92% RQD=82%

Run 2C (TOP 27.5' – BOTTOM 32.5')

- JX30°I3 WJT
- 1.0
- MB
- 2.0
- J//30I3 FeJ
- JX0S2 WJT
- 3.0
- J//70S3 WJT
- BOT
- 4.0

Run 1C (TOP 22.5' – BOTTOM 27.5')

- gry gvl
- JX45I3 WJT
- JX10S3 WJT
- 1.0
- JU45S3 WJT
- JU60°I3 WJT
- 2.0
- J//20S2 WJT
- 3.0
- 4.0
- J//30S2

SCALE: 1 division = 0.1 feet

TOP / BOTTOM

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

NOTES

PIEZOMETER RECORD

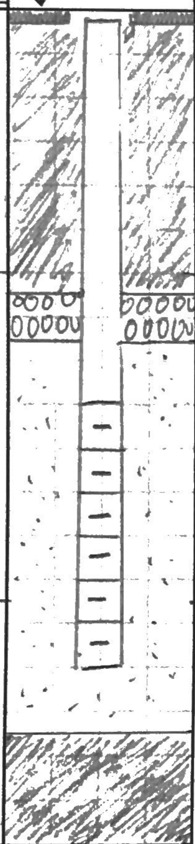
MRCE
built on firm foundations

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

PIEZOMETER OR BORING NO. MR-02P
SHEET 3 OF 5
FILE NO. 13900
INSTALLATION DATE 10-9-20
RES ENGR. D Ullrich

PROJECT: 4778 Broadway
LOCATION: Manhattan, NY
PIEZOMETER LOCATION: SEE BLP
☐ SEE SKETCH ON BACK

STRATA	PIEZOMETER INSTALLATION DETAILS	DEPTH (FT)
GROUND SURFACE ELEV.		
F		0, 5, 10
S		13, 15, 20
R		22.5, 25, 27, 30, 32.5
B.O.B at 32.5'		



PIEZOMETER TYPE Slotted PVC

INTAKE POINT

depth to bottom, ft = 27
depth to top, ft = 13
length, ft = 14 = L
diameter, in = 4, ft = 0.33 = 2R

STANDPIPE/RISER

elevation of rim, ft =
diameter, in = 2, ft = 0.17 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
10-9-20	10:45	15.0		upon install
10-9-20	14:30	15.1		
10-14-20	09:00	14.9		

SAND BENTONITE GRAVEL GROUT

GROUND SURFACE ELEV.

PIEZOMETER NO. MR-02P

BOR-5_JUNE2018

MRCE
built on firm foundations

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

VARIABLE HEAD PERMEABILITY TEST

☐ BOREHOLE OR ☒ PIEZOMETER NO. MR-02P

TEST NO.

FILE NO. 13900

PROJECT: 4778 Broadway

LOCATION: Manhattan, NY

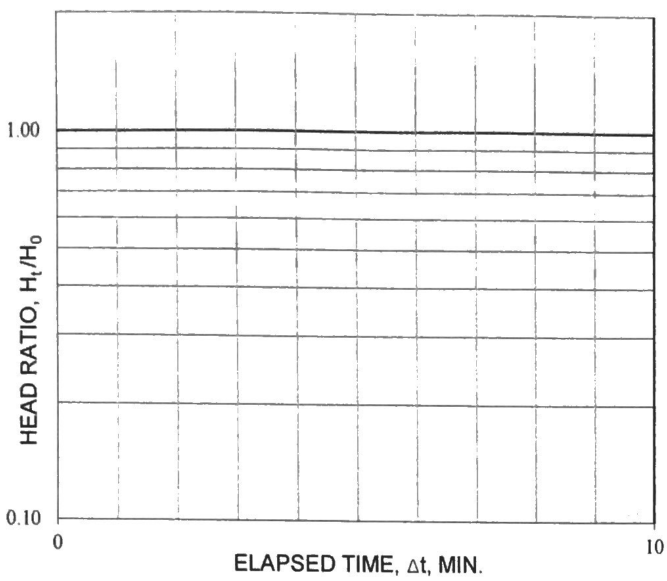
PIEZOMETER LOCATION:

