BROOK 156
740 BROOK AVENUE
BRONX, NEW YORK

Remedial Action Work Plan

AKRF Project Number: 11703
NYSDEC BCP Site Number: C203078

Prepared for:

NYSDEC Region 2
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47-40 21st Street
Long Island City, New York 11101

On Behalf Of:

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and
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CERTIFICATIONS

I, Michelle Lapin, P.E., certify that I am currently a NYS registered Professional Engineer as defined in 6 NYCRR Part 375 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.

STATE OF NEW YORK
MICHELLE LAPIN
No. 073934-1
LICENSED PROFESSIONAL ENGINEER

Michelle Lapin, P.E. - 073934-1	10-18-2018	
NYS Professional Engineer #	Date	Signature

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Acronym	Definition
ACM	Asbestos-Containing Material
AWQS	Ambient Water Quality Standard
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAMP	Construction Air Monitoring Plan
CFM	Cubic Feet per Minute
COC	Contaminants of Concern
CoC	Certificate of Completion
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CVOC	Chlorinated Volatile Organic Compound
DUSR	Data Usability Summary Report
ECL	Environmental Conservation Law
EE	Environmental Easement
ELAP	NYS Environmental Laboratory Approval Program
EM	Electromagnetic
ESA	Environmental Site Assessment
eV	Electron Volt
FER	Final Engineering Report
GAC	Granular-Activated Carbon
GPR	Ground Penetrating Radar
GPS	Global Positioning System
HASP	Health and Safety Plan
HDFC	Housing Development Fund Corporation
LBP	Lead-Based Paint
LIRR	Long Island Railroad
MTA	Metropolitan Transit Authority
NAVD	North American Vertical Datum
ND	Non-Detect
NTU	Nephelometric Turbidity Unit
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYSDEC	New York State Department of Environmental Conservation (Department)
NYSDOH	New York State Department of Health

Acronym	Definition
HPD	New York City Department of Housing Preservation and Development
PAH	Polycyclic Aromatic Hydrocarbon
PFC	Perfluorinated Compound
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PGWSCO	Protection of Groundwater Soil Cleanup Objective
PID	Photoionization Detector
PPM	Parts Per Million
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RA	Remedial Action
RAWP	Remedial Action Work Plan
RE	Remedial Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RRSCO	Restricted Residential Soil Cleanup Objective
ROI	Radius of Influence
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOP	Standard Operating Procedure
SSDS	Sub-Slab Depressurization System
SSSCO	Site-Specific Soil Cleanup Objective
SVE	Soil Vapor Extraction
SVOC	Semivolatile Organic Compound
SWPPP	Storm Water Pollution Prevention Plan
TCE	Trichloroethylene
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objective
VMP	Vapor Monitoring Point
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

Site Description, Physical Setting, and Background

This Remedial Action Work Plan (RAWP) has been prepared by AKRF, Inc. (AKRF) on behalf of Brook 156 Housing Development Fund Corporation (HDFC) and the New York City Department of Housing Preservation and Development (HPD) for the approximately 7,438-square foot Brook 156 site located at 740 Brook Avenue in the Morrisania neighborhood of the Bronx, New York, hereafter referred to as the "Site". The Site is identified as Tax Block 2360, Lots 1 and 3 on the New York City Tax Map.

Lot 1, approximately 5,658-square feet, comprises the eastern portion of the Site and consists of a former rail bed and tunnel that lie approximately 19 feet below sidewalk grade and a small grass covered area on the eastern portion. Lot 3, approximately 1,780-square feet, comprises the western portion of the Site and consists of an irregularly-shaped, concrete- and asphalt-paved lot. The Site is abutted to the north by East 157th Street, followed by a parking lot; to the east by a parking lot, followed by Hegney Place; to the south by East 156th Street, followed by a residential and commercial building ("Via Verde"); and to the west by Brook Avenue, followed by a residential and commercial building. The surrounding area is developed primarily with residential and commercial buildings. A Site Location Map is provided as Figure 1 and a Site and Sample Location Plan is provided as Figure 2.

Brook 156 HDFC and the HPD, hereafter collectively referred to as the "Volunteers" or "Applicants", entered into a Brownfield Cleanup Agreement (BCA) (BCA Index No. C203078-03-15) with the New York State Department of Environmental Conservation (NYSDEC) on April 30, 2015 (NYSDEC BCP Site No. C203078). A January 2015 Remedial Investigation (RI) Report (RIR) and an October 2017 Supplemental Remedial Investigation (SRI) Report (SRIR) were submitted previously to the NYSDEC. The data compiled from the RI and SRI were used to prepare this RAWP.

Summary of Historic Uses

Historic reports indicated that Lot 3 was developed historically as a gasoline station with a one-story lubrication office, and a used automotive sales lot between 1949 and 1969. Lot 1 was occupied by the Port Morris branch of the New York and Harlem Railroad since at least 1891. The railroad was abandoned circa 1999. Lots 1 and 3 have remained vacant since approximately 1969 and 1999, respectively.

Summary of the Remedial Investigation

Soil, groundwater, and soil vapor were investigated during AKRF's October 2013 and August 2014 RI and August and September 2016 SRI. The results of the investigations were documented in AKRF's January 2015 RIR and October 2017 SRIR. Soil/fill sample analytical results were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs). Select petroleum-related volatile organic compounds (VOCs) in soil/fill analytical results were also compared to Protection of Groundwater Soil Cleanup Objectives (PGWSCOs). Groundwater sample analytical results were compared to NYSDEC Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards (AWQSs). Standards do not currently exist for soil vapor; therefore, the data is presented without comparative standards.

The analytical results for soil, groundwater, and soil vapor data collected during the RI are presented in Attached Tables 1 through 5, 6 through 11, and 12, respectively. The analytical results for soil, groundwater, and soil vapor data collected during the SRI are presented in Attached Tables 13 through 17, 18 through 23, and 24, respectively. A Groundwater Elevation Map depicting groundwater table elevations collected during the RI and SRI is presented as Figure 3. Figures 4 and 5 show soil concentrations above UUSCOs, RRSCOs, and/or PGWSCOs; and groundwater sample concentrations above AWQSs, respectively. Soil vapor concentrations are shown on Figure 6. Below is a summary of the findings of the RI and SRI:

Soil

Chlorinated VOCs (CVOCs) were detected above UUSCOs in two soil samples: acetone in soil sample SB-7 (0-2') at an estimated concentration of 0.228 mg/kg, above its UUSCO of 0.05 milligrams per kilogram (mg/kg), but below its RRSCO of 100 mg/kg; and 1,2-DCA in soil sample SB-3 (8-12') at a concentration of 0.0523 mg/kg, above its UUSCO of 0.02 mg/kg, but below its RRSCO of 3.1 mg/kg. The following petroleum-related VOCs were detected in the same soil sample: benzene at a concentration of 4.43 mg/kg from a diluted analysis, above its UUSCO and PGWSCO of 0.06 mg/kg, but below its RRSCO of 4.8 mg/kg; ethylbenzene at a concentration of 11.1 mg/kg from a diluted analysis, above its UUSCO and PGWSCO of 1 mg/kg, but below its RRSCO of 41 mg/kg; and m,p-xylene and o-xylene at concentrations of 55.1 mg/kg and 18.1 mg/kg, respectively, from diluted analyses, above their sum total UUSCO of 0.26 mg/kg and their sum total PGWSCO of 1.6 mg/kg, but below their sum total RRSCO of 100 mg/kg; and toluene at a concentration of 26.9 mg/kg from a diluted analysis, above its UUSCO and PGWSCO of 0.7 mg/kg, but below its RRSCO of 100 mg/kg. VOCs were not detected above RRSCOs in any of the soil samples analyzed.

Semivolatile organic compounds (SVOCs) were detected across the Site in shallow and deep soil samples at concentrations above their respective UUSCOs and/or RRSCOs. Benzo(k)fluoranthene was detected in 3 samples and chrysene was detected in 5 samples at concentrations above their respective UUSCOs. Compounds detected above their respective RRSCOs include: benzo(a)anthracene in 5 samples up to an estimated 2.45 mg/kg; benzo(a)pyrene in 4 samples up to 2.78 mg/kg; benzo(b)fluoranthene in 6 samples up to 4.08 mg/kg; dibenz(a,h)anthracene in 3 samples up to 0.791 mg/kg; and indeno(1,2,3-cd)pyrene in 7 samples up to 2.86 mg/kg.

Heavy metals were detected in several soil samples across the Site, including: barium in soil sample SB-5 (0-2') at a concentration of 655 mg/kg, above its UUSCO of 350 mg/kg and its RRSCO of 400 mg/kg; cadmium in 2 shallow soil samples at concentrations of 4 mg/kg, above its UUSCO of 2.5 mg/kg, but below its RRSCO of 4.3 mg/kg; chromium in 5 samples and one blind duplicate at concentrations between an estimated 30.4 mg/kg and 77.7 mg/kg, above its UUSCO of 30 mg/kg, but below its RRSCO of 180 mg/kg; copper in 4 samples at concentrations between 57.1 mg/kg and 159 mg/kg, above its UUSCO of 50 mg/kg, but below its RRSCO of 270 mg/kg; lead in 6 samples and 2 blind duplicates at concentrations between 73.1 mg/kg and an estimated 347 mg/kg, above its UUSCO of 63 mg/kg but below its RRSCO of 400 mg/kg and above its RRSCO of 400 mg/kg in 3 samples up to 876 mg/kg; mercury in 11 samples above its UUSCO of 0.18 mg/kg and in 4 samples also above its RRSCO of 0.81 mg/kg at concentrations up to 5 mg/kg; nickel in two samples at concentrations of 34.2 mg/kg and 34.4 mg/kg, above its UUSCO of 30 mg/kg, but below its RRSCO of 210 mg/kg; selenium in soil sample SB-7 (0-2') at an estimated 4.1 mg/kg, above its UUSCO of 3.9 mg/kg but below its RRSCO of 180 mg/kg; and zinc in 9 samples and 3 blind duplicates up to an estimated 1,530 mg/kg, above its UUSCO of 109 mg/kg, but below its RRSCO of 10,000 mg/kg.

The pesticide 4,4'-DDT was detected in 4 soil samples at concentrations ranging between and estimated 0.006 mg/kg and 0.0267 mg/kg, above its UUSCO of 0.003 mg/kg but below its RRSCO of 7.9 mg/kg; and total PCBs were detected in sample SB-5 (0-2') at a concentration of 0.392 mg/kg, above its UUSCO of 0.1 mg/kg but below its RRSCO of 1 mg/kg.

Soil analytes detected above UUSCOs and/or RRSCOs during the RI and SRI are summarized in In-Text Table 1.

In-Text Table 1
Soil Analytes Detected Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (mg/kg)	RRSCO (mg/kg)	PGWSCO (mg/kg)	Result (mg/kg)
1,2-Dichloroethane (1,2-DCA)	SB-3 (8-12’)	0.02	3.1	NA	0.0523
Acetone	SB-7 (0-2’)	0.05	100	NA	0.288 J
	SB-XX				0.092 J
Benzene	SB-3 (8-12’)	0.06	4.8	0.6	4.43 D
Ethylbenzene	SB-3 (8-12’)	1	41	1	11.1 D
Toluene	SB-3 (8-12’)	0.7	100	0.7	26.9 D
Xylenes	SB-3 (8-12’)	0.26	100	1.6	73.2 D
Benzo(a)anthracene	SB-1 (25-27’)	1	1	NA	1.03
	SB-10 (0-1’)				1.83
	SB-11 (0-1’)				2.11
	SSB-3 (14-15') 20160901				2.45 J
	SSB-4 (27-28') 20160831				1.13
Benzo(a)pyrene	SB-3 (0-4’)	1	1	NA	1.13
	SB-10 (0-1’)				2.71
	SB-11 (0-1’)				2.78
	SSB-3 (14-15') 20160901				2.27 J
Benzo(b)fluoranthene	SB-1 (25-27’)	1	1	NA	1.18
	SB-3 (0-4’)				1.34
	SB-10 (0-1’)				3.54 D
	SB-11 (0-1’)				4.08
	SSB-3 (14-15') 20160901				2.84 J
	SSB-4 (27-28') 20160831				1.12
Benzo(k)fluoranthene	SB-10 (0-1’)	1	3.9	NA	1.18
	SB-11 (0-1’)				1.37
	SSB-3 (14-15') 20160901				1.02 J
Chrysene	SB-1 (25-27’)	1	3.9	NA	1.17
	SB-10 (0-1’)				1.96
	SB-11 (0-1’)				2.21
	SSB-3 (14-15') 20160901				2.14 J
	SSB-4 (27-28') 20160831				1.12
Dibenzo(a,h)anthracene	SB-10 (0-1’)	0.33	0.33	NA	0.791
	SB-11 (0-1’)				0.734
	SSB-3 (14-15') 20160901				0.338 J

In-Text Table 1
Soil Analytes Detected Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (mg/kg)	RRSCO (mg/kg)	PGWSCO (mg/kg)	Result (mg/kg)
Indeno(1,2,3-cd)pyrene	SB-1 (25-27’)	0.5	0.5	NA	0.648
	SB-3 (0-4’)				1.05
	SB-10 (0-1’)				2.86
	SB-11 (0-1’)				2.56
	SSB-3 (14-15') 20160901				1.3 J
	SSB-4 (26-27') 20160831				0.524
	SSB-4 (27-28') 20160831				0.611
Arsenic	SB-11 (0-1’)	13	16	NA	14.4
Barium	SB-5 (0-2’)	350	400	NA	655
Cadmium	SB-5 (0-2’)	2.5	4.3	NA	4
	SB-13 (0-2’)				4
Chromium	SB-1 (25-27’)	30	180	NA	30.4 J
	SB-5 (0-2’)				33.6 J
	SB-7 (0-2’)				77.7
	SB-XX				40.8
	SB-8 (0-2’)				32.5
	SB-10 (0-1’)				31 b
	SB-11 (0-1’)				39.9 b
Copper	SB-Y	50	270	NA	57.9
	SB-4 (0-4’)				57.1
	SB-5 (0-2’)				65.5
	SB-10 (0-1’)				171 b
	SB-11 (0-1’)				189 b
	SB-13 (0-2’)				62.9
	SSB-5 (9-10') 20160902				159
Lead	SB-1 (0-2’)	63	400	NA	193 J
	SB-X				184 J
	SB-3 (0-4’)				95.2 J
	SB-Y				433 J
	SB-4 (0-4’)				347 J
	SB-5 (0-2’)				752 J
	SB-10 (0-1’)				505 b
	SB-11 (0-1’)				876 b
	SB-12 (0-2’)				73.1
	SB-13 (0-2’)				192
	SSB-5 (9-10') 20160902				81.8

In-Text Table 1
Soil Analytes Detected Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (mg/kg)	RRSCO (mg/kg)	PGWSCO (mg/kg)	Result (mg/kg)
Mercury	SB-1 (0-2’)	0.18	0.81	NA	0.81 J
	SB-1 (25-27’)				0.23 J
	SB-X				1.1 J
	SB-3 (8-12’)				0.21
	SB-Y				0.2
	SB-4 (0-4’)				0.22
	SB-5 (0-2’)				0.33
	SB-9 (0-2’)				0.29
	SB-10 (0-1’)				0.28
	SB-11 (0-1’)				0.42
	SB-12 (0-2’)				0.51
	SB-13 (0-2’)				1.1
	SSB-3 (14-15') 20160901				1.3 J
	SSB-X 20160901				0.67 J
	SSB-4 (26-27') 20160831				5
	SSB-5 (9-10') 20160902				2.7
Nickel	SB-10 (0-1’)	30	310	NA	34.2
	SB-11 (0-1’)				34.4
Selenium	SB-7 (0-2’)	3.9	180	NA	4.1 J
Zinc	SB-1 (0-2’)	109	10,000	NA	153 J
	SB-X				165 J
	SB-2 (10-12’)				195 J
	SB-3 (0-4’)				159 J
	SB-Y				336 J
	SB-4 (0-4’)				304 J
	SB-5 (0-2’)				1,530 J
	SB-XX				122
	SB-10 (0-1’)				345
	SB-11 (0-1’)				567
	SB-13 (0-2’)				2,210
	SSB-4 (26-27') 20160831				111
Total PCBs	SB-5 (0-2’)	0.1	1	NA	0.392

In-Text Table 1
Soil Analytes Detected Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (mg/kg)	RRSCO (mg/kg)	PGWSCO (mg/kg)	Result (mg/kg)
4-4'-DDT	SB-5 (0-2')	0.0033	7.9	NA	0.0267
	SB-7 (4-6')				0.0034
	SB-10 (0-1')				0.006 a J N
	SB-11 (0-1')				0.0164 a J N

Notes:
J: The analyte was identified, but the reported quantity is approximate and may be inaccurate or imprecise.
D: Analyte concentration obtained from dilution.
b: Elevated detection limit due to dilution required for high interfering element.
a: More than 40% relative percent difference for detected concentrations between the two gas chromatography columns.
N: The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."
NA: PGWSCOs were not applicable for the analyte/compound.

Groundwater

Six groundwater samples were collected during the RI and SRI. VOCs were detected above their respective AWQSs in one groundwater sample, MW-2, collected during the RI: 1,2-DCA was detected at a concentration of 122 micrograms per liter (µg/L), above its AWQS of 0.6 µg/L; benzene was detected at a concentration of 212 µg/L from a diluted analysis, above its AWQS of 1 µg/L; and ethylbenzene, m,p-xylene, o-xylene, and toluene were detected in the same groundwater sample at concentrations of 33.6 µg/L, 153 µg/L, 81.3 µg/L, and 50.9 µg/L, respectively, above their respective AWQSs of 5 µg/L. The SVOC naphthalene was detected in groundwater sample MW-2 at a concentration of 13.2 µg/L, slightly above its AWQS of 10 µg/L.

Metals were detected in each of the groundwater samples. Thirteen metals were detected in the unfiltered groundwater samples (total metals analysis) and 12 metals were detected in the filtered samples (dissolved metals analysis). Six total metals (chromium, iron, magnesium, manganese, selenium, and sodium) and four dissolved metals (magnesium, manganese, selenium, and sodium) were detected in at least one of the groundwater samples above their respective AWQSs.

Groundwater analytes detected above AWQSs are summarized in In-Text Table 2.

In-Text Table 2
Groundwater Analytes Detected Above AWQSs

Analyte	Sample Identification	AWQS (µg/L)	Result (µg/L)
1,2-Dichloroethane (1,2-DCA)	MW-2	0.6	122
Benzene	MW-2	1	212 D
Ethylbenzene	MW-2	5	33.6
m,p-Xylene	MW-2	5	153
o-Xylene	MW-2	5	81.3
Toluene	MW-2	5	50.9
Naphthalene	MW-2	13.2	10

In-Text Table 2
Groundwater Analytes Detected Above AWQSs

Analyte	Sample Identification	AWQS (µg/L)	Result (µg/L)
Chromium (Total)	MW-4	50	53.2
Iron (Total)	MW-1	300+	900
	MW-2		2,930
	MW-3		2,260
	MW-4		28,600
	MW-X		443
	SMW-2 20160920		2,310 J
	SMW-X 20160920		1,070 J
Iron (Dissolved)	SMW-2 20160920	300 +	374
	SMW-X 20160920		381
Magnesium (Total)	MW-1	35,000	50,100
	MW-2		50,700
	MW-3		35,300
	MW-X		50,800
Magnesium (Dissolved)	MW-1	35,000	55,500
	MW-2		57,600
	MW-3		39,900
	MW-X		56,300
Manganese (Total)	MW-1	300	1,090
	MW-2		1,870
	MW-3		1,390
	MW-4		535
	MW-X		1,070
Manganese (Dissolved)	MW-1	300	1,160
	MW-3		1,680
	MW-X		1,120
Selenium (Total)	MW-2	10	27.3
	MW-3		15.9
Selenium (Dissolved)	MW-2	10	11.4
Sodium (Total)	MW-1	20,000	70,800
	MW-2		226,000
	MW-3		44,200
	MW-4		53,900
	MW-X		73,200
Sodium (Dissolved)	MW-1	20,000	69,100
	MW-2		263,000

In-Text Table 2
Groundwater Analytes Detected Above AWQSs

Analyte	Sample Identification	AWQS (µg/L)	Result (µg/L)
Sodium (Dissolved)	MW-3	20,000	49,000
	MW-4		61,800
	MW-X		69,000

Note:
J: The analyte was identified, but the reported quantity is approximate and may be inaccurate or imprecise.
D: Analyte concentration obtained from dilution.

Soil Vapor

Seven soil vapor samples were collected from seven temporary soil vapor points during the RI and SRI. VOCs associated with petroleum were detected at concentrations up to 3,340,000 micrograms per cubic meter (µg/m^3). CVOCs were detected at concentrations up to 534 µg/m^3. Of note, PCE was detected in soil vapor sample SV-1 at a concentration of 69.2 µg/m^3 and in soil vapor sample SV-4 at a concentration of 114 µg/m^3.

Conclusions

Based on an evaluation of the data and information from the RI and SRI, the Site is contaminated with petroleum-related VOCs, the CVOC 1,2-DCA, SVOCs, and metals in soil and groundwater; and petroleum-related and CVOCs in soil vapor. The elevated levels of petroleum-related VOCs, naphthalene, CVOCs, and PCBs, elevated PID readings, petroleum staining, and odors appear to be associated with the former use of the Site as a gasoline station and lubritorium. The greatest concentration of petroleum-related compounds was found downgradient of the suspect UST(s) on the southwestern portion of the Site. The SVOCs and metals present in the soil appear to be associated with the historic use as a railroad, a gasoline filling station, and subsequent demolition of the former gasoline station building. The elevated levels of DDT indicate the prior usage of pesticides at the Site.

Based on the elevated levels of petroleum-related VOCs in the soil and groundwater, a spill was reported to NYSDEC and spill number 1404448 was assigned to the Site.

Qualitative Human Health Exposure Assessment (QHHEA)

Potential exposure pathways for the current Site condition include ingestion and/or dermal contact with exposed soil/fill at the Site to trespassers; and from inhalation of VOCs from soil vapor emanating from the Site entering into the neighboring buildings by off-site construction and commercial workers, and adult and child residents. Once redevelopment activities begin, there will be a potential exposure pathway from contaminated soil and fill to construction workers, as these workers could ingest, inhale, or have dermal contact with exposed soil and/or fill. Redevelopment plans do not currently include dewatering. However, if redevelopment plans change to include dewatering, there will be an additional potential exposure pathway as workers could inhale or have dermal contact with the contaminated groundwater. Once redevelopment of the Site has been completed, there will be a potential exposure pathway from the potential off-gassing of residual organic vapors in the subsurface to adult and child residents, maintenance staff, and visitors through cracks or openings in the foundation of the proposed building and/or future adjacent buildings. There will also be a potential exposure pathway from dermal contact, inhalation, or ingestion of surface soil in any landscaped or non-capped areas by adult and child residents, visitors, and trespassers. In addition, there will be a potential exposure pathway from any particulates emanating from the Site during construction to off-site pedestrians, visitors, cyclists, and adult and child residents.

NYSDEC and NYSDOH have determined that this Site does not pose a significant threat to human health and the environment. Implementation of the Remedial Actions outlined in this RAWP will prevent the potential exposure pathways from becoming complete.

Summary of the Remedy

Remedial activities will be performed at the Site in accordance with this RAWP and the NYSDEC-issued Decision Document (DD). All deviations from this RAWP and/or the DD will be promptly reported to NYSDEC for approval and will be fully explained in the Final Engineering Report (FER).

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

   - Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
   - Reducing direct and indirect greenhouse gases and other emissions;
   - Increasing energy efficiency and minimizing use of non-renewable energy;
   - Conserving and efficiently managing resources and materials;
   - Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
   - Maximizing habitat value and creating habitat when possible;
   - Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
   - Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

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

2. The remediation will include excavation and off-site disposal of contaminant source areas, including: underground storage tanks (USTs) and any associated piping or other structures associated with a source of contamination; and grossly-contaminated soil, if encountered.

   Soil which exceeds the restricted residential use soil cleanup objectives (SCOs), as defined by 6 NYCRR Part 375-6.8, will be excavated to the extent practical and transported off-site for disposal. Soil will be excavated to a depth of 12 feet below grade surface beneath and around the periphery of the suspect USTs on the southwestern portion of the Site (southern portion of Lot 3) and on the southeastern portion of the Site; and to a depth of 2 feet below grade surface across the northern portion of Lot 3 and on the northeastern portion of the Site.

   Confirmation samples will be collected and analyzed to demonstrate achievement of restricted residential use SCOs. Approximately 1,000 cubic yards of contaminated soil will be removed from the Site.

3. Clean fill meeting the requirements of the 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the Site. Approximately 2,000 cubic yards of clean fill will be imported to raise the elevation of the rail bed on Lot 1 from 19 feet to 12 feet below grade surface for the partial cellar, and to install the 2-foot clean fill buffer for the composite cover system for the Site. On-site soil that does not exceed the lower of the restricted residential use SCOs or protection of groundwater SCOs for any compound may be used on-site, including below the water table, to backfill the excavation areas or re-grade the Site.

4. A site cover will be required to allow for restricted residential use of the Site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the Site, will meet the SCOs for cover material for the use of the Site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

5. Groundwater sampling will be conducted to establish pre-remedial baseline conditions at the Site and to determine whether groundwater treatment and post-remedial monitoring is needed. Based on the results of the groundwater sampling, in-situ groundwater treatment will be implemented. Prior to the full implementation of in-situ treatment, laboratory and/or on-site pilot scale studies will be conducted to more clearly define design parameters. The method and depth of injection will be determined during the remedial design.

6. A soil vapor extraction (SVE) system with a passive sub-slab depressurization system (SSDS) will be installed to remove volatile organic compounds (VOCs) from the subsurface. VOCs will be physically removed from the soil by applying a vacuum to wells that have been installed into the vadose zone (the area below the ground but above the water table). The vacuum draws air through the soil matrix which carries the VOCs from the soil to the SVE well. The air extracted from the SVE wells is then treated as necessary prior to being discharged to the atmosphere.

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

8. A Site Management Plan is required, which includes the following:

   a) An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional controls remain in place and effective:

- Institutional Controls: The Environmental Easement discussed above.
- Engineering Controls: The cover system and the SVE system with a passive sub-slab depressurization system discussed above.

This plan includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- A provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the Site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- Maintaining site access controls and Department notification; and
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

- Monitoring of groundwater to assess the performance and effectiveness of the remedy;
- A schedule of monitoring and frequency of submittals to the Department; and
- Monitoring for vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

c) An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but may not be limited to:

- Compliance monitoring of treatment to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- Maintaining site access controls and Department notification; and
- Providing the Department access to the Site and the O&M records.

Remedial activities will be performed at the Site in accordance with this RAWP and the Department-issued Decision Document (DD). All deviations from this RAWP and/or the DD will be promptly reported to NYSDEC for approval and will be fully explained in the Final Engineering Report (FER).

REMEDIAL ACTION WORK PLAN (RAWP)

1.0 INTRODUCTION

Brook 156 Housing Development Fund Corporation (HDFC) and the New York City Housing Preservation Department (HPD) entered into a Brownfield Cleanup Agreement (BCA) (BCA Index No. C203078-03-15; Site No. C203078) with the New York State Department of Environmental Conservation (NYSDEC) in April 2015 to investigate and remediate an approximately 7,438-square foot property located at 740 Brook Avenue in the Morrisania neighborhood of the Bronx, New York, hereafter referred to as the "Site". Brook 156 HDFC and the HPD are collectively referred to as the "Volunteers" or "Applicant". When completed, the Site will contain a new 9- to 10-story affordable housing building for seniors; therefore, restricted residential use is proposed for the Site.

This Remedial Action Work Plan (RAWP) has been prepared by AKRF, Inc. (AKRF) on behalf of the Volunteers. A Remedial Investigation (RI) Report (RIR) and a Supplemental Remedial Investigation (SRI) Report (SRIR) were prepared and submitted to NYSDEC in January 2015 and October 2017, respectively. The data compiled in the RIR and SRIR were used to prepare this RAWP, which provides an evaluation of Remedial Action (RA) 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 (SCG), which are detailed in Appendix A. The remedy described in this document also complies with all applicable federal, state, and local laws, regulations and requirements. 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. Fish and wildlife resources were not identified for the Site.

1.1 Site Location and Description

The Site is located in the County of Bronx, New York and is identified as Block 2360, Lots 1 and 3 on the New York City Tax Map. The Site is currently zoned as R7-2. Lot 1 comprises the eastern portion of the Site and consists of an approximately 5,658-square foot rail bed and tunnel that lie approximately 19 feet below sidewalk grade, and a small portion at sidewalk grade along the eastern portion of the lot. Lot 3 comprises the western portion of the Site and consists of an approximately 1,780-square foot, irregularly-shaped, concrete- and asphalt-paved lot. The Site is abutted to the north by East 157th Street followed by a parking lot, to the east by a parking lot followed by Hegney Place, to the south by East 156th Street followed by a residential and commercial building ("Via Verde"), and to the west by Brook Avenue, followed by a residential and commercial building.

A boundary map is attached to the BCA, as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The approximately7,438-square foot Site is fully described in the Metes and Bounds, provided as Appendix B. A Site Location map is provided as Figure 1 and a Site and Sample Location Plan is provided as Figure 2.

1.2 Contemplated Redevelopment Plan

The Remedial Action (RA) to be performed under this 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 below to provide the basis for this assessment. However, the RA contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

The proposed development consists of a new 9- to 10-story residential building comprising approximately 50,220 square feet. When completed, the proposed building will contain: a partial cellar encompassing portions of both lots that will contain mechanical and maintenance rooms, a bicycle room, and storage; the ground floor will contain a lobby, community facilities, a residential apartment, and a laundry room; and the floors above will contain a total of 70 affordable housing units for seniors. Rooftop terraces will be located on the 9th and 10th floor roofs and landscaped entrances to the building will be set back from the Site boundaries along Hegney Place and Brook Avenue. The Site is currently being re-zoned from R7-2 to C6-2 to support the proposed redevelopment. The proposed redevelopment plans are included as Appendix C.

1.3 Description of Surrounding Property

The Site is abutted to the north by East 157th Street, followed by a parking lot, to the east by a parking lot followed by Hegney Place, to the south by East 156th Street followed by a residential and commercial building ("Via Verde"), and to the west by Brook Avenue, followed by a residential and commercial building. The surrounding area is developed with primarily residential and commercial buildings.

2.0 DESCRIPTION OF PREVIOUS INVESTIGATION FINDINGS

The Site was investigated to determine whether past usage of the Site as a gasoline station with a lubrication office, and a railroad have adversely affected the Site subsurface. An RI was conducted at the Site between October 2013 and August 2014. An SRI was conducted at the Site in August and September 2016 to delineate petroleum contamination identified on Lot 3 during the RI. Soil, groundwater, and soil vapor were investigated during both the RI and SRI, the results of which were documented in AKRF's January 2015 RIR and October 2017 SRIR, respectively. The RIR and SRIR are included in Appendix D.

2.1 Previous Investigations Summary

AKRF conducted an RI between October 2013 and August 2014, the results of which are documented in a RIR; and an SRI in August and September 2016, the results of which are documented in an SRIR. The scope of the RI included: the performance of a geophysical survey on accessible portions of Lot 3; the advancement of 13 soil borings with the collection and laboratory analysis of 22 soil samples; the installation of 4 permanent, flush-mounted, 2-inch diameter groundwater monitoring wells with the collection and analysis of 4 groundwater samples; the installation of 4 temporary soil vapor probes with the collection and laboratory analysis of 4 soil vapor samples and 1 ambient air sample; and a groundwater monitoring well elevation survey to determine groundwater flow direction and elevation. The scope of the SRI included: the advancement of 6 soil borings with the collection and laboratory analysis of 11 soil samples; the installation of 2 permanent, flush-mounted 2-inch diameter groundwater monitoring wells with the collection and laboratory analysis of 2 groundwater samples; the installation of 3 temporary soil vapor probes with the collection and laboratory analysis of 3 soil vapor and 1 ambient air sample; and a groundwater monitoring well elevation survey to determine groundwater flow direction and elevation.

2.1.1 Soil Boring Advancement and Groundwater Monitoring Well and Temporary Soil Vapor Point Installation

Soil Borings

During the RI, 13 soil borings (denoted as SB-1 through SB-13) were advanced across the Site between October 2013 and August 2014 by Aarco Environmental Services (Aarco) of Lindenhurst, New York and CMI Subsurface Investigations, Inc. (CMI) of Tappan, New York. Soil borings SB-1, SB-2, and SB-13 were advanced using a Geoprobe® direct push probe (DPP) and soil cores were collected in 5-foot stainless steel macrocore samplers fitted with dedicated internal acetate liners. Soil borings SB-3 and SB-9 were advanced using a Hollow Stem Auger (HSA) rig with 2-foot split spoon samplers. Soil borings SB-10 and SB-12 were advanced with a hand auger. Twenty-two soil samples were collected from the soil borings for laboratory analysis.

The SRI was conducted to delineate contamination identified on Lot 3 during the RI. Six soil borings (denoted as SSB-1 through SSB-6) were advanced on Lot 3 and on the adjacent sidewalks between August 31 and September 2, 2016 by Aarco. Soil borings SSB-1 through SSB-3, SSB-5, and SSB-6 were installed using a Rotosonic rig fitted with a core barrel and internal, dedicated plastic sampling liners and soil boring SSB-4 was installed using a track-mounted Geoprobe® DPP rig with 5-foot long stainless steel macrocore samplers fitted with dedicated internal acetate liners. Eleven soil samples were collected for chemical analysis during this investigation, including one soil sample from the presumed invert of the suspect UST(s) (approximately nine to ten feet below grade) and from the interval directly below any observed contamination.

Soil borings advanced during the RI and SRI were sampled continuously until refusal or the groundwater interface, whichever was encountered first, with the following exceptions: soil boring SSB-4 was advanced to presumed bedrock at approximately 40 feet below grade; and soil borings with observed contamination extending into the groundwater table. If evidence of contamination was identified, soil sampling continued beyond the groundwater interface until a clean interval was identified or refusal was encountered.

Soil cores were field-screened for evidence of contamination using a PID equipped with a 10.6 electron volt (eV) lamp, calibrated at the beginning of each field day with 100 ppm isobutylene calibration gas in accordance with the manufacturer's specifications. At each boring location, AKRF field personnel recorded and documented subsurface conditions.

Groundwater Monitoring Wells

During the RI, soil borings SB-1, SB-3, SB-6, and SB-9 were converted into 2-inch diameter permanent groundwater monitoring wells MW-1, MW-2, MW-3, and MW-4, respectively. Well construction consisted of 15 feet of 0.020-inch polyvinyl chloride (PVC) screen installed approximately 10 feet into the water table with a solid PVC riser to grade. A No. 2 morie sandpack was installed to approximately two feet above the well screen and a 2-foot bentonite seal was installed above the sandpack. The bentonite seal was hydrated and the remainder of the annular space around the solid well riser was backfilled with drill cuttings to approximately one foot below grade. The wells were finished with a locking j-plug and flush-mounted, locking monitoring well cover. Immediately after installation, the wells were developed via surging and pumping using a submersible bladder pump and dedicated polyethylene tubing to remove any accumulated fines and establish a hydraulic connection with the surrounding aquifer. On June 10, 2014, at least one week following well development, one groundwater sample was collected from each of the wells using EPA low-flow sampling methodology and submitted for laboratory analysis of VOCs, SVOCs, PCBs, pesticides, and total and dissolved metals.

During the SRI, two 2-inch diameter permanent groundwater monitoring wells (SMW-1 and SMW-2) were installed to 35 feet below grade using a Rotosonic drill rig. Well construction consisted of 10 feet of 0.020-inch slotted PVC monitoring well screen installed approximately 5 feet into the water table with a solid PVC riser to the grade. A No. 2 morie sandpack was installed to approximately two feet above the well screen and a two-foot bentonite seal was installed above the sandpack. The bentonite seal was hydrated and the remainder of the annular space around the solid well riser was backfilled with clean sand to approximately one foot below grade. The wells were finished with a locking j-plug and flush-mounted locking well cover. Immediately after installation, the wells were developed via surging and pumping using a submersible bladder pump and dedicated polyethylene tubing to remove any accumulated fines and establish a hydraulic connection with the surrounding aquifer. On September 20, 2016, 20 days following well development, one groundwater sample was collected from each of the wells using EPA low-flow sampling methodology and submitted for laboratory analysis of VOCs and SVOCs. SMW-2 was also analyzed for PCBs, pesticides, and total and dissolved metals.

Groundwater Elevation Surveys

On June 10, 2014, monitoring wells MW-1 through MW-4 were surveyed by Montrose Surveying Company (Montrose) of Richmond Hill, New York, a New York State-licensed surveyor, to the nearest 0.01 foot. Two elevation measurements were taken at each monitoring well location on the northern side of the well: the at-grade elevation; and the elevation of the top of PVC casing. Vertical datum was tied to the North American Vertical Datum (NAVD-88). Depth to water in all groundwater monitoring wells was measured the same day as the survey using a sonic interface tape accurate to 0.01 foot. Based on the data collected on June 10, 2014, groundwater flows southerly beneath the Site.

On September 20, 2016, monitoring wells SMW-1 and SMW-2 were surveyed by Montrose to the nearest 0.01 foot. Consistent with the previous surveying event, two elevation measurements were taken at each monitoring well location on the northern side of the well: the at-grade elevation; and the elevation of the top of PVC casing. Vertical datum was tied to the NAVD 88. Depth to water in the accessible groundwater monitoring wells located on Lot 3 (SMW-1, SMW-2, MW-1, and MW-3) was measured the same day as the survey using a sonic interface tape. Based on the data collected on September 20, 2016, groundwater flow was inconclusive, potentially due to nearby off-site groundwater pumping or the inability to collect enough Site-wide data due to the inaccessibility of the wells within the rail bed on Lot 1.

Temporary Soil Vapor Points

During the RI, four temporary soil vapor points (SV-1 through SV-4) were installed. Temporary soil vapor points SV-1 and SV-2 were installed by Aarco on October 21, 2013 and SV-3 and SV-4 were installed by CMI on May 21, 2014. The temporary soil vapor points were installed at approximately 5 feet below grade using a track-mounted Geoprobe® DPP unit by advancing a 0.75-inch diameter hollow probe rod fitted with an expendable 6-inch long stainless steel screened drive point. Dedicated polyethylene tubing with threaded fittings was connected to the probe. The hollow probe rod was then removed and the boring was backfilled with clean silica sand to 3 to 6 inches above the screen. Hydrated bentonite was used to fill the remaining void around the sampling tubing to the ground surface. Soil vapor samples were collected at SV-1 and SV-2 on October 22 and 23, 2013, respectively, and at SV-3 and SV-4 on May 22, 2014. An ambient air sample was collected for chemical analysis concurrently with soil vapor samples SV-3 and SV-4.

During the SRI, three temporary soil vapor points (SSV-1 through SSV-3) were installed by Aarco using a track-mounted Geoprobe® DPP unit at approximately five feet below grade. Soil vapor samples SSV-1 20160831 through SSV-3 20160831 and ambient air sample SAA-1 20160831 were collected on August 31, 2016.

The soil boring, monitoring well, and temporary soil vapor point locations are shown on Figure 2.

2.1.2 Geophysical Survey and Utility Mark-Outs

On October 21, 2013, a geophysical survey was conducted across accessible portions of the Site by Enviroprobe Service, Inc. (Enviroprobe) of Mt. Laurel, New Jersey to clear the proposed boring locations for subsurface utilities and to locate other potential subsurface structures. The geophysical survey included both electromagnetic (EM) and ground penetrating radar (GPR) methods. All utility locations were marked out with spray paint prior to the commencement of drilling activities. An anomaly consistent with that of a UST or several smaller USTs, measuring approximately 8.5 feet by 27 feet, was detected on the southwestern portion of the Site (southern portion of Lot 3). One tank fill port and a suspect fill port and vent pipe were observed adjacent to the anomaly. Two unknown manholes previously identified on Lot 3 were inspected during the geophysical survey to determine their purpose and configuration. The southern manhole was determined to be an electric utility manhole and the northern manhole appeared to be an empty vault.

In addition to the geophysical survey, Dig Safely New York was contacted at least three days prior to the start of intrusive work and obtained utility markouts, as required by law. The Geophysical Investigation Report is included as Appendix A of the RIR, which is included in Appendix D. The suspect UST(s), fill ports, vent pipe, and manhole locations are shown on Figure 2.

2.1.3 Soil, Groundwater, and Soil Vapor Sampling

Soil Sampling

Twenty-three soil samples and 3 blind duplicate soil samples were collected for chemical analysis during the RI, and 11 soil samples and 1 blind duplicate soil sample were collected for chemical analysis during the SRI. A summary of soil borings and the soil samples collected from each boring is presented in In-Text Table 3.

In-Text Table 3
Summary of Soil Borings and Soil Samples

Soil Boring ID	Soil Sample ID
SB-1	SB-1 (0-2’)
	SB-1 (25-27’)
	SB-X
SB-2	SB-2 (0-2’)
	SB-2 (10-12’)
	SB-2 (14-16’)
SB-3	SB-3 (0-4’)
	SB-3 (8-12’)
	SB-3 (32-36’)
SB-4	SB-4 (0-4’)
	SB-Y
SB-5	SB-5 (0-2’)
SB-6	SB-6 (0-2’)
	SB-6 (4-6’)
SB-7	SB-7 (0-2’)
	SB-XX
	SB-7 (4-6’)
SB-8	SB-8 (0-2’)
	SB-8 (4-6’)
SB-9	SB-9 (0-2’)
	SB-9 (4-6’)
SB-10	SB-10 (0-1’)
SB-11	SB-11 (0-1’)
SB-12	SB-12 (0-2’)
SB-13	SB-13 (0-2’)
SSB-1	SSB-1 (22-23’) 20160901
	SSB-1 (26-27’) 20160901

In-Text Table 3
Summary of Soil Borings and Soil Samples

Soil Boring ID	Soil Sample ID
SSB-2	SSB-2 (22-23') 20160901
	SSB-2 (23-24') 20160901
SSB-3	SSB-3 (14-15') 20160901
	SSB-X 20160901
	SSB-3 (22-23') 20160901
	SSB-3 (23-24') 20160901
SSB-4	SSB-4 (26-27') 20160831
	SSB-4 (27-28') 20160831
SSB-5	SSB-5 (9-10') 20160902
SSB-6	SSB-6 (9-10') 20160902

Notes:
Soil borings and soil samples denoted as SB-# were advanced/collected during the 2013-2014 RI.
Soil borings and soil samples denoted as SSB-# were advanced/collected during the 2016 SRI.
Soil sample SB-X is a blind duplicate of soil sample SB-1 (25-27').
Soil sample SB-Y is a blind duplicate of soil sample SB-4 (0-4').
Soil sample SB-XX is a blind duplicate of soil sample SB-7 (0-2').
Soil sample SSB-X 20160901 is a blind duplicate of soil sample SSB-3 (14-15') 20160901.

Soil boring locations are shown on Figure 2. Soil analytical data from the RI and SRI are presented in Attached Tables 1 through 5 and 13 through 17, respectively.

Groundwater Sampling

Four groundwater samples were collected during the RI and two groundwater samples were collected during the SRI. A list of groundwater monitoring wells and the groundwater samples collected from each well is summarized in In-Text Table 4.