RES ENGR. D Ullrich

CALC. BY DJU DATE 10-9-20

CH'KD BY DATE

SHEET NO. X OF X



INTAKE POINT

Depth to bottom, ft = 27

Depth to top, ft = 13

Length, ft = 14 = L

Diameter, in = 4 ft = .33 = 2R

STANDPIPE/RISER

elevation of rim, ft =

Diameter, in = 2 ft = 0.17 = 2r

BOREHOLE

Depth of casing, ft =

Diameter, in = ft = 0 = 2R

Depth to which standpipe/casing was bailed or filled to, ft = $= Z_0$

READING TIME			TEST DEPTH, RIM TO WATER Z_t (ft.)	INITIAL UNBALANCED HEAD $H_0 = \lvert Z_0 - Z_{STATIC} \rvert$ (ft.)	UNBALANCED HEAD $H_t = \lvert Z_t - Z_{STATIC} \rvert$ (ft.)	HEAD RATIO H_t/H_0	REMARKS ☒ Falling Head Test ☐ Rising Head Test
DATE	CLOCK	Δt MIN.					
10-9-20	10:45	STATIC					STATIC WATER LEVEL
		0.00	0.0	15.0'	15.0	1	
		0.5	4.5		11.5	.77	
		1.0	5.8		9.2	.61	
		2.0	8.0		7.0	.47	
		3.0	10.0		5.0	.33	
		4.0	11.0		4.0	.27	
		5.0	11.9		3.1	.21	
		7.0	13.0		2.0	.13	
		9.0	14.2		0.8	.05	
		10.0	14.5		0.5	.03	
		12.0	15.0		0.0	0.0	

NOTES

PIEZOMETER NO. MR-02P

BOR-6_APR2017

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

PROJECT	4778 BROADWAY	**BORING NO.**	MR-02P
		SHEET	5 **OF** 5
		FILE NO.	13900
LOCATION	NEW YORK, NEW YORK	**SURFACE ELEV.**	+25.60
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	NAVD88

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	22.5
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. AVERAGE FALL, IN.

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): 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.

PIEZOMETER INSTALLED [X] YES [ ] NO **SKETCH SHOWN ON** SEE SHEET NO. 3

STANDPIPE:	TYPE	PVC	ID, IN.	1-3/4	LENGTH, FT.	15	TOP ELEV.	
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	2	LENGTH, FT.	10	TIP ELEV.	
FILTER:	MATERIAL	SAND	OD, IN.	4	LENGTH, FT.	14	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	22.5	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.	10	OTHER:	

BORING CONTRACTOR CRAIG TEST BORING

DRILLER KEITH PARENT **HELPERS** SEAN CLEARY

REMARKS PIEZOMETER INSTALLED.

RESIDENT ENGINEER DOROTHY ULLRICH **DATE** 10-09-20

CLASSIFICATION CHECK: YESID ORDONEZ **TYPING CHECK:** YESID ORDONEZ

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-03
SHEET 1 OF	3
FILE NO.	13900
SURFACE ELEV.	+24.80
RES. ENGR.	DOROTHY ULLRICH

PROJECT: 4778 BROADWAY
LOCATION: NEW YORK, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
07:30	1D	0.0	6-6	Gray fine to coarse sand, some silt, trace clay,	**	0.5	DRILLED	**Asphalt from 0' to 0.5'
10-14-20		2.0	7-9	gravel, asphalt (Fill) (SM)			AHEAD	
Wednesday	2D	2.0	10-22	Black brown fine to coarse sand, trace silt,	F		4"	
Sunny		4.0	13-5	gravel, concrete (Fill) (SP-SM)		4		
65°F	3D	4.0	2-1	Brown fine to coarse sand, some silt, trace		5		Petroleum odor.
		6.0	2-3	gravel, clay (SM)				
	4D	6.0	8-20	Do 3D (SM)				
		8.0	21-10					
	5D	8.0	16-9	Brown silty fine to coarse sand, some clay,				
		10.0	6-6	trace gravel (SM)		10		
	6D	10.0	WH-3	Brown clayey silt, some fine sand, trace medium				WC=23
		12.0	3-3	to coarse sand, gravel (ML)				
					S			
						15		
	7D	15.0	2-3	Brown silty fine to coarse sand, trace gravel (SM)				Petroleum odor.
		17.0	4-9					
						20		
	8D	20.0	20-50/3"	Brown fine to coarse sand, some gray silty fine		20.75		***Decomposed rock
		20.75		to medium sand, trace clay, gravel	DR			from 20.75' to 22.5'.
				(Decomposed Rock) (SM)	***	22.5	3*	Hard drilling from 22.5'
	1C	23.0	REC=84%	Top: Medium hard slightly weathered to			3*	to 23'.
		28.0	RQD=60%	moderately weathered, light gray marble,		25	2*	*Coring time in
				broken to jointed, blocky, weathered joints			2*	minutes per foot.
				Bot: Medium hard light gray marble, unweathered			2*	
				to weathered joints			2*	
	2C	28.0	REC=100%	Medium hard unweathered to slightly weathered	R		1*	
		33.0	RQD=100%	light gray marble, moderately jointed to jointed,		30	2*	
				weathered joints			2*	
							5*	
10:30						33		End of Boring at 33'.
						35		WC=Water Content
								in percent of dry
								weight.
						40		
						45		
						50		

MRCE Form BL-1

BORING NO. MR-03

MRCE built on firm foundations

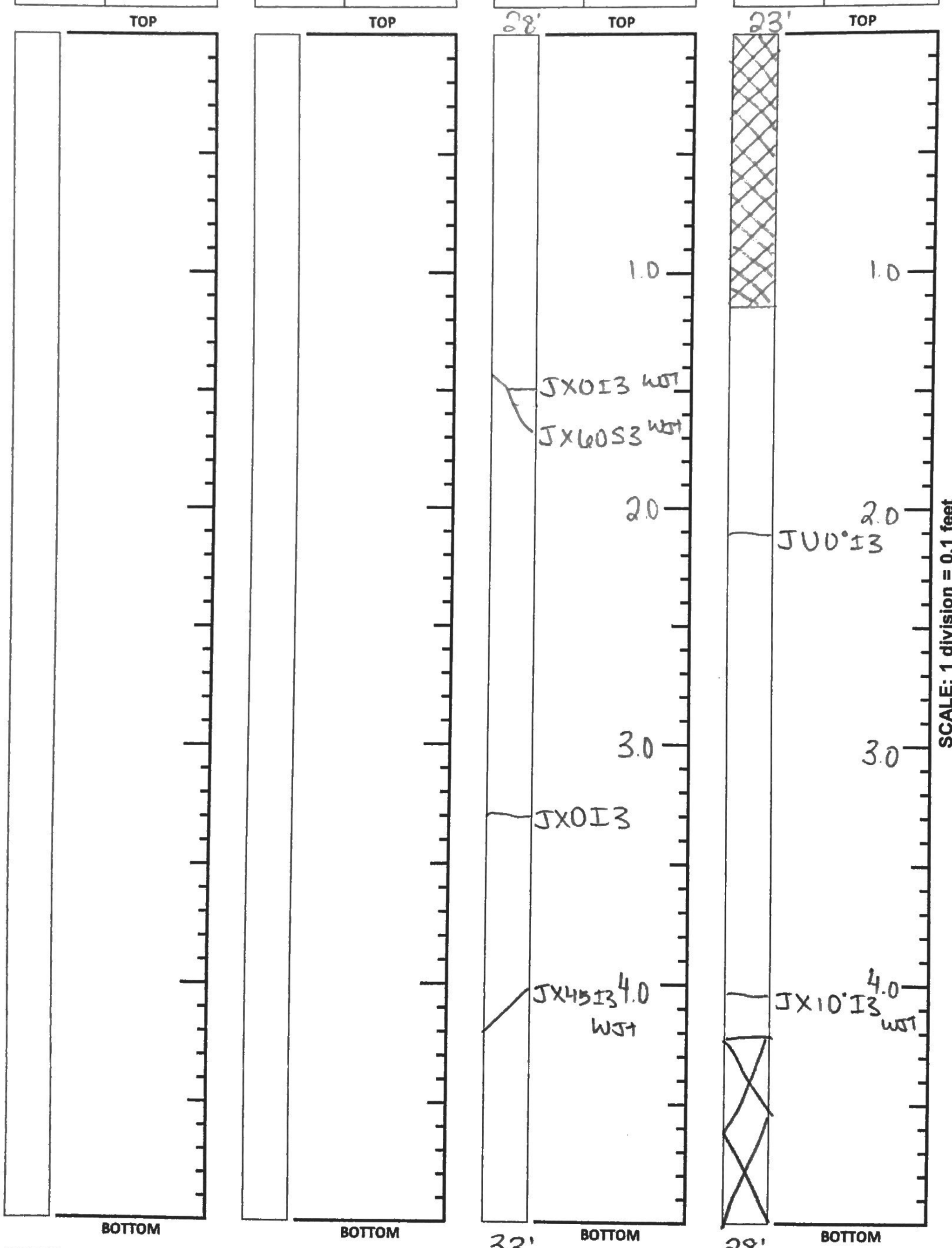
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