In-Text Table 4
Summary of Groundwater Monitoring Wells and Groundwater Samples

Groundwater Monitoring Well ID	Groundwater Sample ID
MW-1	MW-1
MW-2	MW-2
MW-3	MW-3
MW-4	MW-4
	MW-X
SMW-1	SMW-1 20160920
SMW-2	SMW-2 20160920
	SMW-X 20160920

Notes:
Groundwater monitoring wells and groundwater samples denoted as MW-# were installed and sampled during the RI.
Groundwater monitoring wells and groundwater samples denoted as SMW-# were installed and sampled during the SRI.
Groundwater sample MW-X is a blind duplicate of groundwater sample MW-4.
Groundwater sample SMW-X 20160920 is a blind duplicate of groundwater sample SMW-2 20160920.

Groundwater sampling locations are shown on Figure 2. A Site-specific groundwater elevation map is provided as Figure 3. Groundwater sample analytical data from the RI and SRI is presented in Attached Tables 6 through 11 and 18 through 23, respectively.

Soil Vapor Sampling

Four soil vapor samples and one ambient air sample were collected for chemical analysis as part of the RI and three soil vapor samples and one ambient air sample were collected for chemical analysis as part of the SRI. Temporary soil vapor points and the soil vapor samples collected from each point, as well as the comparative ambient air samples, is summarized in In-Text Table 5.

In-Text Table 5
Summary of Temporary Soil Vapor Points and Soil Vapor/Ambient Air Samples

Temporary Soil Vapor Point	Soil Vapor/Ambient Air Sample
SV-1	SV-1
SV-2	SV-2
SV-3	SV-3
SV-4	SV-4
NA	AA-1
SSV-1	SSV-1 20160831
SSV-2	SSV-2 20160831
SSV-3	SSV-3 20160831
SAA-1	SAA-1 20160831

Notes:
NA - Not applicable.
Temporary soil vapor point, and soil vapor and ambient air samples denoted as SV/AA-# were installed and sampled during the RI.
Temporary soil vapor points, and soil vapor and ambient air samples denoted as SSV/SAA-# were installed and collected during the SRI.

Soil vapor sampling locations are shown on Figure 2. Soil vapor sample analytical data from the RI and SRI is provided in Attached Tables 12 and 24, respectively.

2.1.4 Chemical Analytical Work Performed

Chemical analytical work is summarized in In-Text Table 6.

In-Text Table 6
Chemical Analytical Work

Factor	Description
Quality Assurance Officer	The chemical analytical QA/QC was directed by Michelle Lapin, P.E. of AKRF.
Third Party Data Validator	The third-party data validation was performed by Lori Beyer of L.A.B. Validation Corp.

In-Text Table 6
Chemical Analytical Work

Factor	Description
Chemical Analytical Laboratory	The chemical analytical laboratory used in this investigation was SGS Accutest, Inc. of Dayton, New Jersey, a NYS ELAP-certified laboratory.
Chemical Analytical Methods	Soil analytical methods: • TCL and CP-51 List VOCs by EPA Method 8260C (rev. 2006) • TCL and CP-51 List SVOCs by EPA Method 8270D (rev. 2007) • TCL Pesticides by EPA Method 8081B (rev. 2000) • TCL PCBs by EPA Method 8082A (rev. 2000) • TAL Metals by EPA Method 6000/7000 series (rev. 2007) Groundwater analytical methods: • TCL and CP-51 List VOCs by EPA Method 8260C • TCL and CP-51 List SVOCs by EPA Method 8270D • TCL Pesticides by EPA Method 8081B • TCL PCBs by EPA Method 8082A • TAL Metals (total and dissolved) by EPA Method 6000/7000 series (rev. 2007) Soil vapor and ambient air analytical method: • VOCs by EPA Method TO-15

2.1.5 Remedial Investigation (RI) and Supplemental Remedial Investigation (SRI) Findings

RI and SRI soil analytical results are presented in Attached Tables 1 through 5 and Attached Tables 13 through 17, respectively. RI and SRI groundwater analytical results are presented in Attached Tables 6 through 11 and Attached Tables 18 through 23, respectively. RI and SRI soil vapor analytical results are presented in Attached Tables 12 and 24, respectively. Concentration maps showing compounds detected above applicable standards for soil and groundwater are shown on Figures 4 and 5, respectively. A concentration map showing soil vapor concentrations is provided as Figure 6. In-Text Tables 1 and 2 summarize soil and groundwater detections above applicable standards, respectively.

2.2 Significant Threat Determination

The NYSDEC and NYSDOH have determined that this Site does not pose a significant threat to human health and the environment. Notice of that determination is included as Appendix E.

2.3 Site History

2.3.1 Past Uses and Ownership

Historic reports indicated that Lot 3 was developed historically as a gasoline station with a lubrication office, and a used automotive sales lot between 1949 and 1969. Lot 1 was occupied by the Port Morris branch of the New York and Harlem Railroad since at least 1891. The railroad was abandoned circa 1999.

2.3.2 Previous Environmental Reports

Phase I Environmental Site Assessment (ESA) Report, East 156th Street and Brook Avenue, Bronx, New York, AKRF, Inc. (AKRF), March 2013

AKRF conducted a Phase I ESA and a Tier 1 Vapor Encroachment Screen at the Site in March 2013. The assessment revealed the following evidence of Recognized Environmental Conditions (RECs) and Vapor Encroachment Conditions (VECs):

- Lot 3 was developed with a gasoline station with a lubrication office and a used automotive sales lot in 1949. According to City Directory records, the gasoline filling station was called the Brook Service Station in 1949 and the J&L Service Station between 1956 through 1961. The gasoline station was vacated by 1969. During Site reconnaissance, a fill port and vent pipe, which may have been associated with a former UST, were observed within the portion of the Site that was previously used as a gasoline filling station. No closure documents for any former USTs were provided and no Petroleum Bulk Storage (PBS) records were listed with the NYSDEC.
- Historic Sanborn Maps showed that Lot 1 was the Port Morris branch of the New York and Harlem Railroad; railroads are commonly associated with elevated concentrations of metals, pesticides, PCBs, and petroleum products.
- The surrounding area was historically mixed-use and included: gasoline filling stations, a garage, and a paper box manufacturer south of the Site across East 156th Street; and a printer and "paints" west of the Site across Brook Avenue.
- A BCP site with reported elevated concentrations of PCE in soil vapor and groundwater was located approximately 515 feet north of the Site.

The assessment also identified the following Environmental Concerns:

- Two unknown manholes were observed within the concrete-paved portions of Lot 3. The Site owner was unaware of the purpose or configuration of these features and there were no identifiable labels to indicate their use.
- The Site was vacant during the time of the Site visit. Although no painted surfaces or suspect asbestos-containing material (ACM) were observed, it was reported that the potential existed for building materials from former on-site structures and debris to be within the historical fill. Based on the age of the former structures, it was noted that these materials could contain lead-based paint (LBP) and/or ACM.

Sampling Protocol and Health and Safety Plan (HASP), Brook 156, Tax Block 2360, Lots 1 and 3, Bronx, New York, AKRF, Inc. (AKRF), April 2013

AKRF prepared a Sampling Protocol and associated HASP for the Site in April 2013. The work plan proposed: a geophysical survey across accessible areas of the Site; sampling locations; the advancement of 9 soil borings with the collection and laboratory analysis of 2 soil samples from each boring; the installation of 4 2-inch diameter groundwater monitoring wells with the collection and laboratory analysis of 4 groundwater samples; and the installation of 4 temporary soil vapor probes with the collection and laboratory analysis of 4 soil vapor samples. The HASP provided Site-specific health and safety measures during implementation of the investigation. The scope of the investigation was based on the previous reports and investigations for the Site.

Remedial Investigation Report (RIR), Brook 156, Bronx, New York, AKRF, Inc., January 2015

AKRF conducted an RI at the Site and prepared an RIR in January 2015. The RI included: a geophysical survey across accessible areas of the Site; a manhole investigation; the advancement of 13 soil borings to bedrock or refusal with the collection and analysis of 22 soil samples from the borings; the installation of 4 permanent groundwater monitoring wells with the collection and analysis of 4 groundwater samples; and the installation of 4 temporary soil vapor points with the collection and analysis of 4 soil vapor samples and one ambient air sample. Results of the sample analysis were as follows:

- The soil sample analyses identified 16 VOCs [1,2-dichloroethane, 2-butanone (MEK), acetone, benzene, carbon disulfide, cis-1,2-dichloroethene, cyclohexane, ethylbenzene, isopropylbenzene, m,p-xylene, methylcyclohexane, methylene chloride, o-xylene, PCE, toluene, and vinyl chloride] were detected in 18 of the 22 soil samples analyzed. 1,2-DCA was detected in soil sample SB-3 (8-12) at a concentration of 0.0523 mg/kg, above its UUSCO of 0.02 mg/kg, but below its RRSCO of 3.1 mg/kg. Acetone was detected in soil samples SB-7 (0-2) and its associated duplicate at estimated concentrations of 0.228 mg/kg and 0.092 mg/kg, respectively, above its UUSCO of 0.05 mg/kg. BTEX compounds were detected in soil sample SB-3 (8-12) at concentrations of 4.43 mg/kg, 26.9 mg/kg, 11.1 mg/kg, 55.1 mg/kg, and 18.1 mg/kg (from diluted analyses), respectively, above their respective UUSCOs of 0.06 mg/kg, 26.9 mg/kg, 11.1 mg/kg, 0.26 mg/kg, and 0.26 mg/kg, respectively. No VOCs were detected at concentrations exceeding their respective RRSCOs.
- Twenty-two SVOCs [1,1'-biphenyl, acenaphthene, acenapthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, di-n-octyl phthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene] were detected in 20 of the 22 soil samples analyzed. Seven polycyclic aromatic hydrocarbons (PAHs) [benzo(a)anthracene (maximum concentration of 2.11 mg/kg), benzo(a)pyrene (maximum concentration of 2.78 mg/kg), benzo(b)fluoranthene (maximum concentration of 4.08 mg/kg), benzo(k)fluoranthene (maximum concentration of 1.37 mg/kg), chrysene (maximum concentration of 2.21 mg/kg), dibenzo(a,h)anthracene (maximum concentration of 0.791 mg/kg), and indeno(1,2,3-cd)pyrene (maximum concentration of 2.86 mg/kg)] were detected in one or more soil samples at concentrations above their respective UUSCOs. Additionally, five SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene were detected in up to four soil samples at concentrations above their respective RRSCOs. Ten metals including arsenic (up to 14.4 mg/kg), barium (up to 655 mg/kg), cadmium (up to 4 mg/kg), chromium (up to 77.7 mg/kg), copper (up to 189 mg/kg), lead (up to 876 mg/kg), mercury (up to 1.1 mg/kg), nickel (up to 34.4 mg/kg), selenium (up to 4.1 mg/kg), and zinc (up to 2,210 mg/kg) exceeded their respective UUSCOs in 18 of the soil samples. Of these metals, barium in one sample, lead in four samples, and mercury in two samples, exceeded their respective RRSCOs. Two PCB Aroclors were detected in 3 of the 27 soil samples analyzed. Aroclors 1254 and 1260 were detected at concentrations exceeding the 0.1 mg/kg UUSCO for total PCBs at 0.0004 mg/kg in soil sample SB-5 (0-2). Up to 21 pesticides were detected in 15 soil samples analyzed. 4,4'-DDT was

detected in soil samples SB-5 (0-2), SB-7 (4-6), SB-10 (0-1), and SB-11 (0-1) at concentrations exceeding its UUSCO.

- The results of the groundwater sample analyses indicated that 12 VOCs were detected in at least one of the groundwater samples. 1,2-DCA, benzene, ethylbenzene, m,p-xylene, o-xylene, and toluene were detected in groundwater sample MW-2 at concentrations of 122 micrograms per liter (µg/L), 212 µg/L, 33.6 µg/L, 153 µg/L, 81.3 µg/L, and 50.9 µg/L, respectively, above their respective AWQSs of 0.6 µg/L, 1 µg/L, 5 µg/L, 5 µg/L, 5 µg/L, and 5 µg/L, respectively. One SVOC, naphthalene, was detected in groundwater sample MW-2 at a concentration of 13.2 5 µg/L, which is slightly above its AWQS of 10 µg/L. Thirteen metals were detected in the unfiltered groundwater samples (total metals analysis) and 12 metals were detected in the filtered samples (dissolved metals analysis). Six total metals (chromium, iron, magnesium, manganese, selenium, and sodium) and four dissolved metals (magnesium, manganese, selenium, and sodium) were detected in at least one of the groundwater samples above their respective AWQS.
- The results of the soil vapor and ambient air sampling showed that 32 compounds were detected in the four soil vapor samples analyzed. VOCs associated with petroleum (including BTEX, 1,2,4- and 1,3,5-trimethylbenzene, cyclohexane, ethanol, heptane, hexane, 4-ethyltoluene, and 2,2,4-trimethylpentane) were detected at concentrations up to 3,340,000 µg/m^3. Chlorinated solvent-related VOCs (including acetone, chloroform, PCE, TCE, and MEK) were detected at concentrations up to 333 µg/m^3. Of note, PCE was detected at a concentration of 69.2 µg/m^3 in soil vapor sample SV-1 and in soil vapor sample SV-2 at a concentration of 114 µg/m^3.
- Based on an evaluation of the data and information from the RI, it was determined that on-site soil was contaminated with petroleum-related VOCs, PAHs, PCBs, the pesticide DDT, and metals. Groundwater beneath the Site was contaminated with 1,2-DCA, petroleum-related VOCs, and naphthalene. Elevated concentrations of petroleum-related VOCs and the chlorinated VOC PCE were present in soil vapor at the Site. The elevated levels of petroleum-related VOCs, naphthalene, chlorinated solvents, and PCBs, elevated PID readings, petroleum staining and odors are likely associated with former use of the Site as a gasoline station and lubritorium. The greatest concentration of petroleum-related compounds was found downgradient of the suspect UST(s). The SVOCs and metals present in the soil appear to be related to the historic use at the Site as a railroad and subsequent demolition of the former gasoline station building. The elevated levels of DDT indicate the prior usage of pesticides at the Site. Based on the elevated levels of petroleum-related VOCs in the soil and groundwater, a spill was reported to NYSDEC and Spill No. 1404448 was assigned to the Site.

Brownfield Cleanup Program (BCP) Application, Brook 156, Bronx, New York, AKRF, Inc. (AKRF), April 2015

AKRF prepared a BCP Application for the Site in January 2015, which discussed soil, groundwater, and soil vapor contamination associated with the Site's former uses. The Site was entered into the BCP in February 2015.

Citizen Participation Plan (CPP), Brook 156, 740 Brook Avenue, Bronx, New York, AKRF, Inc. (AKRF), July 2015

AKRF prepared a CPP for the Site in May 2015, which provided details on major issues of public concern related to the Site and surrounding areas. The CPP provided this information to the public and encouraged citizen involvement in decisions being made about the Site regarding their health.

Supplemental Remedial Investigation Work Plan (SRIWP), 740 Brook Avenue, Bronx, New York, AKRF, Inc. (AKRF), February 2016

AKRF prepared an SRIWP, Quality Assurance Project Plan (QAPP), and associated HASP for the Site in February 2016. The work plan proposed the advancement of four soil borings with the collection and laboratory analysis of up to three soil samples from each boring, the installation of two permanent groundwater monitoring wells with the collection and analysis of two groundwater samples, and the installation of three temporary soil vapor points with the collection and analysis of three soil vapor samples and one ambient air sample. Up to four additional soil borings were tentatively planned, depending on field observations, to further delineate the horizontal and vertical contamination at the Site identified during the RI. The HASP provided Site-specific health and safety measures during implementation of the investigation. The SRIWP was approved by NYSDEC on February 5, 2016.

Supplemental Remedial Investigation Report (SRIR), 740 Brook Avenue, Bronx, New York, AKRF, Inc. (AKRF), October 2017

AKRF conducted an SRI at the Site and prepared an SRIR in October 2017. The SRI included: the advancement of 6 soil borings with the collection and laboratory analysis of 11 soil samples, the installation of 2 permanent, flush-mounted 2-inch diameter groundwater monitoring wells with the collection and laboratory analysis of 2 groundwater samples, and the installation of 3 temporary soil vapor probes with the collection and laboratory analysis of 3 soil vapor and 1 ambient air samples. Results of the sample analysis were as follows:

- VOCs were detected in 7 of the 11 soil samples at concentrations below their respective UUSCOs and RRSCOs.
- SVOCs were detected in 6 of the 11 soil samples. Two SVOCs [benzo(k)fluoranthene and chrysene] were detected in up to two soil samples at concentrations above their respective UUSCOs. Five polycyclic aromatic hydrocarbons (PAHs) [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected in up to three soil samples at concentrations above their respective UUSCOs and RRSCOs with a maximum estimated concentration of 2.84 mg/kg.
- Metals were detected in the three soil samples analyzed for metals. Copper was detected in soil sample SSB-5 (9-10') 20160902 at a concentration of 159 mg/kg, above its UUSCO of 50 mg/kg, but below its RRSCO of 270 mg/kg. Lead was detected in the same sample at a concentration of 81.8 mg/kg, above its UUSCO of 63, but below its RRSCO of 400 mg/kg. Zinc was detected soil samples SSB-4 (26-27') 20160831 at a concentration of 111 mg/kg, slight above its UUSCO of 109 mg/kg, but below its RRSCO of 10,000 mg/kg. Mercury was detected in each of the 3 soil samples at concentrations ranging between an estimated 1.3 mg/kg and 5 mg/kg, above its UUSCO of 0.18 mg/kg and RRSCO of 0.81 mg/kg. Mercury was also detected in the blind duplicate soil sample SSB-X 20160901 at an estimated concentration of 0.67 mg/kg, above its UUSCO but below its RRSCO.

- VOCs, SVOCs, PCBs, and pesticides were not detected above laboratory reporting limits in the groundwater samples.
- Eight metals were detected in the unfiltered (total analysis) groundwater sample SMW-2 20160920 and six metals were detected in the filtered groundwater sample (dissolved metals analysis). Four metals (iron, magnesium, manganese, and sodium) were detected in the filtered and unfiltered analyses at concentrations above their respective AWQSs. The same metals were also detected in blind duplicate groundwater sample SMW-X 20160920 at similar concentrations above their respective AWQSs.
- Soil vapor sampling results indicated that VOCs associated with petroleum were detected at individual concentrations up to 515 $\mu g/m^3$ and chlorinated solvent-related VOCs were detected at individual concentrations up to 534 $\mu g/m^3$. PCE was detected in soil vapor samples SSV-1 20160831 and SSV-2 20160831 at concentrations of 157 $\mu g/m^3$ and 97.6 $\mu g/m^3$, respectively, above its AGV of 30 $\mu g/m^3$.

The SRI delineated the extent of petroleum contamination at the Site. The vertical extent of contamination was determined to be confined directly south of the suspect UST at two separate depth intervals: below the suspected invert of the tank bottom (11 to 15 feet below grade); and directly above the groundwater table (approximately 20 to 27 feet below grade), immediately downgradient of the tank on the southwestern portion of the Site to the groundwater table. In addition, the elevated concentrations of SVOCs and metals found in the soil appeared to be associated with historic fill at the Site and the elevated concentrations of PCE in soil vapor samples SSV-1 and SSV-2 appeared to be associated with the historic use as a gasoline station and lubritorium.

2.3.3 Sanborn Maps

Historical fire insurance (Sanborn) maps were reviewed for indications of past uses on or near the Site that may have resulted in the generation of hazardous waste. Specifically, maps from 1891, 1908, 1909, 1935, 1946, 1951, 1952, 1969, 1978, and 1989 were reviewed. All Sanborn Maps available for the Site were reviewed prior to preparation of this RAWP and are included as Appendix F.

1891

The Site was partially vacant and partially occupied by the Port Morris branch of the New York and Harlem Railroad. The Site was bound by the Port Morris branch of the New York and Harlem Railroad to the north, East 156th Street to the Site to the south, German Place to the east, and Brook Avenue to the west.

The surrounding blocks were developed with multi-story apartment buildings, a grammar school, churches, a police precinct, and an elevated railway station. The New York and Harlem Railroad tracks continue for three blocks north of the Site. Properties to the south were not shown.

1908

The Site was not shown on the 1908 map.

Surrounding areas to the north, east, and west were not shown. The New York Central and Harlem River Freight Yard was shown south of the Site across East 156th Street. No other significant changes from the 1891 map were noted on the surrounding properties.

1909

The western portion of the Site was developed with a four-story building with a basement and was labeled as a store and dwelling. The railroad was still shown.

East 157th Street abutted the Site to the north. A printer and a paints store were shown on the southeastern portion of the west-adjacent block across Brook Avenue. Multi-story store/dwellings were shown to the east across German Place. Additional residential structures and stores were shown in the greater surrounding area.

1935

The Site was not shown on the 1935 map.

Surrounding areas to the north, west, and east were not shown. A gasoline filling station with buried gasoline tanks and a garage were shown on the northwestern portion of the southeastern-adjacent block. A gasoline filling station with three to five buried gasoline tanks were shown on the northern portion of the south-adjacent block.

1946

The Site was not shown on the 1946 map.

The Site and northern, western, and eastern abutting areas were not shown. A poultry market was shown on the northeastern portion of the southwestern-adjacent block. The gasoline stations remain on the south and southeast-adjacent blocks.

1951

The Site was not shown on the 1951 map.

The Site and northern, western, and eastern abutting areas were not shown. The gasoline station on the southeastern-adjacent block was converted into a paper box manufacturer.

1952

The Site was developed with a gasoline filling station with a one-story office.

German Place was shown in its original configuration as Hegney Place to the east. Additional residential structures and stores were shown in the greater surrounding area.

1969

The Site was partially vacant and partially occupied by the Port Morris branch of the New York and Harlem Railroad.

No significant changes from the 1952 map were noted in the surrounding areas.

1978

The Site remained partially vacant and partially occupied by the Port Morris branch of the New York and Harlem Railroad.

The gasoline filling station on the southern-adjacent block, the paper box manufacturer on the southeastern-adjacent block, the dense residential development on the eastern-adjacent block, and the residential development on the western-adjacent block were shown as vacant.

1989

The Site was not shown on the 1989 map.

Areas north-, east-, and west-adjacent to the Site were not shown on the 1989 map. The northwestern portion of the southeastern-adjacent block was a large residential apartment complex. The poultry market on the southwestern-adjacent block was shown as vacant.

To summarize, the Sanborn maps indicated that the Site was partially vacant and partially developed as the Port Morris branch of the New York and Harlem Railroad by 1891. By 1909, a four-story building with a basement was constructed on the vacant portion of the Site. The building was used as a store on the first floor with residences above. By 1952, the four-story building was converted into a gasoline filling station with a one-story office. By 1969, the gasoline filling station was no longer depicted and the Site appeared vacant on the western portion with a rail bed on the eastern portion.

The surrounding area included predominantly residential and commercial uses, with increasing automotive and/or industrial uses in the surrounding area between 1909 and 1978. Uses in the immediately surrounding area with potential to have affected the Site subsurface included: a gasoline filling station with buried gasoline tanks and a garage located on the northwestern portion of the southeastern-adjacent block on the 1935 map, which was converted into a paper box manufacturer in 1951; a gasoline filling station with three to five buried gasoline tanks on the northern portion of the southern-adjacent block in 1935; and a printer and a paint store located on the southeastern portion of the western-adjacent block in 1909.

2.3 Geological Conditions

Surface topography at the Site is generally level, with the exception of the former rail bed that is approximately 19 feet below surface grade. The Site lies at an elevation of approximately 30 feet National Geodetic Vertical Datum (NGVD), an approximate of mean sea level (msl), with the former rail bed at an elevation of approximately 11 feet NGVD. A total of 19 soil borings were advanced, and 6 permanent groundwater monitoring wells and 7 temporary soil vapor points were installed at the Site during the RI and SRI. Soil observed in the borings during the RI and SRI consisted of up to 35 feet of historic fill (sand, silt, gravel, ash, wood, brick, asphalt, and concrete), underlain by apparent native sand with gravel. Presumed bedrock was encountered at approximately 40 feet below grade beneath Lot 3 and at approximately 6 feet below grade on Lot 1.

During the RI, groundwater was encountered between approximately 26 and 28 feet below grade on Lot 3 and at approximately 6 feet below grade along the former rail bed on Lot 1, which translates to an elevation range of 1.47 feet to 3.25 feet (Bronx Borough Datum). During the SRI, groundwater was encountered between approximately 24.3 and 25.1 feet below grade in the groundwater monitoring wells on Lot 3 [elevations range of 1.5 feet to 1.6 feet (Bronx Borough Datum)]. A groundwater elevation map is provided as Figure 3.

2.5 Contamination Conditions

The data compiled during the RI and SRI were compared to the following SCGs to determine the nature and extent of the contamination area associated with the Site:

Soil – NYSDEC UUSCOs, RRSCOs and/or PGWSCOs

Groundwater – Class GA (Drinking Water) AWQS

Soil Vapor – No soil vapor standards currently exist

2.3.4 Conceptual Model of Site Contamination

Contaminated soil, groundwater, and soil vapor are present at the Site. Elevated concentrations of petroleum-related VOCs, the VOC 1,2-DCA, metals, and PAHs were detected in soil and groundwater, and elevated concentrations of petroleum-related VOCs and the chlorinated VOC PCE and 1,2-DCA were detected in soil vapor on the southwestern portion of the Site (southern portion of Lot 3). The vertical extent of petroleum-contamination in soil was determined to be south (and presumed downgradient) of the suspect UST(s) at two separate depth intervals: below the suspected invert of the tank bottom (11 to 15 feet below grade); and directly above the groundwater table (approximately 20 to 27 feet below grade). Based on the elevated levels of petroleum-related VOCs in the soil and groundwater, a spill was reported to NYSDEC and spill number 1404448 was assigned to the Site.

The contamination, present in soil, groundwater, and soil vapor across the Site, appears to be related to the Site's historic use as a railroad, gasoline filling station, and lubritorium. The elevated detections of petroleum-related VOC and SVOCs in soil and groundwater, and elevated petroleum and chlorinated solvent-related VOCs in soil vapor in the southwestern portion of Lot 3 are most likely attributable to the former gasoline station and lubritorium, and undocumented discharges from the suspected UST(s). The elevated detections of PAHs and metals in fill material are most likely attributable to historic filling, undocumented discharges from tanks, and/or historic operations at the Site. The elevated detections of metals in groundwater at the Site are most likely related to historic filling, historic operations at the Site, and/or regional background conditions.

Based on suspected Site-specific groundwater flow direction, the contaminants in groundwater could be migrating to the south-southwest. Additionally, when organic compounds are exposed to air, contamination can evaporate from the soil and groundwater and migrate in a vapor phase through the pore spaces in unsaturated soil. The vapors can build beneath structures such as pavement and building foundations. The affected media for the existing or potential releases at the Site includes soil, groundwater, and soil vapor.

2.3.5 Description of Areas of Concern (AOCs)

- Historic Use of the Site – The historic usage of the Site included a gasoline station with lubritorium, used automotive sales lot, and the Port Morris branch of the New York and Harlem Railroad. The use of gasoline, oils, and other petroleum-containing fluids or products, acids, solvents, pesticides, and heavy metals are commonly associated with these historic uses and were identified in soil, groundwater, and/or soil vapor during the RI and SRI.
- Potential UST(s) – Historic reports indicated that Lot 3 was developed historically as a gasoline station with a one-story lubrication office between 1949 and 1969. The geophysical survey conducted during the RI identified an anomaly consistent with that of a large UST or several small USTs, measuring approximately 8.5 feet by 27 feet, along with two fill ports and a suspect vent pipe, on Lot 3. Gasoline, waste oil, and/or fuel oil were historically stored at the Site and may be present in the suspected UST(s).

- Undocumented/Documented Discharges – Undocumented discharges from the Site's historic use as a gasoline station and lubritorium, used automotive sales lot, and railroad have occurred based on the elevated concentrations of petroleum-related VOCs and SVOCs in soil and groundwater, and petroleum and chlorinated solvent-related VOCs in soil vapor on the southwestern and western portions of the Site. Based on field observations and laboratory results documented in the RIR, NYSDEC Spill No. 1404448 was assigned to the Site.
- Historical Fill – Historical fill was observed during the RI and SRI at depths up to 35 feet on Lot 3 and to presumed bedrock on Lot 1. The fill material consisted of sand, silt, gravel, ash, wood, brick, asphalt, and concrete. Demolition debris from the former buildings may be present.
- Current/Historic Uses of Surrounding Area – Historic reports identified current and historic uses of the surrounding area that may have affected the Site subsurface, including: a gasoline filling station with buried gasoline tanks and a garage located on the northwestern portion of the southeastern-adjacent block in 1935, which was converted into a paper box manufacturer in 1951; a gasoline filling station with several buried gasoline tanks on the northern portion of the southern-adjacent block in 1935; and a printer and a paints store located on the southeastern portion of the western-adjacent block in 1909.

2.3.6 Contaminated Media

AKRF's RI and SRI concluded that contaminated soil, groundwater, and soil vapor are present at the Site. Elevated concentrations of petroleum-related VOCs, the VOC 1,2-DCA, metals, and PAHs were detected in soil and groundwater, and elevated concentrations of petroleum-related VOCs and the chlorinated VOC PCE and 1,2-DCA were detected in soil vapor on the southwestern portion of the Site (southern portion of Lot 3). The vertical extent of contamination in soil was determined to be south (and presumed downgradient) of the suspect UST(s) at two separate depth intervals: below the suspected invert of the tank bottom (11 to 15 feet below grade); and directly above the groundwater table (approximately 20 to 27 feet below grade). Additionally, elevated concentrations of PAHs and metals were detected in soil and groundwater across the Site.

2.3.7 Identification of Standards, Criteria, and Guidance (SCGs)

The following remedial SCGs apply to the project and are the performance criteria used to determine whether if the RAOs have been met:

- Soil – 6 NYCRR Part 375, UUSCOs, RRSCOs, and PGWSCOs (December 2006); NYCRR Part 371 - Identification and Listing of Hazardous Wastes; 6 NYCRR Part 376 - Land Disposal Restrictions; and NYCRR Part 360 - Solid Waste Management Facilities.
- Groundwater – 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998), and TOGS 1.1.1 AWQS and Guidance Values and Groundwater Effluent Limitations.
- Soil Vapor – NYSDOH 2006 Guidance for Evaluating Soil Vapor Intrusion AGVs in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006 ("NYSDOH Vapor Intrusion Guidance Document"), updated September 2013 for change of AGV for PCE, August 2015 for TCE, and the May 2017 NYSDOH Matrices A, B, and C for PCE, TCE, cis-1,2-DCE, 1,1-DCE, carbon tetrachloride, 1,1,1-TCA, methylene chloride, and vinyl chloride.

- In addition, the following SCGs are applicable to the remedial program at the Site:
- NYSDEC DER-10 – Technical Guidance for Site Investigation and Remediation (May 2010)
- NYSDEC Draft Brownfield Cleanup Program Guide (May 2004)
- NYSDOH Generic CAMP
- DER-23 (January 2010)
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)
- 6 NYCRR Part 612 – Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 – Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 – Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 40 CFR Part 280 – Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 – Underground Injection Control Program

Additional regulations and guidance may be applicable, relevant, and appropriate to the remedial alternatives and will be complied with in connection with implementation of the remedial program. However, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the Site. SCGs for the Site are provided as Appendix A.

2.3.8 Soil/Fill Contamination

The results of the RI and SRI documented elevated concentrations of petroleum-related VOCs, the VOC 1,2-DCA, metals, and PAHs in soil and groundwater, and elevated concentrations of petroleum-related VOCs and the chlorinated VOC PCE and 1,2-DCA in soil vapor on the southwestern portion of the Site (southern portion of Lot 3). The vertical extent of petroleum contamination in soil was determined to be south (and presumed downgradient) of the suspect UST(s) at two separate depth intervals: below the suspected invert of the tank bottom (11 to 15 feet below grade); and directly above the groundwater table (approximately 20 to 27 feet below grade) downgradient of the suspected UST(s). The elevated concentrations of PAHs and metals detected in soil across the Site are present in the historic fill found throughout at the Site.

2.5.5.1 Summary of Soil/Fill Data

CVOCs were detected above UUSCOs in two soil samples: acetone in soil sample SB-7 (0-2’) at an estimated concentration of 0.228 mg/kg, above its UUSCO of 0.05 mg/kg, but below its RRSCO of 100 mg/kg; and 1,2-DCA in soil sample SB-3 (8-12’) at a concentration of 0.0523 mg/kg, above its UUSCO of 0.02 mg/kg, but below its RRSCO of 3.1 mg/kg. The following petroleum-related VOCs were detected in the same soil sample: benzene at a concentration of 4.43 mg/kg from a diluted analysis, above its UUSCO and PGWSCO of 0.06 mg/kg, but below its RRSCO of 4.8 mg/kg; ethylbenzene at a concentration of 11.1 mg/kg from a diluted analysis, above its UUSCO and PGWSCO of 1 mg/kg, but below its RRSCO of 41 mg/kg; and m,p-xylene and o-xylene at concentrations of 55.1 mg/kg and 18.1 mg/kg, respectively, from diluted analyses, above their sum total UUSCO of 0.26 mg/kg and their sum total PGWSCO of 1.6 mg/kg, but below their sum total RRSCO of 100 mg/kg; and toluene at a concentration of 26.9 mg/kg from a diluted analysis, above its UUSCO and PGWSCO of 0.7 mg/kg, but below its RRSCO of 100 mg/kg. VOCs were not detected above RRSCOs in any of the soil samples analyzed.

SVOCs were detected across the Site in shallow and deep soil samples at concentrations above their respective UUSCOs and/or RRSCOs. Benzo(k)fluoranthene was detected in 3 samples and chrysene was detected in 5 samples at concentrations above their respective UUSCOs. Other compounds detected above their respective RRSCOs include: benzo(a)anthracene in 5 samples up to an estimated 2.45 mg/kg; benzo(a)pyrene in 4 samples up to 2.78 mg/kg; benzo(b)fluoranthene in 6 samples up to 4.08 mg/kg; dibenz(a,h)anthracene in 3 samples up to 0.791 mg/kg; and indeno(1,2,3-cd)pyrene in 7 samples up to 2.86 mg/kg.

Heavy metals were detected in several soil samples across the Site, including: barium in soil sample SB-5 (0-2’) at a concentration of 655 mg/kg, above its UUSCO of 350 mg/kg and its RRSCO of 400 mg/kg; cadmium in 2 shallow soil samples at concentrations of 4 mg/kg, above its UUSCO of 2.5 mg/kg, but below its RRSCO of 4.3 mg/kg; chromium in 5 samples and one blind duplicate at concentrations between an estimated 30.4 mg/kg and 77.7 mg/kg, above its UUSCO of 30 mg/kg, but below its RRSCO of 180 mg/kg; copper in 4 samples at concentrations between 57.1 mg/kg and 159 mg/kg, above its UUSCO of 50 mg/kg, but below its RRSCO of 270 mg/kg; lead in 6 samples and 2 blind duplicates at concentrations between 73.1 mg/kg and an estimated 347 mg/kg, above its UUSCO of 63 mg/kg but below its RRSCO of 400 mg/kg and above its RRSCO of 400 mg/kg in 3 samples up to 876 mg/kg; mercury in 11 samples above its UUSCO of 0.18 mg/kg and in 4 samples also above its RRSCO of 0.81 mg/kg at concentrations up to 5 mg/kg; nickel in two samples at concentrations of 34.2 mg/kg and 34.4 mg/kg, above its UUSCO of 30 mg/kg, but below its RRSCO of 210 mg/kg; selenium in soil sample SB-7 (0-2’) at an estimated 4.1 mg/kg, above its UUSCO of 3.9 mg/kg but below its RRSCO of 180 mg/kg; and zinc in 9 samples and 3 blind duplicates up to an estimated 1,530 mg/kg, above its UUSCO of 109 mg/kg, but below its RRSCO of 10,000 mg/kg.

The pesticide 4,4’-DDT was detected in 4 soil samples at concentrations ranging between and estimated 0.006 mg/kg and 0.0267 mg/kg, above its UUSCO of 0.003 mg/kg but below its RRSCO of 7.9 mg/kg; and total PCBs were detected in sample SB-5 (0-2’) at a concentration of 0.392 mg/kg, above its UUSCO of 0.1 mg/kg but below its RRSCO of 1 mg/kg.

Soil data collected during the RI and SRI is presented in Attached Tables 1 through 5 and 13 through 17, respectively. A concentration map that presents the locations of the soil borings and summarizes UUSCO, RRSCO, and PGWSCO exceedances is presented as Figure 4.

2.5.5.2 Comparison of Soil/Fill with Standards, Criteria, and Guidance (SCGs)

The results of the laboratory data presented in the RIR and SRIR indicate that soil/fill is a media of concern. The following compounds of concern were detected above the 6NYCRR Part 375 UUSCOs and/or PGWSCOs in the on-site soil/fill: 1,2-DCA, acetone, benzene, ethylbenzene toluene, m,p-xylene, o-xylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, total PCBs, and 4-4'-DDT.

The following compounds of concern were also detected above the 6NYCRR Part 375 RRSCOs in the on-site soil/fill: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene, barium, lead, and mercury.

Soil data collected during the RI and SRI is presented in Attached Tables 1 through 5 and 13 through 17, respectively. Exceedances of UUSCOs, RRSCOs, and/or PGWSCOs are presented on Figure 4.

2.3.9 Groundwater Contamination

The results of the RI and SRI documented elevated concentrations of petroleum-related VOCs and SVOCs in groundwater on the southwestern portion of the Site (southern portion of Lot 3), which are likely related to discharges from the suspect UST(s). Additionally, elevated concentrations of total and dissolved metals were detected in groundwater across the Site. The elevated detections of metals in groundwater at the Site are most likely related regional background conditions.

2.5.6.1 Summary of Groundwater Data

Six groundwater samples were collected during the RI and SRI. VOCs were detected above their respective AWQSs in one groundwater well, MW-2, during the RI: 1,2-DCA was detected at a concentration of 122 micrograms per liter (µg/L), above its AWQS of 0.6 µg/L; benzene was detected at a concentration of 212 µg/L from a diluted analysis, above its AWQS of 1 µg/L; and ethylbenzene, m,p-xylene, o-xylene, and toluene were detected in the same groundwater sample at concentrations of 33.6 µg/L, 153 µg/L, 81.3 µg/L, and 50.9 µg/L, respectively, above their respective AWQSs of 5 µg/L. The SVOC naphthalene was detected in groundwater sample MW-2 at a concentration of 13.2 µg/L, slightly above its AWQS of 10 µg/L.

Metals were detected in each of the groundwater samples. Thirteen metals were detected in the unfiltered groundwater samples (total metals analysis) and 12 metals were detected in the filtered samples (dissolved metals analysis). Six total metals (chromium, iron, magnesium, manganese, selenium, and sodium) and four dissolved metals (magnesium, manganese, selenium, and sodium) were detected in at least one of the groundwater samples above their respective AWQSs.

Comparison of Groundwater with Standards, Criteria, and Guidance (SCGs)

The results of the laboratory data presented in the RIR and SRIR indicate that groundwater is a media of concern. The following compounds of concern were detected above the TOGS AWQS in the groundwater: 1,2-DCA, benzene, ethylbenzene toluene, m,p-xylene, o-xylene, and naphthalene.

Groundwater data collected during the RI and SRI is presented in Attached Tables 6 through 11 and 18 through 23, respectively. A concentration map that presents the locations of the samples and summarizes AWQS exceedances is shown on Figure 5.

2.3.10 Soil Vapor Contamination

The results of the RI and SRI documented elevated concentrations of petroleum-related VOCs and the chlorinated VOCs 1,2-DCA and PCE in soil vapor on the southern portion of the Site, which are likely related to the historic usage of the Site as a gasoline station and lubritorium. VOCs detected in soil vapor samples are likely related the historic operations at the Site and/or historic/current operations in the surrounding area.

2.5.7.1 Summary of Soil Vapor Data

Seven soil vapor samples were collected from seven temporary soil vapor points during the RI and SRI. VOCs associated with petroleum were detected at concentrations up to 3,340,000 µg/m^3. Chlorinated solvent-related VOCs were detected at concentrations up to 534 µg/m^3. Of note, PCE was detected in soil vapor sample SV-1 at a concentration of 69.2 µg/m^3 and in soil vapor sample SV-4 at a concentration of 114 µg/m^3.

2.5.7.2 Comparison of Soil Vapor with Standards, Criteria, and Guidance (SCGs)

The results of the laboratory data presented in the RIR and SRIR indicate that soil vapor is a media of concern.

Soil vapor data collected during the RI and SRI is presented in Attached Tables 12 and 24, respectively. Soil vapor data is shown on Figure 6.

2.4 Environmental and Public Health Assessments

2.4.1 Qualitative Human Health Exposure Assessment (QHHEA)

The objective of the QHHEA is to identify potential receptors and pathways for human exposure to the COCs that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposure actually occurs.

The RI and SRI, as described in the RIR and this SRIR, are sufficient to complete a QHHEA. A QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI and SRI were evaluated to determine whether there is any health risk by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation. The full QHHEA, which describes the contaminants of concern, potential routes of exposure, potential receptors, and existence of human health exposure pathways, is included in Section 6.0 of the SRIR, which is provided in Appendix D.

2.4.2 Overall Human Health Exposure Assessment (HHEA)

Potential exposure pathways for the current Site condition include ingestion and/or dermal contact with exposed soil/fill at the Site to trespassers; and from inhalation of VOCs from soil vapor emanating from the Site entering into the neighboring buildings by off-site construction and commercial workers, and adult and child residents. Once redevelopment activities begin, there will be a potential exposure pathway from contaminated surface soil/fill to construction workers as these workers could potentially ingest, inhale or have dermal contact with any exposed impacted fill or soil. Once redevelopment of the Site has been completed, there will be a potential exposure pathway from the potential off-gassing of residual organic vapors in the subsurface to adult and child residents, maintenance staff, visitors, and commercial workers through cracks or openings in the foundations of the new building and surrounding buildings. There will also be a potential exposure pathway from dermal contact, inhalation, or ingestion of residual surface soil in any landscaped or non-capped areas by adult and child residents, visitors, and trespassers. In addition, there will be a potential exposure pathway from any particulates emanating from the Site from un-capped areas to off-site pedestrians, visitors, cyclists, and adult and child residents.

2.5 Remedial Action Objectives (RAOs)

Based on the results of the RI and SRI, the following RAOs have been identified for this Site.

2.5.1 Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Restore groundwater aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Remove the source of groundwater contamination.

2.5.2 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.

2.5.3 Soil Vapor

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into future buildings at the Site.
- Prevent the off-site migration of contaminants.

3.0 WASTE CLASSIFICATION

All work in this section will include implementation of the Quality Assurance Protection Plan (QAPP), provided as Appendix G, and the Site-specific Health and Safety Plan (HASP), provided in Appendix H, which includes on-site and community air monitoring procedures.

3.1 Waste Classification Sampling

The proposed remedy includes soil excavation to approximately 12 feet below grade at the location of the suspect UST(s) on the southwestern portion of the Site and on the southeastern portion of Lot 1; and approximately 2 feet below grade across the remainder of Lot 3 and the northeastern portion of Lot 1 to support the installation of the clean fill soil cap. Approximately 1,000 cubic yards of material are estimated to be disposed of off-site as part of the remedy.

To gain acceptance from disposal facilities in advance of excavation, in-situ soil sampling is required. Based on the excavation and disposal of approximately 1,000 cubic yards of material and to ensure representative samples are collected, three waste classification samples consisting of one grab and one five-point composite sample each will be collected from the Site. Since a receiving facility for excavated soil has not been selected, the proposed testing will include sampling and laboratory analyses intended to satisfy the analytical requirements of many soil disposal/receiving facilities in New Jersey, New York, and Pennsylvania. However, it is possible that once a specific facility is selected, additional testing and/or chemical analysis may be required.

In accordance with the typical requirements of disposal facilities permitted to receive historic fill and non-hazardous petroleum-contaminated soil, the grab soil samples will be analyzed for VOCs plus 10 tentatively identified compounds (TICs) by EPA Method 8260. The five-point composite samples will be analyzed for: SVOCs plus 20 TICs by EPA Method 8270; total Target Analyte List (TAL) metals and trivalent chromium; Toxicity Characteristic Leaching Procedure (TCLP) eight Resource Conservation and Recovery Act (RCRA) metals plus copper, nickel, and zinc; PCBs by EPA Method 8082; pesticides by EPA 8081; total cyanide; total petroleum hydrocarbons (TPH) by EPA Method 8015 for diesel range organics (DRO) and gasoline range organics (GRO); extractable petroleum hydrocarbon (EPH); hexavalent chromium; and ignitability, corrosivity, and reactivity. One sample for paint filter by EPA Method 9095 will also be collected. TerraCore® sampling devices will be used to collect the grab samples.

3.2 Waste Classification Report

A waste classification report will be prepared following receipt of the laboratory data. The report will provide a summary of the field work and analytical results. The report will include test pit/boring logs and a sample location map. The report will be submitted to the intended disposal facility(ies) along with the waste disposal profile form so that the material can be approved for disposal prior to the start of excavation.

4.0 DESCRIPTION OF REMEDIAL ACTION PLAN (RAP)

4.1 Evaluation Of Remedial Alternatives

This section includes a review of remediation alternatives that were considered for the remedy phase of the BCP. The purpose of completing the alternatives analysis is to identify, evaluate, and select a remedy to address the contamination identified during the RI and SRI. The RAOs for groundwater and soil include source removal to prevent the potential for exposure and contaminant migration. The RAOs for soil vapor include preventing soil vapor from entering the proposed new Site building. The following performance measures were used to complete the evaluation of remedial alternatives:

- Protection of human health and the environment;
- Compliance with standards, criteria, and guidelines (SCGs);
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance; and
- Land use.

The following remedial SCGs apply to the project, and are the performance criteria used to determine if the RAOs have been met.

- 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 (CAMP)
- NYS Waste Transporter Permits – 6 NYCRR Part 364;
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364;
- DER-23 (January 2010)
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)

- 6 NYCRR Part 612 – Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 – Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 – Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 40 CFR Part 280 – Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 – Underground Injection Control Program

Additional regulations and guidance may be applicable, relevant, and appropriate to the remedial alternatives and will be complied with in connection with implementation of the remedial program. However, the list above is intended to represent the principal SCGs, which should be considered in evaluating the remedial alternatives for the Site.

Remedial Alternative 1 – No Further Action

This alternative consists of allowing the Site to remain in its current condition. No remedial activities would occur under this remedy.

1. Protection of Human Health and the Environment – Not satisfied, as Spill No. 1404448 would remain open and the potential for vapor intrusion into future on-site and adjacent off-site buildings would still exist.
2. Compliance with SCGs – Not satisfied, as contaminants would remain in soil at concentrations that exceed NYSDEC Part 375 UUSCOs, RRSCOs, and/or PGWSCOs; and groundwater at concentrations that exceed NYSDEC AWQSs. Additionally, contaminants would remain in soil vapor at elevated concentrations.
3. Short-Term Effectiveness and Impacts – Not satisfied, as Spill No. 1404448 would remain open and there would be no measures in place to protect workers or the surrounding community from potential exposure to existing contaminated soil, groundwater, or vapors if redevelopment were to occur; or at existing or future adjacent off-site buildings.
4. Long-term Effectiveness and Permanence – Not satisfied, as Spill No. 1404448 would remain open and potential exposure pathways identified in the QHHEA would remain if redevelopment activities began.
5. Reduction of Toxicity, Mobility, or Volume of Contaminated Material – No satisfied, as Spill No. 1404448 would remain open. Potential future redevelopment of adjacent properties could be affected by migrating contaminants in groundwater and/or soil vapor. Additionally, if redevelopment of the Site were to occur, the exposure pathways identified in the QHHEA would remain.
6. Implementability – Very feasible, as no personnel or regulatory approvals would be needed, and natural attenuation would be the only remedial plan utilized.
7. Cost Effectiveness – Very cost effective to proceed with no further action; however, this criterion is not satisfied, as it requires a comparison of cost to long/short term effectiveness and toxicity reduction, which would not be achieved.
8. Community Acceptance – Not satisfied, as this alternative will allow the contamination to remain in place and Spill No. 1404448 would remain open. The Site would remain vacant,

which is unacceptable, as the Site is considered to be an unattractive blight on the community in its current condition.

9. Land Use – Not satisfied, as the Site is considered to be an unattractive blight on the community in its current condition. The development plan will transform the vacant, blighted lots into one new affordable residential building with a community room. As part of the redevelopment, the existing abandoned rail tracks will be removed and the footbridge will be closed prior to the start of remedial activities. Without closure of Spill No. 1404448, potential future purchasers of the Site may be dissuaded from purchasing.

Remedial Alternative 2 – Track 1 Unrestricted Use Soil Cleanup Objectives (UUSCOs)

This alternative would include removal and/or treatment of all contaminated soil, groundwater, and soil vapor to comply with UUSCOs and PGWSCOs. This would include, but is not limited to, the following: an in-situ groundwater treatment program on the southwestern portion of the Site (southern portion of Lot 3); excavation of all soil above the water table exceeding UUSCOs and PGWSCOs; and excavation to remove any USTs encountered.

1. Protection of Human Health and the Environment – Satisfied, as all soil above UUSCOs and PGWSCOs would be removed, and groundwater concentrations would be reduced to comply with AWQSs, and thus the source of contaminants in soil vapor would be removed.
2. Compliance with SCGs – Satisfied, as all soil above UUSCOs and PGWSCOs would be removed and groundwater contamination would comply with AWQSs. In addition, Spill No. 1404448 would be closed.
3. Short-term Effectiveness and Impacts – Effective in reducing soil contamination in the short-term, as all contaminated soil will be removed from the Site. There is, however, a risk of short-term impacts to Site workers and the community, as the process of excavating contaminated soil may cause the release of particulates and organic vapors. This risk can be controlled by employing health and safety procedures during remediation and construction.
4. Long-term Effectiveness and Permanence – Achieved as removal of as all soil above UUSCOs and PGWSCOs and remediation of groundwater to comply with AWQSs would allow for unrestricted use.
5. Reduction of Toxicity, Mobility, or Volume of Contaminated Material – As all soil above UUSCOs and PGWSCOs at the Site would be removed and all contaminated groundwater would be treated, the toxicity, mobility, and the volume of contaminants would be greatly reduced. Additionally, as the source of soil vapor contamination would be removed, the concentrations of contaminants in soil vapor would be significantly reduced, if not eliminated completely.
6. Implementability – Not implementable as this alternative would require excavation to bedrock (to at least 40 feet below grade). As groundwater is approximately 30 feet below grade, this would require significant dewatering and treatment of water prior to discharge. In addition, excessive shoring and sheeting would have to be installed along all sides of the Site. The small size of the Site and the unknown structural stability of the eastern retaining wall and footings for the foot bridge make this alternative not implementable.
7. Cost Effectiveness – Not cost-effective, as it will require extensive structural support to excavate to the required depths. To achieve UUSCOs and PGWSCOs, it is assumed that all material above bedrock would need to be excavated. Approximately 4,100 cubic yards of material would need to be disposed of off-site to meet UUSCOs. Using the conversion factor of 1.5 tons per cubic yard, this equals approximately 6,150 tons. The market rate for the

transportation and disposal of non-hazardous, regulated soils ranges from $40-$70 per ton. Using these rates, the soil disposal for this amount of contaminated material would be on the order of $246,000 to $430,500. As the new building construction cellar will only require excavation to 12 feet below grade and the entryways and landscaped areas would only require excavation to 2 feet below grade, approximately 2,500 cubic yards of clean fill would then have to be imported prior to building construction. Using a market rate of $30 per cubic yard of clean fill, this equals approximately $75,000. A vapor barrier would need to be installed beneath the new building foundation and subgrade walls. Using a market rate of $7 per square foot, this equals approximately $76,000. The suspect UST(s) would be removed, totaling approximately $10,000 and 22 post-excavation endpoints would total approximately $11,000. Inspection, oversight, and reporting associated with this alternative are estimate at a rate of 10% of total costs ($602,500) or approximately $60,250. To perform an excavation of this magnitude, excessive shoring, sheeting, and underpinning would have to be performed for the existing roadways for an estimated cost of $300,000. The cost for this alternative was estimated by combining these figures for an approximate total of $962,750. This assumes remedial work would be performed concurrently with the planned redevelopment of the Site.

8. Community Acceptance – Satisfied, as this alternative would be protective of human health and the environment.
9. Land Use – Satisfied, as this alternative would result in the cleanup of the Site for unrestricted use and closure of Spill No. 1404448, which would allow for redevelopment of the Site. Redevelopment of the Site will eliminate the current concerns in connection with the Site's current blighted condition while providing affordable housing and community resources.

Remedial Alternative 3 – Track 4 Restricted Residential Use Soil Cleanup Objectives (RRSCOs)

Alternative 3 would include removing the source of petroleum contamination, which would include any USTs, fill ports, vent pipes, and other associated piping; excavation and off-site disposal of petroleum-contaminated soil/fill between grade and 12 feet below grade beneath and around the periphery of the suspect UST(s) on the southwestern portion of the Site (southern portion of Lot 3); from grade to 2 feet below grade across the northern portion of Lot 3; from grade to 12 feet on the southeastern portion of the Site; and from grade to 2 feet below grade on the northeastern portion of the Site in accordance with applicable federal, state, and local laws and regulations, as defined by 6 NYCRR Part 375-6.8; import of fill required to raise the grade on Lot 1 from approximately 19 feet to approximately 12 feet below grade for the installation of the partial cellar and to 2 feet below grade in the landscaped areas; collection of excavation endpoint samples; and the installation of ECs and ICs including the installation of a composite cover system, an SVE system, a passive SSDS, and a contingent groundwater treatment program.

A BCP Track 4 cleanup would allow for ICs and ECs to be implemented for long-term management of the Site and to prevent future exposure to any residual contamination. As such, an EE would be recorded for the Site to implement the controls and an SMP would be prepared to specify future soil handling requirements, including a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the Site, provisions for the management and inspection of the ECs that may be necessary, maintaining Site access controls, Department notification, and land use restrictions. Periodic inspection and reporting would be required to verify that the restrictions and requirements included in the easement remain in place and effective.

1. Protection of Human Health and the Environment – Satisfied, as the source of petroleum contamination would be removed and any residual contamination would be addressed by the

SVE, SSDS, contingent groundwater treatment program and/or would be covered by a composite cover system. Any tanks and associated piping would also be removed. Additionally, ICs and ECs would be implemented to prevent future exposure to any residual contamination.

2. Compliance with SCGs – Satisfied, as Spill No. 1404448 would be remediated and closed. RAOs would be achieved by removing the potential for human and environmental exposures to chemical constituents above RRSCOs and/or PGWSCOs. Baseline groundwater monitoring would determine the need for post-remedial groundwater monitoring and/or treatment to achieve AWQSs in addition to natural attenuation.
3. Short-term Effectiveness and Impacts – Satisfied, as this alternative would be effective in reducing soil contaminant levels in the short term, since the source of contamination and any encountered tanks, fill ports, and vent lines would be removed from the Site. Mitigation measures, including a HASP and CAMP, would protect and limit exposure of workers and the surrounding community to contaminated soil, particulate, groundwater, and/or soil vapors during soil removal.
4. Long-term Effectiveness and Permanence – Satisfied, as removal of the source of contamination, the installation and maintenance of ECs (including a SVE system, contingent groundwater treatment program, SSDS, and installation of a composite cover system), and the implementation of ICs would address residual contamination and limit exposure of future occupants to contaminated soil, groundwater, and/or soil vapor, thus achieving the RAOs.
5. Reduction of Toxicity, Mobility, or Volume of Contaminated Material – Satisfied, as the volume of contaminants would be greatly reduced. Removal of source material in soil would reduce residual contaminant mobility into groundwater and soil vapor, and operation of an SVE system would reduce residual contaminants above PGWSCOs. Incorporation of a vapor barrier and activation of an SSDS, if needed, into the proposed structure will reduce mobility of residual soil vapor contaminants with respect to migrating into the structure.
6. Implementability – Satisfied, as contaminated soil removal could be completed in a relatively short timeframe and the equipment and personnel needed to perform the proposed remedial actions are readily available. The majority of the soil to be excavated and disposed of off-site is expected to be classified as non-hazardous, regulated soil. Landfill/beneficial reuse space for these types of materials is readily available. Additionally, implementation of the SVE system, contingent groundwater treatment program, SSDS, and vapor barrier would occur concurrently with development.

Cost Effectiveness – Satisfied, as this alternative is the most cost effective while being implementable.

Under this alternative, a minimum of approximately 1,000 cubic yards, or 1,500 tons, of soil/fill would be excavated and disposed of off-site based on the data collected to date. The market rate for the transportation and disposal of non-hazardous, regulated soil ranges from $40 to $70 per ton. Using this range, the soil disposal for this project would be on the order of $60,000 – $105,000. Approximately 2,000 cubic yards of clean fill will need to be imported to backfill the rail bed on Lot 1 from 19 feet to 12 feet below grade for the proposed cellar and install the 2-foot clean fill buffer for the composite cover system proposed for the Site. Using a market rate of $30 per cubic yard, this equals $60,000. The market rate for installation of an SSDS for the proposed Site building is approximately $50,000. Installation, operation, and maintenance of an SVE system would cost approximately $75,000. A vapor barrier would need to be installed beneath the new building foundation and subgrade walls. Using a market rate of $7 per square foot, this equals approximately $76,000. The suspect

UST(s) would be removed, totaling approximately $10,000 and 22 post-excavation endpoints would total approximately $11,000. Inspection, testing and reporting associated with this work was estimated at a rate of 10% of total costs ($387,000), or approximately $38,700. The cost for this alternative was estimated by combining these figures for an approximate total of $425,700. This assumes the work would be performed concurrent with the planned Site redevelopment.

7. Community Acceptance – Satisfied, as this alternative would be protective of human health and the environment and the open Spill No. would be closed.
8. Land use – Satisfied, as this alternative would result in the cleanup of the Site for residential use, which would allow for redevelopment of the Site. Redevelopment of the Site will eliminate the current concerns in connection with the Site's current blighted condition while providing affordable housing and community resources.

4.2 Selection of the Preferred Remedy

Remedial Alternative 1 (no action) allows the Site to remain in its current condition. This remedial alternative was reviewed and found to be unacceptable, since it would not achieve the RAOs. Therefore, this remedial alternative is not considered a feasible solution.

Remedial Alternative 2 (Track 1) would achieve the RAOs, but was found to be unacceptable since it is not cost-effective or implementable. Therefore, this remedial alternative is not considered a feasible solution.

Remedial Alternative 3 (Track 4) achieves the RAOs while being cost-effective. After careful consideration with respect to the evaluation criteria listed, Remedial Alternative 3 is determined to be the preferred remedy, since it adequately addresses the subsurface contamination with the most cost-effective approach.

4.2.1 Zoning

The Site is currently being rezoned from R7-2 to C6-2 as part of the Uniform Land Use Review Procedure (ULURP). The architect's certification that the proposed plans comply with the proposed zoning is enclosed in Appendix C.

4.2.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The Site has been vacant since 1969. The South Bronx has suffered economically since the 1960s and 1970s when a wave of arson combined with suburban flight ravaged the community. Most of the original housing stock was structurally damaged by the arson and eventually demolished by the city. In addition, the City of New York dismantled the Third Avenue El train in 1973, leaving portions of the southwestern Bronx underserved by public transportation. There is a direct correlation between the economic disparity of the neighborhoods adjacent to Third Avenue and the lack of viable subway access. In addition, the South Bronx is plagued by gang activity, drug use, prostitution, and homelessness.

The Site is considered to be an unattractive blight on the community in its current condition. The proposed development will transform the vacant blighted lots into the proposed development, consisting of a new 9- to 10-story residential building comprising approximately 50,220 square feet. When completed, the proposed building will contain a partial cellar encompassing portions of Lots 1 and 3 with mechanical and maintenance rooms, a bicycle room, and storage. The ground floor will contain a lobby, community facilities, a residential apartment, and a laundry room. The floors above will contain 70 affordable housing units for seniors. Rooftop terraces will be located on the 9th and 10th

floor roofs. Landscaped entrances to the building will be located along Hegney Place and Brook Avenue. As part of the redevelopment, the existing rail bed and footbridge will be demolished prior to the start of remedial activities. Redevelopment of the Site in accordance with this RAWP will eliminate the current concerns in connection with the Site's current blighted condition while providing affordable housing and community resources, and will match the ongoing redevelopment in the area, including the Bronxchester Urban Renewal Area, located immediately south of the Site across East 156th Street.

4.2.3 Surrounding Property Uses

The Site is abutted to the north by East 157th Street, followed by a residential and commercial building, to the east by a parking lot followed by Hegney Place, to the south by East 156th Street followed by a residential and commercial building ("Via Verde"), and to the west by Brook Avenue, followed by a residential and commercial building. The surrounding area is developed with primarily residential and commercial buildings. The proposed development is consistent with the surrounding property uses and will support nearby existing commercial businesses.

4.2.4 Citizen Participation Plan (CPP)

A CPP was submitted to the NYSDEC in July 2015 and was approved in a letter dated August 3, 2015. The CCP was revised in March 2016. The proposed remedy complies with the CPP. The CPP and the NYSDEC-issued approval letters are included as Appendix I.

4.2.5 Environmental Justice (EJ) Concerns

The Site is located in an EJ area. EJ 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 proposed redevelopment plan will alleviate concerns in connection with the Site's current vacant condition while providing affordable housing units and residential amenities. EJ concerns will also be addressed through the requirements of the CPP.

4.2.6 Land Use Designations

The proposed redevelopment plan will comply with the current land use designation for this Site, is consistent with the surrounding property uses, and will support nearby existing commercial businesses. As part of redevelopment, the Site will be re-zoned from R7-2 to C6-2. The architect's certification that the proposed plans comply with the rezoning and Floor Area Ratio (FAR) is enclosed in Appendix C.

4.2.7 Population Growth Patterns

The senior population requiring affordable housing in New York City is expected to increase in the future. This project will help provide necessary affordable housing units to meet that need and will also be in conformance with the Mayor's plan to meet affordable housing needs for the City.

4.2.8 Accessibility to Existing Infrastructure

The Site is located within 0.1 mile of the Bx15 and Bx21 bus lines; within 0.2 mile of the Bx41 bus line; within 0.3 mile of the Bx4A, Bx4, Bx6, BX13 bus lines and the Jackson Avenue Station (2 and 5 subway lines); within 0.4 mile of the Metro-North Railroad Melrose Station; within 0.7 mile of the NYC Subway – East 149th Street Station (6 subway line); within 0.8 mile of the NYC Subway – 149th Street-Grand Concourse Station (2, 4, and 5 subway lines); and within 0.9 mile of the NYC Subway – 161st Street-Yankee Stadium Station (4, B, and D subway lines). The area is also supplied with municipal sewers and water, electric, telephone, natural gas, and fiber-optic lines.

4.2.9 Proximity to Cultural Resources

There are no cultural resources located adjacent to the Site. However, many cultural resources are easily accessed from the Site via public transportation, including Saint Mary's Park, Macombs Dam Park, Yankee Stadium, the Bronx Museum of the Arts, the South Bronx Cultural Corridor, the Bronx Zoo, the New York Botanical Gardens, and various other smaller community and waterfront parks.

4.2.10 Proximity to Natural Resources

The Site is located in an area of the Bronx that does not contain a significant source of natural resources. However, natural resources such as parks and the waterfront along the Harlem and Bronx Rivers are easily accessible from the Site via public transportation.

4.2.11 Off-Site Groundwater Impacts

During the RI, groundwater was encountered between approximately 26 and 28 feet below grade on Lot 3 and at approximately 6 feet below grade on Lot 1, which translates to an elevation range of 1.47 feet to 3.25 feet (Bronx Borough Datum). During the SRI, groundwater was encountered between approximately 24 and 25 feet below grade in the groundwater monitoring wells on Lot 3 [elevations range of 1.5 feet to 1.6 feet (Bronx Borough Datum)]. Regional groundwater likely flows in a southerly or southwesterly direction beneath the Site, although groundwater flow was not able to be confirmed due to inaccessibility of the wells on Lot 1. The results of the RI and SRI documented elevated concentrations of petroleum-related VOCs and SVOCs in groundwater at MW-2, located south (downgradient) of the suspected UST(s) and adjacent to the Site boundary on East 156th Street. Off-site groundwater was investigated as part of the SRI and it was confirmed that groundwater contaminants were not migrating off-site.

4.2.12 Proximity to Floodplains

The Site is not located within a floodplain.

4.2.13 Geography and Geology of the Site

Surface topography at the Site is generally level, with the exception of the rail bed that is approximately 19 feet below surface grade. The at-grade portion of the Site lies at an elevation of approximately 30 feet NGVD, an approximate of mean sea level (msl), with the rail bed at an elevation of approximately 11 feet NGVD. The stratigraphy of the Site as observed in the borings during the RI and SRI consisted of up to 35 feet of historic fill material (sand, silt, gravel, ash, wood, brick, asphalt, and concrete) underlain by apparent native sand with gravel on top of presumed bedrock at approximately 40 feet below grade on Lot 3.

Based on Site-specific groundwater measurements, groundwater was encountered between approximately 26 and 28 feet below grade on Lot 3 and at approximately 6 feet below grade along the rail bed on Lot 1, which translates to an elevation range of 1.47 feet to 3.25 feet (Bronx Borough Datum). During the SRI, groundwater was encountered between approximately 24.3 and 25.1 feet below grade in the groundwater monitoring wells on Lot 3 [elevations range of 1.5 feet to 1.6 feet (Bronx Borough Datum)].

4.2.14 Current Institutional Controls (ICs)

Currently, there are no known ICs at the Site.

4.3 Summary of Selected Remedial Actions (RAs)

Remedial activities will be performed at the Site in accordance with this RAWP and the NYSDEC-issued Decision Document (DD). All deviations from this RAWP and/or the DD will be promptly reported to NYSDEC for approval and will be fully explained in the Final Engineering Report (FER).

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

    - Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
    - Reducing direct and indirect greenhouse gases and other emissions;
    - Increasing energy efficiency and minimizing use of non-renewable energy;
    - Conserving and efficiently managing resources and materials;
    - Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
    - Maximizing habitat value and creating habitat when possible;
    - Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
    - Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

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

2. The remediation will include excavation and off-site disposal of contaminant source areas, including: underground storage tanks (USTs) and any associated piping or other structures associated with a source of contamination; and grossly-contaminated soil, if encountered.

    Soil which exceeds the restricted residential use soil cleanup objectives (SCOs), as defined by 6 NYCRR Part 375-6.8, will be excavated to the extent practical and transported off-site for disposal. Soil will be excavated to a depth of 12 feet below grade surface beneath and around the periphery of the suspect USTs on the southwestern portion of the Site (southern portion of Lot 3) and on the southeastern portion of the Site; and to a depth of 2 feet below grade surface across the northern portion of Lot 3 and on the northeastern portion of the Site.

    Confirmation samples will be collected and analyzed to demonstrate achievement of restricted residential use SCOs. Approximately 1,000 cubic yards of contaminated soil will be removed from the Site.

3. Clean fill meeting the requirements of the 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the Site. Approximately 2,000 cubic yards of clean fill will be imported to raise the elevation of the rail bed on Lot 1 from 19 feet to 12 feet below grade surface for the partial cellar, and to install the 2-foot clean fill buffer for the composite cover system for the Site. On-site soil that does not exceed the lower of the restricted residential use SCOs or protection of groundwater SCOs for any compound may be used on-site, including below the water table, to backfill the excavation areas or re-grade the Site.

4. A site cover will be required to allow for restricted residential use of the Site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the Site, will meet the SCOs for cover material for the use of the Site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

5. Groundwater sampling will be conducted to establish pre-remedial baseline conditions at the Site and to determine whether groundwater treatment and post-remedial monitoring is needed. Based on the results of the groundwater sampling, in-situ groundwater treatment will be implemented. Prior to the full implementation of in-situ treatment, laboratory and/or on-site pilot scale studies will be conducted to more clearly define design parameters. The method and depth of injection will be determined during the remedial design.

6. A soil vapor extraction (SVE) system with a passive sub-slab depressurization system (SSDS) will be installed to remove volatile organic compounds (VOCs) from the subsurface. VOCs will be physically removed from the soil by applying a vacuum to wells that have been installed into the vadose zone (the area below the ground but above the water table). The vacuum draws air through the soil matrix which carries the VOCs from the soil to the SVE well. The air extracted from the SVE wells is then treated as necessary prior to being discharged to the atmosphere.

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

8. A Site Management Plan is required, which includes the following:

   a) An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional controls remain in place and effective:

- Institutional Controls: The Environmental Easement discussed above.
- Engineering Controls: The cover system and the SVE system with a passive sub-slab depressurization system discussed above.

This plan includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- A provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the Site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- Maintaining site access controls and Department notification; and
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

- Monitoring of groundwater to assess the performance and effectiveness of the remedy;
- A schedule of monitoring and frequency of submittals to the Department; and
- Monitoring for vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

c) An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but may not be limited to:

- Compliance monitoring of treatment to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- Maintaining site access controls and Department notification; and
- Providing the Department access to the Site and the O&M records.

Remedial activities will be performed at the Site in accordance with this RAWP and the Department-issued Decision Document (DD). All deviations from this RAWP and/or the DD will be promptly reported to NYSDEC for approval and will be fully explained in the Final Engineering Report (FER).

5.0 DESCRIPTION OF REMEDIAL ACTION PLAN (RAP)

5.1 Governing Documents

5.1.1 Site-Specific Health & Safety Plan (HASP) and Community Air Monitoring Plan (CAMP)

A Site-specific HASP and associated CAMP have been prepared for the Site and are included as Appendix H. All remedial work performed under this RAWP will be in compliance with governmental requirements, including Site and worker safety requirements mandated by the federal Occupational Health and Safety Administration (OSHA). Community air monitoring will be conducted during all intrusive Site activities in compliance with the NYSDOH Generic CAMP and the Site-Specific CAMP. Work zone monitoring will be performed for the health and safety of workers in accordance with action levels and guidance outlined in the HASP.

Community air monitoring will be performed via fixed stations at the perimeter of the Site during all ground-intrusive work. On the perimeter of the work zone, air monitoring will be performed periodically (at a minimum once per hour) on a roving basis with hand-held equipment based upon wind direction and the location of the intrusive work.

The requirements of this RAWP and its appendices pertain to all remediation work performed at the Site until the issuance of a Certificate of Completion (CoC). The Volunteers and associated parties preparing the remedial documents submitted to the state and those performing the construction work, are completely responsible for the preparation of an appropriate HASP and for the appropriate performance of work according to that plan and applicable laws.

The Site Safety Officer (SSO) will be Timothy McClintock of AKRF. Mr. McClintock's resume is included in Appendix J. Confined space entry is not anticipated for this project. If confined space entry becomes necessary, work will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gases.

5.1.2 Quality Assurance Project Plan (QAPP)

Any sampling associated with this project will be conducted in accordance with the QAPP included in Appendix G, which details field screening and sampling methodologies, and sample submittal and reporting requirements. The QAPP includes the project team responsible for implementing the remediation requirements and provisions set forth in this RAWP.

5.1.3 Construction Quality Assurance Plan (CQAP)

The CQAP, provided as Appendix K, provides a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedial construction is in conformance with the remediation objectives and specifications.

5.1.4 Soil/Materials Management Plan (SMMP)

An SMMP is included in Section 6.4 of this document. The SMMP includes detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport, and disposal. It also includes all of the procedures that will be applied to assure effective, nuisance-free performance in compliance with all applicable federal, state, and local laws and regulations.

5.1.5 Stormwater Pollution Prevention Plan (SWPPP)

Based on the size of the Site, a SWPPP is not required. Erosion and sediment controls implemented at the Site will conform to requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control Erosion. Sediment control measures will be installed at the Site prior to conducting any ground-intrusive work. These measures will be installed according to all applicable or relevant and appropriate federal, state, and local laws. The measures will provide for abatement and control of environmental pollution arising from proposed remediation and construction activities. The control measures will include procedures for perimeter Site controls, stabilized construction pads at each construction entrance, equipment decontamination, drainage inlet protection, and particulate suppression. The RE, or his or her representative, will conduct routine inspections, any repairs and/or maintenance of control measures will be completed in a timely fashion to maintain the controls in proper working order. All vehicles leaving the project Site will be inspected to ensure that no soil adheres to the wheels or undercarriage of the vehicle leaving the Site. Any situations involving material spilled in transit or mud and particulate tracked off-site will be remedied. The access routes will be inspected for road conditions, overhead clearance, and weight restrictions.

5.1.6 Community Air Monitoring Plan (CAMP)

The CAMP was prepared as part of the Site-specific HASP, which is provided in Appendix H.

5.1.7 Contractors Site Operations Plan (SOP)

The RE will review all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirm that they are in compliance with this RAWP. The RE 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. A detailed remedial construction design document will be submitted to the NYSDEC for approval prior to its construction.

5.1.8 Citizen Participation Plan (CPP)

A CPP was approved by NYSDEC and NYSDOH in August 2015. The CPP was revised in March 2016. A Project Fact Sheet describing the approved plan for RA will be forwarded to persons on the Site contact list in accordance with the NYSDEC and NYSDOH-approved CPP.

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

No changes will be made to the 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 following local document repositories have been established for this Site and contain all applicable project documents:

In-Text Table 7
Document Repositories

Document Repository	Hours of Operation
Melrose New York Public Library 910 Morris Avenue Bronx, New York 10451 (718) 588-0110	Monday through Tuesday: 10:00 – 1900 Friday and Saturday: 10:00 – 16:00 Sunday: Closed
Bronx Community Board 1 3024 Third Avenue Bronx, New York 10455 (718) 585-7171	Monday through Friday: 09:00 – 17:00

5.2 General Remedial Construction Information

5.2.1 Project Organization

Personnel responsible for implementation of this RAWP are included on the Organization Chart provided as Figure 9. Resumes of key personnel involved in the RA are included in Appendix J.

5.2.2 Remedial Engineer (RE)

The RE for this project will be Michelle Lapin, P.E. The RE is a registered Professional Engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the Brook 156 Site (NYSDEC BCA Index No. C203078-03-15; Site No. C203078). The RE will certify in the FER that the remedial activities were observed by qualified environmental professionals under her supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with the RAWP. Other RE certification requirements are listed later in this RAWP.

The RE 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 backfill material, and management of waste transport and disposal. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER. The RE will provide the certifications listed in Section 9.1 in the FER.

5.2.3 Remedial Action Construction Schedule

A schedule for performance of the remedial work is included in Section 12.

5.2.4 Work Hours

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

5.2.5 Site Security and Traffic Control

The Site will be completely closed from public access by using secured construction fencing. No unauthorized personnel will be able to access the Site. During off hours, the Site will be completely enclosed within a locked gate.

It is not anticipated that traffic will be disrupted beyond normal contractor vehicle traffic going to and from the Site during construction. Any sidewalk closures that are required during the course of construction/remediation activities will be conducted in accordance with New York City Department of Transportation (NYCDOT) permits.

5.2.6 Contingency Plan

A contingency plan has been developed to describe the procedures to be followed upon discovery of an unknown source of contamination or AOC that may require remediation (USTs, stained soil, drums, etc.). The identification of an unknown source structure or unexpected contaminated media discovered by screening during invasive Site work will be promptly communicated by phone to NYSDEC's project manager. These findings will also be included in daily and periodic reports. If USTs 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 soil, etc. Chemical analytical work will be for TCL VOCs, SVOCs, TCL pesticides, PCBs, and TAL metals. These analyses will not be limited to the Commissioner's Policy (CP)-51 parameters where tanks are identified without prior approval by NYSDEC.

5.2.7 Worker Training and Monitoring

All those who enter the work area while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All construction personnel upon entering the Site must attend a brief training meeting, its purpose being to:

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

Construction personnel will be responsible for identifying potential hazards in the work zone. The project manager will be responsible for insuring that the training is conducted. Others who enter the Site must be accompanied by a suitably-trained construction worker. In addition, any site workers within the "work zone" will have received the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and will be under a medical monitoring program. Current certifications for key personnel are included in Appendix J.

5.2.8 Agency Approvals

The Volunteers will be complying with all City Environmental Quality Review (CEQR) 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.

As part of development, the Site will be rezoned from R7-2 to C6-2. The planned end use for the Site is in conformance with the proposed zoning for the Site, 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 will be included in the FER.

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 this approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

5.2.9 NYSDEC BCP Signage

Signs are optional for BCP sites and will be discussed with the NYSDEC project manager. If a sign is displayed, it will follow NYSDEC specifications for design and content, provided by the NYSDEC project manager.

5.2.10 Pre-Construction Meeting with NYSDEC

A pre-construction meeting with the NYSDEC will be scheduled prior to the start of major construction activities. Representative members of the Volunteers, AKRF, and NYSDEC/NYSDOH will be invited to attend.

5.2.11 Emergency Contact Information

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

5.3 Site Preparation

Prior to conducting any intrusive activities for Site remediation activities, the work zone(s), designated entry points, soil stockpile staging areas, decontamination zones, and truck routes will be established, as applicable. The Site Plan will be updated as necessary to reflect any changes in operations during the course of the intrusive work. Particulate control measures, if necessary, will be implemented. Additional details of Site preparation activities are provided in the following sections.

5.3.1 Mobilization

Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking excavation areas will be performed prior to undertaking any Site remediation activities.

5.3.2 Groundwater Monitoring Well Decommissioning

Existing groundwater monitoring wells will either be protected during remediation and Site redevelopment for use during post-remedial monitoring (if needed), or will be properly decommissioned in accordance with NYSDEC policy CP-43. Decommissioning will not occur if the full length of the well is excavated during remediation and development and the well components are removed.

5.3.3 Erosion and Sedimentation Controls

Erosion and sedimentation control measures will be installed at the Site prior to conducting any ground-intrusive work. These measures will be installed according to all applicable or relevant and appropriate federal, state, and local laws. The measures will provide for abatement and control of environmental pollution arising from proposed remediation and construction activities. The control measures will include procedures for perimeter Site controls, stabilized construction pads at each construction entrance, equipment decontamination, drainage inlet protection, and particulate suppression. The RE, or her representative, will conduct routine inspections, and any repairs and/or maintenance of control measures required will be completed in a timely fashion to maintain the controls in proper working order. All vehicles leaving the project Site will be inspected to ensure that no soil adheres to the wheels or undercarriage of the vehicle leaving the Site. Any situations involving material spilled in transit or mud and particulate tracked off-site will be remedied. The access routes will be inspected for road conditions, overhead clearance, and weight restrictions.

5.3.4 Stabilized Construction Entrance(s)

A crushed stone path will be constructed by the general contractor at all truck entrances for the Site. All trucks will drive over this path prior to leaving so that they do not get re-contaminated prior to departure from the Site. A laborer with a hose connected to a NYC fire hydrant will check the trucks as they leave. The hose will be used to wash off soil from the truck tires and body as it leaves the Site, as necessary.

5.3.5 Utility Marker and Easements Layout

The Volunteers and its contractors are solely responsible for the identification of utilities that might be affected by work under this RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Volunteers and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteers and its contractors must obtain any local, state, or federal permits or approvals 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 RE. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

5.3.6 Sheeting and Shoring

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

5.3.7 Equipment and Material Staging

Staging and storage of equipment and materials will be contained within the secured Site or within a secured area on the street/sidewalk in accordance with a NYCDOT permit. By the nature of the work involved in this project, equipment and materials will be moved to different areas within the secured Site as work progresses.

5.3.8 Decontamination Area

A decontamination area will be established adjacent to the work areas. Decontamination fluids will be managed to prevent discharge to the ground surface.

All equipment in direct contact with known or potentially contaminated material will be either dedicated or decontaminated prior to handling less contaminated material or removal from the Site. All liquids used in the decontamination procedure will be collected, stored and disposed of in accordance with federal, state, and local regulations. Personnel performing this task will wear the proper personal protective equipment (PPE) as prescribed in the HASP.

5.3.9 Site Fencing

The Site will be secured with a locking fence that will be placed around the entire perimeter. During all remedial activities, access to the Site will be limited and all persons entering the Site will be required to sign a log book and meet all applicable health and safety requirements. The Site will be secured during non-working hours.

5.3.10 Demobilization

Restoration of the excavation work will include backfilling and general earthwork to prepare for construction of the foundation elements. Upon completion of the remedial excavation work, any waste materials (i.e., plastic sheet, absorbent pads, etc.) and the decontamination pad will be removed from the Site for proper disposal.

5.4 Reporting

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

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

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (e.g., 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 alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and particulate exceedances, if any, and corrective actions, and all complaints received from the public. The NYSDEC assigned project number will appear on all reports.

5.4.2 Monthly Reports

Monthly reports prepared in accordance with DER-10 Section 5.7(b) will be submitted to NYSDEC and NYSDOH project managers by the tenth day of the month following the reporting period and will include, at a minimum:

- 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.

5.4.3 Other Reporting

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

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.

5.4.4 Complaint Management Plan

A log of all complaints from the public regarding nuisance or other Site conditions will be compiled by the project director, as applicable. All complaints will be reported in the daily reports.

5.4.5 Deviations From This RAWP

All deviations from this RAWP will require prior approval from NYSDEC. These deviations will be recorded in both the monthly progress reports and in the FER. At a minimum, the report of the deviation will include the following:

- Reasons for deviating from this approved RAWP;
- Approval process to be followed for changes/editions to this RAWP; and
- Effect of the deviations on overall remedy.

6.0 REMEDIAL ACTION (RA): BASELINE GROUNDWTAER SAMPLING

Groundwater sampling occurred prior to NYSDEC issuing the Groundwater Sampling for Emerging Contaminants guidance in February 2018. As such, NYSDEC-issued a letter on April 4, 2018, included as Appendix B of the QAPP, requesting that two groundwater samples be collected from existing groundwater monitoring wells MW-1 and MW-2 to establish pre-remedial baseline groundwater concentrations for emerging contaminants and to determine whether groundwater treatment and post-remedial groundwater monitoring is required. All work in this section will include implementation of the Quality Assurance Protection Plan (QAPP), provided as Appendix G, and the Site-specific Health and Safety Plan (HASP), provided in Appendix H.

In accordance with EPA low-flow sampling protocols and the protocols included in the April 4, 2018 NYSDEC-issued letter, groundwater monitoring wells MW-1 and MW-2 will be sampled using a submersible pump. Prior to sampling, an electronic interface meter will be used to check for and measure water levels and a bailer will be used to measure the thickness of any separate phase product. The purge water will be monitored for turbidity and water quality indicators [i.e., pH, dissolved oxygen, oxidation-reduction potential (ORP), temperature, and specific conductivity] with measurements collected approximately every five minutes. The criteria for stabilization will be three successive readings within ±10% for pH, temperature, and specific conductivity.

One groundwater sample will be collected from each well, placed in laboratory-supplied containers, and shipped in accordance with appropriate EPA protocols to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory. The samples will be analyzed for TCL VOCs by EPA Method 8260, 1,4-Dioxane by EPA Method modified 8260C Selective Ion Monitoring (SIM), and PFCs by Modified EPA Method 537 using Category B deliverables. One blind duplicate, field blank, trip blank and matrix spike/matrix spike duplicate (MS/MSD) sample will be collected for quality assurance/quality control (QA/QC) purposes from MW-2. The QA/QC samples will be analyzed for the same analytes as the samples with the exception of the trip blank, which will be analyzed for VOCs and 1,4-Dioxane only. The data will be reviewed by a third-party validator and a DUSR will be prepared to document the usability and validity of the data.

After receipt of analytical results, a brief letter report will be prepared for submittal to NYSDEC. The letter report will include a description of the field sampling activities, a summary of the results, and conclusions and recommendations regarding the need for groundwater treatment and post-remedial groundwater monitoring. If NYSDEC determines that groundwater treatment and post-remedial monitoring are not needed, the on- and off-site wells will be decommissioned in accordance with CP-43. If groundwater treatment and post-remedial monitoring is needed, monitoring wells MW-1, MW-2, and SMW-1 will be preserved during remedial activities to the extent feasible. In the event that the wells are destroyed, they will be replaced. The schedule for post-remedial monitoring will be outlined in the SMP.

7.0 REMEDIAL ACTION (RA): MATERIAL REMOVAL FROM SITE

Based on data collected to date, removal of materials from the Site will include: (1) excavation and off-site disposal of asphalt, concrete, and contaminated soil, as shown on Figure 7; and (2) removal of petroleum storage tank(s), fill port(s), and vent(s). The minimum amount of soil to be excavated is approximately 1,000 cubic yards. Additional soil/fill may have to be removed as part of the remedial excavation following the results of the endpoint sampling. All contaminated soil will be removed from the Site and disposed of at a facility(ies) licensed to accept such material. Proposed disposal facilities will be submitted to NYSDEC after completion of waste characterization sampling.

7.1 Soil Cleanup Objectives (SCOs)

The applicable SCOs for this Site are the RRSCOs and PGWSCOs for benzene, toluene, ethylbenzene and xylenes (BTEX). Soil and materials management on-site and off-site will be conducted in accordance with the SMMP as described below. UST closures will, at a minimum, conform to criteria defined in DER-10.

7.2 Remedial Performance Evaluation (Post-Excavation Endpoint Sampling)

Excavation endpoint samples will be collected at the proposed locations shown on Figure 8. Additional post-excavation soil samples will be collected around any additional USTs encountered on the Site.

7.2.1 Endpoint Sampling Frequency

Based on the sampling frequency outlined in Section 5.4 of DER-10, endpoint sampling for the remedial excavation will include one bottom soil sample for every 900 square feet across the Site and one sidewall sample for every 30 linear feet around the perimeter of the Site. Based on the size of the proposed remedial excavation area at the Site, 7 endpoint samples would be collected from the 12-foot deep excavation in the vicinity of the suspect UST(s), and 15 endpoint samples would be collected from the remaining excavation across the remainder of Lot 3 and along the eastern portion of Lot 1. Endpoint sampling will occur around any additional AOCs identified during the RA based on the sampling frequency outlined in Section 5.4 of DER-10.