ROCK CORE SKETCH

BORING NO. MR-03
SHEET 2 OF 3
FILE NO. 13900
SURFACE ELEV.
RES ENGR. D. Ullrich

PROJECT: 4778 Broadway
LOCATION: Manhattan, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD
				2C	REC: 100% RQD: 100%	1C	REC: 84% RQD: 60%



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

NOTES

MRCE
built on firm foundations
Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122

		BORING NO.	MR-03
		SHEET	3 **OF** 3
PROJECT	4778 BROADWAY	**FILE NO.**	13900
LOCATION	NEW YORK, NEW YORK	**SURFACE ELEV.**	+24.80
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	NAVD88

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	23
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 [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.		AVERAGE FALL, IN.	
*SAMPLER HAMMER, LBS.	140	AVERAGE FALL, IN.	30

*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): 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.

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.	23	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 TEST BORING
DRILLER JOE SCHUSTER **HELPERS** JOSEPH HONIMAR
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER DOROTHY ULLRICH **DATE** 10-14-20
CLASSIFICATION CHECK: YESID ORDONEZ **TYPING CHECK:** YESID ORDONEZ

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 W. 34th Street
New York, NY 10122
built on firm foundations

BORING LOG

BORING NO. MR-04
SHEET 1 OF 3
FILE NO. 13900
SURFACE ELEV. +24.80
RES. ENGR. DOROTHY ULLRICH

PROJECT: 4778 BROADWAY
LOCATION: NEW YORK, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:30	1D	0.0	5-5	Brown fine to coarse sand, trace silt, gravel,	**	0.3	DRILLED	**Asphalt from 0' to 0.3'
10-14-20		2.0	40-48	concrete, asphalt (Fill) (SP-SM)			AHEAD	
Wednesday	2D	2.0	87-26	Brown black fine to coarse sand, some concrete,	F		4"	
Sunny		4.0	25-24	trace silt, gravel (Fill) (SP-SM)		4		
65°F	3D	4.0	11-7	Brown fine to coarse sand, some silt, trace		5		
		6.0	6-4	gravel (SM)				
	4D	6.0	3-4	Brown silty fine to coarse sand, trace gravel (SM)				
		8.0	24-26					
	5D	8.0	8-4	Do 4D (SM)				
		10.0	4-5			10		
	6D	10.0	WH-1	Brown fine to coarse sand & silt, trace clay,	S			WC=28
		12.0	1-1	gravel (SM)				
						15		
	7D	15.0	13-13	Gray brown fine to medium sand, trace silt, gray				
		17.0	29-20	silty clay pockets, gravel, decomposed		17		
				rock (SP-SM)				
					DR	20		
	8D	20.0	54/4"	Light gray weathered rock (Decomposed Rock)				***Decomposed rock
		20.33						from 17' to 22.5'.
					***	22.5	2*	Hard drilling from 22.5'
	1C	23.0	REC=86%	Medium hard unweathered to slightly weathered			2*	to 23'.
		28.0	RQD=90%	light gray marble, jointed, weathered joints		25	1*	*Coring time in
							2*	minutes per foot.
							1*	
					R		2*	
	2C	28.0	REC=96%	Medium hard slightly weathered light gray			1*	
		33.0	RQD=96%	marble, jointed to blocky, weathered joints		30	2*	
							1*	
							1*	
13:30						33		End of Boring at 33'.
						35		WC=Water Content
								in percent of dry
								weight.
						40		
						45		
						50		