7.2.2 Methodology

The excavation endpoint samples will be collected using a decontaminated stainless steel sampling trowel, hand auger, or a dedicated wooden tongue depressor and placed directly into pre-sterilized laboratory-issued containers. The sample containers will be properly labeled and immediately placed on ice within a cooler. Sample time, date, and location will be recorded on a chain of custody. The samples will be submitted to an ELAP-certified laboratory for analysis of VOCs by EPA Method 8260, SVOCs by EPA Method 8270, pesticides by EPA Method 8081, PCBs by EPA Method 8082, and TAL metals by EPA Method 6000/7000 series. The laboratory will follow the NYSDEC – Analytical Services Protocol (ASP) dated 1995 using NYSDEC ASP Category B deliverables. Further details regarding the specific sampling methodology and analytical procedures are presented in the QAPP, included as Appendix G.

7.2.3 Reporting of Results

The analytical results of the endpoint samples will be tabulated and compared to the UUSCOs, RRSCOs, and/or PGWSCOs for BTEX. The tabulated data and the laboratory reports will be included in the FER. All analytical data will be submitted in electronic data deliverable (EDD) format via the Environmental Quality Information System (EQuIS™).

7.2.4 Quality Assurance/Quality Control (QA/QC)

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision, and completeness requirements will be addressed by the laboratory for all data generated. Collected samples will be appropriately packaged, placed in coolers, and shipped or delivered directly to the analytical laboratory by the laboratory's courier service. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved to maintain a temperature of 4 °C. Decontamination of non-dedicated sampling equipment will consist of the following: gently tap or scrape to remove adhered soil; rinse with tap water; wash with Alconox® detergent solution and scrub; rinse with tap water; rinse with distilled or deionized water; prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

One trip blank, one field blank, one blind duplicate sample, and one MS/MSD will be collected per every 20 samples or sample digestion group (SDG) per media and submitted for analysis during the endpoint sampling event. The field blank(s), blind duplicate(s), and MS/MSD(s) will include all of the parameters included in the sample analysis while the trip blank will be analyzed for VOCs only. Additional QA/QC information is provided in the QAPP, included as Appendix G.

7.2.5 Data Usability Summary Report (DUSR)

A qualified, third-party data validator will review the endpoint sample laboratory reports and prepare a DUSR. The DUSR will be discussed and included as an appendix to the FER.

7.2.6 Reporting of Endpoint Data in Final Engineering Report (FER)

The FER will include a detailed description of endpoint sampling activities, data summary tables, concentration figure showing endpoint sample locations and concentrations, DUSR, and laboratory reports. Chemical labs used for all endpoint sample results and contingency sampling (if any) will be NYSDOH ELAP-certified.

Endpoint sampling, including bottom and sidewall sampling, will be performed in accordance with DER-10 sample frequency requirements. The FER will provide a tabulated and map summary of all endpoint sample results and exceedances of SCOs, if any.

7.3 Estimated Material Removal Quantities

The removal of materials from the Site will include: (1) excavation and off-site disposal of soil to comply with RRSCOs and/or PGWSCOs, as shown on Figure 7; and (2) removal of any USTs, fill ports, and vent lines encountered.

The minimum amount of material to be removed as part of the excavation work is estimated at 1,000 cubic yards and consists of the following: excavation to 12 feet below grade on the southern and eastern portions of Lot 3 and on the southeastern portion of Lot 1, and to 2 feet below grade on the northwestern portion of Lot 3 and on the northeastern portion of Lot 1. The proposed remedial excavation plan is shown on Figure 7.

Endpoint samples will be collected and analyzed across the excavated portions of the Site to evaluate if Track 4 RRSCOs and/or PGWSCOs, where applicable, are achieved. It is noted that soil meeting RRSCOs and/or PGWSCOs may be reused as backfill on-site to prepare for the new building's foundation. It is noted that these quantities cannot be currently estimated, but will be tabulated and included in the FER.

The amount of construction and demolition (C&D) material cannot be estimated at this time. The exact quantities will be included in the FER.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) may be brought in to replace the excavated soil and establish the grade at the Site. On-site soil which does not exceed the above-noted excavation criteria (RRSCOs or PGWSCOs for any constituent) may be used anywhere on-site without pre-approval by the NYSDEC project manager.

7.4 Soil/Materials Management Plan (SMMP)

The SMMP describes the procedures to be performed during the handling of soil/fill materials on-site during all intrusive work.

7.4.1 Soil Screening Methods

Visual, olfactory, and PID soil screening and assessment will be performed by a QEP or experienced field geologist/engineer/environmental scientist under the direction of the RE during all remedial excavations. 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, the subsurface investigations, and the RA will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the FER.

Screening will be performed by QEPs. Resumes have been provided in Appendix J for all personnel responsible for field screening (i.e., those representing the RE) of invasive work for unknown contaminant sources during remediation and development work.

7.4.2 Stockpile Methods

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. 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 particulate control.

7.4.3 Materials Excavation and Load Out

The RE or a QEP under her supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The Volunteers and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP.

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

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate federal, state, local, and NYSDOT requirements (and all other applicable transportation requirements). Vehicles leaving the Site will not be overloaded. The RE'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 RE 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 RE will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

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

The RE will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

All contaminated materials and structures to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and endpoint 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 RAWP.

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, subsurface investigation, and RA will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the FER.

7.4.4 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.

Truck transport routes are as follows:

- Trucks entering the Site will take Exit 2B on Interstate I-95/Cross Bronx Expressway North for Webster Avenue; turn right onto Webster Avenue and continue south; continue straight onto Melrose Avenue; turn left onto East 158th Street; and turn right onto Brook Avenue. The Site will be on the left.
- Trucks leaving the Site will turn right onto East 156th Street; turn right onto Third Avenue; turn left onto East 157th Street; turn right onto Melrose Avenue and continue north; continue straight onto Webster Avenue; turn left onto Ittner Place; and turn left to merge onto Interstate I-95/Cross Bronx Expressway South.

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

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development. Queuing of trucks will be performed on-site to minimize off-site disturbance. Off-site queuing will be prohibited.

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

7.4.5 Materials Disposal Off-Site

The disposal facility(ies) information will be reported to the NYSDEC project manager after completion of waste characterization testing and prior to commencing the disposal activities. Based on the waste characterization results, a properly permitted waste disposal facility will be selected for off-site disposal. The disposal facility information including location will be reported to the NYSDEC project manager prior to commencing the disposal activities.

The total quantity of material expected to be disposed off-site is approximately 1,000 cubic yards.

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 UUSCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the RE 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 RE or BCP Volunteers 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 RE. 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 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed of at Part 360-16 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 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 360-16 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 RE. The letter will include as an attachment a summary of all chemical data for the material being transported.

The FER will include an accounting of the destination of all material removed from the Site during this RA, 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 tabulated form in the FER.

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

Any 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 (See Section 3.0). 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.

7.4.6 Materials Reuse On-Site

Chemical criteria for on-site reuse of material have been approved by NYSDEC. Materials planned for reuse (if any) will be segregated and stockpiled from materials slated for off-site disposal. Stockpiles will be placed on and covered with polyethylene sheeting. The stockpiled soil will be sampled and analyzed in accordance with Table 5.49(e)10 on page 161 of DER-10 Technical Guidance for Investigation and Remediation. All materials reused on the Site will comply with RRSCOs and PGWSCOs. The RE will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-site.

Demolition material will not be reused on-site. Concrete crushing or processing on-site is prohibited. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-site.

Contaminated on-site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer (if any), within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final SMP.

7.4.7 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by the New York City Department of Environmental Protection (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 State Pollutant Discharge Elimination System (SPDES) permit.

7.4.8 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 SMP. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the SMP. A map showing the survey results will be included in the FER and the SMP.

7.4.9 Backfill from Off-Site Sources

The proposed redevelopment plans include the importation of clean fill to raise the grade on Lot 1, over-excavated areas as part of the RA (if any) and in specific locations as part of the two-foot clean soil cap (to be placed over all non-covered, landscaped areas). Further, as noted in Section 7.4.8, a highly visible demarcation barrier (orange snow fencing or equivalent) will be installed beneath the two feet of clean fill/soil cap. All materials proposed for import onto the Site will be approved by the RE and will be in compliance with provisions in this RAWP prior to receipt at the Site. Material proposed for import shall either be from a NYSDEC-registered certified clean fill facility or other permitted facility. Any facility proposed for import shall undergo a facility history review and background check by the RE. 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.

Prior to import, soil will be segregated and tested at the source facility for analysis of TCL VOCs, SVOCs, PCBs, pesticides, and TAL Metals at the frequency outlined in Table 5.4(e)10 in DER-10 on page 161 of DER-10 Technical Guidance for Investigation and Remediation. The analytical results will be compared to Table 375-6.8(b) of 6 NYCRR Part 375 and submitted to NYSDEC for review and approval prior to importation and placement on-site.

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 PGWSCOs or the protection of public health RRSCOs 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 RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this RAWP should be construed as an approval for this purpose.

The FER will include the following certification by the RE: “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”.

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

7.4.10 Stormwater Pollution Prevention

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control Erosion and sediment control measures will be installed at the Site prior to conducting ground-intrusive work. These measures will be installed according to all applicable or relevant and appropriate federal, state, and local laws.

Any barriers and/or hay bales will be installed and will be 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/or 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 this 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.

7.4.11 Contingency Plan

If USTs 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 (TCL VOCs, TCL SVOCs, TCL pesticides, PCBs, and TAL metals). These analyses will not be limited to CP-51 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 the NYSDEC project manager. These findings will be also included in daily and periodic electronic media reports.

7.4.12 Community Air Monitoring Plan (CAMP)

A Site-specific HASP containing a CAMP has been prepared for this Site and is enclosed as Appendix H. Community air monitoring and real-time air monitoring at the perimeter of the exclusion zone will be conducted during all intrusive Site activities in accordance with the NYSDOH Generic CAMP and as described in Section 2.6 of Appendix H.

All readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

7.4.13 Odor, Particulate, and Nuisance Control Plan

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

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 the use of a PID to screen for VOCs and olfactory observations by a field technician. 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 RE, who is responsible for certifying the FER.

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

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

Particulate Control Plan

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

- Particulate suppression will be achieved through the use of a dedicated hose connected to a fire hydrant. The hose will be equipped with a nozzle capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to particulate production.
- Gravel will be used on roadways to provide a clean and particulate-free road surface.
- On-site roads will be limited in total area to minimize the area required for water spraying.

Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and 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.

8.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil, groundwater, and soil vapor may still exist beneath the Site after the remedy is complete, Engineering and Institutional Controls (ECs and ICs) will be required to protect human health and the environment. The ECs and ICs are described in Sections 10.0 and 11.0. Long-term management of EC/ICs and of residual contamination will be executed under a Site-specific SMP that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination.

The Site will have three primary EC systems and one contingent EC system. These are: (1) an SVE system; (2) SSDS; and (3) an engineered composite cover system consisting of a minimum two-foot clean fill buffer with demarcation barrier in all landscaped and non-covered areas, and concrete building foundations underlain by a 20-mil vapor barrier, and sidewalks/pathways. A groundwater treatment program will be the contingent EC system. The manufacturer’s specifications for the vapor barrier are enclosed as Appendix L. The proposed SVE and SSDS layout is shown on Figure 10. A map showing the proposed composite cover types and locations is included as Figure 11.

The FER will report residual contamination on the Site in tabulated and map form. This will include presentation of exceedances of UUSCOs, RRSCOs, and PGWSCOs, as applicable.

9.0 ENGINEERING CONTROL (EC): TREATMENT SYSTEMS

9.1 Soil Vapor Extraction (SVE) System

An SVE system will be installed at the southwestern portion of the Site to address residual concentrations of VOCs in soil after removal of the suspect UST(s) and any grossly contaminated soil to approximately 12 feet on the southwestern portion of the Site. The SVE system will be effective in preventing the migration of VOCs in soil vapor into the proposed building and off-site by targeting remaining contamination in the vadose (unsaturated) zone.

9.1.1 Soil Vapor Extraction (SVE) Well and Vapor Monitoring Point (VMP) Installation

Two SVE (SVE-1 and SVE-2) wells will be installed at the approximate locations shown on Figure 10 using an HSA drill rig with 6.25-inch outside diameter augers. The wells will be installed with 4-inch diameter, Schedule 40 polyvinyl chloride (PVC) pipe, with a length of 0.020-inch slotted screen and solid riser. A No. 2 sand filter pack will be installed around and to 6 inches above the top of the well screen(s). Approximately 2 feet of hydrated bentonite will be installed above the sand filter pack and a non-shrinking bentonite-cement grout will be used to fill the annular space to approximately 1 foot below grade. Each SVE well will be finished in the proposed new building cellar with a locking cap flush-with-grade curb box with an apron around the curb box to direct run-off away from the well. The top of the screen interval will be determined based on final excavation depths. The wells will be screened from the top of the residual management zone (approximately 12 feet below grade) to 5 feet above the groundwater table (approximately 25 feet below grade).

Seven vapor monitoring points (VMPs) will be installed at the approximate locations shown on Figure 10. VMP-1 through VMP-5 will be installed immediately below the slab within the proposed new building cellar and VMP-6 and VMP-7 will be installed within the sidewalk to approximately 12 feet below grade (the approximate grade of the proposed new building cellar). VMPs installed in the cellar (VMP-1 through VMP-5) will be constructed of 1-inch diameter Schedule 80 PVC piping terminating 3 inches below the bottom of the slab with a threaded PVC cap. Hydrated bentonite will be installed around the PVC and will be finished with a non-shrinking cement/grout mixture.

VMPs installed in the sidewalk (VMP-6 and VMP7) will be installed by advancing an expendable drive point using a Geoprobe™ direct-push drill rig to approximately 12.5 feet below grade. At each monitoring point, a six-inch stainless steel screen implant, connected to Teflon™ tubing, will be installed through the drilling rods and threaded into the drive point. The sampling tubing will extend from the end of the screen to above grade. The push probe rods will then be removed and the boring will be backfilled with clean silica sand to approximately 3 to 6 inches above the screen. Hydrated bentonite will be used to fill the remaining void around the sampling tubing to approximately one foot below the ground surface. A non-shrinking cement/grout mixture will be installed above the bentonite to grade. Each of the 7 VMPs will be finished with a female quick-connect fitting with a shut-off valve. The VMPs will be air-tight and finished with flush-mounted 6-inch diameter watertight locking well covers. Identification tags denoting each VMP identification will be attached to each VMP.

9.1.2 Soil Vapor Extraction (SVE) Well and Vapor Monitoring Point (VMP) Location Survey

The SVE wells and VMPs will be surveyed by a New York State-licensed surveyor to determine their accurate locations. The locations would be plotted graphically and would be included in the FER.

9.1.3 Soil Vapor Extraction (SVE) Well Communication Testing

After the pilot test SVE wells are constructed, they will be connected to a blower and the corresponding sub-slab negative pressure will be measured using magnehelic differential pressure gauges at soil vapor points in the vicinity of the extraction well. The communication testing will be used to establish the necessary design of the full-scale SVE blower and treatment system. Throughout the testing, extraction air flow rate and applied vacuum will be measured at the VMPs, induced vacuum will be measured at the VMPs, and total VOC concentrations will be measured in both the extraction wells and VMPs using a PID. The data will be recorded on pilot test data sheets, and graphically plotted to aid in optimizing the system design.

Monitoring will consist of measuring vacuum at each point with a magnehelic differential pressure gauge during full system operation. A vacuum reading of 0.1 inch of water column will be utilized at the minimum induced vacuum target for the monitoring points during the SVE communication testing to establish the design ROI for the respective extraction well.

A skid-mounted regenerative blower equipped with a variable frequency drive and a capacity of 100 cubic feet per minute (cfm) at a vacuum of 40 inH_2O will be utilized for the testing. The system will be equipped with a moisture separator, flow meter, and vacuum gauge. During each test, applied vacuum, air flow, influent and effluent VOCs, and influent oxygen will be monitored at the extraction wells. Induced vacuum, VOCs, and oxygen will be monitored at each VMP.

Data will be collected at approximate 30 minute intervals for a minimum period of two hours and until steady state conditions are reached. A vacuum reading of 0.1 inH2O column will be utilized as the minimum induced vacuum target for the monitoring points during the SVE pilot testing. The data will be recorded on pilot test data sheets and subsequently plotted graphically to aid in selecting the appropriate blower.

The blower will be attached to the extraction well with a 2-inch diameter hose or PVC piping, and a dilution valve will be installed to adjust the flow rate and vacuum of the blower. This will allow the applied vacuum to be adjusted by bleeding in ambient air through a bypass valve. One granular-activated carbon (GAC) filter equipped with a minimum of 170 pounds of carbon will be used to treat recovered vapors during the testing. Sampling ports will be provided to determine the influent VOC concentrations. The vacuum monitoring points will be used to measure observed vacuum at varying distances from the pilot test wells. The effective radius of influence (ROI) will be evaluated for both of the extraction wells by plotting the observed vacuum versus distance from each extraction well from each of the VMPs.

This iterative design approach of SVE well installation with communication testing ensures a continuous zone of extraction with adequate vacuum to mobilize and/or contain target contamination. The capacity (vacuum and flow) at each SVE well will be evaluated for use in the final system design, including the potential need for additional SVE wells, blower specifications, and components.

9.1.4 Influent Vapor Sampling

One influent air sample will be collected during each step test for laboratory analysis of VOCs by EPA Method TO-15 to determine VOC mass loading and associated treatment requirements as part of the design for the SVE system. The laboratory sample collected during the pilot testing will be collected in a Tedlar® bag and analyzed by a NYSDOH-certified laboratory using Category B deliverables.

9.1.5 SVE System Shutdown

Once asymptotic levels of VOCs are observed during system monitoring, the SVE system may be turned off with written approval by NYSDEC and NYSDOH. The SVE system will not be shut down without written approval by NYSDEC and NYSDOH. A proposal to discontinue operation of the SVE may be submitted by the Volunteers and/or the Site owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue operation is granted in writing by NYSDEC and NYSDOH.

As-built drawings, diagrams, calculations, and manufacturer documentation for the SVE system will be presented in the FER.

9.1.6 Vapor Intrusion (VI) Assessment

After SVE system shutdown, a Vapor Intrusion (VI) Assessment will be conducted to determine the need for activation of the SSDS, as described in Section 9.4. A VI work plan (VIWP) will be submitted to NYSDEC and NYSDOH for review and approval prior to conducting the work. The results of the VI Assessment will be documented in a VI Report and will be used to determine whether vapor concentrations necessitate active operation of the SSDS to prevent contaminated vapors from entering the Site building.

9.2 Sub-Slab Depressurization System (SSDS)

An SSDS will be installed beneath the proposed new building foundation. The SSDS will initially be installed as a passive system, but will be constructed so that it could be activated if needed, based on the results of the VI Assessment (see Section 9.2). The SSDS plan is shown on Figure 10. The SSDS will consist of slotted PVC piping beneath the entire proposed Site building footprint, which will be connected via a network of aboveground piping to a riser and stack equipped with a wind turbine. The final design of the proposed SSDS will be finalized based on final construction plans for the new building. The SSDS to be installed consists of:

1. Three slotted Schedule 40 4-inch diameter pipes (denoted as VR-1A, VR-1B, and VR-1C), connected to a 6-inch diameter galvanized steel vertical riser pipe (VR-1).
2. Seven monitoring points (denoted as VMP-1 through VMP-7).

During construction, non-woven geotextile fabric overlain by a minimum 6-inch layer of ¾-inch gas-permeable aggregate (GPA) stone bedding will be installed under, around, and above all SSDS piping, below the entire building slab. The installation of GPA in the treatment areas is expected to promote favorable subsurface conditions for ventilation of vapors. The seven vacuum monitoring points will be installed around the perimeter of the Site.

If the system is activated, a suction fan will be located in a secure enclosure in the cellar maintenance room. The operational capabilities of the suction fan will have a rating of 160 cfm and will operate at a vacuum of 8 inH_2O. The vacuum capabilities of the proposed fan are intended to overcome frictional losses within the subsurface and aboveground piping and induce a minimum vacuum of 0.004 inH_2O at each of the vacuum monitoring points. The installation of a minimum 20-mil vapor barrier under the building slab, as previously discussed, is expected to assist the SSDS in generating a subsurface vacuum by creating an upper boundary that will prohibit sub-slab vapors from escaping the treatment area.

9.2.1 SSDS Confirmatory Testing

If results of the VI Assessment reveal that activation of the system is warranted, system startup, including balancing the system and the collection of vacuum readings at the vacuum monitoring points, will be used to assess induced vacuum conditions throughout the Site. If sub-slab vacuum is not adequately maintained in any portion of the Site, the SSDS will be rebalanced by adjusting vacuum and air flow rate conditions in the individual SSDS lines until acceptable vacuum conditions are observed. SSDS operations and maintenance requirements will be outlined in the SMP.

If activated, operation of the SSDS will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSDS may be submitted by the Volunteers and/or the Site owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue operation is granted in writing by NYSDEC and NYSDOH.

All as-built drawings, diagrams, calculations, and manufacturer documentation for the SSDS will be presented in the FER.

9.3 Composite Cover System

To prevent direct contact with any residually-contaminated soil, a composite cover system will be installed at the Site. The proposed composite cover system will consist of: (1) concrete building foundation, sidewalks, and pathways; (2) a minimum 2-foot clean fill buffer with a demarcation barrier in all landscaped and non-covered areas to prevent human exposure to residual contamination soil/fill at the Site; and (3) a 20-mil vapor barrier.

A StegoWrap™ 20-mil vapor barrier or equivalent membrane that meets or exceeds ASTM E-1745 standard for installation of a vapor barrier between granular fill and concrete will be selected. The membrane will be installed in accordance with the manufacturer's installation procedures. Prior to pouring the concrete slab, the installed vapor barrier will be inspected, documented, and photographed. In addition, the vapor barrier will serve as the demarcation barrier underneath the building. As such, a NYS-licensed surveyor will survey the vapor barrier for inclusion on an "as built" drawing. Installation photographs and "as built" drawings will be included in the FER.

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. Inspections of the composite cover system will be detailed in the SMP.

The manufacturer's specifications for the vapor barrier are included as Appendix L. The proposed composite cover system plan is provided as Figure 11.

9.4 In-Situ Groundwater Treatment Program

Based on elevated concentrations of BTEX found in MW-2 during the RI, a contingent in-situ groundwater treatment program has been incorporated into the remedy. Two groundwater samples will be collected from existing groundwater monitoring wells MW-1 and MW-2 and analyzed for TCL VOCs via EPA Method 8260 to establish pre-remedial baseline groundwater concentrations and to determine whether groundwater treatment and post-remedial groundwater monitoring is required (Section 6.0). If NYSDEC determines that groundwater treatment and post-remedial monitoring is needed, additional benchscale testing will be performed, and the groundwater treatment program will be designed. A full description of the in-situ groundwater treatment program, including treatment areas, injection locations, treatment technology, and monitoring protocols, will be provided to NYSDEC prior to initiation.

10.0 INSTITUTIONAL CONTROLS (ICS)

After the remedy is complete, residual contamination will remain at the Site. ICs 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 EE and an SMP.

All as-built drawings, diagrams, calculations, and manufacturer documentation for treatment systems will be presented in the FER. A Site-specific EE will be recorded with New York City 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 EE and the grantor's successors and assigns adhere to all ECs and ICs placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate O&M and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the EE. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the EE and grantor's successors and assigns.

10.1 Environmental Easement (EE)

An EE, as defined in Article 71 Title 36 of the ECL, is required when residual contamination is left on-site after the RA is complete. As part of this remedy, an EE approved by NYSDEC will be filed and recorded with the New York City Register. The EE will be submitted as an appendix to the FER.

The EE renders the Site a Controlled Property. The EE must be recorded with the New York City Register before the CoC can be issued by NYSDEC. A series of ICs are required under this remedy to implement, maintain and monitor these ECs, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to restricted residential, commercial, or industrial use(s) only. These ICs are requirements or restrictions placed on the Site that are listed in, and required by, the EE. ICs can, generally, be subdivided between controls that support ECs, and those that place general restrictions on Site usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The ICs that support ECs are:

- Compliance with the EE by the Grantee and/or the Grantee's successors and adherence of all elements of the SMP is required;
- All ECs must be operated and maintained as specified in this SMP;
- An SVE system and an SSDS under all building structures must be inspected, certified, operated and maintained as required by the SMP;
- All ECs on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring, if needed, 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 VMPs, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP; and
- ECs may not be discontinued without an amendment or extinguishment of the EE.

Adherence to these ICs for the Site will be mandated by the EE and will be implemented under the SMP. The Site will also have a series of ICs in the form of Site restrictions and requirements. The Site restrictions that apply to the Site include:

- In-ground vegetable gardening and farming on the Site are prohibited;
- The use of groundwater underlying the Site is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Site that will disturb residual management zone are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;
- The Site may be used for restricted residential, commercial, or industrial use(s) only, provided the long-term ECs and ICs included in the SMP are employed;
- The Site may not be used for a higher level of use, such as residential or unrestricted use without an amendment or extinguishment of this EE; and
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Site 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 the Site at any time 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.

11.0 SITE MANAGEMENT PLAN (SMP)

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

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the RA in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all ECs and ICs; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems [including, where appropriate, preparation of an Operation and Maintenance Manual (O&MM)]; (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 EC and IC Plan for implementation and management of ECs and ICs; (2) a monitoring plan for implementation of Site monitoring; (3) an O&M 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 SMP 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.

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

12.0 FINAL ENGINEERING REPORT (FER)

An FER will be submitted to NYSDEC following implementation of the RA 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 FER will include as-built drawings for all constructed elements, calculations, and manufacturer documentation for treatment systems, certifications, manifests, bills of lading as well as the complete SMP (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the RA from the elements provided in this RAWP and associated design documents. The FER will provide a tabulated summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the RA. 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 SMP and EE. This determination will be made by NYSDEC in the context of the FER review.

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

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 UUSCOs in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 UUSCOs for all soil/fill remaining at the Site after the RA and a map that shows the location and summarizes exceedances from Track 1 UUSCOs for all soil/fill remaining at the Site after the RA 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 RA. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

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

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

12.1 Certifications

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the RE, Ms. Michelle Lapin P.E., 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, Michelle Lapin, 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 Brook 156 Site (NYSDEC BCA Index No. C203078-03-15; Site No. C203078).

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 Brook 156 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 Volunteers 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 particulate 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.

13.0 PROPOSED PROJECT SCHEDULE

Activity	Time To Complete
Remedial Action Work Plan (RAWP) Submitted to NYSDEC	April 24, 2018
Public Comment Period for RAWP	August 2018
RAWP approval and Issuance of Decision Document	October 2018
Issue Remedial/Construction Notice Fact Sheet	October 2018
Baseline and Emerging Contaminant Groundwater Sampling	November 2018
Begin Redevelopment (Construction) with Implementation of RAWP	January 2018
Execution of Environmental Easement (EE)	June 2019
Draft Site Management Plan (SMP)	August 2019
Final Engineering Report (FER) and Fact Sheet	September 2019
Certificate of Completion and Fact Sheet	December 2019
Completion of Building	December 2022

TABLES

Attached Table 1
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	SB-1 (0-2)	SB-1 (25-27)	SB-X	SB-2 (0-2)
Lab Sample ID				JB50766-1	JB50766-2	JB50766-3	JB50884-1
Date Sampled				10/21/2013	10/21/2013	10/21/2013	10/21/2013
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1,1-Trichloroethane	0.68	100	NA	0.00037 U	0.00039 U	0.0004 U	0.00034 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.00044 U	0.00047 U	0.00047 U	0.00041 U
1,1,2-Trichloroethane	NS	NS	NA	0.0011 U	0.0011 U	0.0011 U	0.00097 U
1,1-Dichloroethane	0.27	26	NA	0.0004 U	0.00043 U	0.00044 U	0.00037 U
1,1-Dichloroethene	0.33	100	NA	0.00037 U	0.00039 U	0.0004 U	0.00034 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00027 U	0.00028 U	0.00029 U	0.00025 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.00023 U	0.00025 U	0.00025 U	0.00021 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.0017 U	0.0018 U	0.0018 U	0.0016 U
1,2-Dibromoethane	NS	NS	NA	0.00071 U	0.00075 U	0.00076 U	0.00065 U
1,2-Dichlorobenzene	1.1	100	NA	0.00044 U	0.00046 U	0.00047 U	0.0004 U
1,2-Dichloroethane	0.02	3.1	NA	0.00041 U	0.00044 U	0.00045 U	0.00038 U
1,2-Dichloropropane	NS	NS	NA	0.00056 U	0.0006 U	0.0006 U	0.00052 U
1,3-Dichlorobenzene	2.4	49	NA	0.00028 U	0.0003 U	0.0003 U	0.00026 U
1,4-Dichlorobenzene	1.8	13	NA	0.00032 U	0.00034 U	0.00035 U	0.0003 U
2-Butanone (MEK)	0.12	100	NA	0.0057 U R	0.006 U R	0.0061 U R	0.0052 U R
2-Hexanone	NS	NS	NA	0.0023 U	0.0024 U	0.0025 U	0.0021 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0017 U	0.0018 U	0.0018 U	0.0016 U
Acetone	0.05	100	NA	0.0261 J	0.0089 J	0.0063 U R	0.0136 J
Benzene	0.06	4.8	0.06	0.00016 U	0.00017 U	0.00017 U	0.00015 U
Bromochloromethane	NS	NS	NA	0.00067 U	0.00071 U	0.00072 U	0.00061 U
Bromodichloromethane	NS	NS	NA	0.00036 U	0.00038 U	0.00039 U	0.00033 U
Bromoform	NS	NS	NA	0.00034 U	0.00036 U	0.00036 U	0.00031 U
Bromomethane	NS	NS	NA	0.00062 U	0.00066 U	0.00067 U	0.00057 U
Carbon disulfide	NS	NS	NA	0.00018 U	0.00019 U	0.0002 U	0.00017 U
Carbon tetrachloride	0.76	2.4	NA	0.00032 U	0.00034 U	0.00035 U	0.0003 U
Chlorobenzene	1.1	100	NA	0.00025 U	0.00027 U	0.00027 U	0.00023 U
Chloroethane	NS	NS	NA	0.0013 U	0.0014 U	0.0014 U	0.0012 U
Chloroform	0.37	49	NA	0.00033 U	0.00035 U	0.00035 U	0.0003 U
Chloromethane	NS	NS	NA	0.00044 U	0.00047 U	0.00048 U	0.00041 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00027 U	0.00028 U	0.00029 U	0.00025 U
cis-1,3-Dichloropropene	NS	NS	NA	0.00029 U	0.00031 U	0.00031 U	0.00027 U
Cyclohexane	NS	NS	NA	0.00033 U	0.00035 U	0.00036 U	0.0003 U
Dibromochloromethane	NS	NS	NA	0.00031 U	0.00033 U	0.00034 U	0.00029 U
Dichlorodifluoromethane	NS	NS	NA	0.00045 U	0.00048 U	0.00049 U	0.00042 U
Ethylbenzene	1	41	1	0.00023 U	0.00024 U	0.00024 U	0.0003 J
Freon 113	NS	NS	NA	0.00056 U J	0.00059 U J	0.0006 U J	0.00052 U
Isopropylbenzene	NS	NS	2.3	0.00019 U	0.0002 U	0.0002 U	0.00017 U
m,p-Xylene	NS	NS	NS	0.00062 U	0.00066 U	0.00067 U	0.0013
Methyl Acetate	NS	NS	NA	0.0021 U	0.0023 U	0.0023 U	0.002 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.00044 U	0.00047 U	0.00048 U	0.00041 U
Methylcyclohexane	NS	NS	NA	0.00021 U	0.00022 U	0.00023 U	0.00019 U
Methylene chloride	0.05	100	NA	0.0044 J	0.0023 U	0.0024 U	0.0067 U
o-Xylene	NS	NS	NS	0.00023 U	0.00024 U	0.00025 U	0.00057 J
Styrene	NS	NS	NA	0.0003 U	0.00032 U	0.00032 U	0.00027 U
Tetrachloroethene	1.3	19	NA	0.00053 U	0.00056 U J	0.00065 J	0.00049 U
Toluene	0.7	100	0.7	0.00018 U	0.00028 J	0.0002 U J	0.00017 U
trans-1,2-Dichloroethene	0.19	100	NA	0.00054 U	0.00058 U	0.00059 U	0.0005 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00035 U	0.00037 U	0.00037 U	0.00032 U
Trichloroethene	0.47	21	NA	0.00045 U	0.00048 U	0.00049 U	0.00041 U
Trichlorofluoromethane	NS	NS	NA	0.00029 U	0.00031 U	0.00031 U	0.00027 U
Vinyl chloride	0.02	0.9	NA	0.00044 U	0.00047 U	0.00047 U	0.00041 U
Xylene (total)	0.26	100	1.6	0.00023 U	0.00024 U	0.00025 U	0.0018

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Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	SB-2 (10-12)	SB-2 (14-16)	SB-3 (0-4)	SB-3 (8-12)
Lab Sample ID				JB50884-2	JB50884-3	JB50884-6	JB50884-7
Date Sampled				10/21/2013	10/21/2013	10/23/2013	10/23/2013
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1,1-Trichloroethane	0.68	100	NA	0.00031 U	0.00035 U	0.00033 U	0.00034 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.00037 U	0.00041 U	0.00039 U	0.00041 U
1,1,2-Trichloroethane	NS	NS	NA	0.00089 U	0.00099 U	0.00094 U	0.00098 U
1,1-Dichloroethane	0.27	26	NA	0.00034 U	0.00038 U	0.00036 U	0.00037 U
1,1-Dichloroethene	0.33	100	NA	0.00031 U	0.00035 U	0.00033 U	0.00034 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00023 U	0.00025 U	0.00024 U	0.00025 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.0002 U	0.00022 U	0.00021 U	0.00022 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.0014 U	0.0016 U	0.0015 U	0.0016 U
1,2-Dibromoethane	NS	NS	NA	0.0006 U	0.00066 U	0.00063 U	0.00065 U
1,2-Dichlorobenzene	1.1	100	NA	0.00037 U	0.00041 U	0.00039 U	0.0004 U
1,2-Dichloroethane	0.02	3.1	NA	0.00035 U	0.00039 U	0.0012	**0.0523**
1,2-Dichloropropane	NS	NS	NA	0.00047 U	0.00053 U	0.0005 U	0.00052 U
1,3-Dichlorobenzene	2.4	49	NA	0.00024 U	0.00026 U	0.00025 U	0.00026 U
1,4-Dichlorobenzene	1.8	13	NA	0.00027 U	0.0003 U	0.00029 U	0.0003 U
2-Butanone (MEK)	0.12	100	NA	0.0048 U R	0.0053 U R	0.005 U R	0.06 J
2-Hexanone	NS	NS	NA	0.0019 U	0.0021 U	0.002 U	0.0021 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0014 U	0.0016 U	0.0015 U	0.0016 U
Acetone	0.05	100	NA	0.0062 J	0.0055 U R	0.0119 J	0.0054 U R
Benzene	0.06	4.8	0.06	0.00014 U	0.00015 U	0.0151	***4.43 D***
Bromochloromethane	NS	NS	NA	0.00056 U	0.00063 U	0.00059 U	0.00062 U
Bromodichloromethane	NS	NS	NA	0.00031 U	0.00034 U	0.00032 U	0.00033 U
Bromoform	NS	NS	NA	0.00029 U	0.00032 U	0.0003 U	0.00031 U
Bromomethane	NS	NS	NA	0.00052 U	0.00058 U	0.00055 U	0.00057 U
Carbon disulfide	NS	NS	NA	0.00015 U	0.00017 U	0.00016 U	0.00017 U
Carbon tetrachloride	0.76	2.4	NA	0.00027 U	0.0003 U	0.00029 U	0.0003 U
Chlorobenzene	1.1	100	NA	0.00021 U	0.00024 U	0.00023 U	0.00023 U
Chloroethane	NS	NS	NA	0.0011 U	0.0012 U	0.0011 U	0.0012 U
Chloroform	0.37	49	NA	0.00028 U	0.00031 U	0.00029 U	0.0003 U
Chloromethane	NS	NS	NA	0.00037 U	0.00041 U	0.00039 U	0.00041 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00023 U	0.00025 U	0.00024 U	0.00025 U
cis-1,3-Dichloropropene	NS	NS	NA	0.00025 U	0.00027 U	0.00026 U	0.00027 U
Cyclohexane	NS	NS	NA	0.00028 U	0.00031 U	0.0023 J	10.3 D
Dibromochloromethane	NS	NS	NA	0.00026 U	0.00029 U	0.00028 U	0.00029 U
Dichlorodifluoromethane	NS	NS	NA	0.00038 U	0.00043 U	0.0004 U	0.00042 U
Ethylbenzene	1	41	1	0.00019 U	0.00021 U	0.0123	***11.1 D***
Freon 113	NS	NS	NA	0.00047 U	0.00053 U	0.0005 U	0.00052 U
Isopropylbenzene	NS	NS	2.3	0.00016 U	0.00018 U	0.00073 J	0.128
m,p-Xylene	NS	NS	NS	0.00053 U	0.00058 U	0.0649	55.1 D
Methyl Acetate	NS	NS	NA	0.0018 U	0.002 U	0.0019 U	0.002 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.00037 U	0.00041 U	0.00039 U	0.00041 U
Methylcyclohexane	NS	NS	NA	0.00018 U	0.0002 U	0.0062	44.9 D
Methylene chloride	0.05	100	NA	0.0034 U	0.0064 U	0.0056 U	0.002 U
o-Xylene	NS	NS	NS	0.00019 U	0.00021 U	0.0226	18.1 D
Styrene	NS	NS	NA	0.00025 U	0.00028 U	0.00027 U	0.00028 U
Tetrachloroethene	1.3	19	NA	0.00045 U	0.0005 U	0.0011 J	0.002 J
Toluene	0.7	100	0.7	0.00015 U	0.00017 U	0.0936	***26.9 D***
trans-1,2-Dichloroethene	0.19	100	NA	0.00046 U	0.00051 U	0.00048 U	0.0005 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00029 U	0.00033 U	0.00031 U	0.00032 U
Trichloroethene	0.47	21	NA	0.00038 U	0.00042 U	0.0004 U	0.00042 U
Trichlorofluoromethane	NS	NS	NA	0.00024 U	0.00027 U	0.00026 U	0.00027 U
Vinyl chloride	0.02	0.9	NA	0.00037 U	0.00041	0.00039	0.00041
Xylene (total)	0.26	100	1.6	0.00019 U	0.00021 U	0.0875	***73.2 D***

Attached Table 1
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	SB-3 (32-36)	SB-4 (0-4)	SB-Y	SB-5 (0-2)
Lab Sample ID				JB50884-8	JB50884-10	JB50884-9	JB50884-11
Date Sampled				10/23/2013	10/23/2013	10/23/2013	10/23/2013
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1,1-Trichloroethane	0.68	100	NA	0.00033 U	0.00027 U	0.00027 U	0.00034 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.0004 U	0.00032 U	0.00033 U	0.0004 U
1,1,2-Trichloroethane	NS	NS	NA	0.00095 U	0.00076 U	0.00078 U	0.00096 U
1,1-Dichloroethane	0.27	26	NA	0.00037 U	0.00029 U	0.0003 U	0.00037 U
1,1-Dichloroethene	0.33	100	NA	0.00033 U	0.00027 U	0.00027 U	0.00034 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00024 U	0.00019 U	0.0002 U	0.00024 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.00021 U	0.00017 U	0.00017 U	0.00021 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.0015 U	0.0012 U	0.0013 U	0.0016 U
1,2-Dibromoethane	NS	NS	NA	0.00064 U	0.00051 U	0.00052 U	0.00064 U
1,2-Dichlorobenzene	1.1	100	NA	0.00039 U	0.00031 U	0.00032 U	0.0004 U
1,2-Dichloroethane	0.02	3.1	NA	0.00037 U	0.00031 U J	0.00031 J	0.00038 U
1,2-Dichloropropane	NS	NS	NA	0.00051 U	0.0004 U	0.00042 U	0.00051 U
1,3-Dichlorobenzene	2.4	49	NA	0.00025 U	0.0002 U	0.00021 U	0.00026 U
1,4-Dichlorobenzene	1.8	13	NA	0.00029 U	0.00023 U	0.00024 U	0.00029 U
2-Butanone (MEK)	0.12	100	NA	0.0051 U R	0.0041 U R	0.0042 U R	0.0052 U R
2-Hexanone	NS	NS	NA	0.0021 U	0.0016 U	0.0017 U	0.0021 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0015 U	0.0012 U	0.0013 U	0.0015 U
Acetone	0.05	100	NA	0.0053 U R	0.0127 J	0.0132 J	0.0053 U R
Benzene	0.06	4.8	0.06	0.00071 J	0.00073	0.0012	0.00015 U
Bromochloromethane	NS	NS	NA	0.0006 U	0.00048 U	0.0005 U	0.00061 U
Bromodichloromethane	NS	NS	NA	0.00033 U	0.00026 U	0.00027 U	0.00033 U
Bromoform	NS	NS	NA	0.0003 U	0.00024 U	0.00025 U	0.00031 U
Bromomethane	NS	NS	NA	0.00056 U	0.00045 U	0.00046 U	0.00056 U
Carbon disulfide	NS	NS	NA	0.00016 U	0.00013 U	0.00013 U	0.00017 U
Carbon tetrachloride	0.76	2.4	NA	0.00029 U	0.00023 U	0.00024 U	0.00029 U
Chlorobenzene	1.1	100	NA	0.00023 U	0.00018 U	0.00019 U	0.00023 U
Chloroethane	NS	NS	NA	0.0012 U	0.00092 U	0.00095 U	0.0012 U
Chloroform	0.37	49	NA	0.00064 J	0.00024 U	0.00024 U	0.0003 U
Chloromethane	NS	NS	NA	0.0004 U	0.00032 U	0.00033 U	0.0004 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00024 U	0.00019 U	0.0002 U	0.00024 U
cis-1,3-Dichloropropene	NS	NS	NA	0.00026 U	0.00021 U	0.00022 U	0.00027 U
Cyclohexane	NS	NS	NA	0.0003 U	0.001 J	0.00086 J	0.0003 U
Dibromochloromethane	NS	NS	NA	0.00028 U	0.00022 U	0.00023 U	0.00028 U
Dichlorodifluoromethane	NS	NS	NA	0.00041 U	0.00033 U	0.00034 U	0.00041 U
Ethylbenzene	1	41	1	0.00027 J	0.0048	0.0047	0.0003 J
Freon 113	NS	NS	NA	0.00051 U	0.0004 U	0.00042 U	0.00051 U
Isopropylbenzene	NS	NS	2.3	0.00017 U	0.0017 J	0.0017 J	0.00017 U
m,p-Xylene	NS	NS	NS	0.0011 J	0.0378	0.0396	0.0017
Methyl Acetate	NS	NS	NA	0.0019 U	0.0015 U	0.0016 U	0.002 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.0004 U	0.00032 U	0.00033 U	0.0004 U
Methylcyclohexane	NS	NS	NA	0.00069 J	0.0073	0.0069	0.00019 U
Methylene chloride	0.05	100	NA	0.0082 U	0.0024 U	0.0016 U	0.0024 U
o-Xylene	NS	NS	NS	0.00044 J	0.0182	0.0196	0.0012
Styrene	NS	NS	NA	0.00027 U	0.00021 U	0.00022 U	0.00027 U
Tetrachloroethene	1.3	19	NA	0.00048 U	0.00056 J	0.00087 J	0.00048 U
Toluene	0.7	100	0.7	0.0014	0.007	0.007	0.00017 U
trans-1,2-Dichloroethene	0.19	100	NA	0.00049 U	0.00039 U	0.0004 U	0.0005 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00031 U	0.00025 U	0.00026 U	0.00032 U
Trichloroethene	0.47	21	NA	0.00041 U	0.00032 U	0.00033 U	0.00041 U
Trichlorofluoromethane	NS	NS	NA	0.00026 U	0.00021 U	0.00021 U	0.00026 U
Vinyl chloride	0.02	0.9	NA	0.0004	0.00032 U	0.00033 U	0.0004 U
Xylene (total)	0.26	100	1.6	0.0016	0.0561	0.0592	0.0029

Attached Table 1
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	SB-6 (0-2)	SB-6 (4-6)	SB-7 (0-2)	SB-XX
Lab Sample ID				JB67612-1	JB67612-2	JB67612-7	JB67612-9
Date Sampled				5/21/2014	5/21/2014	5/22/2014	5/22/2014
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1,1-Trichloroethane	0.68	100	NA	0.00032 U	0.00032 U	0.00096 U	0.00053 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.00039 U	0.00038 U	0.0011 U	0.00063 U
1,1,2-Trichloroethane	NS	NS	NA	0.00093 U	0.00092 U	0.0028 U	0.0015 U
1,1-Dichloroethane	0.27	26	NA	0.00035 U	0.00035 U	0.0011 U	0.00058 U
1,1-Dichloroethene	0.33	100	NA	0.00032 U	0.00032 U	0.00096 U	0.00053 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00023 U	0.00023 U	0.00069 U	0.00038 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.0002 U	0.0002 U	0.00061 U	0.00034 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.0015 U	0.0015 U	0.0045 U	0.0025 U
1,2-Dibromoethane	NS	NS	NA	0.00062 U	0.00061 U	0.0018 U	0.001 U
1,2-Dichlorobenzene	1.1	100	NA	0.00038 U	0.00038 U	0.0011 U	0.00063 U
1,2-Dichloroethane	0.02	3.1	NA	0.00036 U	0.00036 U	0.0011 U	0.0006 U
1,2-Dichloropropane	NS	NS	NA	0.00049 U	0.00049 U	0.0015 U	0.00081 U
1,3-Dichlorobenzene	2.4	49	NA	0.00025 U	0.00024 U	0.00073 U	0.0004 U
1,4-Dichlorobenzene	1.8	13	NA	0.00028 U	0.00028 U	0.00084 U	0.00047 U
2-Butanone (MEK)	0.12	100	NA	0.005 U	0.0049 U	0.0479 J	0.0187 J
2-Hexanone	NS	NS	NA	0.002 U	0.002 U	0.006 U	0.0033 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0015 U	0.0015 U	0.0044 U	0.0024 U
Acetone	0.05	100	NA	0.0209	0.0051 U	**0.228 J**	**0.092 J**
Benzene	0.06	4.8	0.06	0.00014 U	0.00014 U	0.00042 U	0.00023 U
Bromochloromethane	NS	NS	NA	0.00059 U	0.00058 U	0.0017 U	0.00096 U
Bromodichloromethane	NS	NS	NA	0.00032 U	0.00031 U	0.00094 U	0.00052 U
Bromoform	NS	NS	NA	0.0003 U	0.00029 U	0.00088 U	0.00049 U
Bromomethane	NS	NS	NA	0.00054 U	0.00054 U	0.0016 U	0.00089 U
Carbon disulfide	NS	NS	NA	0.00016 U	0.00016 U	0.0013 J	0.00048
Carbon tetrachloride	0.76	2.4	NA	0.00028 U	0.00028 U	0.00084 U	0.00047 U
Chlorobenzene	1.1	100	NA	0.00022 U	0.00022 U	0.00066 U	0.00037 U
Chloroethane	NS	NS	NA	0.0011 U	0.0011 U	0.0033 U	0.0018 U
Chloroform	0.37	49	NA	0.00029 U	0.00028 U	0.00085 U	0.00047 U
Chloromethane	NS	NS	NA	0.00039 U	0.00038 U	0.0012 U	0.00064 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00023 U	0.00023 U	0.0009 J	0.00043 J
cis-1,3-Dichloropropene	NS	NS	NA	0.00026 U	0.00025 U	0.00076 U	0.00042 U
Cyclohexane	NS	NS	NA	0.00029 U	0.00029 U	0.00086 U	0.00048 U
Dibromochloromethane	NS	NS	NA	0.00027 U	0.00027 U	0.00081 U	0.00045 U
Dichlorodifluoromethane	NS	NS	NA	0.0004 U	0.0004 U	0.0012 U	0.00065 U
Ethylbenzene	1	41	1	0.0002 U	0.0002 U	0.00059 U	0.00032 U
Freon 113	NS	NS	NA	0.00049 U	0.00049 U	0.0015 U	0.00081 U
Isopropylbenzene	NS	NS	2.3	0.00017 U	0.00016 U	0.00049 U	0.00027 U
m,p-Xylene	NS	NS	NS	0.00055 U	0.00054 U	0.0016 U	0.0009 U
Methyl Acetate	NS	NS	NA	0.0019 U	0.0019 U	0.0056 U	0.0031 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.00039 U	0.00038 U	0.0012 U	0.00064 U
Methylcyclohexane	NS	NS	NA	0.00019 U	0.00018 U	0.00055 U	0.0003 U
Methylene chloride	0.05	100	NA	0.0019 U	0.0019 U	0.0057 U	0.0032 U
o-Xylene	NS	NS	NS	0.0002 U	0.0002 U	0.0006 U	0.00033 U
Styrene	NS	NS	NA	0.00026 U	0.00026 U	0.00078 U	0.00043 U
Tetrachloroethene	1.3	19	NA	0.00046 U	0.00046 U	0.0014 U	0.00076 U
Toluene	0.7	100	0.7	0.00016 U	0.00016 U	0.00048 U	0.00026 U
trans-1,2-Dichloroethene	0.19	100	NA	0.00048 U	0.00047 U	0.0014 U	0.00078 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00031 U	0.0003 U	0.00091 U	0.0005 U
Trichloroethene	0.47	21	NA	0.0004 U	0.00039 U	0.0012 U	0.00065 U
Trichlorofluoromethane	NS	NS	NA	0.00025 U	0.00025 U	0.00075 U	0.00042 U
Vinyl chloride	0.02	0.9	NA	0.00039 U	0.00038 U	0.0011 U	0.00063 U
Xylene (total)	0.26	100	1.6	0.0002 U	0.0002 U	0.0006 U	0.00033 U

Attached Table 1
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	SB-7 (4-6)	SB-8 (0-2)	SB-8 (4-6)	SB-8 (4-6)
Lab Sample ID				JB67612-8	JB67612-5	JB67612-6	JB67612-6A
Date Sampled				5/22/2014	5/22/2014	5/22/2014	5/22/2014
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1,1-Trichloroethane	0.68	100	NA	0.00054 U	0.00036 U	0.016 U R	0.00032 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.00065 U	0.00043 U	0.019 U R	0.00039 U
1,1,2-Trichloroethane	NS	NS	NA	0.0016 U	0.001 U	0.045 U R	0.00093 U
1,1-Dichloroethane	0.27	26	NA	0.00059 U	0.00039 U	0.017 U R	0.00035 U
1,1-Dichloroethene	0.33	100	NA	0.00054 U	0.00036 U	0.016 U R	0.00032 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00039 U	0.00026 U	0.011 U R	0.00023 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.00034 U	0.00023 U	0.0098 U R	0.0002 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.0025 U	0.0017 U	0.072 U R	0.0015 U
1,2-Dibromoethane	NS	NS	NA	0.001 U	0.00068 U	0.03 U R	0.00062 U
1,2-Dichlorobenzene	1.1	100	NA	0.00064 U	0.00042 U	0.018 U R	0.00038 U
1,2-Dichloroethane	0.02	3.1	NA	0.00061 U	0.0004 U	0.017 U R	0.00036 U
1,2-Dichloropropane	NS	NS	NA	0.00082 U	0.00054 U	0.024 U R	0.00049 U
1,3-Dichlorobenzene	2.4	49	NA	0.00041 U	0.00027 U	0.012 U R	0.00025 U
1,4-Dichlorobenzene	1.8	13	NA	0.00047 U	0.00031 U	0.014 U R	0.00028 U
2-Butanone (MEK)	0.12	100	NA	0.0083 U	0.0063 J	0.24 U R	0.005 U
2-Hexanone	NS	NS	NA	0.0034 U	0.0022 U	0.097 U R	0.002 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0025 U	0.0016 U	0.072 U R	0.0015 U
Acetone	0.05	100	NA	0.0319	0.0321	0.25 U R	0.0052 U
Benzene	0.06	4.8	0.06	0.00024 U	0.00016 U	0.0068 U R	0.00014 U
Bromochloromethane	NS	NS	NA	0.00098 U	0.00065 U	0.028 U R	0.00059 U
Bromodichloromethane	NS	NS	NA	0.00053 U	0.00035 U	0.015 U R	0.00032 U
Bromoform	NS	NS	NA	0.00049 U	0.00033 U	0.014 U R	0.0003 U
Bromomethane	NS	NS	NA	0.00091 U	0.0006 U	0.026 U R	0.00054 U
Carbon disulfide	NS	NS	NA	0.00027 U	0.00051 J	0.0076 U R	0.00016 U
Carbon tetrachloride	0.76	2.4	NA	0.00047 U	0.00031 U	0.014 U R	0.00028 U
Chlorobenzene	1.1	100	NA	0.00037 U	0.00025 U	0.011 U R	0.00022 U
Chloroethane	NS	NS	NA	0.0019 U	0.0012 U	0.054 U R	0.0011 U
Chloroform	0.37	49	NA	0.00048 U	0.00032 U	0.014 U R	0.00029 U
Chloromethane	NS	NS	NA	0.00065 U	0.00043 U	0.019 U R	0.00039 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00039 U	0.00026 U	0.011 U R	0.00023 U
cis-1,3-Dichloropropene	NS	NS	NA	0.00043 U	0.00028 U	0.012 U R	0.00026 U
Cyclohexane	NS	NS	NA	0.00049 U	0.0017 J	0.014 U R	0.00029 U
Dibromochloromethane	NS	NS	NA	0.00046 U	0.0003 U	0.013 U R	0.00027 U
Dichlorodifluoromethane	NS	NS	NA	0.00067 U	0.00044 U	0.019 U R	0.0004 U
Ethylbenzene	1	41	1	0.00033 U	0.00022 U	0.0095 U R	0.0002 U
Freon 113	NS	NS	NA	0.00082 U	0.00054 U	0.024 U R	0.00049 U
Isopropylbenzene	NS	NS	2.3	0.00028 U	0.00018 U	0.008 U R	0.00017 U
m,p-Xylene	NS	NS	NS	0.00091 U	0.0006 U	0.026 U R	0.00055 U
Methyl Acetate	NS	NS	NA	0.0032 U	0.0021 U	0.091 U R	0.0019 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.00065 U	0.00043 U	0.019 U R	0.00039 U
Methylcyclohexane	NS	NS	NA	0.00031 U	0.0033 J	0.0204 J R	0.00019 U
Methylene chloride	0.05	100	NA	0.0032 U	0.0021 U	0.092 U R	0.0019 U
o-Xylene	NS	NS	NS	0.00034 U	0.00022 U	0.0097 U R	0.0002 U
Styrene	NS	NS	NA	0.00044 U	0.00029 U	0.013 U R	0.00026 U
Tetrachloroethene	1.3	19	NA	0.00077 U	0.00051 U	0.022 U R	0.00046 U
Toluene	0.7	100	0.7	0.00027 U	0.00018 U	0.0077 U R	0.00016 U
trans-1,2-Dichloroethene	0.19	100	NA	0.0008 U	0.00053 U	0.023 U R	0.00048 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00051 U	0.00034 U	0.015 U R	0.00031 U
Trichloroethene	0.47	21	NA	0.00066 U	0.00044 U	0.019 U R	0.0004 U
Trichlorofluoromethane	NS	NS	NA	0.00042 U	0.00028 U	0.012 U R	0.00025 U
Vinyl chloride	0.02	0.9	NA	0.00065 U	0.00043 U	0.019 U R	0.00039 U
Xylene (total)	0.26	100	1.6	0.00034 U	0.00022 U	0.0097 U R	0.0002 U

Attached Table 1
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	SB-9 (0-2)	SB-9 (4-6)	SB-10 (0-1)	SB-11 (0-1)
Lab Sample ID				JB67612-3	JB67612-4	JB73881-1	JB73881-2
Date Sampled				5/22/2014	5/22/2014	8/12/2014	8/12/2014
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1,1-Trichloroethane	0.68	100	NA	0.0003 U	0.00033 U	0.00019 U	0.00018 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.00035 U	0.0004 U	0.00021 U	0.00019 U
1,1,2-Trichloroethane	NS	NS	NA	0.00084 U	0.00095 U	0.00026 U	0.00024 U
1,1-Dichloroethane	0.27	26	NA	0.00032 U	0.00036 U	0.00051 U	0.00047 U
1,1-Dichloroethene	0.33	100	NA	0.0003 U	0.00033 U	0.00035 U	0.00032 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00021 U	0.00024 U	0.00022 U	0.0002 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.00019 U	0.00021 U	0.00026 U	0.00024 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.0014 U	0.0015 U	0.00075 U	0.00069 U
1,2-Dibromoethane	NS	NS	NA	0.00056 U	0.00064 U	0.00022 U	0.0002 U
1,2-Dichlorobenzene	1.1	100	NA	0.00035 U	0.00039 U	0.00023 U	0.00021 U
1,2-Dichloroethane	0.02	3.1	NA	0.00033 U	0.00037 U	0.00017 U	0.00015 U
1,2-Dichloropropane	NS	NS	NA	0.00045 U	0.00051 U	0.00025 U	0.00023 U
1,3-Dichlorobenzene	2.4	49	NA	0.00022 U	0.00025 U	0.00022 U	0.00021 U
1,4-Dichlorobenzene	1.8	13	NA	0.00026 U	0.00029 U	0.00024 U	0.00022 U
2-Butanone (MEK)	0.12	100	NA	0.0045 U	0.0051 U	0.0017 U R	0.0016 U R
2-Hexanone	NS	NS	NA	0.0018 U	0.0021 U	0.0008 U	0.00073 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0014 U	0.0015 U	0.00046 U	0.00042 U
Acetone	0.05	100	NA	0.0166	0.0053 U	0.0021 U R	0.002 U R
Benzene	0.06	4.8	0.06	0.00013 U	0.00015 U	0.00025 U	0.00023 U
Bromochloromethane	NS	NS	NA	0.00053 U	0.0006 U	0.00035 U	0.00032 U
Bromodichloromethane	NS	NS	NA	0.00029 U	0.00033 U	0.00035 U	0.00032 U
Bromoform	NS	NS	NA	0.00027 U	0.0003 U	0.00015 U	0.00014 U
Bromomethane	NS	NS	NA	0.00049 U	0.00056 U	0.00042 U	0.00038 U
Carbon disulfide	NS	NS	NA	0.00014 U	0.00016 U	0.00034 U	0.00031 U
Carbon tetrachloride	0.76	2.4	NA	0.00026 U	0.00029 U	0.0002 U	0.00019 U
Chlorobenzene	1.1	100	NA	0.0002 U	0.00023 U	0.00018 U	0.00016 U
Chloroethane	NS	NS	NA	0.001 U	0.0012 U	0.00034 U	0.00031 U
Chloroform	0.37	49	NA	0.00026 U	0.0003 U	0.00015 U	0.00014 U
Chloromethane	NS	NS	NA	0.00035 U	0.0004 U	0.00043 U	0.00039 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00021 U	0.00024 U	0.00037 U	0.00034 U
cis-1,3-Dichloropropene	NS	NS	NA	0.00023 U	0.00026 U	0.00018 U	0.00017 U
Cyclohexane	NS	NS	NA	0.00026 U	0.0003 U	0.00051 U	0.00047 U
Dibromochloromethane	NS	NS	NA	0.00025 U	0.00028 U	0.00019 U	0.00018 U
Dichlorodifluoromethane	NS	NS	NA	0.00036 U	0.00041 U	0.00075 U	0.00069 U
Ethylbenzene	1	41	1	0.00018 U	0.0002 U	0.00015 U	0.00014 U
Freon 113	NS	NS	NA	0.00045 U	0.00051 U	0.00041 U	0.00038 U
Isopropylbenzene	NS	NS	2.3	0.00015 U	0.00017 U	0.00022 U	0.0002 U
m,p-Xylene	NS	NS	NS	0.0005 U	0.00056 U	0.00032 U	0.0003 U
Methyl Acetate	NS	NS	NA	0.0017 U	0.0019 U	0.0007 U	0.00064 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.00035 U	0.0004 U	0.00024 U	0.00022 U
Methylcyclohexane	NS	NS	NA	0.00017 U	0.00019 U	0.0002 U	0.00018 U
Methylene chloride	0.05	100	NA	0.0017 U	0.002 U	0.0014 U	0.0013 U
o-Xylene	NS	NS	NS	0.00018 U	0.00021 U	0.0002 U	0.00019 U
Styrene	NS	NS	NA	0.00024 U	0.00027 U	0.0002 U	0.00018 U
Tetrachloroethene	1.3	19	NA	0.00042 U	0.00048 U	0.00028 U	0.00026 U
Toluene	0.7	100	0.7	0.00015 U	0.00016 U	0.00021 U	0.0002 U
trans-1,2-Dichloroethene	0.19	100	NA	0.00043 U	0.00049 U	0.00027 U	0.00025 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00028 U	0.00031 U	0.00024 U	0.00022 U
Trichloroethene	0.47	21	NA	0.00036 U	0.00041 U	0.00028 U	0.00026 U
Trichlorofluoromethane	NS	NS	NA	0.00023 U	0.00026 U	0.00024 U	0.00022 U
Vinyl chloride	0.02	0.9	NA	0.00035 U	0.0004 U	0.0002 U	0.00019 U
Xylene (total)	0.26	100	1.6	0.00018 U	0.00021 U	0.0002 U	0.00019 U

Attached Table 1
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	SB-12 (0-2)	SB-13 (0-2)	TRIP BLANK	TRIP BLANK
Lab Sample ID				JB73881-4	JB73881-3	JB50766-5	JB67612-11
Date Sampled				8/12/2014	8/12/2014	10/21/2013	5/22/2014
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L
1,1,1-Trichloroethane	0.68	100	NA	0.00017 U	0.00017 U	0.00029 U	0.00029 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.00018 U	0.00019 U	0.00034 U	0.00034 U
1,1,2-Trichloroethane	NS	NS	NA	0.00022 U	0.00023 U	0.00082 U	0.00082 U
1,1-Dichloroethane	0.27	26	NA	0.00045 U	0.00046 U	0.00031 U	0.00031 U
1,1-Dichloroethene	0.33	100	NA	0.00031 U	0.00031 U	0.00029 U	0.00029 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00019 U	0.0002 U	0.00021 U	0.00021 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.00022 U	0.00023 U	0.00018 U	0.00018 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.00065 U	0.00067 U	0.0013 U	0.0013 U
1,2-Dibromoethane	NS	NS	NA	0.00019 U	0.0002 U	0.00055 U	0.00055 U
1,2-Dichlorobenzene	1.1	100	NA	0.0002 U	0.00021 U	0.00034 U	0.00034 U
1,2-Dichloroethane	0.02	3.1	NA	0.00014 U	0.00015 U	0.00032 U	0.00032 U
1,2-Dichloropropane	NS	NS	NA	0.00021 U	0.00022 U	0.00044 U	0.00044 U
1,3-Dichlorobenzene	2.4	49	NA	0.00019 U	0.0002 U	0.00022 U	0.00022 U
1,4-Dichlorobenzene	1.8	13	NA	0.00021 U	0.00021 U	0.00025 U	0.00025 U
2-Butanone (MEK)	0.12	100	NA	0.0015 U R	0.0016 U R	0.0044 U R	0.0044 U
2-Hexanone	NS	NS	NA	0.00069 U	0.00072 U	0.0018 U	0.0018 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0004 U	0.00041 U	0.0013 U	0.0013 U
Acetone	0.05	100	NA	0.0081 J	0.0062 J	0.0046 U R	0.0046 U
Benzene	0.06	4.8	0.06	0.00022 U	0.00022 U	0.00013 U	0.00013 U
Bromochloromethane	NS	NS	NA	0.0003 U	0.00031 U	0.00052 U	0.00052 U
Bromodichloromethane	NS	NS	NA	0.0003 U	0.00031 U	0.00028 U	0.00028 U
Bromoform	NS	NS	NA	0.00013 U	0.00014 U	0.00026 U	0.00026 U
Bromomethane	NS	NS	NA	0.00036 U	0.00037 U	0.00048 U	0.00048 U
Carbon disulfide	NS	NS	NA	0.0003 U	0.0003 U	0.00014 U	0.00014 U
Carbon tetrachloride	0.76	2.4	NA	0.00018 U	0.00018 U	0.00025 U	0.00025 U
Chlorobenzene	1.1	100	NA	0.00015 U	0.00016 U	0.0002 U	0.0002 U
Chloroethane	NS	NS	NA	0.0003 U	0.00031 U	0.001 U	0.001 U
Chloroform	0.37	49	NA	0.00013 U	0.00013 U	0.00025 U	0.00025 U
Chloromethane	NS	NS	NA	0.00037 U	0.00038 U	0.00034 U	0.00034 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00032 U	0.00033 U	0.00021 U	0.00021 U
cis-1,3-Dichloropropene	NS	NS	NA	0.00016 U	0.00016 U	0.00023 U	0.00023 U
Cyclohexane	NS	NS	NA	0.00044 U	0.00045 U	0.00026 U	0.00026 U
Dibromochloromethane	NS	NS	NA	0.00017 U	0.00017 U	0.00024 U	0.00024 U
Dichlorodifluoromethane	NS	NS	NA	0.00065 U	0.00067 U	0.00035 U	0.00035 U
Ethylbenzene	1	41	1	0.00013 U	0.00014 U	0.00018 U	0.00018 U
Freon 113	NS	NS	NA	0.00036 U	0.00037 U	0.00044 U J	0.00044 U
Isopropylbenzene	NS	NS	2.3	0.00019 U	0.0002 U	0.00015 U	0.00015 U
m,p-Xylene	NS	NS	NS	0.00028 U	0.00029 U	0.00048 U	0.00048 U
Methyl Acetate	NS	NS	NA	0.0006 U	0.00062 U	0.0017 U	0.0017 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.00021 U	0.00021 U	0.00034 U	0.00034 U
Methylcyclohexane	NS	NS	NA	0.00017 U	0.00018 U	0.00016 U	0.00016 U
Methylene chloride	0.05	100	NA	0.0012 U	0.0012 U	0.0017 U	0.0017 U
o-Xylene	NS	NS	NS	0.00018 U	0.00018 U	0.00018 U	0.00018 U
Styrene	NS	NS	NA	0.00017 U	0.00018 U	0.00023 U	0.00023 U
Tetrachloroethene	1.3	19	NA	0.00024 U	0.00025 U	0.00041 U	0.00041 U
Toluene	0.7	100	0.7	0.00019 U	0.00019 U	0.00014 U	0.00014 U
trans-1,2-Dichloroethene	0.19	100	NA	0.00023 U	0.00024 U	0.00042 U	0.00042 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00021 U	0.00022 U	0.00027 U	0.00027 U
Trichloroethene	0.47	21	NA	0.00024 U	0.00025 U	0.00035 U	0.00035 U
Trichlorofluoromethane	NS	NS	NA	0.00021 U	0.00021 U	0.00023 U	0.00023 U
Vinyl chloride	0.02	0.9	NA	0.00018 U	0.00018 U	0.00034 U	0.00034 U
Xylene (total)	0.26	100	1.6	0.00018 U	0.00018 U	0.00018 U	0.00018 U

Attached Table 1
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	NYSDEC PGWSCO	TRIP BLANK	FB-SOIL-1	FB-SOIL-2	FB052214
Lab Sample ID				JB50884-5	JB50766-4	JB50884-4	JB67612-10
Date Sampled				10/21/2013	10/21/2013	10/21/2013	5/22/2014
Unit	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L
1,1,1-Trichloroethane	0.68	100	NA	0.00029 U	0.00025 U	0.00025 U	0.00025 U
1,1,2,2-Tetrachloroethane	NS	NS	NA	0.00034 U	0.0002 U	0.0002 U	0.0002 U
1,1,2-Trichloroethane	NS	NS	NA	0.00082 U	0.00021 U	0.00021 U	0.00021 U
1,1-Dichloroethane	0.27	26	NA	0.00031 U	0.00026 U	0.00026 U	0.00026 U
1,1-Dichloroethene	0.33	100	NA	0.00029 U	0.00034 U	0.00034 U	0.00034 U
1,2,3-Trichlorobenzene	NS	NS	NA	0.00021 U	0.00024 U	0.00024 U	0.00024 U
1,2,4-Trichlorobenzene	NS	NS	NA	0.00018 U	0.00022 U	0.00022 U	0.00022 U
1,2-Dibromo-3-chloropropane	NS	NS	NA	0.0013 U	0.0013 U	0.0013 U	0.0013 U
1,2-Dibromoethane	NS	NS	NA	0.00055 U	0.00016 U	0.00016 U	0.00016 U
1,2-Dichlorobenzene	1.1	100	NA	0.00034 U	0.0002 U	0.0002 U	0.0002 U
1,2-Dichloroethane	0.02	3.1	NA	0.00032 U	0.00022 U	0.00022 U	0.00022 U
1,2-Dichloropropane	NS	NS	NA	0.00044 U	0.00028 U	0.00028 U	0.00028 U
1,3-Dichlorobenzene	2.4	49	NA	0.00022 U	0.00031 U	0.00031 U	0.00031 U
1,4-Dichlorobenzene	1.8	13	NA	0.00025 U	0.0003 U	0.0003 U	0.0003 U
2-Butanone (MEK)	0.12	100	NA	0.0044 U R	0.0032 U R	0.0032 U R	0.0032 U
2-Hexanone	NS	NS	NA	0.0018 U	0.0017 U	0.0017 U	0.0017 U
4-Methyl-2-pentanone (MIBK)	NS	NS	NA	0.0013 U	0.0015 U	0.0015 U	0.0015 U
Acetone	0.05	100	NA	0.0046 U R	0.0033 U	0.0033 U	0.0033 U
Benzene	0.06	4.8	0.06	0.00013 U	0.00028 U	0.00028 U	0.00028 U
Bromochloromethane	NS	NS	NA	0.00052 U	0.00042 U	0.00042 U	0.00042 U
Bromodichloromethane	NS	NS	NA	0.00028 U	0.00021 U	0.00021 U	0.00021 U
Bromoform	NS	NS	NA	0.00026 U	0.0003 U	0.0003 U	0.0003 U
Bromomethane	NS	NS	NA	0.00048 U	0.00056 U	0.00056 U	0.00056 U
Carbon disulfide	NS	NS	NA	0.00014 U	0.00018 U	0.00018 U	0.00018 U
Carbon tetrachloride	0.76	2.4	NA	0.00025 U	0.00023 U	0.00023 U	0.00023 U
Chlorobenzene	1.1	100	NA	0.0002 U	0.00035 U	0.00035 U	0.00035 U
Chloroethane	NS	NS	NA	0.001 U	0.00039 U	0.00039 U	0.00039 U
Chloroform	0.37	49	NA	0.00025 U	0.00025 U	0.00025 U	0.00025 U
Chloromethane	NS	NS	NA	0.00034 U	0.00036 U	0.00036 U	0.00036 U
cis-1,2-Dichloroethene	0.25	100	NA	0.00021 U	0.00024 U	0.00024 U	0.00024 U
cis-1,3-Dichloropropene	NS	NS	NA	0.00023 U	0.00015 U	0.00015 U	0.00015 U
Cyclohexane	NS	NS	NA	0.00026 U	0.00018 U	0.00018 U	0.00018 U
Dibromochloromethane	NS	NS	NA	0.00024 U	0.00019 U	0.00019 U	0.00019 U
Dichlorodifluoromethane	NS	NS	NA	0.00035 U	0.00063 U J	0.00063 U J	0.00063 U
Ethylbenzene	1	41	1	0.00018 U	0.00021 U	0.00021 U	0.00021 U
Freon 113	NS	NS	NA	0.00044 U	0.00077 U	0.00077 U	0.00077 U
Isopropylbenzene	NS	NS	2.3	0.00015 U	0.00022 U	0.00022 U	0.00022 U
m,p-Xylene	NS	NS	NS	0.00048 U	0.0004 U	0.0004 U	0.0004 U
Methyl Acetate	NS	NS	NA	0.0017 U	0.0015 U	0.0015 U	0.0015 U
Methyl Tert Butyl Ether	0.93	100	0.93	0.00034 U	0.00029 U	0.00029 U	0.00029 U
Methylcyclohexane	NS	NS	NA	0.00016 U	0.00015 U	0.00015 U	0.00015 U
Methylene chloride	0.05	100	NA	0.0017 U	0.00086 U	0.0062	0.00086 U
o-Xylene	NS	NS	NS	0.00018 U	0.00019 U	0.00019 U	0.00019 U
Styrene	NS	NS	NA	0.00023 U	0.0003 U	0.0003 U	0.0003 U
Tetrachloroethene	1.3	19	NA	0.00041 U	0.00025 U	0.00025 U	0.00025 U
Toluene	0.7	100	0.7	0.00014 U	0.00044 U	0.00044 U	0.00044 U
trans-1,2-Dichloroethene	0.19	100	NA	0.00042 U	0.00038 U	0.00038 U	0.00038 U
trans-1,3-Dichloropropene	NS	NS	NA	0.00027 U	0.00021 U	0.00021 U	0.00021 U
Trichloroethene	0.47	21	NA	0.00035 U	0.0005 U	0.0005 U	0.0005 U
Trichlorofluoromethane	NS	NS	NA	0.00023 U	0.00033 U	0.00033 U	0.00033 U
Vinyl chloride	0.02	0.9	NA	0.00034 U	0.00041 U	0.00041 U	0.00041 U
Xylene (total)	0.26	100	1.6	0.00018 U	0.00019 U	0.00019 U	0.00019 U

Attached Table 2
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-1 (0-2)	SB-1 (25-27)	SB-X	SB-2 (0-2)	SB-2 (10-12)	SB-2 (14-16)	SB-3 (0-4)
Date Sampled			10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/23/2013
Dilution			1	1	1	1	2	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1'-Biphenyl	NS	NS	0.004 U	0.0197 J	0.004 U J	0.0071 U	0.008 U	0.0039 U	0.0039 U
1,2,4,5-Tetrachlorobenzene	NS	NS	0.011 U	0.01 U	0.011 U	0.019 U	0.021 U	0.01 U	0.01 U
1,4-Dioxane	0.1	13	0.023 U	0.022 U	0.023 U	0.04 U	0.045 U	0.022 U	0.022 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.036 U	0.035 U	0.036 U	0.063 U J	0.071 U	0.035 U	0.035 U
2,4,5-Trichlorophenol	NS	NS	0.04 U	0.039 U	0.04 U	0.071 U J	0.08 U	0.039 U	0.039 U
2,4,6-Trichlorophenol	NS	NS	0.033 U	0.032 U	0.033 U	0.058 U J	0.065 U	0.032 U	0.032 U
2,4-Dichlorophenol	NS	NS	0.056 U	0.055 U	0.056 U	0.099 U J	0.11 U	0.054 U	0.054 U
2,4-Dimethylphenol	NS	NS	0.058 U	0.057 U	0.058 U	0.1 U J	0.12 U	0.056 U	0.056 U
2,4-Dinitrophenol	NS	NS	0.042 U	0.041 U	0.042 U	0.075 U J	0.084 U	0.041 U	0.041 U
2,4-Dinitrotoluene	NS	NS	0.015 U	0.015 U	0.015 U	0.027 U	0.03 U	0.015 U	0.015 U
2,6-Dinitrotoluene	NS	NS	0.013 U	0.013 U	0.013 U	0.023 U	0.026 U	0.013 U	0.013 U
2-Chloronaphthalene	NS	NS	0.011 U	0.011 U	0.011 U	0.019 U	0.021 U	0.01 U	0.01 U
2-Chlorophenol	NS	NS	0.035 U	0.034 U	0.035 U	0.062 U J	0.069 U	0.034 U	0.034 U
2-Methylnaphthalene	NS	NS	0.019 U	0.0732 J	0.0301 J	0.034 U	0.038 U	0.0419 J	0.112
2-Methylphenol	0.33	100	0.04 U	0.039 U	0.04 U	0.07 U J	0.078 U	0.038 U	0.038 U
2-Nitroaniline	NS	NS	0.015 U	0.015 U	0.015 U	0.027 U	0.03 U	0.015 U	0.015 U
2-Nitrophenol	NS	NS	0.037 U	0.036 U	0.037 U	0.065 U J	0.073 U	0.036 U	0.036 U
3&4-Methylphenol	NS	NS	0.044 U	0.043 U	0.044 U	0.078 U J	0.087 U	0.043 U	0.043 U
3,3'-Dichlorobenzidine	NS	NS	0.0088 U	0.0086 U	0.0088 U	0.016 U	0.017 U J	0.0085 U	0.0085 U
3-Nitroaniline	NS	NS	0.014 U	0.014 U	0.014 U	0.025 U	0.028 U J	0.013 U	0.013 U
4,6-Dinitro-o-cresol	NS	NS	0.042 U	0.041 U	0.042 U	0.075 U J	0.084 U	0.041 U	0.041 U
4-Bromophenyl phenyl ether	NS	NS	0.013 U	0.012 U	0.013 U	0.022 U	0.025 U	0.012 U	0.012 U
4-Chloro-3-methyl phenol	NS	NS	0.035 U	0.034 U	0.035 U	0.062 U J	0.069 U	0.034 U	0.034 U
4-Chloroaniline	NS	NS	0.011 U	0.011 U	0.011 U	0.02 U	0.022 U	0.011 U	0.011 U
4-Chlorophenyl phenyl ether	NS	NS	0.01 U	0.01 U	0.01 U	0.019 U	0.021 U	0.01 U	0.01 U
4-Nitroaniline	NS	NS	0.014 U	0.013 U	0.014 U	0.024 U	0.027 U	0.013 U	0.013 U
4-Nitrophenol	NS	NS	0.059 U	0.057 U	0.059 U	0.1 U J	0.12 U	0.057 U	0.057 U
Acenaphthene	20	100	0.0331 J	0.329 J	0.138 J	0.018 U	0.02 U	0.0862	0.0436
Acenaphthylene	100	100	0.0161 J	0.0389	0.0262 J	0.245	0.0555 J	0.0382	0.628
Acetophenone	NS	NS	0.0061 U	0.006 U	0.0061 U	0.011 U	0.012 U	0.0059 U	0.0059 U
Anthracene	100	100	0.0721	0.449 J	0.22 J	0.109	0.024 U	0.219	0.418
Atrazine	NS	NS	0.0068 U	0.0067 U	0.0069 U	0.012 U	0.014 U	0.0066 U	0.0066 U
Benzaldehyde	NS	NS	0.008 U	0.0078 U	0.008 U	0.014 U	0.016 U	0.0077 U	0.0077 U
Benzo(a)anthracene	1	1	0.336	**1.03**	0.537	0.137	0.0396 J	0.273	0.676
Benzo(a)pyrene	1	1	0.367	0.991	0.551	0.234	0.0593 J	0.229	**1.13**
Benzo(b)fluoranthene	1	1	0.394	**1.18**	0.648	0.258	0.0586 J	0.254	**1.34**
Benzo(g,h,i)perylene	100	100	0.237	0.632	0.35	0.337	0.0845	0.112	1.2
Benzo(k)fluoranthene	0.8	3.9	0.146	0.409	0.234	0.0905	0.026 U	0.0924	0.378
bis(2-Chloroethoxy)methane	NS	NS	0.014 U	0.014 U	0.014 U	0.025 U	0.028 U	0.014 U	0.014 U
bis(2-Chloroethyl)ether	NS	NS	0.01 U	0.01 U	0.01 U	0.019 U	0.021 U	0.01 U	0.01 U
bis(2-Chloroisopropyl)ether	NS	NS	0.01 U	0.01 U	0.01 U	0.018 U	0.02 U	0.01 U	0.01 U
bis(2-Ethylhexyl)phthalate	NS	NS	0.031 U	0.03 U	0.031 U	0.054 U	0.061 U J	0.03 U J	0.03 U
Butyl benzyl phthalate	NS	NS	0.02 U	0.02 U	0.02 U	0.036 U	0.04 U	0.019 U	0.019 U
Caprolactam	NS	NS	0.011 U	0.011 U	0.011 U	0.019 U	0.022 U	0.011 U	0.011 U
Carbazole	NS	NS	0.0243 J	0.173	0.0783	0.028 U	0.032 U	0.0897	0.0783
Chrysene	1	3.9	0.365	**1.14**	0.597	0.147	0.0408 J	0.284	0.812
Dibenzo(a,h)anthracene	0.33	0.33	0.0587	0.151	0.0831	0.0564 J	0.023 U	0.0359	0.272
Dibenzofuran	7	59	0.0174 J	0.161 J	0.0657 J	0.018 U	0.02 U	0.0836	0.0864
Diethyl phthalate	NS	NS	0.012 U	0.012 U	0.012 U	0.021 U	0.023 U	0.011 U	0.011 U
Dimethyl phthalate	NS	NS	0.012 U	0.012 U	0.012 U	0.022 U	0.024 U	0.012 U	0.012 U
Di-n-butyl phthalate	NS	NS	0.0077 U	0.0075 U	0.0077 U	0.014 U	0.015 U	0.0075 U	0.0075 U
Di-n-octyl phthalate	NS	NS	0.017 U	0.017 U	0.017 U	0.03 U	0.033 U	0.016 U	0.016 U J
Fluoranthene	100	100	0.651	2.38	1.29	0.135	0.0387 J	0.649	1.19
Fluorene	30	100	0.0241 J	0.228 J	0.0996 J	0.02 U	0.023 U	0.0854	0.222
Hexachlorobenzene	0.33	1.2	0.011 U	0.011 U	0.011 U	0.02 U	0.022 U	0.011 U	0.011 U
Hexachlorobutadiene	NS	NS	0.0096 U	0.0094 U	0.0097 U	0.017 U	0.019 U	0.0093 U	0.0093 U
Hexachlorocyclopentadiene	NS	NS	0.035 U J	0.035 U J	0.035 U J	0.063 U	0.07 U	0.034 U	0.034 U
Hexachloroethane	NS	NS	0.0096 U	0.0094 U	0.0097 U	0.017 U	0.019 U	0.0093 U	0.0093 U
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.225	**0.648**	0.355	0.24	0.0628 J	0.12	**1.05**
Isophorone	NS	NS	0.0093 U	0.0091 U	0.0094 U	0.017 U	0.019 U	0.009 U	0.009 U
Naphthalene	12	100	0.0161 J	0.115 J	0.0445 J	0.017 U	0.019 U	0.0811	0.149
Nitrobenzene	NS	NS	0.01 U	0.0098 U	0.01 U	0.018 U	0.02 U	0.0097 U	0.0097 U
N-Nitroso-di-n-propylamine	NS	NS	0.0085 U	0.0083 U	0.0085 U	0.015 U	0.017 U	0.0082 U	0.0082 U
N-Nitrosodiphenylamine	NS	NS	0.021 U	0.02 U	0.021 U	0.037 U	0.041 U	0.02 U	0.02 U
Pentachlorophenol	0.8	6.7	0.059 U	0.058 U	0.059 U	0.11 U J	0.12 U	0.057 U	0.057 U
Phenanthrene	100	100	0.351	2.28 J	1.07 J	0.0703	0.031 U	0.862	0.991
Phenol	0.33	100	0.036 U	0.036 U	0.037 U	0.065 U J	0.072 U	0.035 U	0.035 U
Pyrene	100	100	0.706	2.39	1.29	0.171	0.0504 J	0.62	1.61