MRCE Form BL-1

MRCE built on firm foundations

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New York, NY 10122

ROCK CORE SKETCH

PROJECT: 4778 Broadway

LOCATION: Manhattan, NY

TEST/INSP. EQUIPMENT

REF. CODES/STANDARDS

BORING NO. MR-04

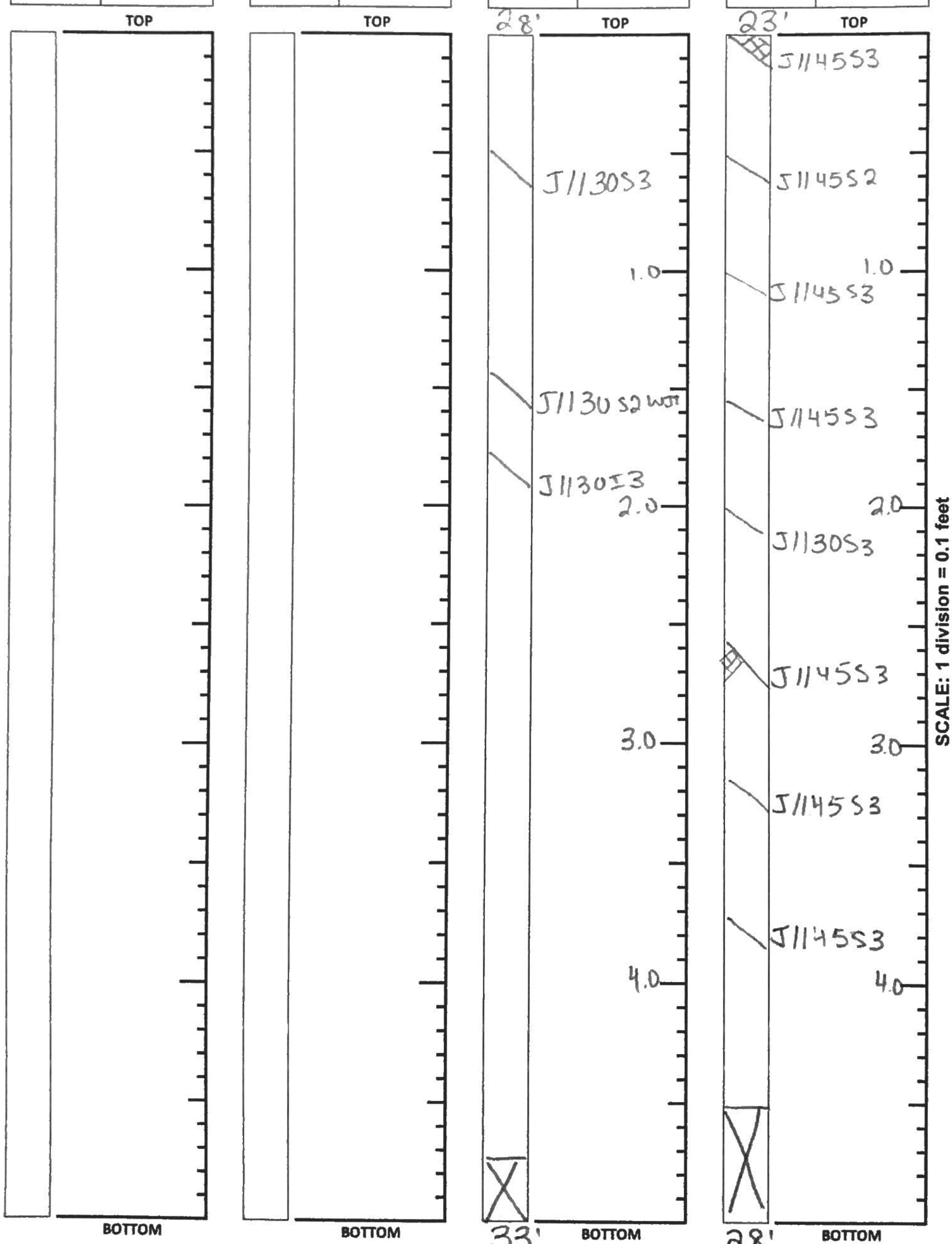
SHEET 2 OF 3

FILE NO. 13900

SURFACE ELEV.

RES ENGR. D. Ullrich

Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD	Run No.	REC/RQD
				2C	REC=96% RQD=96%	1C	REC=86% RQD=90%



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

NOTES

MR-04 1C MD HD UW/SW LITE GREY MAR. JTD ~ + W JTS

2C MD HD SW/UW LGM JTD-BLKY, WJTS

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BORING NO. MR-04
SHEET 3 **OF** 3
PROJECT 4778 BROADWAY
FILE NO. 13900
LOCATION NEW YORK, NEW YORK
SURFACE ELEV. +24.80
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD88

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TYPE OF BORING RIG MAKE AND MODEL:
TRUCK CME-75
SKID
BARGE
OTHER

TYPE OF FEED DURING CORING
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HYDRAULIC X
OTHER

CASING USED [X] YES [ ] NO
DIA., IN. 4 DEPTH, FT. FROM 0 TO 23
DIA., IN. DEPTH, FT. FROM TO
DIA., IN. DEPTH, FT. FROM TO

TYPE AND SIZE OF
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U-SAMPLER
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TYPE OF DRILLING MUD QUIK GEL

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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.

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3.5" DIA. U-SAMPLE BORING LIN. FT.
CORE DRILLING IN ROCK LIN. FT. 10
NO. OF 3" SHELBY TUBE SAMPLES
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