Attached Table 2
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-3 (8-12)	SB-3 (32-36)	SB-4 (0-4)	SB-Y	SB-5 (0-2)	SB-6 (0-2)	SB-6 (4-6)
Date Sampled			10/23/2013	10/23/2013	10/23/2013	10/23/2013	10/23/2013	5/21/2014	5/21/2014
Dilution			4	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1'-Biphenyl	NS	NS	0.0358 J	0.0044 U	0.004 U	0.0041 U	0.0041 U	0.0044 U	0.0042 U
1,2,4,5-Tetrachlorobenzene	NS	NS	0.011 U	0.012 U	0.011 U	0.011 U	0.011 U	0.012 U	0.011 U
1,4-Dioxane	0.1	13	0.023 U	0.025 U	0.022 U	0.023 U	0.023 U	0.025 U	0.024 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.037 U	0.039 U	0.035 U	0.036 U	0.036 U	0.039 U	0.037 U
2,4,5-Trichlorophenol	NS	NS	0.042 U	0.044 U	0.04 U	0.041 U	0.041 U	0.044 U	0.042 U
2,4,6-Trichlorophenol	NS	NS	0.034 U	0.036 U	0.032 U	0.033 U	0.033 U	0.036 U	0.034 U
2,4-Dichlorophenol	NS	NS	0.058 U	0.062 U	0.055 U	0.057 U	0.057 U	0.062 U	0.058 U
2,4-Dimethylphenol	NS	NS	0.061 U	0.064 U	0.058 U	0.059 U	0.059 U	0.064 U	0.061 U
2,4-Dinitrophenol	NS	NS	0.044 U	0.047 U	0.042 U	0.043 U	0.043 U	0.047 U	0.044 U J
2,4-Dinitrotoluene	NS	NS	0.016 U	0.017 U	0.015 U	0.015 U	0.015 U	0.017 U	0.016 U
2,6-Dinitrotoluene	NS	NS	0.014 U	0.015 U	0.013 U	0.013 U	0.013 U	0.015 U	0.014 U
2-Chloronaphthalene	NS	NS	0.011 U	0.012 U	0.011 U	0.011 U	0.011 U	0.012 U	0.011 U
2-Chlorophenol	NS	NS	0.036 U	0.039 U	0.035 U	0.035 U	0.035 U	0.038 U	0.036 U
2-Methylnaphthalene	NS	NS	5.24 D	0.021 U	0.202	0.185	0.026 J	0.021 U	0.02 U
2-Methylphenol	0.33	100	0.041 U	0.044 U	0.039 U	0.04 U	0.04 U	0.044 U	0.041 U
2-Nitroaniline	NS	NS	0.016 U	0.017 U	0.015 U	0.015 U	0.015 U	0.017 U J	0.016 U J
2-Nitrophenol	NS	NS	0.038 U	0.041 U	0.036 U	0.037 U	0.037 U	0.041 U	0.038 U
3&4-Methylphenol	NS	NS	0.046 U	0.049 U	0.043 U	0.045 U	0.045 U	0.049 U	0.046 U
3,3'-Dichlorobenzidine	NS	NS	0.0092 U	0.0097 U	0.0087 U	0.0089 U	0.0089 U	0.0097 U J	0.0092 U
3-Nitroaniline	NS	NS	0.014 U	0.015 U	0.014 U	0.014 U	0.014 U	0.015 U	0.014 U
4,6-Dinitro-o-cresol	NS	NS	0.044 U	0.047 U	0.042 U	0.043 U	0.043 U	0.047 U	0.044 U
4-Bromophenyl phenyl ether	NS	NS	0.013 U	0.014 U	0.012 U	0.013 U	0.013 U	0.014 U	0.013 U
4-Chloro-3-methyl phenol	NS	NS	0.036 U	0.038 U	0.034 U	0.035 U	0.035 U	0.038 U	0.036 U
4-Chloroaniline	NS	NS	0.012 U	0.012 U	0.011 U	0.011 U	0.011 U	0.012 U J	0.012 U
4-Chlorophenyl phenyl ether	NS	NS	0.011 U	0.012 U	0.01 U	0.011 U	0.011 U	0.012 U	0.011 U
4-Nitroaniline	NS	NS	0.014 U	0.015 U	0.013 U	0.014 U	0.014 U	0.015 U	0.014 U
4-Nitrophenol	NS	NS	0.061 U	0.065 U	0.058 U	0.059 U	0.059 U	0.065 U J	0.061 U
Acenaphthene	20	100	0.0295 J	0.011 U	0.0099 U	0.01 U	0.0318 J	0.011 U	0.01 U
Acenaphthylene	100	100	0.0179 J	0.012 U	0.2	0.266	0.0921	0.0157 J	0.012 U
Acetophenone	NS	NS	0.0063 U	0.0067 U	0.006 U	0.0062 U	0.0062 U	0.0067 U	0.0064 U
Anthracene	100	100	0.057	0.013 U	0.0699	0.0953	0.15	0.013 U	0.013 U
Atrazine	NS	NS	0.0071 U	0.0075 U	0.0067 U	0.0069 U	0.0069 U	0.0075 U	0.0071 U
Benzaldehyde	NS	NS	0.0083 U	0.0088 U	0.0079 U	0.0081 U	0.0081 U	0.0088 U	0.0083 U
Benzo(a)anthracene	1	1	0.105	0.012 U	0.011 U J	0.053	0.498	0.0329 J	0.012 U
Benzo(a)pyrene	1	1	0.091	0.012 U	0.109	0.134	0.501	0.0371 J	0.011 U
Benzo(b)fluoranthene	1	1	0.112	0.013 U	0.151	0.163	0.61	0.0546	0.012 U
Benzo(g,h,i)perylene	100	100	0.0655	0.014 U	0.382	0.454	0.677	0.0351 J	0.013 U
Benzo(k)fluoranthene	0.8	3.9	0.0361	0.014 U	0.0336 J	0.0495	0.246	0.0188 J	0.014 U
bis(2-Chloroethoxy)methane	NS	NS	0.015 U	0.015 U	0.014 U	0.014 U	0.014 U	0.015 U	0.015 U
bis(2-Chloroethyl)ether	NS	NS	0.011 U	0.012 U	0.01 U	0.011 U	0.011 U	0.012 U	0.011 U
bis(2-Chloroisopropyl)ether	NS	NS	0.011 U	0.011 U	0.01 U	0.01 U	0.01 U	0.011 U	0.011 U
bis(2-Ethylhexyl)phthalate	NS	NS	0.032 U	0.034 U	0.129	0.13	0.227	0.0587 J	0.032 U
Butyl benzyl phthalate	NS	NS	0.021 U	0.022 U	0.02 U	0.02 U	0.02 U	0.022 U	0.0769
Caprolactam	NS	NS	0.011 U	0.012 U	0.011 U	0.011 U	0.011 U	0.012 U	0.011 U
Carbazole	NS	NS	0.0185 J	0.018 U	0.016 U	0.016 U	0.0445 J	0.018 U	0.017 U
Chrysene	1	3.9	0.102	0.013 U	0.056	0.0613	0.552	0.0314 J	0.012 U
Dibenzo(a,h)anthracene	0.33	0.33	0.012 U	0.013 U	0.0395	0.042	0.105	0.013 U	0.012 U
Dibenzofuran	7	59	0.0178 J	0.011 U	0.01 U	0.01 U	0.017 J	0.011 U	0.011 U
Diethyl phthalate	NS	NS	0.012 U	0.013 U	0.012 U	0.012 U	0.012 U	0.013 U	0.012 U
Dimethyl phthalate	NS	NS	0.013 U	0.013 U	0.012 U	0.012 U	0.012 U	0.013 U	0.013 U
Di-n-butyl phthalate	NS	NS	0.008 U	0.0085 U	0.0076 U	0.0078 U	0.0078 U	0.0085 U	0.008 U
Di-n-octyl phthalate	NS	NS	0.018 U J	0.019 U J	0.017 U J	0.017 U J	0.017 U J	0.019 U	0.018 U
Fluoranthene	100	100	0.206	0.017 U	0.039	0.0446	0.788	0.038	0.016 U
Fluorene	30	100	0.0321 J	0.013 U	0.011 U	0.012 U	0.0313 J	0.013 U	0.012 U
Hexachlorobenzene	0.33	1.2	0.012 U	0.012 U	0.011 U	0.011 U	0.011 U	0.012 U	0.012 U
Hexachlorobutadiene	NS	NS	0.01 U	0.011 U	0.0095 U	0.0098 U	0.0098 U	0.011 U	0.01 U
Hexachlorocyclopentadiene	NS	NS	0.037 U	0.039 U	0.035 U	0.036 U	0.036 U	0.039 U	0.037 U J
Hexachloroethane	NS	NS	0.01 U	0.011 U	0.0095 U	0.0098 U	0.0098 U	0.011 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.0675	0.013 U	0.202	0.234	0.437	0.0363 J	0.013 U
Isophorone	NS	NS	0.0097 U	0.01 U	0.0092 U	0.0094 U	0.0094 U	0.01 U	0.0097 U
Naphthalene	12	100	4.64 D	0.01 U	0.131	0.127	0.0181 J	0.01 U	0.0099 U
Nitrobenzene	NS	NS	0.01 U	0.011 U	0.0099 U	0.01 U	0.01 U	0.011 U	0.01 U
N-Nitroso-di-n-propylamine	NS	NS	0.0088 U	0.0093 U	0.0084 U	0.0086 U	0.0086 U	0.0093 U	0.0088 U
N-Nitrosodiphenylamine	NS	NS	0.022 U	0.023 U	0.02 U	0.021 U	0.021 U	0.023 U	0.022 U
Pentachlorophenol	0.8	6.7	0.062 U	0.065 U	0.059 U	0.06 U	0.06 U	0.065 U	0.062 U
Phenanthrene	100	100	0.236	0.017 U	0.018 J	0.0178 J	0.452	0.017 U	0.016 U
Phenol	0.33	100	0.038 U	0.04 U	0.036 U	0.037 U	0.037 U	0.04 U	0.038 U
Pyrene	100	100	0.245	0.015 U	0.0669	0.0864	0.993	0.0425	0.014 U

Attached Table 2
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-7 (0-2)	SB-XX	SB-7 (4-6)	SB-8 (0-2)	SB-8 (4-6)	SB-9 (0-2)	SB-9 (4-6)
Date Sampled			5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014
Dilution			1	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,1'-Biphenyl	NS	NS	0.0091 U	0.0049 U	0.0051 U	0.0052 U	0.0039 U	0.0042 U	0.0044 U
1,2,4,5-Tetrachlorobenzene	NS	NS	0.024 U	0.013 U	0.014 U	0.014 U	0.01 U	0.011 U	0.012 U
1,4-Dioxane	0.1	13	0.051 U	0.028 U	0.029 U	0.029 U	0.022 U	0.024 U	0.025 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.081 U	0.044 U	0.045 U	0.046 U	0.035 U	0.038 U	0.039 U
2,4,5-Trichlorophenol	NS	NS	0.091 U	0.049 U	0.051 U	0.052 U	0.039 U	0.042 U	0.044 U
2,4,6-Trichlorophenol	NS	NS	0.074 U	0.04 U	0.041 U	0.042 U	0.032 U	0.034 U	0.036 U
2,4-Dichlorophenol	NS	NS	0.13 U	0.069 U	0.071 U	0.072 U	0.054 U	0.059 U	0.062 U
2,4-Dimethylphenol	NS	NS	0.13 U	0.072 U	0.074 U	0.075 U	0.057 U	0.061 U	0.064 U
2,4-Dinitrophenol	NS	NS	0.095 U	0.052 U	0.054 U J	0.054 U	0.041 U	0.044 U J	0.047 U J
2,4-Dinitrotoluene	NS	NS	0.034 U	0.019 U	0.019 U	0.019 U	0.015 U	0.016 U	0.017 U
2,6-Dinitrotoluene	NS	NS	0.03 U	0.016 U	0.017 U	0.017 U	0.013 U	0.014 U	0.015 U
2-Chloronaphthalene	NS	NS	0.024 U	0.013 U	0.014 U	0.014 U	0.01 U	0.011 U	0.012 U
2-Chlorophenol	NS	NS	0.078 U	0.043 U	0.044 U	0.045 U	0.034 U	0.036 U	0.038 U
2-Methylnaphthalene	NS	NS	0.044 U	0.024 U	0.025 U	0.025 U	0.019 U	0.02 U	0.021 U
2-Methylphenol	0.33	100	0.089 U	0.049 U	0.05 U	0.051 U	0.038 U	0.042 U	0.044 U
2-Nitroaniline	NS	NS	0.034 U J	0.019 U	0.019 U J	0.02 U J	0.015 U J	0.016 U J	0.017 U J
2-Nitrophenol	NS	NS	0.083 U	0.045 U	0.047 U	0.047 U	0.036 U	0.039 U	0.041 U
3&4-Methylphenol	NS	NS	0.099 U	0.054 U	0.056 U	0.057 U	0.043 U	0.046 U	0.049 U
3,3'-Dichlorobenzidine	NS	NS	0.02 U J	0.011 U	0.011 U	0.011 U J	0.0086 U J	0.0092 U	0.0097 U
3-Nitroaniline	NS	NS	0.031 U	0.017 U	0.018 U	0.018 U	0.013 U	0.015 U	0.015 U
4,6-Dinitro-o-cresol	NS	NS	0.095 U	0.052 U	0.054 U	0.054 U	0.041 U	0.044 U	0.047 U
4-Bromophenyl phenyl ether	NS	NS	0.028 U	0.015 U	0.016 U	0.016 U	0.012 U	0.013 U	0.014 U
4-Chloro-3-methyl phenol	NS	NS	0.078 U	0.043 U	0.044 U	0.045 U	0.034 U	0.036 U	0.038 U
4-Chloroaniline	NS	NS	0.025 U J	0.014 U	0.014 U	0.014 U J	0.011 U J	0.012 U	0.012 U
4-Chlorophenyl phenyl ether	NS	NS	0.024 U	0.013 U	0.013 U	0.013 U	0.01 U	0.011 U	0.012 U
4-Nitroaniline	NS	NS	0.031 U	0.017 U	0.017 U	0.017 U	0.013 U	0.014 U	0.015 U
4-Nitrophenol	NS	NS	0.13 U J	0.072 U J	0.075 U	0.075 U J	0.057 U J	0.062 U	0.065 U
Acenaphthene	20	100	0.023 U	0.012 U	0.013 U	0.013 U	0.0098 U	0.011 U	0.011 U
Acenaphthylene	100	100	0.025 U	0.014 U	0.014 U	0.028 J	0.011 U	0.012 U	0.012 U
Acetophenone	NS	NS	0.014 U	0.0075 U	0.0078 U	0.0078 U	0.0059 U	0.0064 U	0.0067 U
Anthracene	100	100	0.027 U	0.015 U	0.015 U	0.0229 J	0.012 U	0.013 U	0.013 U
Atrazine	NS	NS	0.015 U	0.0084 U	0.0087 U	0.0088 U	0.0066 U	0.0072 U	0.0076 U
Benzaldehyde	NS	NS	0.018 U	0.0098 U	0.01 U	0.01 U	0.0078 U	0.0084 U	0.0088 U
Benzo(a)anthracene	1	1	0.0656 J	0.014 U J	0.0403 J	0.0651	0.0167 J	0.012 U	0.013 U
Benzo(a)pyrene	1	1	0.0682 J	0.013 U J	0.0373 J	0.0672	0.0164 J	0.011 U	0.012 U
Benzo(b)fluoranthene	1	1	0.0871	0.014 U	0.0578	0.0922	0.0218 J	0.0174 J	0.013 U
Benzo(g,h,i)perylene	100	100	0.059 J	0.016 U J	0.0348 J	0.0781	0.0233 J	0.014 U	0.014 U
Benzo(k)fluoranthene	0.8	3.9	0.039 J	0.016 U J	0.0201 J	0.0295 J	0.013 U	0.014 U	0.014 U
bis(2-Chloroethoxy)methane	NS	NS	0.032 U	0.017 U	0.018 U	0.018 U	0.014 U	0.015 U	0.015 U
bis(2-Chloroethyl)ether	NS	NS	0.024 U	0.013 U	0.013 U	0.013 U	0.01 U	0.011 U	0.012 U
bis(2-Chloroisopropyl)ether	NS	NS	0.023 U	0.013 U	0.013 U	0.013 U	0.01 U	0.011 U	0.011 U
bis(2-Ethylhexyl)phthalate	NS	NS	0.126 J	0.038 U J	0.386	0.086 J	0.03 U	0.032 U	0.0388
Butyl benzyl phthalate	NS	NS	0.045 U	0.025 U	0.0654 J	0.026 U	0.02 U	0.021 U	0.022 U
Caprolactam	NS	NS	0.025 U	0.013 U	0.014 U	0.014 U	0.011 U	0.011 U	0.012 U
Carbazole	NS	NS	0.036 U	0.02 U	0.02 U	0.021 U	0.016 U	0.017 U	0.018 U
Chrysene	1	3.9	0.063 J	0.014 U J	0.0411 J	0.0591	0.011 U	0.012 U	0.013 U
Dibenzo(a,h)anthracene	0.33	0.33	0.027 U	0.015 U	0.015 U	0.015 U	0.012 U	0.012 U	0.013 U
Dibenzofuran	7	59	0.023 U	0.013 U	0.013 U	0.013 U	0.01 U	0.011 U	0.011 U
Diethyl phthalate	NS	NS	0.027 U	0.015 U	0.015 U	0.015 U	0.012 U	0.012 U	0.013 U
Dimethyl phthalate	NS	NS	0.028 U	0.015 U	0.016 U	0.016 U	0.012 U	0.013 U	0.013 U
Di-n-butyl phthalate	NS	NS	0.017 U	0.0095 U	0.0098 U	0.0099 U	0.0075 U	0.0081 U	0.0085 U
Di-n-octyl phthalate	NS	NS	0.038 U	0.021 U	0.0841 J	0.022 U	0.016 U	0.018 U	0.019 U
Fluoranthene	100	100	0.084	0.019 U J	0.0518	0.0863	0.017 J	0.016 U	0.017 U
Fluorene	30	100	0.026 U	0.014 U	0.014 U	0.015 U	0.011 U	0.012 U	0.013 U
Hexachlorobenzene	0.33	1.2	0.026 U	0.014 U	0.014 U	0.015 U	0.011 U	0.012 U	0.013 U
Hexachlorobutadiene	NS	NS	0.022 U	0.012 U	0.012 U	0.012 U	0.0094 U	0.01 U	0.011 U
Hexachlorocyclopentadiene	NS	NS	0.08 U	0.043 U	0.045 U J	0.045 U	0.034 U	0.037 U J	0.039 U J
Hexachloroethane	NS	NS	0.022 U	0.012 U	0.012 U	0.012 U	0.0094 U	0.01 U	0.011 U
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.0462 J	0.015 U J	0.024 J	0.0656	0.016 J	0.013 U	0.013 U
Isophorone	NS	NS	0.021 U	0.011 U	0.012 U	0.012 U	0.0091 U	0.0098 U	0.01 U
Naphthalene	12	100	0.021 U	0.012 U	0.012 U	0.012 U	0.0092 U	0.0099 U	0.01 U
Nitrobenzene	NS	NS	0.023 U	0.012 U	0.013 U	0.013 U	0.0097 U	0.011 U	0.011 U
N-Nitroso-di-n-propylamine	NS	NS	0.019 U	0.01 U	0.011 U	0.011 U	0.0082 U	0.0089 U	0.0094 U
N-Nitrosodiphenylamine	NS	NS	0.047 U	0.025 U	0.026 U	0.027 U	0.02 U	0.022 U	0.023 U
Pentachlorophenol	0.8	6.7	0.13 U	0.073 U	0.075 U	0.076 U	0.058 U	0.062 U	0.066 U
Phenanthrene	100	100	0.036 U	0.019 U	0.02 U	0.0333 J	0.015 U	0.017 U	0.017 U
Phenol	0.33	100	0.082 U	0.045 U	0.046 U	0.047 U	0.035 U	0.038 U	0.04 U
Pyrene	100	100	0.0937	0.016 U J	0.0802	0.0923	0.0229 J	0.0231 J	0.015 U

Attached Table 2
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-10 (0-1)	SB-11 (0-1)	SB-12 (0-2)	SB-13 (0-2)	FB-SOIL-1	FB-SOIL-2	FB052214
Date Sampled			8/12/2014	8/12/2014	8/12/2014	8/12/2014	10/21/2013	10/21/2013	5/22/2014
Dilution			2	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L
1,1'-Biphenyl	NS	NS	0.0474 J	0.0354 J	0.0038 U	0.0039 U	0.0003 U	0.00031 U	0.00027 U
1,2,4,5-Tetrachlorobenzene	NS	NS	0.011 U	0.013 U	0.01 U	0.01 U	0.00031 U	0.00031 U	0.00044 U
1,4-Dioxane	0.1	13	0.023 U	0.028 U	0.022 U	0.022 U	0.00027 U	0.00027 U	0.00072 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.037 U	0.044 U	0.034 U	0.035 U	0.00094 U	0.00095 U	0.0014 U
2,4,5-Trichlorophenol	NS	NS	0.041 U	0.05 U	0.038 U	0.039 U	0.0016 U	0.0016 U	0.0017 U
2,4,6-Trichlorophenol	NS	NS	0.034 U	0.041 U	0.031 U	0.032 U	0.0013 U	0.0013 U	0.0015 U
2,4-Dichlorophenol	NS	NS	0.058 U	0.069 U	0.053 U	0.054 U	0.0012 U	0.0012 U	0.0016 U
2,4-Dimethylphenol	NS	NS	0.06 U	0.073 U	0.056 U	0.056 U	0.0015 U	0.0015 U	0.0018 U
2,4-Dinitrophenol	NS	NS	0.044 U J	0.053 U J	0.04 U J	0.041 U J	0.017 U J	0.017 U	0.0065 U
2,4-Dinitrotoluene	NS	NS	0.016 U	0.019 U	0.014 U	0.015 U	0.00043 U	0.00043 U	0.00032 U
2,6-Dinitrotoluene	NS	NS	0.014 U	0.016 U	0.013 U	0.013 U	0.00046 U	0.00047 U	0.00026 U
2-Chloronaphthalene	NS	NS	0.011 U	0.013 U	0.01 U	0.01 U	0.0003 U	0.0003 U	0.00034 U
2-Chlorophenol	NS	NS	0.036 U	0.043 U	0.033 U	0.034 U	0.00097 U	0.00098 U	0.0013 U
2-Methylnaphthalene	NS	NS	0.116	0.0999	0.018 U	0.019 U	0.00038 U	0.00039 U	0.00029 U
2-Methylphenol	0.33	100	0.041 U	0.049 U	0.038 U	0.038 U	0.001 U	0.0011 U	0.0013 U
2-Nitroaniline	NS	NS	0.016 U	0.019 U	0.015 U	0.015 U	0.0011 U	0.0011 U	0.00032 U
2-Nitrophenol	NS	NS	0.038 U	0.046 U	0.035 U	0.036 U	0.0015 U	0.0015 U	0.0019 U
3&4-Methylphenol	NS	NS	0.045 U	0.055 U	0.042 U	0.043 U	0.00093 U	0.00093 U	0.0011 U
3,3'-Dichlorobenzidine	NS	NS	0.0091 U	0.011 U	0.0084 U	0.0085 U	0.00036 U	0.00036 U	0.00056 U
3-Nitroaniline	NS	NS	0.014 U	0.017 U	0.013 U	0.013 U	0.0013 U	0.0013 U	0.00026 U
4,6-Dinitro-o-cresol	NS	NS	0.044 U	0.053 U J	0.04 U J	0.041 U J	0.00099 U	0.001 U	0.0013 U
4-Bromophenyl phenyl ether	NS	NS	0.013 U	0.016 U	0.012 U	0.012 U	0.00036 U	0.00036 U	0.00025 U
4-Chloro-3-methyl phenol	NS	NS	0.036 U	0.043 U	0.033 U	0.034 U	0.0018 U	0.0018 U	0.0013 U
4-Chloroaniline	NS	NS	0.011 U	0.014 U	0.011 U	0.011 U	0.00053 U	0.00053 U	0.0003 U
4-Chlorophenyl phenyl ether	NS	NS	0.011 U	0.013 U	0.01 U	0.01 U	0.00031 U	0.00032 U	0.00038 U
4-Nitroaniline	NS	NS	0.014 U	0.017 U	0.013 U	0.013 U	0.0017 U	0.0017 U	0.0003 U
4-Nitrophenol	NS	NS	0.06 U	0.073 U	0.056 U	0.057 U	0.0052 U	0.0053 U	0.00091 U
Acenaphthene	20	100	0.133	0.0865	0.0158 J	0.0097 U	0.00026 U	0.00027 U	0.0003 U
Acenaphthylene	100	100	1.75	1.2	0.011 U	0.011 U	0.00023 U	0.00023 U	0.0002 U
Acetophenone	NS	NS	0.0063 U	0.0859 J	0.0058 U	0.0059 U	0.00029 U	0.00029 U	0.00036 U
Anthracene	100	100	1.91	1.34	0.0612	0.0251 J	0.00029 U	0.00029 U	0.00019 U
Atrazine	NS	NS	0.007 U	0.0085 U	0.0065 U	0.0066 U	0.00049 U	0.00049 U	0.00042 U
Benzaldehyde	NS	NS	0.0082 U	0.0099 U	0.0076 U	0.0077 U	0.0033 U	0.0033 U	0.00067 U
Benzo(a)anthracene	1	1	**1.83**	**2.11**	0.167	0.118	0.00023 U	0.00023 U	0.00022 U
Benzo(a)pyrene	1	1	**2.71**	**2.78**	0.152	0.118	0.00023 U	0.00023 U	0.00024 U
Benzo(b)fluoranthene	1	1	**3.54 D**	**4.08**	0.172	0.154	0.00046 U	0.00046 U	0.00022 U
Benzo(g,h,i)perylene	100	100	3.47	2.68	0.0863	0.0862	0.00032 U	0.00033 U	0.00031 U
Benzo(k)fluoranthene	0.8	3.9	**1.18**	**1.37**	0.0767	0.0587	0.00051 U	0.00051 U	0.00022 U
bis(2-Chloroethoxy)methane	NS	NS	0.014 U	0.017 U	0.013 U	0.014 U	0.00031 U	0.00031 U	0.00042 U
bis(2-Chloroethyl)ether	NS	NS	0.011 U	0.013 U	0.01 U	0.01 U	0.00031 U	0.00031 U	0.00043 U
bis(2-Chloroisopropyl)ether	NS	NS	0.011 U	0.013 U	0.0098 U	0.01 U	0.00045 U	0.00046 U	0.00041 U
bis(2-Ethylhexyl)phthalate	NS	NS	0.545	3.06	0.029 U	0.03 U	0.00059 U	0.00059 U	0.00055 U
Butyl benzyl phthalate	NS	NS	0.021 U	0.205	0.019 U	0.019 U	0.00029 U	0.00029 U	0.00022 U
Caprolactam	NS	NS	0.011 U	0.014 U	0.01 U	0.011 U	0.00069 U	0.0007 U	0.00041 U
Carbazole	NS	NS	0.257	0.208	0.0229 J	0.016 U	0.00036 U	0.00036 U	0.00017 U
Chrysene	1	3.9	**1.96**	**2.21**	0.173	0.145	0.00029 U	0.00029 U	0.00016 U
Dibenzo(a,h)anthracene	0.33	0.33	**0.791**	**0.734**	0.0277 J	0.0242 J	0.00038 U	0.00038 U	0.00028 U
Dibenzofuran	7	59	0.243	0.164	0.0098 U	0.01 U	0.00027 U	0.00027 U	0.00023 U
Diethyl phthalate	NS	NS	0.012 U	0.015 U	0.011 U	0.011 U	0.00033 U	0.00033 U	0.00023 U
Dimethyl phthalate	NS	NS	0.013 U	0.015 U	0.012 U	0.012 U	0.00028 U	0.00029 U	0.00026 U
Di-n-butyl phthalate	NS	NS	0.0079 U	0.137	0.0381 J	0.0348 J	0.00056 U	0.00056 U	0.00058 U
Di-n-octyl phthalate	NS	NS	0.017 U	0.021 U	0.016 U	0.016 U	0.00031 U J	0.00031 U	0.0011
Fluoranthene	100	100	2.13	2.46	0.309	0.225	0.00032 U	0.00032 U	0.00016 U
Fluorene	30	100	0.199	0.141	0.0135 J	0.011 U	0.00028 U	0.00028 U	0.00027 U
Hexachlorobenzene	0.33	1.2	0.012 U	0.014 U	0.011 U	0.011 U	0.00034 U	0.00034 U	0.00046 U
Hexachlorobutadiene	NS	NS	0.0099 U	0.012 U	0.0092 U	0.0093 U	0.00051 U	0.00052 U	0.00039 U
Hexachlorocyclopentadiene	NS	NS	0.036 U	0.044 U	0.034 U J	0.034 U J	0.0071 U	0.0072 U	0.00048 U
Hexachloroethane	NS	NS	0.0099 U	0.012 U	0.0092 U	0.0093 U	0.00055 U	0.00056 U	0.00029 U
Indeno(1,2,3-cd)pyrene	0.5	0.5	**2.86**	**2.56**	0.0992	0.086	0.00037 U	0.00038 U	0.0004 U
Isophorone	NS	NS	0.0096 U	0.012 U	0.0089 U	0.009 U	0.00027 U	0.00028 U	0.00034 U
Naphthalene	12	100	0.235	0.157	0.009 U	0.0092 U	0.00026 U	0.00026 U	0.00027 U
Nitrobenzene	NS	NS	0.01 U	0.012 U	0.0096 U	0.0097 U	0.00042 U	0.00042 U	0.00052 U
N-Nitroso-di-n-propylamine	NS	NS	0.0087 U	0.011 U	0.0081 U	0.0082 U	0.0003 U	0.00031 U	0.00038 U
N-Nitrosodiphenylamine	NS	NS	0.021 U	0.026 U	0.02 U	0.02 U	0.00031 U	0.00031 U	0.00021 U
Pentachlorophenol	0.8	6.7	0.061 U	0.074 U	0.057 U	0.057 U	0.0014 U	0.0014 U	0.0014 U
Phenanthrene	100	100	0.658	0.713	0.254	0.123	0.00029 U	0.00029 U	0.00019 U
Phenol	0.33	100	0.038 U	0.045 U	0.035 U	0.035 U	0.0013 U	0.0013 U	0.00055 U
Pyrene	100	100	2.3	2.83	0.312	0.25	0.00027 U	0.00027 U	0.00019 U

Attached Table 3
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results

Polychlorinated Biphenyls (PCBs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-1 (0-2)	SB-1 (25-27)	SB-X	SB-2 (0-2)	SB-2 (10-12)	SB-2 (14-16)	SB-3 (0-4)
Date Sampled			10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/23/2013
Dilution			1	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aroclor 1016	NS	NS	0.0092 U	0.0091 U	0.0093 U	0.00085 U	0.00092 U	0.00089 U	0.00092 U
Aroclor 1221	NS	NS	0.021 U	0.021 U	0.021 U	0.002 U	0.0021 U	0.0021 U	0.0021 U
Aroclor 1232	NS	NS	0.018 U	0.018 U	0.018 U	0.0016 U	0.0018 U	0.0017 U	0.0018 U
Aroclor 1242	NS	NS	0.011 U	0.011 U	0.011 U	0.001 U	0.0011 U	0.0011 U	0.0011 U
Aroclor 1248	NS	NS	0.011 U	0.011 U	0.011 U	0.00099 U	0.0011 U	0.001 U	0.0011 U
Aroclor 1254	NS	NS	0.017 U	0.016 U	0.017 U	0.0015 U	0.0017 U	0.0016 U	0.0017 U
Aroclor 1260	NS	NS	0.012 U	0.011 U	0.012 U	0.0011 U	0.0012 U	0.0011 U	0.0012 U
Aroclor 1262	NS	NS	0.011 U	0.011 U	0.011 U	0.001 U	0.0011 U	0.0011 U	0.0011 U
Aroclor 1268	NS	NS	0.01 U	0.01 U	0.01 U	0.00096 U	0.001 U	0.001 U	0.001 U
Total PCBs	0.1	1	ND	ND	ND	ND	ND	ND	ND

Attached Table 3
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Polychlorinated Biphenyls (PCBs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-3 (8-12)	SB-3 (32-36)	SB-4 (0-4)	SB-Y	SB-5 (0-2)	SB-6 (0-2)	SB-6 (4-6)
Date Sampled			10/23/2013	10/23/2013	10/23/2013	10/23/2013	10/23/2013	5/21/2014	5/21/2014
Dilution			1	1	1	1	5	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aroclor 1016	NS	NS	0.00093 U	0.00093 U	0.00089 U	0.0009 U	0.00086 U	0.001 U	0.00093 U
Aroclor 1221	NS	NS	0.0021 U	0.0022 U	0.0021 U	0.0021 U	0.002 U	0.0024 U	0.0022 U
Aroclor 1232	NS	NS	0.0018 U	0.0018 U	0.0017 U	0.0018 U	0.0017 U	0.002 U	0.0018 U
Aroclor 1242	NS	NS	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0013 U	0.0011 U
Aroclor 1248	NS	NS	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.001 U	0.0012 U	0.0011 U
Aroclor 1254	NS	NS	0.0017 U	0.0017 U	0.0016 U	0.0016 U	0.261	0.0019 U	0.0017 U
Aroclor 1260	NS	NS	0.0012 U	0.0012 U	0.0763	0.0666	0.131	0.0013 U	0.0012 U
Aroclor 1262	NS	NS	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0013 U	0.0011 U
Aroclor 1268	NS	NS	0.001 U	0.0011 U	0.001 U	0.001 U	0.00097 U	0.0012 U	0.0011 U
Total PCBs	0.1	1	ND	ND	0.0763	0.0666	0.000392	ND	ND

Attached Table 3
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Polychlorinated Biphenyls (PCBs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-7 (0-2)	SB-XX	SB-7 (4-6)	SB-8 (0-2)	SB-8 (4-6)	SB-9 (0-2)	SB-9 (4-6)
Date Sampled			5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014
Dilution			1	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aroclor 1016	NS	NS	0.0022 U	0.0011 U	0.0012 U	0.0012 U	0.00088 U	0.00098 U	0.001 U
Aroclor 1221	NS	NS	0.005 U	0.0026 U	0.0028 U	0.0028 U	0.002 U	0.0023 U	0.0024 U
Aroclor 1232	NS	NS	0.0042 U	0.0022 U	0.0024 U	0.0024 U	0.0017 U	0.0019 U	0.002 U
Aroclor 1242	NS	NS	0.0026 U	0.0014 U	0.0015 U	0.0015 U	0.0011 U	0.0012 U	0.0012 U
Aroclor 1248	NS	NS	0.0025 U	0.0013 U	0.0014 U	0.0014 U	0.001 U	0.0011 U	0.0012 U
Aroclor 1254	NS	NS	0.0039 U	0.002 U	0.0022 U	0.0022 U	0.0016 U	0.0018 U	0.0018 U
Aroclor 1260	NS	NS	0.0027 U	0.0014 U	0.0015 U	0.0015 U	0.0011 U	0.0012 U	0.0013 U
Aroclor 1262	NS	NS	0.0026 U	0.0014 U	0.0015 U	0.0015 U	0.0011 U	0.0012 U	0.0012 U
Aroclor 1268	NS	NS	0.0024 U	0.0013 U	0.0014 U	0.0014 U	0.001 U	0.0011 U	0.0012 U
Total PCBs	0.1	1	ND	ND	ND	ND	ND	ND	ND

Attached Table 3
Brook 156
740 Brook Avenue, Bronx, New York

Remedial Investigation Soil Analytical Results

Polychlorinated Biphenyls (PCBs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-10 (0-1)	SB-11 (0-1)	SB-12 (0-2)	SB-13 (0-2)	FB-SOIL-1	FB-SOIL-2	FB052214
Date Sampled			8/12/2014	8/12/2014	8/12/2014	8/12/2014	10/21/2013	10/21/2013	5/22/2014
Dilution			1	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L
Aroclor 1016	NS	NS	0.0088 U	0.011 U	0.0089 U	0.0091 U	0.00013 U	0.000013 U	0.000013 U
Aroclor 1221	NS	NS	0.02 U	0.026 U	0.021 U	0.021 U	0.00027 U	0.000029 U	0.000027 U
Aroclor 1232	NS	NS	0.017 U	0.022 U	0.017 U	0.018 U	0.00039 U	0.000041 U	0.000039 U
Aroclor 1242	NS	NS	0.011 U	0.014 U	0.011 U	0.011 U	0.000086 U	0.0000091 U	0.0000086 U
Aroclor 1248	NS	NS	0.01 U	0.013 U	0.01 U	0.011 U	0.00015 U	0.000015 U	0.000015 U
Aroclor 1254	NS	NS	0.016 U	0.021 U	0.016 U	0.016 U	0.00014 U	0.000015 U	0.000014 U
Aroclor 1260	NS	NS	0.011 U	0.014 U	0.011 U	0.012 U	0.00021 U	0.000022 U	0.000021 U
Aroclor 1262	NS	NS	0.011 U	0.014 U	0.011 U	0.011 U	0.00006 U	0.0000063 U	0.000006 U
Aroclor 1268	NS	NS	0.0099 U	0.013 U	0.01 U	0.01 U	0.00013 U	0.000014 U	0.000013 U
Total PCBs	0.1	1	ND	ND	ND	ND	ND	ND	ND

Attached Table 4
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Pesticides

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-1 (0-2)	SB-1 (25-27)	SB-X	SB-2 (0-2)	SB-2 (10-12)	SB-2 (14-16)	SB-3 (0-4)
Date Sampled			10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/23/2013
Dilution			1	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	0.0033	13	0.000037 U	0.000039 U	0.000038 U	0.000037 U	0.000036 U	0.000034 U	0.000037 U
4,4'-DDE	0.0033	8.9	0.000027 U	0.000029 U	0.000028 U	0.000072 J N	0.000027 U	0.000025 U	0.00018 J N
4,4'-DDT	0.0033	7.9	0.00052	0.000035 U	0.000034 U	0.00016 J N	0.00017 J	0.00003 U	0.0004 J N
Aldrin	0.005	0.097	0.000031 U	0.000033 U	0.000032 U	0.000031 U	0.00003 U	0.000028 U	0.000031 U
alpha-BHC	0.02	0.48	0.00002 U	0.000021 U	0.000021 U	0.00002 U	0.00002 U	0.000018 U	0.00002 U
alpha-Chlordane	0.094	4.2	0.000025 U	0.000026 U	0.000026 U	0.000025 U	0.000025 U	0.000023 U	0.000025 U
beta-BHC	0.036	0.36	0.000042 U	0.000044 U	0.000043 U	0.000042 U	0.000041 U	0.000039 U	0.000042 U
delta-BHC	0.04	100	0.000034 U	0.000035 U	0.000034 U	0.000033 U	0.000033 U	0.000031 U	0.000034 U
Dieldrin	0.005	0.2	0.000027 U	0.000028 U	0.000027 U	0.000026 U	0.000026 U	0.000024 U	0.000027 U
Endosulfan sulfate	2.4	24	0.000029 U	0.000031 U	0.00003 U	0.0004 J	0.000028 U	0.000027 U	0.000029 U
Endosulfan-I	2.4	24	0.000026 U	0.000027 U	0.000026 U	0.000025 U	0.000025 U	0.000023 U	0.000026 U
Endosulfan-II	2.4	24	0.000041 U	0.000043 U	0.000042 U	0.00004 U	0.00004 U	0.000037 U	0.000041 U
Endrin	0.014	11	0.000022 U	0.000023 U	0.000023 U	0.000022 U	0.000021 U	0.00002 U	0.000022 U
Endrin aldehyde	NS	NS	0.000036 U	0.000037 U	0.000037 U	0.000035 U	0.000035 U	0.000032 U	0.000036 U
Endrin ketone	NS	NS	0.000028 U	0.000029 U	0.000028 U	0.000027 U	0.000027 U	0.000025 U	0.000028 U
gamma-BHC (Lindane)	0.1	1.3	0.000033 U	0.000035 U	0.000034 U	0.000033 U	0.000032 U	0.00003 U	0.000033 U
gamma-Chlordane	NS	NS	0.000047 U	0.000049 U	0.000048 U	0.000046 U	0.000046 U	0.000043 U	0.000047 U
Heptachlor	0.042	2.1	0.000033 U	0.000035 U	0.000034 U	0.000033 U	0.000032 U	0.00003 U	0.000033 U
Heptachlor epoxide	NS	NS	0.000025 U	0.000027 U	0.000026 U	0.000025 U	0.000025 U	0.000023 U	0.000026 U
Methoxychlor	NS	NS	0.000067 U	0.00007 U	0.000068 U	0.000066 U	0.000065 U	0.000061 U	0.000067 U
Toxaphene	NS	NS	0.00086 U	0.0009 U	0.00088 U	0.00085 U	0.00083 U	0.00078 U	0.00086 U

Attached Table 4
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Pesticides

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-3 (8-12)	SB-3 (32-36)	SB-4 (0-4)	SB-Y	SB-5 (0-2)	SB-6 (0-2)	SB-6 (4-6)
Date Sampled			10/23/2013	10/23/2013	10/23/2013	10/23/2013	10/23/2013	5/21/2014	5/21/2014
Dilution			1	1	1	1	20	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	**0.0033**	**13**	0.000039 U	0.000043 U	0.000041 U	0.00004 U	0.000038 U	0.000043 U	0.00004 U
4,4'-DDE	**0.0033**	**8.9**	0.000029 U	0.000031 U	0.00003 U	0.00003 U	0.000028 U	0.000032 U	0.00003 U
4,4'-DDT	**0.0033**	**7.9**	0.00035	0.000038 U	0.000037 U	0.000036 U	**0.0267**	0.00022 J	0.000036 U
Aldrin	**0.005**	**0.097**	0.000033 U	0.000036 U	0.000034 U	0.000034 U	0.000032 U	0.000036 U	0.000034 U
alpha-BHC	**0.02**	**0.48**	0.000022 U	0.000023 U	0.000022 U	0.000022 U	0.000021 U	0.000024 U	0.000022 U
alpha-Chlordane	**0.094**	**4.2**	0.000027 U	0.000029 U	0.0014 J N	0.000027 U	0.000025 U	0.000029 U	0.000027 U
beta-BHC	**0.036**	**0.36**	0.000045 U	0.000049 U	0.000047 U	0.000046 U	0.000043 U	0.000049 U	0.000046 U
delta-BHC	**0.04**	**100**	0.000036 U	0.000039 U	0.000037 U	0.000036 U	0.000034 U	0.000039 U	0.000036 U
Dieldrin	**0.005**	**0.2**	0.000028 U	0.000031 U	0.0042	0.0036	0.000027 U	0.000031 U	0.000029 U
Endosulfan sulfate	**2.4**	**24**	0.000031 U	0.000034 U	0.000032 U	0.000031 U	0.00003 U	0.000034 U	0.000032 U
Endosulfan-I	**2.4**	**24**	0.000027 U	0.00003 U	0.000028 U	0.000028 U	0.000026 U	0.00003 U	0.000028 U
Endosulfan-II	**2.4**	**24**	0.000043 U	0.000047 U	0.000045 U	0.000044 U	0.000041 U	0.000048 U	0.000044 U
Endrin	**0.014**	**11**	0.000023 U	0.000025 U	0.000024 U	0.000024 U	0.000022 U	0.000026 U	0.000024 U
Endrin aldehyde	**NS**	**NS**	0.000038 U	0.000041 U	0.000039 U	0.000038 U	0.000036 U	0.000041 U	0.000038 U
Endrin ketone	**NS**	**NS**	0.000029 U	0.000032 U	0.00003 U	0.00003 U	0.000028 U	0.000032 U	0.00003 U
gamma-BHC (Lindane)	**0.1**	**1.3**	0.000035 U	0.000038 U	0.000037 U	0.000036 U	0.000034 U	0.000039 U	0.000036 U
gamma-Chlordane	**NS**	**NS**	0.00005 U	0.000054 U	0.0022 J N	0.000051 U	0.000048 U	0.000055 U	0.000051 U
Heptachlor	**0.042**	**2.1**	0.000035 U	0.000038 U	0.000036 U	0.000036 U	0.000034 U	0.000039 U	0.000036 U
Heptachlor epoxide	**NS**	**NS**	0.000027 U	0.000029 U	0.000028 U	0.000027 U	0.000026 U	0.00003 U	0.000027 U
Methoxychlor	**NS**	**NS**	0.000071 U	0.000076 U	0.000073 U	0.000072 U	0.000067 U	0.000078 U	0.000072 U
Toxaphene	**NS**	**NS**	0.00091 U	0.00098 U	0.00094 U	0.00092 U	0.00087 U	0.001 U	0.00092 U

Attached Table 4
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Pesticides

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-7 (0-2)	SB-XX	SB-7 (4-6)	SB-8 (0-2)	SB-8 (4-6)	SB-9 (0-2)	SB-9 (4-6)
Date Sampled			5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014
Dilution			1	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	0.0033	13	0.000087 U	0.000049 U	0.000051 U	0.0003 a J N	0.000037 U	0.000043 U	0.00004 U
4,4'-DDE	0.0033	8.9	0.000064 U	0.000036 U	0.00029 J	0.000036 U	0.000027 U	0.000031 U	0.00003 U
4,4'-DDT	0.0033	7.9	0.000078 U	0.000044 U	**0.0034**	0.00026 a J N	0.000033 U	0.000039 U	0.000037 U
Aldrin	0.005	0.097	0.000073 U	0.000041 U	0.000043 U	0.000042 U	0.000031 U	0.000036 U	0.000034 U
alpha-BHC	0.02	0.48	0.000048 U	0.000027 U	0.000028 U	0.000027 U	0.00002 U	0.000023 U	0.000022 U
alpha-Chlordane	0.094	4.2	0.000059 U	0.000033 U	0.000034 U	0.000033 U	0.000025 U	0.000029 U	0.000027 U
beta-BHC	0.036	0.36	0.000099 U	0.000056 U	0.000058 U	0.000056 U	0.000042 U	0.000049 U	0.000046 U
delta-BHC	0.04	100	0.000079 U	0.000044 U	0.000046 U	0.000045 U	0.000033 U	0.000039 U	0.000037 U
Dieldrin	0.005	0.2	0.000062 U	0.000035 U	0.0008	0.000096	0.000026 U	0.000031 U	0.000029 U
Endosulfan sulfate	2.4	24	0.000068 U	0.000039 U	0.00004 U	0.00013 a J	0.000029 U	0.000034 U	0.000032 U
Endosulfan-I	2.4	24	0.00006 U	0.000034 U	0.000035 U	0.000034 U	0.000025 U	0.00003 U	0.000028 U
Endosulfan-II	2.4	24	0.000095 U	0.000054 U	0.000055 U	0.000054 U	0.00004 U	0.000047 U	0.000044 U
Endrin	0.014	11	0.000052 U	0.000029 U	0.00003 U	0.000029 U	0.000022 U	0.000025 U	0.000024 U
Endrin aldehyde	NS	NS	0.000083 U	0.000047 U	0.000048 U	0.000047 U	0.000035 U	0.000041 U	0.000039 U
Endrin ketone	NS	NS	0.000065 U	0.000036 U	0.000038 U	0.000037 U	0.000027 U	0.000032 U	0.00003 U
gamma-BHC (Lindane)	0.1	1.3	0.000078 U	0.000044 U	0.000045 U	0.000044 U	0.000033 U	0.000038 U	0.000036 U
gamma-Chlordane	NS	NS	0.00011 U	0.000062 U	0.000064 U	0.000062 U	0.000046 U	0.000054 U	0.000051 U
Heptachlor	0.042	2.1	0.000077 U	0.000044 U	0.000045 U	0.000044 U	0.000033 U	0.000038 U	0.000036 U
Heptachlor epoxide	NS	NS	0.000059 U	0.000034 U	0.000035 U	0.000034 U	0.000025 U	0.000029 U	0.000028 U
Methoxychlor	NS	NS	0.00016 U	0.000088 U	0.000091 U	0.000088 U	0.000066 U	0.00044 a J N	0.000072 U
Toxaphene	NS	NS	0.002 U	0.0011 U	0.0012 U	0.0011 U	0.00085 U	0.00098 U	0.00093 U

Attached Table 4
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Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-10 (0-1)	SB-11 (0-1)	SB-12 (0-2)	SB-13 (0-2)	FB-SOIL-1	FB-SOIL-2	FB052214
Date Sampled			8/12/2014	8/12/2014	8/12/2014	8/12/2014	10/21/2013	10/21/2013	5/22/2014
Dilution			1	1	1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L
4,4'-DDD	0.0033	13	0.00037 U	0.00048 U	0.00037 U	0.00038 U	0.00000025 U	0.00000025 U	0.0000025 U
4,4'-DDE	0.0033	8.9	0.00027 U	0.00035 U	0.00028 U	0.00028 U	0.00000017 U	0.00000017 U	0.0000017 U
4,4'-DDT	0.0033	7.9	**0.006 a J N**	**0.0164 a J**	0.00034 U	0.00035 U	0.00000032 U	0.00000032 U	0.0000032 U
Aldrin	0.005	0.097	0.00031 U	0.0004 U	0.00031 U	0.00032 U	0.0000008 U	0.00000079 U	0.0000079 U
alpha-BHC	0.02	0.48	0.0002 U	0.00026 U	0.0002 U	0.00021 U	0.00000024 U	0.00000023 U	0.0000023 U
alpha-Chlordane	0.094	4.2	0.00025 U	0.00033 U	0.00025 U	0.00026 U	0.00000029 U	0.00000029 U	0.0000029 U
beta-BHC	0.036	0.36	0.00042 U	0.00055 U	0.00043 U	0.00044 U	0.00000023 U	0.00000023 U	0.0000023 U
delta-BHC	0.04	100	0.00033 U	0.00043 U	0.00034 U	0.00035 U	0.00000019 U	0.00000019 U	0.0000019 U
Dieldrin	0.005	0.2	0.0031 a J	0.0049	0.00027 U	0.00027 U	0.00000016 U	0.00000016 U	0.0000016 U
Endosulfan sulfate	2.4	24	0.00029 U	0.00038 U	0.00029 U	0.0003 U	0.00000019 U	0.00000019 U	0.0000019 U
Endosulfan-I	2.4	24	0.00026 U	0.00033 U	0.00026 U	0.00027 U	0.00000029 U	0.00000028 U	0.0000028 U
Endosulfan-II	2.4	24	0.0004 U	0.00053 U	0.00041 U	0.00042 U	0.0000002 U	0.0000002 U	0.000002 U
Endrin	0.014	11	0.00022 U	0.00028 U	0.00022 U	0.00023 U	0.0000002 U	0.0000002 U	0.000002 U
Endrin aldehyde	NS	NS	0.00035 U	0.00046 U	0.00036 U	0.00037 U	0.00000037 U	0.00000037 U	0.0000037 U
Endrin ketone	NS	NS	0.00027 U	0.00036 U	0.00028 U	0.00029 U	0.00000048 U	0.00000047 U	0.0000047 U
gamma-BHC (Lindane)	0.1	1.3	0.00033 U	0.00043 U	0.00034 U	0.00034 U	0.00000017 U	0.00000017 U	0.0000017 U
gamma-Chlordane	NS	NS	0.00047 U	0.00061 U	0.00047 U	0.00048 U	0.00000021 U	0.00000021 U	0.0000021 U
Heptachlor	0.042	2.1	0.00033 U	0.00043 U	0.00033 U	0.00034 U	0.00000022 U	0.00000022 U	0.0000022 U
Heptachlor epoxide	NS	NS	0.00025 U	0.00033 U	0.00026 U	0.00026 U	0.00000027 U	0.00000026 U	0.0000026 U
Methoxychlor	NS	NS	0.00066 U	0.00086 U	0.00067 U	0.00069 U	0.00000041 U	0.00000041 U	0.0000041 U
Toxaphene	NS	NS	0.0085 U	0.011 U	0.0086 U	0.0089 U	0.000015 U	0.000015 U	0.00015 U

Attached Table 5
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Metals

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-1 (0-2)	SB-1 (25-27)	SB-X	SB-2 (0-2)	SB-2 (10-12)	SB-2 (14-16)	SB-3 (0-4)
Date Sampled			10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/21/2013	10/23/2013
Dilution			1	1	1/2 †	1/10 †	1/10 †	1/10 †	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	**NS**	**NS**	11,400	10,500	12,200	7,810	5,200	16,100	10,400
Antimony	**NS**	**NS**	0.93 UJ	0.94 UJ	0.93 UJ	0.89 UJ	0.94 UJ	0.92 UJ	0.91 UJ
Arsenic	**13**	**16**	4.8	1.3 J	4.8 J	3	4.1	1.1	3.2
Barium	**350**	**400**	122 J	121 J	135 J	86.4	158	136	118
Beryllium	**7.2**	**72**	0.61	0.38 UJ	0.63	0.42	0.38 U	0.37 U	0.38
Cadmium	**2.5**	**4.3**	0.37 U	0.38 U	0.37	0.36 U	0.43	0.37 U	0.37 U
Calcium	**NS**	**NS**	24,000 J	7,400 J	18,900 J	88,800 J	88,600 J	15,700 J	26,300 J
Chromium	**30**	**180**	20.8 J	**30.4 J**	21.6 J	12.1 J	16.1 J	29.8 J	18.9 J
Chromium, Hexavalent	**NS**	**NS**	NA	NA	NA	NA	NA	NA	NA
Cobalt	**NS**	**NS**	8.6 J	6.8 J	8.6 J	4.5 J	4.7 UJ	11 J	7.8 J
Copper	**50**	**270**	45.8	13.9 J	47.8 J	18.9	23.6	23.8	27.8
Iron	**NS**	**NS**	17,000 J	14,800 J	18,200 J	9,950 J	28,000 J	26,500 J	13,700 J
Lead	**63**	**400**	**193 J**	23.2 J	**184 J**	61.7 J	33.8 J	28.7 J	**95.2 J**
Magnesium	**NS**	**NS**	14,200 J	6,940 J	9,950 J	39,500	36,000	12,600	8,500
Manganese	**1,600**	**2,000**	293 J	172 J	314 J	263 J	237 J	313 J	290 J
Mercury	**0.18**	**0.81**	**0.81 J**	**0.23 J**	**1.1 J**	0.098	0.13	0.13	0.11
Nickel	**30**	**310**	16.6 J	13.9 J	17 J	11.4 J	20.1 J	21.2 J	15.5 J
Potassium	**NS**	**NS**	2,790 J	3,260 J	2,490 J	1,290	893	10,000	2,030
Selenium	**3.9**	**180**	0.93 U	0.94 U	0.93 U	0.89 U	0.94 U	0.92 U	0.91 U
Silver	**2**	**180**	0.54	0.47 U	0.47 U	0.45 U	0.47 U	0.46 U	0.46 U
Sodium	**NS**	**NS**	470 U	470 U	470 U	450 U	470 U	460 U	460 U
Thallium	**NS**	**NS**	0.93 U	0.94 U	0.93 U	0.89 U	0.94 U	0.92 U	0.91 U
Vanadium	**NS**	**NS**	31.6 J	27.1 J	33.1 J	20.7 J	12.3 J	45.3 J	30.9 J
Zinc	**109**	**10,000**	**153 J**	52.1 J	**165 J**	72.2 J	**195 J**	74.7 J	**159 J**

Attached Table 5
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Remedial Investigation Soil Analytical Results

Metals

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-3 (8-12)	SB-3 (32-36)	SB-4 (0-4)	SB-Y	SB-5 (0-2)	SB-6 (0-2)	SB-6 (4-6)
Date Sampled			10/23/2013	10/23/2013	10/23/2013	10/23/2013	10/23/2013	5/21/2014	5/21/2014
Dilution			1	1	1	1	1/10 †	1	1/2 †
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	NS	NS	10,600	4,650	9,310	9,460	10,200	10,400 J	3,290 J
Antimony	NS	NS	0.91 U J	0.95 U J	0.92 U J	0.89 U J	0.86 U J	2.1 U J	2 U J
Arsenic	13	16	2.3	0.95 U	5.5	6.2	8.3	2.4	2 U
Barium	350	400	110	20.6	106	160	**655**	212	24.2
Beryllium	7.2	72	0.36 U	0.38 U	0.59	0.73	0.55	0.31	0.2 U
Cadmium	2.5	4.3	0.36 U	0.38 U	2	2.3	**4**	0.52 U	0.5 U
Calcium	NS	NS	28,800 J	33,200 J	23,100 J	24,300 J	17,700 J	2,910 J	1,890 J
Chromium	30	180	23.9 J	10.5 J	19.5 J	22 J	**33.6 J**	29.5	12.7
Chromium, Hexavalent	NS	NS	NA	NA	NA	NA	NA	1 J	0.52 J
Cobalt	NS	NS	8.2 J	4.7 U J	6.8 J	7 J	7.2 J	8.9	5 U
Copper	50	270	26.6	16.1	**57.1**	**57.9**	**65.5**	9.6	8.4
Iron	NS	NS	15,900 J	7,030 J	13,400 J	13,700 J	26,500 J	15,000 J	5,080 J
Lead	63	400	52.3 J	2.6 J	**347 J**	**433 J**	**752 J**	18.2	2 U
Magnesium	NS	NS	13,300	21,300	13,100	14,600	7,150	5,060 J	1,400 J
Manganese	1,600	2,000	369 J	87.5 J	163 J	177 J	330 J	147	53.2
Mercury	0.18	0.81	**0.21**	0.035 U	**0.22**	**0.2**	**0.33**	0.038 U	0.035 U
Nickel	30	310	16.5 J	7.4	20.6 J	22.3 J	25.4 J	17.1	4.6
Potassium	NS	NS	3,550	1,030	1,780	1,950	2,570	1,000 U	1,000 U
Selenium	3.9	180	0.91 U	0.95 U	0.92 U	0.89 U	1.1	2.1 U	2 U
Silver	2	180	0.45 U	0.47 U	0.46 U	0.44 U	0.43 U	0.52 U	0.5 U
Sodium	NS	NS	450 U	470 U	460 U	440 U	430 U	1,000 U	1,000 U
Thallium	NS	NS	0.91 U	0.95 U	0.92 U	0.89 U	0.86 U	1 U	1 U
Vanadium	NS	NS	28 J	15.1 J	37.8 J	40.6 J	33.6 J	25.6	5.7
Zinc	109	10,000	53 J	17.5 J	**304 J**	**336 J**	**1,530 J**	85.2	14.9

Attached Table 5
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740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Analytical Results
Metals

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-7 (0-2)	SB-XX	SB-7 (4-6)	SB-8 (0-2)	SB-8 (4-6)	SB-9 (0-2)	SB-9 (4-6)
Date Sampled			5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014	5/22/2014
Dilution			1	1	1/2 †	1	1	1/2 †	1/2 †
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	NS	NS	21,600 J	16,600 J	8,610 J	14,100 J	5,900 J	19,800 J	6,260 J
Antimony	NS	NS	2 U J	1.9 U J	2.1 U J	2 U J	2.1 U J	1.9 U J	2 U J
Arsenic	13	16	2.7	2.1	2.1	2 U	2.1 U	3.7	2 U
Barium	350	400	287	154	99.3	83.2	39.3	47.3	37.5
Beryllium	7.2	72	0.74	0.55	0.34	0.46	0.21 U	0.61	0.39
Cadmium	2.5	4.3	0.93	0.49	0.52 U	0.51 U	0.53 U	0.48 U	0.49 U
Calcium	NS	NS	7,610 J	3,510 J	3,200 J	4,130 J	2,520 J	1,730 J	2,390 J
Chromium	30	180	**77.7**	**40.8**	29.9	**32.5**	18.1	30	20.1
Chromium, Hexavalent	NS	NS	3 J	1.2 J	0.91 J	0.56 U J	0.86 J	1.3 J	0.64 J
Cobalt	NS	NS	10.9	12.3	6.3	7.2	5.3 U	9.8	5.1
Copper	50	270	14	11	10.6	17.8	10.9	16.3	8
Iron	NS	NS	17,800 J	19,400 J	11,000 J	14,700 J	6,900 J	22,200 J	8,500 J
Lead	63	400	25.2 J	7.8 J	13.2	10.3	3.7	10.9	2.9
Magnesium	NS	NS	4,980 J	7,110 J	3,630 J	3,860 J	2,160 J	5,180 J	2,550 J
Manganese	1,600	2,000	280	225	139	149	72	198	101
Mercury	0.18	0.81	0.13 J	0.043 U J	0.046 U	0.044 U	0.035 U	**0.29**	0.037 U
Nickel	30	310	26.7	24.4	13.5	17.1	8.2	18.7	8.8
Potassium	NS	NS	990 U	970 U	1,000 U	1,300	1,100 U	1,050	1,470
Selenium	3.9	180	**4.1 J**	1.9 U J	2.1 U	2 U	2.1 U	1.9 U	2 U
Silver	2	180	0.49 U	0.49 U	0.52 U	0.51 U	0.53 U	0.48 U	0.49 U
Sodium	NS	NS	990 U	970 U	1,000 U	1,000 U	1,100 U	970 U	990 U
Thallium	NS	NS	0.99 U	0.97 U	1 U	1 U	1.1 U	0.97 U	0.99 U
Vanadium	NS	NS	38.8	36.8	30.5	29.6	13	37.3	18.9
Zinc	109	10,000	108	**122**	64.2	51.1	23.4	57.6	24

Attached Table 5
Brook 156
740 Brook Avenue, Bronx, New York

Remedial Investigation Soil Analytical Results

Metals

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SB-10 (0-1)	SB-11 (0-1)	SB-12 (0-2)	SB-13 (0-2)	FB-SOIL-1	FB-SOIL-2	FB052214
Date Sampled			8/12/2014	8/12/2014	8/12/2014	8/12/2014	10/21/2013	10/21/2013	5/22/2014
Dilution			1/2 †	1/2 †	1/2 †	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L
Aluminum	NS	NS	8,760	7,460	8,720	11,900	200 U	200 U	200 U
Antimony	NS	NS	2.1 U	1.9 U	2.1 U	2.2 U	6 U	6 U	6 U
Arsenic	13	16	12.2	**14.4**	2.9	7.3	4 U	4 U	3 U
Barium	350	400	89.6	198	49.1	122	50 U	50 U	200 U
Beryllium	7.2	72	0.34	0.35	0.44	0.71	4 U	4 U	1 U
Cadmium	2.5	4.3	1.4 b	2.1 b	0.53 U	**4**	4 U	4 U	3 U
Calcium	NS	NS	19,400	24,500	71,200	12,300	5,000 U	5,000 U	5,000 U
Chromium	30	180	**31 b**	**39.9 b**	14.1	21.3	10 U	10 U	10 U
Chromium, Hexavalent	NS	NS	1 J	0.56 U J	0.53 J	0.42 U J	NA	NA	NA
Cobalt	NS	NS	10.9	9	5.5	8.7	50 U	50 U	50 U
Copper	50	270	**171 b**	**189 b**	18.3	**62.9**	25 U	25 U	10 U
Iron	NS	NS	55,400	53,300	10,500	18,700	100 U	100 U	100 U
Lead	63	400	**505 b**	**876 b**	**73.1**	**192**	5 U	5 U	3 U
Magnesium	NS	NS	4,870	5,720	44,700	9,490	5,000 U	5,000 U	5,000 U
Manganese	1,600	2,000	550 b	569 b	229	375	15 U	15 U	15 U
Mercury	0.18	0.81	**0.28**	**0.42**	**0.51**	**1.1**	0.2 U	0.2 U	0.2 U
Nickel	30	310	**34.2**	**34.4**	11.2	23.2	40 U	40 U	10 U
Potassium	NS	NS	1,100 U	996	2,510	2,170	5,000 U	5,000 U	10,000 U
Selenium	3.9	180	4.3 Ub	3.8 Ub	2.1 U	2.2 U	10 U	10 U	10 U
Silver	2	180	1.1 Ub	0.95 Ub	0.53 U	0.54 U	5 U	5 U	10 U
Sodium	NS	NS	1,100 U	950 U	1,100 U	1,100 U	5,000 U	5,000 U	10,000 U
Thallium	NS	NS	2.1 Ub	1.9 Ub	1.1 U	1.1 U	5 U	5 U	2 U
Vanadium	NS	NS	58.5	46.9	18.2	32	10 U	10 U	50 U
Zinc	109	10,000	**345**	**567**	59.5	**2,210**	20 U	20 U	20 U

Attached Table 6
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Groundwater Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC AWQS	MW-1	MW-X	MW-2	MW-3	MW-4	FB06102014	TRIP BLANK
Date Sampled		6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014
Dilution		1	1	1/10*	1	1	1	1
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1,1,1-Trichloroethane	5	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1,2,2-Tetrachloroethane	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	1	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
1,1-Dichloroethane	5	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,1-Dichloroethene	5	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
1,2,3-Trichlorobenzene	5	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
1,2,4-Trichlorobenzene	5	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
1,2-Dibromo-3-chloropropane	0.04	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
1,2-Dibromoethane	0.0006	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1,2-Dichlorobenzene	3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	0.6	0.22 U	0.22 U	**122**	0.22 U	0.22 U	0.22 U	0.22 U
1,2-Dichloropropane	1	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,3-Dichlorobenzene	3	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
1,4-Dichlorobenzene	3	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
2-Butanone (MEK)	50	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U
2-Hexanone	50	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
4-Methyl-2-pentanone (MIBK)	NS	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Acetone	50	3.3 U R	3.3 U R	37.6 J	3.3 U R	3.3 U R	3.3 U R	3.3 U R
Benzene	1	0.28 U	0.28 U	**212 D**	0.28 U	0.28 U	0.28 U	0.28 U
Bromochloromethane	5	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Bromodichloromethane	50	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Bromoform	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Bromomethane	5	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U
Carbon disulfide	60	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Carbon tetrachloride	5	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
Chlorobenzene	5	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Chloroethane	5	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Chloroform	7	0.25 U	0.25 U	0.25 U	0.33 J	2.5	0.25 U	0.25 U
Chloromethane	5	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
cis-1,2-Dichloroethene	5	1.5	1.5	0.24 U	0.33 J	0.24 U	0.24 U	0.24 U
cis-1,3-Dichloropropene	NS	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Cyclohexane	NS	0.18 U	0.18 U	40.3	0.18 U	0.18 U	0.18 U	0.18 U
Dibromochloromethane	50	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Dichlorodifluoromethane	5	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U
Ethylbenzene	5	0.21 U	0.21 U	**33.6**	0.21 U	0.21 U	0.21 U	0.21 U
Freon 113	5	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
Isopropylbenzene	5	0.22 U	0.22 U	1.7 J	0.22 U	0.22 U	0.22 U	0.22 U
m,p-Xylene	5	0.4 U	0.4 U	**153**	0.4 U	0.4 U	0.4 U	0.4 U
Methyl Acetate	NS	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Methyl Tert Butyl Ether	10	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Methylcyclohexane	NS	0.15 U	0.15 U	15.6	0.15 U	0.15 U	0.15 U	0.15 U
Methylene chloride	5	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U
o-Xylene	5	0.19 U	0.19 U	**81.3**	0.19 U	0.19 U	0.19 U	0.19 U
Styrene	5	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Tetrachloroethene	5	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Toluene	5	0.44 U	0.44 U	**50.9**	0.44 U	0.44 U	0.44 U	0.44 U
trans-1,2-Dichloroethene	5	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
trans-1,3-Dichloropropene	NS	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Trichloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	5	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Vinyl chloride	2	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
Xylenes, Total	5	0.19 U	0.19 U	**235**	0.19 U	0.19 U	0.19 U	0.19 U

Attached Table 7
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Groundwater Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC	MW-1	MW-X	MW-2	MW-3	MW-4	FB06102014
Date Sampled	AWQS	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1,1'-Biphenyl	5	0.27 U J	2.1	0.29 U	0.28 U	0.27 U	0.29 U
1,2,4,5-Tetrachlorobenzene	5	0.44 U	0.47 U	0.46 U	0.46 U	0.44 U	0.47 U
1,4-Dioxane	NS	0.72 U	0.75 U	0.74 U	0.74 U	0.72 U	0.75 U
2,3,4,6-Tetrachlorophenol	NS	1.4 U	1.5 U	1.5 U	1.4 U	1.4 U	1.5 U
2,4,5-Trichlorophenol	NS	1.7 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U
2,4,6-Trichlorophenol	NS	1.5 U	1.6 U	1.6 U	1.6 U	1.5 U	1.6 U
2,4-Dichlorophenol	5	1.6 U	1.7 U	1.7 U	1.7 U	1.6 U	1.7 U
2,4-Dimethylphenol	50	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U
2,4-Dinitrophenol	10	6.5 U J	6.9 U J	6.8 U J	6.7 U J	6.5 U J	6.9 U J
2,4-Dinitrotoluene	5	0.32 U	0.34 U	0.33 U	0.33 U	0.32 U	0.34 U
2,6-Dinitrotoluene	5	0.26 U	0.27 U	0.27 U	0.26 U	0.26 U	0.27 U
2-Chloronaphthalene	10	0.34 U	0.36 U	0.36 U	0.35 U	0.34 U	0.36 U
2-Chlorophenol	NS	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
2-Methylnaphthalene	NS	0.29 U J	13.6	1.6	0.3 U	0.29 U	0.31 U
2-Methylphenol	NS	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
2-Nitroaniline	5	0.32 U	0.33 U	0.33 U	0.33 U	0.32 U	0.33 U
2-Nitrophenol	NS	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
3&4-Methylphenol	NS	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
3,3'-Dichlorobenzidine	5	0.56 U	0.59 U	0.58 U R	0.58 U	0.56 U	0.59 U
3-Nitroaniline	5	0.26 U	0.28 U	0.27 U	0.27 U	0.26 U	0.28 U
4,6-Dinitro-o-cresol	NS	1.3 U	1.4 U	1.4 U	1.4 U	1.3 U	1.4 U
4-Bromophenyl phenyl ether	NS	0.25 U	0.26 U	0.26 U	0.26 U	0.25 U	0.26 U
4-Chloro-3-methyl phenol	NS	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.4 U
4-Chloroaniline	5	0.3 U	0.32 U	0.31 U	0.31 U	0.3 U	0.32 U
4-Chlorophenyl phenyl ether	NS	0.38 U	0.4 U	0.4 U	0.39 U	0.38 U	0.4 U
4-Nitroaniline	5	0.3 U	0.32 U	0.31 U	0.31 U	0.3 U	0.32 U
4-Nitrophenol	NS	0.91 U	0.95 U	0.94 U	0.94 U	0.91 U	0.95 U
Acenaphthene	20	0.3 U J	1.4	0.31 U	0.3 U	0.3 U	0.31 U
Acenaphthylene	NS	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U
Acetophenone	NS	0.36 U	0.38 U	0.38 U	0.38 U	0.36 U	0.38 U
Anthracene	50	0.19 U	0.2 U	0.2 U	0.19 U	0.19 U	0.2 U
Atrazine	7.5	0.42 U	0.45 U	0.44 U	0.44 U	0.42 U	0.45 U
Benzaldehyde	NS	0.67 U	0.71 U	0.7 U	0.69 U	0.67 U	0.71 U
Benzo(a)anthracene	0.002	0.22 U	0.23 U	0.23 U	0.22 U	0.22 U	0.23 U
Benzo(a)pyrene	ND	0.24 U	0.25 U	0.25 U	0.25 U	0.24 U	0.25 U
Benzo(b)fluoranthene	0.002	0.22 U	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Benzo(g,h,i)perylene	NS	0.31 U	0.33 U	0.32 U	0.32 U	0.31 U	0.33 U
Benzo(k)fluoranthene	0.002	0.22 U	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
bis(2-Chloroethoxy)methane	5	0.42 U	0.44 U	0.44 U	0.43 U	0.42 U	0.44 U
bis(2-Chloroethyl)ether	1	0.43 U	0.46 U	0.45 U	0.45 U	0.43 U	0.46 U
bis(2-Chloroisopropyl)ether	NS	0.41 U	0.43 U	0.42 U	0.42 U	0.41 U	0.43 U
bis(2-Ethylhexyl)phthalate	5	0.55 U	0.58 U	0.58 U	0.57 U	0.55 U	0.58 U
Butyl benzyl phthalate	50	0.22 U	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Caprolactam	NS	0.41 U	0.43 U	0.42 U	0.42 U	0.41 U	0.43 U
Carbazole	NS	0.17 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U
Chrysene	0.002	0.16 U	0.17 U	0.17 U	0.17 U	0.16 U	0.17 U
Dibenzo(a,h)anthracene	NS	0.28 U	0.29 U	0.29 U	0.29 U	0.28 U	0.29 U
Dibenzofuran	NS	0.23 U	0.24 U	0.24 U	0.24 U	0.23 U	0.24 U
Diethyl phthalate	50	0.23 U	0.25 U	0.24 U	0.24 U	0.23 U	0.25 U
Dimethyl phthalate	50	0.26 U	0.28 U	0.27 U	0.27 U	0.26 U	0.28 U
Di-n-butyl phthalate	50	0.58 U	0.61 U	0.61 U	0.6 U	0.58 U	0.61 U
Di-n-octyl phthalate	50	0.25 U	0.26 U	0.26 U	0.26 U	0.25 U	0.26 U
Fluoranthene	50	0.16 U	0.17 U	0.17 U	0.17 U	0.16 U	0.17 U
Fluorene	50	0.27 U	2.1	0.28 U	0.28 U	0.27 U	0.29 U
Hexachlorobenzene	0.04	0.46 U	0.48 U	0.48 U	0.47 U	0.46 U	0.48 U
Hexachlorobutadiene	0.5	0.39 U	0.41 U	0.4 U	0.4 U	0.39 U	0.41 U
Hexachlorocyclopentadiene	5	0.48 U	0.51 U	0.5 U	0.5 U	0.48 U	0.51 U
Hexachloroethane	5	0.29 U	0.3 U	0.3 U	0.3 U	0.29 U	0.3 U
Indeno(1,2,3-cd)pyrene	0.002	0.4 U	0.42 U	0.42 U	0.42 U	0.4 U	0.42 U
Isophorone	50	0.34 U	0.36 U	0.35 U	0.35 U	0.34 U	0.36 U
Naphthalene	10	0.27 U J	2.8	**13.2**	0.27 U	0.27 U	0.28 U
Nitrobenzene	0.4	0.52 U	0.55 U	0.54 U	0.54 U	0.52 U	0.55 U
N-Nitroso-di-n-propylamine	NS	0.38 U	0.4 U	0.39 U	0.39 U	0.38 U	0.4 U
N-Nitrosodiphenylamine	50	0.21 U	0.22 U	0.21 U	0.21 U	0.21 U	0.22 U
Pentachlorophenol	NS	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Phenanthrene	50	0.19 U J	3.8	0.19 U	0.19 U	0.19 U	0.19 U
Phenol	NS	0.55 U	0.58 U	0.57 U	0.56 U	0.55 U	0.58 U
Pyrene	50	0.19 U J	0.75 J	0.2 U	0.2 U	0.19 U	0.2 U

Attached Table 8
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Groundwater Analytical Results
Polychlorinated Biphenyls (PCBs)

Sample ID	NYSDEC AWQS	MW-1	MW-X	MW-2	MW-3	MW-4	FB06102014
Date Sampled		6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Aroclor 1016	NS	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Aroclor 1221	NS	0.27 U	0.28 U	0.28 U	0.27 U	0.27 U	0.27 U
Aroclor 1232	NS	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Aroclor 1242	NS	0.087 U	0.088 U	0.088 U	0.086 U	0.086 U	0.086 U
Aroclor 1248	NS	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Aroclor 1254	NS	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Aroclor 1260	NS	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Aroclor 1262	NS	0.061 U	0.061 U	0.062 U	0.06 U	0.06 U	0.06 U
Aroclor 1268	NS	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Total PCBs	0.09	ND	ND	ND	ND	ND	ND

Attached Table 9
Brook 156
740 Brook Avenue, Bronx, New York

Remedial Investigation Groundwater Analytical Results

Pesticides

Sample ID	NYSDEC AWQS	MW-1	MW-X	MW-2	MW-3	MW-4	FB06102014
Date Sampled		6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
4,4'-DDD	0.3	0.0025 U	0.0025 U J	0.0025 U	0.0025 U	0.0025 U	0.0025 U
4,4'-DDE	0.2	0.0017 U	0.0017 U J	0.0018 U	0.0018 U	0.0018 U	0.0017 U
4,4'-DDT	0.2	0.0032 U	0.0032 U J	0.0032 U	0.0032 U	0.0032 U	0.0032 U
Aldrin	ND	0.008 U	0.008 U J	0.0081 U	0.0081 U	0.0081 U	0.0079 U
alpha-BHC	0.01	0.0024 U	0.0024 U J	0.0024 U	0.0024 U	0.0024 U	0.0023 U
alpha-Chlordane	0.05	0.0029 U	0.0029 U J	0.0029 U	0.0029 U	0.0029 U	0.0029 U
beta-BHC	0.04	0.0023 U	0.0023 U J	0.0024 U	0.0024 U	0.0024 U	0.0023 U
delta-BHC	0.04	0.0019 U	0.0019 U J	0.0019 U	0.0019 U	0.0019 U	0.0019 U
Dieldrin	0.004	0.0016 U	0.0016 U J	0.0016 U	0.0016 U	0.0016 U	0.0016 U
Endosulfan sulfate	NS	0.0019 U	0.0019 U J	0.002 U	0.002 U	0.002 U	0.0019 U
Endosulfan-I	NS	0.0029 U	0.0029 U J	0.0029 U	0.0029 U	0.0029 U	0.0028 U
Endosulfan-II	NS	0.002 U	0.002 U J	0.002 U	0.002 U	0.002 U	0.002 U
Endrin	ND	0.002 U	0.002 U J	0.002 U	0.002 U	0.002 U	0.002 U
Endrin aldehyde	5	0.0037 U	0.0037 U J	0.0038 U	0.0038 U	0.0038 U	0.0037 U
Endrin ketone	5	0.0048 U	0.0048 U J	0.0049 U	0.0049 U	0.0049 U	0.0047 U
gamma-BHC (Lindane)	0.05	0.0017 U	0.0018 U J	0.0018 U	0.0018 U	0.0018 U	0.0017 U
gamma-Chlordane	0.05	0.0021 U	0.0022 U J	0.0022 U	0.0022 U	0.0022 U	0.0021 U
Heptachlor	0.04	0.0022 U	0.0022 U J	0.0022 U	0.0022 U	0.0022 U	0.0022 U
Heptachlor epoxide	0.03	0.0027 U	0.0027 U J	0.0027 U	0.0027 U	0.0027 U	0.0026 U
Methoxychlor	35	0.0041 U	0.0041 U J	0.0042 U	0.0042 U	0.0042 U	0.0041 U
Toxaphene	0.06	0.15 U	0.15 U J	0.15 U	0.15 U	0.15 U	0.15 U

Attached Table 10
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Groundwater Analytical Results

Metals - Total

Sample ID	NYSDEC AWQS	MW-1	MW-X	MW-2	MW-3	MW-4	FB06102014
Date Sampled		6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Aluminum	NS	522	274	743	924	13,700	200 U
Antimony	3	6 U	6 U	6 U	6 U	6 U	6 U
Arsenic	25	3 U	3 U	6.3	3 U	6	3 U
Barium	1,000	200 U	200 U	200 U	200 U	200 U	200 U
Beryllium	3	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	5	3 U	3 U	3 U	3 U	3 U	3 U
Calcium	NS	117,000	119,000	143,000	105,000	59,700	5,000 U
Chromium	50	10 U	10 U	10 U	10 U	**53.2**	10 U
Cobalt	NS	50 U	50 U	50 U	50 U	50 U	50 U
Copper	200	10 U	10 U	17.9	10 U	43.1	10 U
Iron	300	**990**	**443**	**2,930**	**2,260**	**28,600**	100 U
Lead	25	3 U	3 U	8	7.7	16.7	3 U
Magnesium	35,000	**50,100**	**50,800**	**50,700**	**35,300**	20,500	5,000 U
Manganese	300	**1,090**	**1,070**	**1,870**	**1,390**	**535**	15 U
Mercury	0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100	10 U	10 U	17.8	10 U	35.7	10 U
Potassium	NS	10,000 U	10,000 U	10,600	10,000 U	10,000 U	10,000 U
Selenium	10	10 U	10 U	**27.3**	**15.9**	10 U	10 U
Silver	50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	20,000	**70,800**	**73,200**	**226,000**	**44,200**	**53,900**	10,000 U
Thallium	0.5	2 U	2 U	2 U	2 U	2 U	2 U
Vanadium	NS	50 U	50 U	50 U	50 U	50 U	50 U
Zinc	2,000	20 U	20 U	20 U	20 U	82.5	20 U

Attached Table 11
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Groundwater Analytical Results

Metals - Filtered

Sample ID	NYSDEC AWQS	MW-1	MW-X	MW-2	MW-3	MW-4	FB06102014
Date Sampled		6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014	6/10/2014
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Aluminum	NS	200 U	200 U	200 U	200 U	200 U	200 U
Antimony	3	6 U	6 U	6 U	6 U	6 U	6 U
Arsenic	25	3 U	3 U	6.4	3 U	3 U	3 U
Barium	1,000	200 U	200 U	200 U	200 U	200 U	200 U
Beryllium	3	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	5	3 U	3 U	3 U	3 U	3 U	3 U
Calcium	NS	125,000	128,000	164,000	122,000	71,900	5,000 U
Chromium	50	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	NS	50 U	50 U	50 U	50 U	50 U	50 U
Copper	200	10 U	10 U	19.5	10 U	10 U	10 U
Iron	300	100 U	100 U	218	100 U	100 U	100 U
Lead	25	3 U	3 U	5.5	3 U	3 U	3 U
Magnesium	35,000	**55,500**	**56,300**	**57,600**	**39,900**	18,100	5,000 U
Manganese	300	**1,160**	**1,120**	2,040 U	**1,680**	20.4	15 U
Mercury	0.7	0.2 U	0.2 U	0.2	0.2 U	0.2 U	0.2 U
Nickel	100	10 U	10 U	20.9	10 U	10 U	10 U
Potassium	NS	10,000 U	10,000 U	12,100	10,000 U	10,000 U	10,000 U
Selenium	10	10 U	10 U	**11.4**	10 U	10 U	10 U
Silver	50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	20,000	**69,100**	**69,000**	**263,000**	**49,000**	**61,800**	10,000 U
Thallium	0.5	2 U	2 U	2 U	2 U	2 U	2 U
Vanadium	NS	50 U	50 U	50 U	50 U	50 U	50 U
Zinc	2,000	20 U	20 U	20 U	20 U	20 U	20 U

Attached Table 12
Brook 156
740 Brook Avenue, Bronx, New York
Remedial Investigation Soil Vapor Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	SV-1	SV-2	SV-3	SV-4	AA-1
Date Sampled	10/22/2013	10/23/2013	5/22/2014	5/22/2014	5/22/2014
Dilution	1.55	19,760	29	59.2	1
Unit	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
1,1,1-Trichloroethane	0.36 U	87 U	0.36 U	0.71 U	0.087 U
1,1,2,2-Tetrachloroethane	0.82 U	210 U	0.82 U	1.6 U	0.21 U
1,1,2-Trichloroethane	0.65 U	170 U	0.65 U	1.4 U	0.17 U
1,1-Dichloroethane	0.27 U	65 U	0.27 U	0.53 U	0.065 U
1,1-Dichloroethylene	0.33 U	83 U	0.33 U	0.67 U	0.083 U
1,2,4-Trichlorobenzene	2.4 U J	580 U	2.4 U	4.7 U	0.59 U
1,2,4-Trimethylbenzene	0.32 U	2,950	189	115	0.79 J
1,2-Dibromoethane	0.85 U	210 U	0.85 U	1.7 U	0.21 U
1,2-Dichloroethane	18	65 U	0.27 U	0.53 U	0.065 U
1,2-Dichloropropane	0.74 U	180 U	0.74 U	1.5 U	0.18 U
1,3,5-Trimethylbenzene	0.29 U	2,010	40	37	0.074 U
1,3-Butadiene	0.17 U	42 U	0.17 U	0.35 U	0.044 U
1,4-Dioxane	0.86 U	220 U	0.86 U	1.7 U	0.22 U
2,2,4-Trimethylpentane	0.39 U	98 U	29	227	1.9
2-Chlorotoluene	0.41 U	100 U	0.41 U	0.83 U	0.1 U
2-Hexanone	0.4 U	98 U	0.4 U	0.82 U	0.1 U
3-Chloropropene	0.34 U	85 U	0.34 U	0.69 U	0.088 U
4-Ethyltoluene	0.29 U	1,830	15	37	0.074 U
Acetone	72.5 J	81 U	58.4	69.1	16
Benzene	8.9	1,010,000 D	15	140	1
Benzyl Chloride	0.51 U	120 U	0.51 U	1 U	0.13 U
Bromodichloromethane	0.66 U	160 U	0.66 U	1.3 U	0.17 U
Bromoethene	0.25 U	61 U	0.25 U	0.48 U	0.061 U
Bromoform	0.89 U	220 U	0.89 U	1.8 U	0.23 U
Bromomethane	0.27 U	66 U	0.27 U	0.54 U	0.066 U
Carbon disulfide	9.7	53 U	44.8	123	0.053 U
Carbon tetrachloride	0.28 U	69 U	0.28 U	0.57 U	0.069 U
Chlorobenzene	0.46 U	120 U	0.46 U	0.92 U	0.12 U
Chloroethane	0.22 U	53 U	0.22 U	0.42 U	0.053 U
Chloroform	6.8	88 U	333	230	0.093 U
Chloromethane	7.4	68 U	0.27 U	17	1.3
cis-1,2-Dichloroethylene	0.44 U	110 U	0.44 U	0.87 U	0.11 U
cis-1,3-Dichloropropene	0.34 U	82 U	0.34 U	0.68 U	0.086 U
Cyclohexane	10	1,340,000 D	15	20	0.52 J
Dibromochloromethane	1 U	250 U	1 U	2 U	0.25 U
Dichlorodifluoromethane	11	74 U	3.9 J	0.59 U	3.3
Ethanol	25.4	340 U	25.6	58.2	15
Ethyl Acetate	6.1	200 U	0.83 U	1.7 U	2.1
Ethylbenzene	34	35,000	13	118	0.91
Freon 113	0.63 U	150 U	0.63 U	1.2 U	2
Freon 114	0.59 U	150 U	0.59 U	1.2 U	0.15 U
Heptane	31	1,340,000 D	24	134	0.9
Hexachlorobutadiene	2.7 U J	660 U	2.7 U	5.3 U	0.67 U
Hexane	42.6	3,340,000 D	44.8	158	3.3
Isopropyl Alcohol	4.9	93 U	0.37 U	0.76 U	2.7
m,p-Xylene	22	132,000	46	423	3.1
m-Dichlorobenzene	0.6 U	150 U	0.6 U	1.2 U	0.15 U
Methyl ethyl ketone	19	170 U	8	33.9	1.2
Methyl Isobutyl Ketone	0.49 U	120 U	0.49 U	0.94 U	0.12 U
Methyl Tert Butyl Ether	0.25 U	61 U	0.25 U	0.5 U	0.061 U
Methylene chloride	14 J	160 U	13	9.7	6.3
Methylmethacrylate	7.8	160 U	0.66 U	20	0.16 U
o-Dichlorobenzene	0.72 U	170 U	0.72 U	1.4 U	0.17 U
o-Xylene	6.5	32,800	20	109	1.1
p-Dichlorobenzene	0.52 U	130 U	0.52 U	1 U	0.13 U
Propylene	0.22 U	53 U	1400 D	4,470 D	0.053 U
Styrene	6	85 U	0.34 U	0.68 U	0.085 U
Tertiary Butyl Alcohol	5.8	130 U	8.5	7	0.13 U
Tetrachloroethylene	69.2	190 U	5.2	114	0.95
Tetrahydrofuran	21	130 U	43.1	11	0.13 U
Toluene	761 D	942,000 D	66.7	2,130 D	4.9
trans-1,2-Dichloroethylene	0.23 U	59 U	0.23 U	0.48 U	0.059 U
trans-1,3-Dichloropropene	0.38 U	95 U	0.38 U	0.77 U	0.095 U
Trichloroethylene	1.7	100 U	1.8	0.86 U	0.1 U
Trichlorofluoromethane	0.31 U	79 U	0.31 U	0.62 U	1.7
Vinyl Acetate	0.81 U	200 U	0.81 U	1.7 U	0.2 U
Vinyl Chloride	0.17 U	43 U	0.17 U	0.36 U	0.043 U
Xylenes (total)	28	165,000	65.6	530	4.2

Attached Table 13
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC	NYSDEC	NYSDEC	SSB-1 (22-23') 20160901	SSB-1 (26-27') 20160901	SSB-2 (22-23') 20160901	SSB-2 (23-24') 20160901
Date Sampled	UUSCO	RRSCO	PGWSCO	9/1/2016	9/1/2016	9/1/2016	9/1/2016
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,2,4-Trimethylbenzene	3.6	52	3.6	0.0232	0.00019 J	0.0051	0.0023 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	8.4	0.0216	0.0002 J	0.0032 J	0.0023 U
Benzene	0.06	4.8	0.06	0.0107	0.00052 U	0.0011 U	0.00058 U
Cymene	NS	NS	10	0.00037 J	0.0021 U	0.00081 J	0.0023 U
Ethylbenzene	1	41	1	0.0048	0.001 U	0.0022 U	0.0012 U
Isopropylbenzene (Cumene)	NS	NS	2.3	0.0021	0.0021 U	0.00064 J	0.0023 U
M-P-Xylene	NS	NS	NS	0.0298	0.00047 J	0.0013 J	0.0012 U
Naphthalene	12	100	12	0.0063	0.00026 J	0.011 U	0.0058 U
N-Butylbenzene	12	100	12	0.00094 J	0.0021 U	0.00075 J	0.0023 U
N-Propylbenzene	3.9	100	3.9	0.0016 J	0.0021 U	0.0016 J	0.0023 U
O-Xylene (1,2-Dimethylbenzene)	NS	100	NS	0.0096	0.001 U	0.00047 J	0.0012 U
Sec-Butylbenzene	11	100	11	0.00046 J	0.0021 U	0.00078 J	0.0023 U
T-Butylbenzene	5.9	100	5.9	0.0021 U	0.0021 U	0.0044 U	0.0023 U
Tert-Butyl Methyl Ether	0.93	100	0.93	0.0011 U	0.001 U	0.0022 U	0.0012 U
Toluene	0.7	100	0.7	0.0053	0.00017 J	0.0022 U	0.0012 U
Xylenes, Total	0.26	100	1.6	0.0394	0.00047 J	0.0018 J	0.0012 U

Attached Table 13
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC	NYSDEC	NYSDEC	SSB-3 (14-15') 20160901	SSB-X 20160901	SSB-3 (22-23') 20160901	SSB-3 (23-24') 20160901
Date Sampled	UUSCO	RRSCO	PGWSCO	9/1/2016	9/1/2016	9/1/2016	9/1/2016
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,2,4-Trimethylbenzene	3.6	52	3.6	0.0027 J	0.00026 J	0.00041 J	0.0022 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	8.4	0.0021 J	0.00031 J	0.00077 J	0.0022 U
Benzene	0.06	4.8	0.06	0.0086	0.0082	0.0042	0.00056 U
Cymene	NS	NS	10	0.0021 U	0.0019 U	0.0025 U	0.0022 U
Ethylbenzene	1	41	1	0.0011 J	0.00053 J	0.0016	0.0011 U
Isopropylbenzene (Cumene)	NS	NS	2.3	0.00018 J	0.0019 U	0.00025 J	0.0022 U
M-P-Xylene	NS	NS	NS	0.0068 J	0.0023 J	0.0045	0.0011 U
Naphthalene	12	100	12	0.0021 J	0.00038 J	0.0064 U	0.0056 U
N-Butylbenzene	12	100	12	0.0021 U	0.0019 U	0.0025 U	0.0022 U
N-Propylbenzene	3.9	100	3.9	0.0021 U	0.0019 U	0.0025 U	0.0022 U
O-Xylene (1,2-Dimethylbenzene)	NS	100	NS	0.0064 J	0.0016 J	0.0027	0.0011 U
Sec-Butylbenzene	11	100	11	0.0021 U	0.0019 U	0.0025 U	0.0022 U
T-Butylbenzene	5.9	100	5.9	0.0021 U	0.0019 U	0.0025 U	0.0022 U
Tert-Butyl Methyl Ether	0.93	100	0.93	0.001 U	0.00095 U	0.0013 U	0.0011 U
Toluene	0.7	100	0.7	0.0164 J	0.0087 J	0.0024	0.0011 U
Xylenes, Total	0.26	100	1.6	0.0131 J	0.0039 J	0.0072	0.0011 U

Attached Table 13
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC	NYSDEC	NYSDEC	SSB-4 (26-27') 20160831	SSB-4 (27-28') 20160831	SSB-5 (9-10') 20160902	SSB-6 (9-10') 20160902
Date Sampled	UUSCO	RRSCO	PGWSCO	8/31/2016	8/31/2016	9/2/2016	9/2/2016
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,2,4-Trimethylbenzene	3.6	52	3.6	0.0012 J	0.0011 J	0.0023 U	0.0022 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	8.4	0.0011 J	0.0014 J	0.0023 U	0.0022 U
Benzene	0.06	4.8	0.06	0.00052 J	0.0011	0.00059 U	0.00054 U
Cymene	NS	NS	10	0.0022 U	0.00039 J	0.0023 U	0.0022 U
Ethylbenzene	1	41	1	0.00043 J	0.0005 J	0.0012 U	0.0011 U
Isopropylbenzene (Cumene)	NS	NS	2.3	0.0022 U	0.00029 J	0.0023 U	0.0022 U
M-P-Xylene	NS	NS	NS	0.0015	0.0013	0.0012 U	0.0011 U
Naphthalene	12	100	12	0.003 J	0.0013 J	0.0059 U	0.0054 U
N-Butylbenzene	12	100	12	0.0022 U	0.00098 J	0.0023 U	0.0022 U
N-Propylbenzene	3.9	100	3.9	0.0022 U	0.00049 J	0.0023 U	0.0022 U
O-Xylene (1,2-Dimethylbenzene)	NS	100	NS	0.00071 J	0.00087 J	0.0012 U	0.0011 U
Sec-Butylbenzene	11	100	11	0.0022 U	0.00044 J	0.0023 U	0.0022 U
T-Butylbenzene	5.9	100	5.9	0.0022 U	0.0022 U	0.0023 U	0.0022 U
Tert-Butyl Methyl Ether	0.93	100	0.93	0.0011 U	0.0011 U	0.0012 U	0.0011 U
Toluene	0.7	100	0.7	0.0013	0.0012	0.0012 U	0.0011 U
Xylenes, Total	0.26	100	1.6	0.0022	0.0022	0.0012 U	0.0011 U

Attached Table 13
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC	NYSDEC	NYSDEC	FB-20160902	TB-20160901
Date Sampled	UUSCO	RRSCO	PGWSCO	9/2/2016	9/1/2016
Unit	mg/kg	mg/kg	mg/kg	µg/L	mg/kg
1,2,4-Trimethylbenzene	3.6	52	3.6	2 U	0.002 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	8.4	2 U	0.002 U
Benzene	0.06	4.8	0.06	0.5 U	0.0005 U
Cymene	NS	NS	10	2 U	0.002 U
Ethylbenzene	1	41	1	1 U	0.001 U
Isopropylbenzene (Cumene)	NS	NS	2.3	1 U	0.002 U
M-P-Xylene	NS	NS	NS	1 U	0.001 U
Naphthalene	12	100	12	5 U	0.005 U
N-Butylbenzene	12	100	12	2 U	0.002 U
N-Propylbenzene	3.9	100	3.9	2 U	0.002 U
O-Xylene (1,2-Dimethylbenzene)	NS	100	NS	1 U	0.001 U
Sec-Butylbenzene	11	100	11	2 U	0.002 U
T-Butylbenzene	5.9	100	5.9	2 U	0.002 U
Tert-Butyl Methyl Ether	0.93	100	0.93	1 U	0.001 U
Toluene	0.7	100	0.7	1 U	0.001 U
Xylenes, Total	0.26	100	1.6	1 U	0.001 U

Attached Table 14
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SSB-1 (22-23') 20160901	SSB-1 (26-27') 20160901	SSB-2 (22-23') 20160901	SSB-2 (23-24') 20160901
Date Sampled			9/1/2016	9/1/2016	9/1/2016	9/1/2016
Dilution Factor			1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	20	100	0.041 U	0.038 U	0.057 U	0.042 U
Acenaphthylene	100	100	0.041 U	0.038 U	0.057 U	0.042 U
Anthracene	100	100	0.041 U	0.038 U	0.057 U	0.042 U
Benzo(a)anthracene	1	1	0.041 U	0.038 U	0.057 U	0.042 U
Benzo(a)pyrene	1	1	0.041 U	0.038 U	0.057 U	0.042 U
Benzo(b)fluoranthene	1	1	0.041 U	0.038 U	0.057 U	0.042 U
Benzo(g,h,i)perylene	100	100	0.041 U	0.038 U	0.057 U	0.042 U
Benzo(k)fluoranthene	0.8	3.9	0.041 U	0.038 U	0.057 U	0.042 U
Chrysene	1	3.9	0.041 U	0.038 U	0.057 U	0.042 U
Dibenz(a,h)anthracene	0.33	0.33	0.041 U	0.038 U	0.057 U	0.042 U
Fluoranthene	100	100	0.041 U	0.038 U	0.057 U	0.042 U
Fluorene	30	100	0.041 U	0.038 U	0.057 U	0.042 U
Indeno(1,2,3-c,d)pyrene	0.5	0.5	0.041 U	0.038 U	0.057 U	0.042 U
Naphthalene	12	100	0.05	0.038 U	0.057 U	0.042 U
Phenanthrene	100	100	0.041 U	0.038 U	0.057 U	0.042 U
Pyrene	100	100	0.041 U	0.038 U	0.057 U	0.042 U
Total SVOCs	NS	NS	0.05	ND	ND	ND

Attached Table 14
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SSB-3 (14-15') 20160901	SSB-X 20160901	SSB-3 (22-23') 20160901	SSB-3 (23-24') 20160901
Date Sampled			9/1/2016	9/1/2016	9/1/2016	9/1/2016
Dilution Factor			1 And 5	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	20	100	0.813 J	0.101 J	0.039 U	0.035 U
Acenaphthylene	100	100	0.235 J	0.0431 J	0.039 U	0.035 U
Anthracene	100	100	1.48 J	0.198 J	0.039 U	0.035 U
Benzo(a)anthracene	1	1	**2.45 J**	0.415 J	0.039 U	0.035 U
Benzo(a)pyrene	1	1	**2.27 J**	0.38 J	0.039 U	0.035 U
Benzo(b)fluoranthene	1	1	**2.84 J**	0.461 J	0.039 U	0.035 U
Benzo(g,h,i)perylene	100	100	1.03 J	0.189 J	0.039 U	0.035 U
Benzo(k)fluoranthene	0.8	3.9	**1.02 J**	0.185 J	0.039 U	0.035 U
Chrysene	1	3.9	**2.14 J**	0.424 J	0.039 U	0.035 U
Dibenz(a,h)anthracene	0.33	0.33	**0.338 J**	0.0774 J	0.039 U	0.035 U
Fluoranthene	100	100	5.27 JD	0.927 J	0.039 U	0.035 U
Fluorene	30	100	0.726 J	0.101 J	0.039 U	0.035 U
Indeno(1,2,3-c,d)pyrene	0.5	0.5	**1.3 J**	0.238 J	0.039 U	0.035 U
Naphthalene	12	100	0.843 J	0.369 J	0.039 U	0.035 U
Phenanthrene	100	100	7.08 JD	0.906 J	0.039 U	0.035 U
Pyrene	100	100	4.87 JD	0.753 J	0.039 U	0.035 U
Total SVOCs	NS	NS	34.705 JD	5.768	ND	ND

Attached Table 14
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SSB-4 (26-27') 20160831	SSB-4 (27-28') 20160831	SSB-5 (9-10') 20160902	SSB-6 (9-10') 20160902	FB-20160902
Date Sampled			8/31/2016	8/31/2016	9/2/2016	9/2/2016	9/2/2016
Dilution Factor			1	1	1	1	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L
Acenaphthene	20	100	0.15	0.207	0.0362 J	0.019 J	1 U
Acenaphthylene	100	100	0.0941	0.127	0.037 U	0.033 U	1 U
Anthracene	100	100	0.362	0.526	0.0868	0.0383	1 U
Benzo(a)anthracene	1	1	0.852	**1.13**	0.178	0.0826	1 U
Benzo(a)pyrene	1	1	0.755	0.964	0.149	0.0574	1 U
Benzo(b)fluoranthene	1	1	0.946	**1.12**	0.181	0.0666	1 UJ
Benzo(g,h,i)perylene	100	100	0.472	0.547	0.0728	0.0305 J	1 U
Benzo(k)fluoranthene	0.8	3.9	0.297	0.479	0.0752	0.0471	1 U
Chrysene	1	3.9	0.829	**1.12**	0.175	0.0708	1 U
Dibenz(a,h)anthracene	0.33	0.33	0.137	0.161	0.0351 J	0.033 U	1 U
Fluoranthene	100	100	1.97	2.69	0.349	0.154	1 U
Fluorene	30	100	0.157	0.212	0.0327 J	0.033 U	1 U
Indeno(1,2,3-c,d)pyrene	0.5	0.5	**0.524**	**0.611**	0.102	0.0474	1 U
Naphthalene	12	100	0.152	0.228	0.0215 J	0.0134 J	1 U
Phenanthrene	100	100	1.92	2.51	0.377	0.15	1 U
Pyrene	100	100	1.64	2.27	0.313	0.144	1 U
Total SVOCs	NS	NS	11.26	14.902	2.1843 J	0.9211	ND

Attaached Table 15
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Polychlorinated Biphenyls (PCBs)

Sample ID	NYSDEC	NYSDEC	SSB-3 (14-15') 20160901	SSB-X 20160901	SSB-4 (26-27') 20160831	SSB-5 (9-10') 20160902	FB-20160902
Date Sampled	UUSCO	RRSCO	9/1/2016	9/1/2016	8/31/2016	9/2/2016	9/2/2016
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L
PCB-1016 (Aroclor 1016)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1221 (Aroclor 1221)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1232 (Aroclor 1232)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1242 (Aroclor 1242)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1248 (Aroclor 1248)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1254 (Aroclor 1254)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1260 (Aroclor 1260)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1262 (Aroclor 1262)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U
PCB-1268 (Aroclor 1268)	NS	NS	0.036 U	0.036 U	0.041 U	0.035 U	0.33 U

Attached Table 16
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Pesticides

Sample ID	NYSDEC	NYSDEC	SSB-3 (14-15') 20160901	SSB-X 20160901	SSB-4 (26-27') 20160831	SSB-5 (9-10') 20160902	FB-20160902
Date Sampled	UUSCO	RRSCO	9/1/2016	9/1/2016	8/31/2016	9/2/2016	9/2/2016
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L
Aldrin	0.005	0.097	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Alpha Endosulfan	NS	NS	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Beta Endosulfan	NS	NS	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
cis-Chlordane	0.094	4.2	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Dieldrin	0.005	0.2	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Endosulfan Sulfate	NS	NS	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Endrin	0.014	11	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Endrin Aldehyde	NS	NS	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Endrin Ketone	NS	NS	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Gamma Bhc (Lindane)	0.1	1.3	0.00072 U	0.00072	0.00082 U	0.00071 U	0.0067 U
Heptachlor	0.042	2.1	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Heptachlor Epoxide	NS	NS	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
Methoxychlor	NS	NS	0.0014 U	0.0014 U	0.0016 U	0.0014 U	0.013 U
P,P'-DDD	0.0033	13	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
P,P'-DDE	0.0033	8.9	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U
P,P'-DDT	0.0033	7.9	0.0016 JN	0.00072 UJ	0.00082 U	0.00071 U	0.0067 U
Toxaphene	NS	NS	0.018 U	0.018 U	0.02 U	0.018 U	0.17 U
trans-Chlordane	NS	NS	0.00072 U	0.00072 U	0.00082 U	0.00071 U	0.0067 U

Attached Table 17
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Analytical Results
Target Analyte List Metals

Sample ID	NYSDEC UUSCO	NYSDEC RRSCO	SSB-3 (14-15') 20160901	SSB-X 20160901	SSB-4 (26-27') 20160831	SSB-5 (9-10') 20160902	FB-20160902
Date Sampled			9/1/2016	9/1/2016	8/31/2016	9/2/2016	9/2/2016
Dilution Factor			1 and 2	1	1 and 10	1 and 5	1
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L
Aluminum	NS	NS	10,800 JH	12,300 JH	12,900	10,600	200 U
Antimony	NS	NS	2.2 UJ	2.2 UJ	2.4 U	2.3 U	6 U
Arsenic	13	16	2.2 U	2.2	5	3.4	3 U
Barium	350	400	96.1	104	145	67	200 U
Beryllium	7.2	72	0.26 J	0.45 J	0.46	0.42	1 U
Cadmium	2.5	4.3	0.55 U	0.56 U	0.59 U	0.58 U	3 U
Calcium	NS	NS	10,200 JH	8,650 JH	12,600	5,780	5,000 U
Chromium	NS	NS	22	22.9	47.7	25.7	10 U
Cobalt	NS	NS	8.5	8.7	14.2	8.2	50 U
Copper	50	270	29	28.1	36.5	**159**	10 U
Iron	NS	NS	15,400	16,400	28,700	18,000	100 U
Lead	63	400	55.9	55.2	54.1	**81.8**	3 U
Magnesium	NS	NS	7,430 JH	7,970 JH	8,190	6,670	5,000 U
Manganese	1,600	2,000	174	177	264	224	15 U
Mercury	0.18	0.81	**1.3 J**	**0.67 J**	**5**	**2.7**	0.2 U
Nickel	30	310	16.2	17.7	25	17.3	10 U
Potassium	NS	NS	2,660	2,870	3,340	1,700	10,000 U
Selenium	3.9	180	2.2 U	2.2 U	2.4 U	2.3 U	10 U
Silver	2	180	0.55 U	0.65	1.9	0.73	10 U
Sodium	NS	NS	1,100 U	1,100 U	1,200 U	1,200 U	10,000 U
Thallium	NS	NS	1.1 U	1.1 U	1.2 U	1.2 U	2 U
Vanadium	NS	NS	26.6	28.2	35.7	28.6	50 U
Zinc	109	10,000	60.2	66.8	**111**	67.6	20 U

Attached Table 18
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Groundwater Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	NYSDEC	SMW-1 20160920	SMW-2 20160920	SMW-X 20160920	FB-20160920	TB-20160920
Date Sampled	AWQS	9/20/2016	9/20/2016	9/20/2016	9/20/2016	9/20/2016
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1,2,4-Trimethylbenzene	5	2 U	2 U	2 U	2 U	2 U
1,3,5-Trimethylbenzene (Mesitylene)	5	2 U	2 U	2 U	2 U	2 U
Benzene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cymene	5	2 U	2 U	2 U	2 U	2 U
Ethylbenzene	5	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene (Cumene)	5	1 U	1 U	1 U	1 U	1 U
M-P-Xylene	NS	1 U	1 U	1 U	1 U	1 U
Naphthalene	10	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	5	2 U	2 U	2 U	2 U	2 U
N-Propylbenzene	5	2 U	2 U	2 U	2 U	2 U
O-Xylene (1,2-Dimethylbenzene)	5	1 U	1 U	1 U	1 U	1 U
Sec-Butylbenzene	5	2 U	2 U	2 U	2 U	2 U
T-Butylbenzene	5	2 U	2 U	2 U	2 U	2 U
Tert-Butyl Methyl Ether	10	1 U	1 U	1 U	1 U	1 U
Toluene	5	1 U	1 U	1 U	1 U	1 U
Xylenes, Total	NS	1 U	1 U	1 U	1 U	1 U

Attached Table 19
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Groundwater Analytical Results
Semivolatile Organic Compounds (SVOCs)

Sample ID	NYSDEC	SMW-1 20160920	SMW-2 20160920	SMW-X 20160920	FB-20160920
Date Sampled	AWQS	9/20/2016	9/20/2016	9/20/2016	9/20/2016
Unit	µg/L	µg/L	µg/L	µg/L	µg/L
Acenaphthene	20	1.1 U	1.4 U	1.4 U	1.1 U
Acenaphthylene	NS	1.1 U	1.4 U	1.4 U	1.1 U
Anthracene	50	1.1 U	1.4 U	1.4 U	1.1 U
Benzo(A)Anthracene	0.002	1.1 U	1.4 U	1.4 U	1.1 U
Benzo(A)Pyrene	ND	1.1 U	1.4 U	1.4 U	1.1 U
Benzo(B)Fluoranthene	0.002	1.1 U	1.4 U	1.4 U	1.1 U
Benzo(G,H,I)Perylene	NS	1.1 U	1.4 U	1.4 U	1.1 U
Benzo(K)Fluoranthene	0.002	1.1 U	1.4 U	1.4 U	1.1 U
Chrysene	0.002	1.1 U	1.4 U	1.4 U	1.1 U
Dibenz(A,H)Anthracene	NS	1.1 U	1.4 U	1.4 U	1.1 U
Fluoranthene	50	1.1 U	1.4 U	1.4 U	1.1 U
Fluorene	50	1.1 U	1.4 U	1.4 U	1.1 U
Indeno(1,2,3-C,D)Pyrene	0.002	1.1 U	1.4 U	1.4 U	1.1 U
Naphthalene	10	1.1 U	1.1 U	1.4 U	1.4 U
Phenanthrene	50	1.1 U	1.4 U	1.4 U	1.1 U
Pyrene	50	1.1 U	1.4 U	1.4 U	1.1 U

Attached Table 20
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Groundwater Analytical Results
Polychlorinated Biphenyls (PCBs)

Sample ID	NYSDEC	SMW-2 20160920	SMW-X 20160920	FB-20160920
Date Sampled	AWQS	9/20/2016	9/20/2016	9/20/2016
Unit	µg/L	µg/L	µg/L	µg/L
PCB-1016 (Aroclor 1016)	NS	0.5 U	0.5 U	0.5 U
PCB-1221 (Aroclor 1221)	NS	0.5 U	0.5 U	0.5 U
PCB-1232 (Aroclor 1232)	NS	0.5 U	0.5 U	0.5 U
PCB-1242 (Aroclor 1242)	NS	0.5 U	0.5 U	0.5 U
PCB-1248 (Aroclor 1248)	NS	0.5 U	0.5 U	0.5 U
PCB-1254 (Aroclor 1254)	NS	0.5 U	0.5 U	0.5 U
PCB-1260 (Aroclor 1260)	NS	0.5 U	0.5 U	0.5 U
PCB-1262 (Aroclor 1262)	NS	0.5 U	0.5 U	0.5 U
PCB-1268 (Aroclor 1268)	NS	0.5 U	0.5 U	0.5 U

Attached Table 21
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Groundwater Analytical Results
Pesticides

Sample ID	NYSDEC	SMW-2 20160920	SMW-X 20160920	FB-20160920
Date Sampled	AWQS	9/20/2016	9/20/2016	9/20/2016
Unit	µg/L	µg/L	µg/L	µg/L
Aldrin	ND	0.011 UJ	0.011 UJ	0.01 UJ
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.01	0.011 UJ	0.011 UJ	0.01 UJ
Alpha Endosulfan	NS	0.011 UJ	0.011 UJ	0.01 UJ
Beta Bhc (Beta Hexachlorocyclohexane)	0.04	0.011 UJ	0.011 UJ	0.01 UJ
Beta Endosulfan	NS	0.011 UJ	0.011 UJ	0.01 UJ
cis-Chlordane	NS	0.011 UJ	0.011 UJ	0.01 UJ
Delta BHC (Delta Hexachlorocyclohexane)	0.04	0.011 UJ	0.011 UJ	0.01 UJ
Dieldrin	0.004	0.011 UJ	0.011 UJ	0.01 UJ
Endosulfan Sulfate	NS	0.011 UJ	0.011 UJ	0.01 UJ
Endrin	ND***	0.011 UJ	0.011 UJ	0.01 UJ
Endrin Aldehyde	5	0.011 UJ	0.011 UJ	0.01 UJ
Endrin Ketone	5	0.011 UJ	0.011 UJ	0.01 UJ
Gamma Bhc (Lindane)	0.05	0.011 UJ	0.011 UJ	0.01 UJ
Heptachlor	0.04	0.011 UJ	0.011 UJ	0.01 UJ
Heptachlor Epoxide	0.03	0.011 UJ	0.011 UJ	0.01 UJ
Methoxychlor	35	0.022 UJ	0.022 UJ	0.02 UJ
P,P'-DDD	0.3	0.011 UJ	0.011 UJ	0.01 UJ
P,P'-DDE	0.2	0.011 UJ	0.011 UJ	0.01 UJ
P,P'-DDT	0.2	0.011 UJ	0.011 UJ	0.01 UJ
Toxaphene	0.06	0.27 UJ	0.27 UJ	0.26 UJ
trans-Chlordane	NS	0.011 UJ	0.011 UJ	0.01 UJ

Attached Table 22
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Groundwater Analytical Results
Metals - Total

Sample ID	NYSDEC AWQS	SMW-2 20160920	SMW-X 20160920	FB-20160920
Lab Sample ID		JC28157-1	JC28157-2	JC28157-4
Date Sampled		9/20/2016	9/20/2016	9/20/2016
Unit	µg/L	µg/L	µg/L	µg/L
Aluminum	NS	1,180 J	358 J	200 U
Antimony	3	6 U	6 U	6 U
Arsenic	25	3 U	3 U	3 U
Barium	1,000	200 U	200 U	200 U
Beryllium	3	1 U	1 U	1 U
Cadmium	5	3 U	3 U	3 U
Calcium	NS	159,000	168,000	5,000 U
Cobalt	NS	50 U	50 U	50 U
Copper	200	10 U	10 U	10 U
Iron	300+	**2,310 J**	**1,070 J**	100 U
Lead	25	9.7 J	3 UJ	3 U
Magnesium	35,000	**72,800**	**77,200**	5,000 U
Manganese	300+	**379**	**375**	15 U
Mercury	0.7	0.2 U	0.2 U	0.2 U
Nickel	100	10 U	10 U	10 U
Potassium	NS	15,400	16,000	10,000 U
Selenium	10	10 U	10 U	10 U
Silver	50	10 U	10 U	10 U
Sodium	20,000	**95,000**	**99,600**	10,000 U
Thallium	0.5	2 U	2 U	2 U
Vanadium	NS	50 U	50 U	50 U
Zinc	2,000	20 U	20 U	20 U

Attached Table 23
Brook 156
740 Brook Avenue, Bronx, NY
Supplemental Remedial Investigation Groundwater Analytical Results
Metals - Filtered

Sample ID	NYSDEC	SMW-2 20160920	SMW-X 20160920	FB-20160920
Date Sampled	AWQS	9/20/2016	9/20/2016	9/20/2016
Unit	µg/L	µg/L	µg/L	µg/L
Aluminum	NS	200 U	200 U	200 U
Antimony	3	6 U	6 U	6 U
Arsenic	25	3 U	3 U	3 U
Barium	1,000	200 U	200 U	200 U
Beryllium	3	1 U	1 U	1 U
Cadmium	5	3 U	3 U	3 U
Calcium	NS	155,000	168,000	5,000 U
Chromium, Total	50	10 U	10 U	10 U
Cobalt	NS	50 U	50 U	50 U
Copper	200	10 U	10 U	10 U
Iron	300	**374**	**381**	100 U
Lead	25	3 U	3 U	3 U
Magnesium	35,000	**71,400**	**78,000**	5,000 U
Manganese	300	**359**	**370**	15 U
Mercury	0.7	0.2 U	0.2 U	0.2 U
Nickel	100	10 U	10 U	10 U
Potassium	NS	14,700	16,000	10,000 U
Selenium	10	10 U	10 U	10 U
Silver	50	10 U	10 U	10 U
Sodium	20,000	**93,800**	**102,000**	10,000 U
Thallium	0.5	2 U	2 U	2 U
Vanadium	NS	50 U	50 U	50 U
Zinc	2,000	20 U	20 U	20 U

Attached Table 24
Brook 156
740 Brook Avenue, Bronx, New York
Supplemental Remedial Investigation Soil Vapor Analytical Results
Volatile Organic Compounds (VOCs)

Sample ID	SSV-1 20160831	SSV-2 20160831	SSV-3 20160831	SAA-1 20160831
Date Sampled	8/31/2016	8/31/2016	8/31/2016	8/31/2016
Dilution Factor	1 And 1.43	1 And 1.48	1 And 1.38	1
Unit	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
1,1,1-Trichloroethane	10	4.4 U	2.8 J	1.1 U
1,1,2,2-Tetrachloroethane	5.5 U	5.5 U	5.5 U	1.4 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	6.1 U	6.1 U	6.1 U	1.5 U
1,1,2-Trichloroethane	4.4 U	4.4 U	4.4 U	1.1 U
1,1-Dichloroethane	3.2 U	3.2 U	3.2 U	0.81 U
1,1-Dichloroethene	3.2 U	3.2 U	3.2 U	0.79 U
1,2,4-Trimethylbenzene	22	23	21	0.45 J
1,2-Dibromoethane (Ethylene Dibromide)	6.1 U	6.1 U	6.1 U	1.5 U
1,2-Dichloroethane	3.2 U	3.2 U	3.2 U	0.81 U
1,2-Dichloropropane	3.7 U	3.7 U	3.7 U	0.92 U
1,2-Dichlorotetrafluoroethane	5.6 U	5.6 U	5.6 U	1.4 U
1,3,5-Trimethylbenzene (Mesitylene)	7.4	7.4	6.4	0.98 U
1,3-Butadiene	1.8 U	1.8 U	1.8 U	0.44 U
1,4-Dioxane (P-Dioxane)	2.9 U	2.9 U	2.9 U	0.72 U
2,2,4-Trimethylpentane	11	3.7 U	3.7 U	0.75 J
2-Chlorotoluene	4.1 U	4.1 U	4.1 U	1 U
2-Hexanone	181	148	105	0.82 U
4-Ethyltoluene	6.4	6.4	5.4	0.98 U
Acetone	534 D	437 D	461 D	12
Allyl Chloride (3-Chloropropene)	2.5 U	2.5 U	2.5 U	0.63 U
Benzene	23	52.7	2.4 J	0.8
Benzyl Chloride	4.1 U	4.1 U	4.1 U	1 U
Bromodichloromethane	5.4 U	5.4 U	5.4 U	1.3 U
Bromoform	8.3 U	8.3 U	8.3 U	2.1 U
Bromomethane	3.1 U	3.1 U	3.1 U	0.78 U
Carbon Disulfide	218	45.2	19	0.62 U
Carbon Tetrachloride	5 U	5 U	5 U	1.3 U
Chlorobenzene	3.7 U	3.7 U	3.7 U	0.92 U
Chloroethane	2.1 U	2.1 U	2.1 U	0.53 U
Chloroform	4	8.3	4.4	0.21 J
Chloromethane	1.7 U	2.7	1.7 U	0.93
Cis-1,2-Dichloroethylene	3.2 U	3.2 U	3.2 U	0.79 U
Cis-1,3-Dichloropropene	3.6 U	3.6 U	3.6 U	0.91 U
Cyclohexane	73.7	38.2	3.4	0.69 U
Dibromochloromethane	6.8 U	6.8 U	6.8 U	1.7 U
Dichlorodifluoromethane	4.2	2.8 J	3.1 J	2.5
Ethanol	86.1	56	43.5	10
Ethyl Acetate	30	17	26	17
Ethylbenzene	12	15	12	0.37 J
Isopropanol	31.2	32.7	17	2.7
Methyl Ethyl Ketone (2-Butanone)	976 D	846 D	891 D	1.8
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	3.3 U	11	3.3 U	0.82 U
Methylene Chloride	2.1 J	2.8 U	2 J	0.87
N-Heptane	13	261	11	0.37 J
N-Hexane	19	515	15	0.74
O-Xylene (1,2-Dimethylbenzene)	19	21	18	0.48 J
Propylene	105	354	46.2	1.3
Styrene	16	17	14	0.85 U
Tert-Butyl Alcohol	48.5	119	22	0.61 U
Tert-Butyl Methyl Ether	2.9 U	2.9 U	2.9 U	0.72 U
Tetrachloroethylene (PCE)	157	97.6	27	0.88
Tetrahydrofuran	5.3	6.8	3.5	0.59 U
Toluene	37	40.7	22	2.7
Trans-1,2-Dichloroethene	3.2 U	3.2 U	3.2 U	0.79 U
Trans-1,3-Dichloropropene	3.6 U	3.6 U	3.6 U	0.91 U
Trichloroethylene (TCE)	0.86 U	1.1	0.86 U	0.21 U
Trichlorofluoromethane	3.7 J	1.7 J	2.1 J	1.5
Vinyl Acetate	2.8 U	2.8 U	2.8 U	0.7 U
Vinyl Bromide	3.5 U	3.5 U	3.5 U	0.87 U
Vinyl Chloride	2 U	2 U	2 U	0.51 U
Xylenes, Total	57.8	66	53.4	1.6

Attached Tables 1-24
Brook 156
740 Brook Avenue, Bronx, New York
Remedial and Supplemental Remedial Investigation Analytical Results

Notes

DATA QUALIFIERS

NS : A standard has not been established for the analyte.

NA : The standard is not applicable for the analyte.

ND : The standard is a non-detectable concentration by the approved analytical method.

U : The analyte was not detected above the laboratory reporting limit.

J : The reported concentration was detected above the laboratory reporting limit but may be inaccurate or imprecise.

N : The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

UJ : The analyte was not detected above the laboratory reporting limit.The reported concentration is approximate and may be inaccurate or imprecise.

R : The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality assurance/quality control

JH : The reported concentration is an estimated quantity and may be biased high.

JL : The reported concentration is an estimated quantity and may be biased low.

D : The concentration was obtained from a diluted analysis.

a : More than 40% rpd for detected concentrations was observed between the two GC columns.

b : An elevated detection limit was observed due to dilution required for high interfering element.

SOIL

Part 375 Soil Cleanup Objectives:Soil Cleanup Objectives listed in NYSDEC (New York State Department of Environmental Conservation) "Part 375" Regulations (6 NYCRR Part 375).

Exceedances of Commisioner's Policy (CP)-51 Soil Cleanup Objectes are indicated in italic font.
Exceedances of Part 375 Unrestricted Soil Cleanup Objectives are indicated in bold font.
Exceedances of Part 375 Restricted Residential Soil Cleanup Objectives are indicated in gray.

mg/kg : milligrams per kilogram = parts per million (ppm)

SB-X is a blind duplicate of sample SB-1 (25-27).
SB-XX is a blind duplicate of sample SB-7 (0-2).
SB-Y is a blind duplicate of sample SB-4 (0-4).
SSB-X 20160901 is a blind duplicate of sample SSB-3 (14-15') 20160901.
SMW-X 20160920 is a blind duplicate of sample SMW-2 20160920.

GROUNDWATER

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

Exceedances of NYSDEC Class GA Ambient Standards are highlighted in bold font.

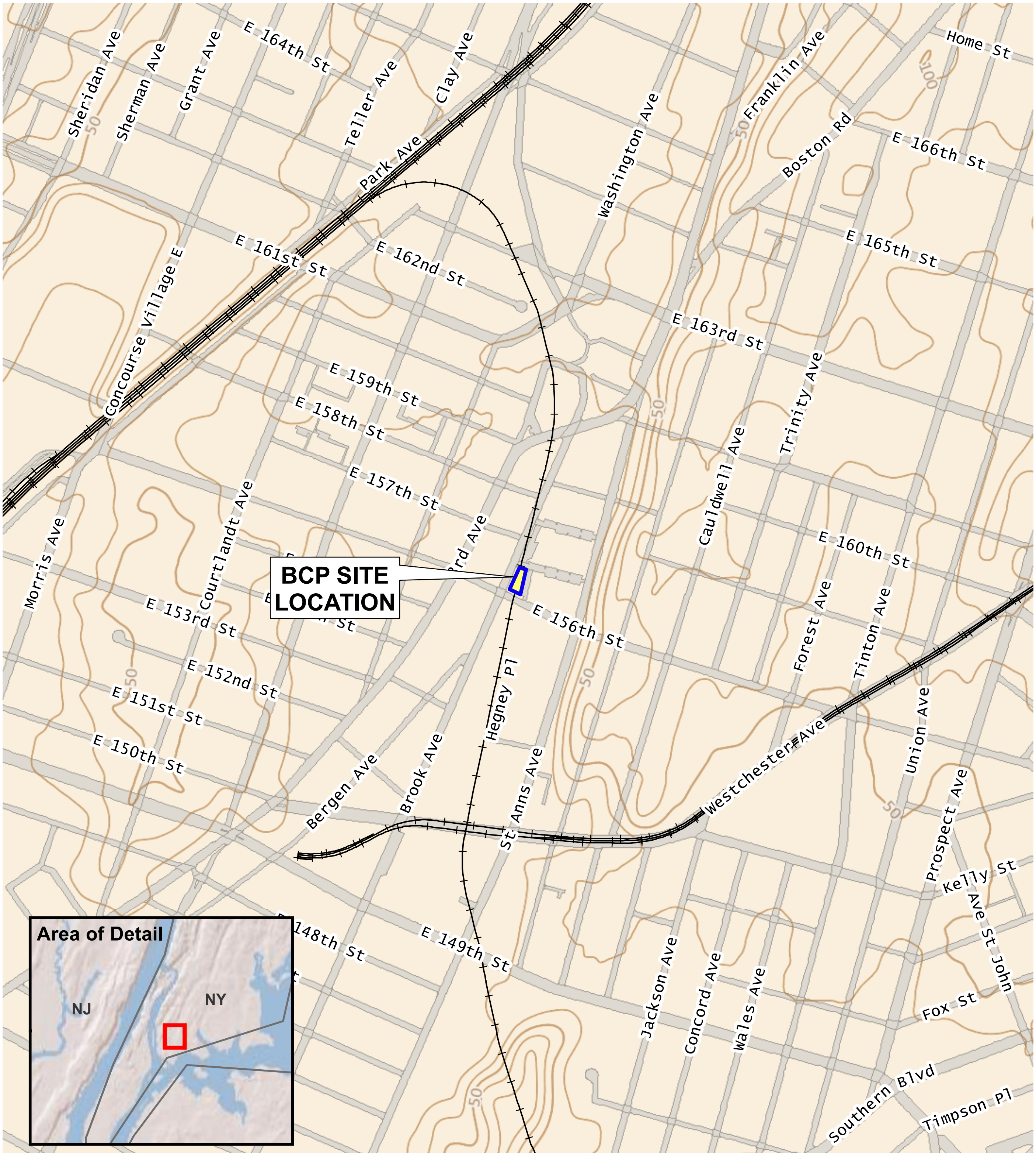
µg/L : micrograms per Liter = parts per billion (ppb)

MW-X is a blind duplicate sample of MW-1.

SOIL VAPOR

µg/m^3 : micrograms per cubic meter

FIGURES



Map Source: USGS Topo base map service from The National Map

0 800 1,600

SCALE IN FEET

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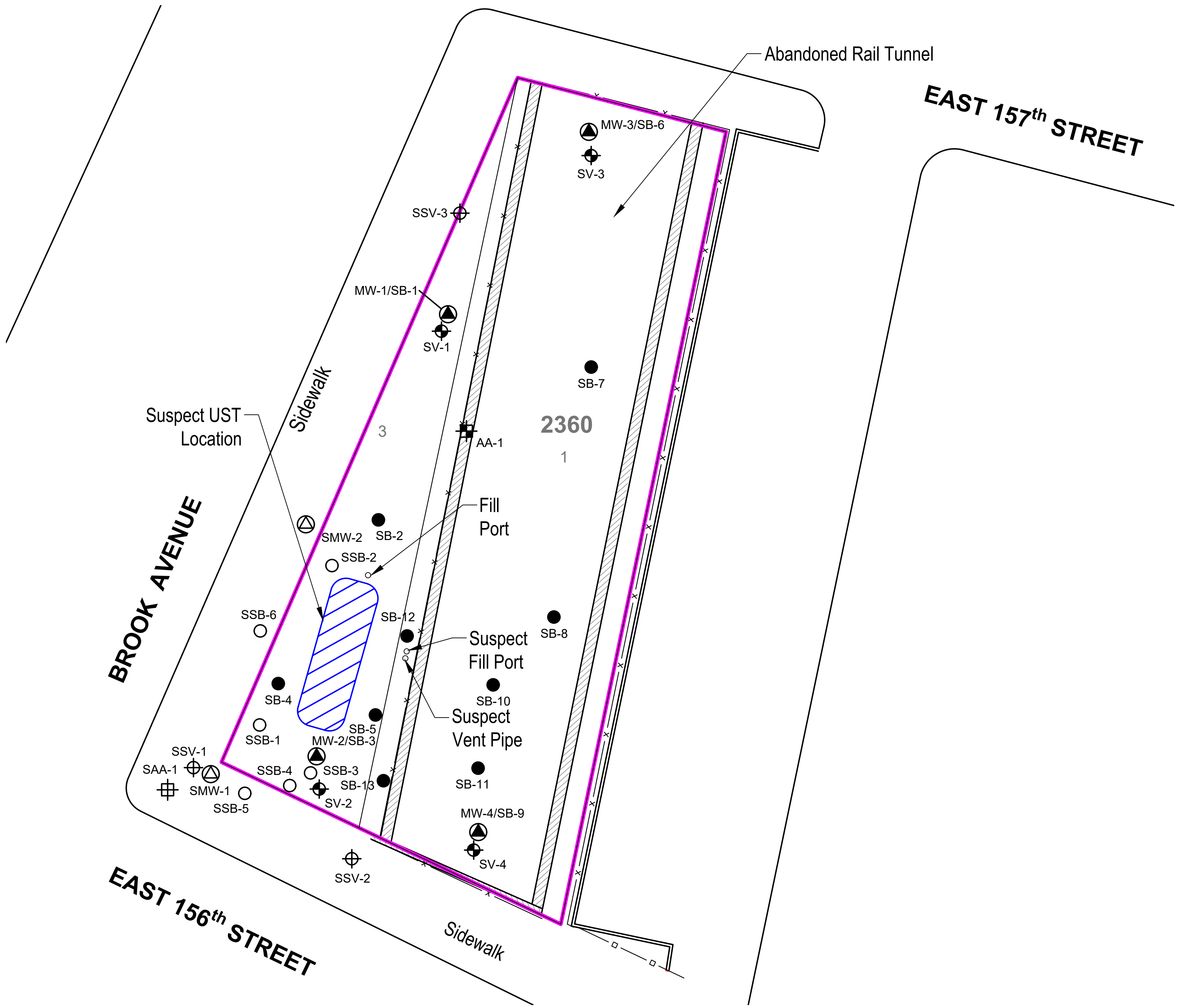
Bronx, New York

BROWNFIELD CLEANUP PROGRAM
SITE LOCATION

DATE	2/14/2018
PROJECT NO.	11703
FIGURE	1



LEGEND

- BCP SITE BOUNDARY
- FENCE
- RAIL BED RETAINING WALL
- 1 — LOT BOUNDARY AND TAX LOT NUMBER
- 2360 — TAX BLOCK NUMBER
- REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELL/SOIL BORING LOCATION (2014)
- REMEDIAL INVESTIGATION TEMPORARY SOIL VAPOR POINT LOCATION (2014)
- REMEDIAL INVESTIGATION SOIL BORING LOCATION (2013/2014)
- REMEDIAL INVESTIGATION AMBIENT AIR SAMPLE LOCATION (2014)
- SUPPLEMENTAL REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELL LOCATION (2016)
- SUPPLEMENTAL REMEDIAL INVESTIGATION TEMPORARY SOIL VAPOR POINT LOCATION (2016)
- SUPPLEMENTAL REMEDIAL INVESTIGATION SOIL BORING LOCATION (2016)
- SUPPLEMENTAL REMEDIAL INVESTIGATION AMBIENT AIR SAMPLE LOCATION (2016)
- MH — UTILITY MANHOLE
- UST — UNDERGROUND STORAGE TANK

0 25 50
SCALE IN FEET

SOURCE: MONTROSE SURVEYING CO., LLP, SURVEY NO. 62510-39, TAX BLOCK 2360, TAX LOTS 1 & 3, REVISED 9/20/2016.

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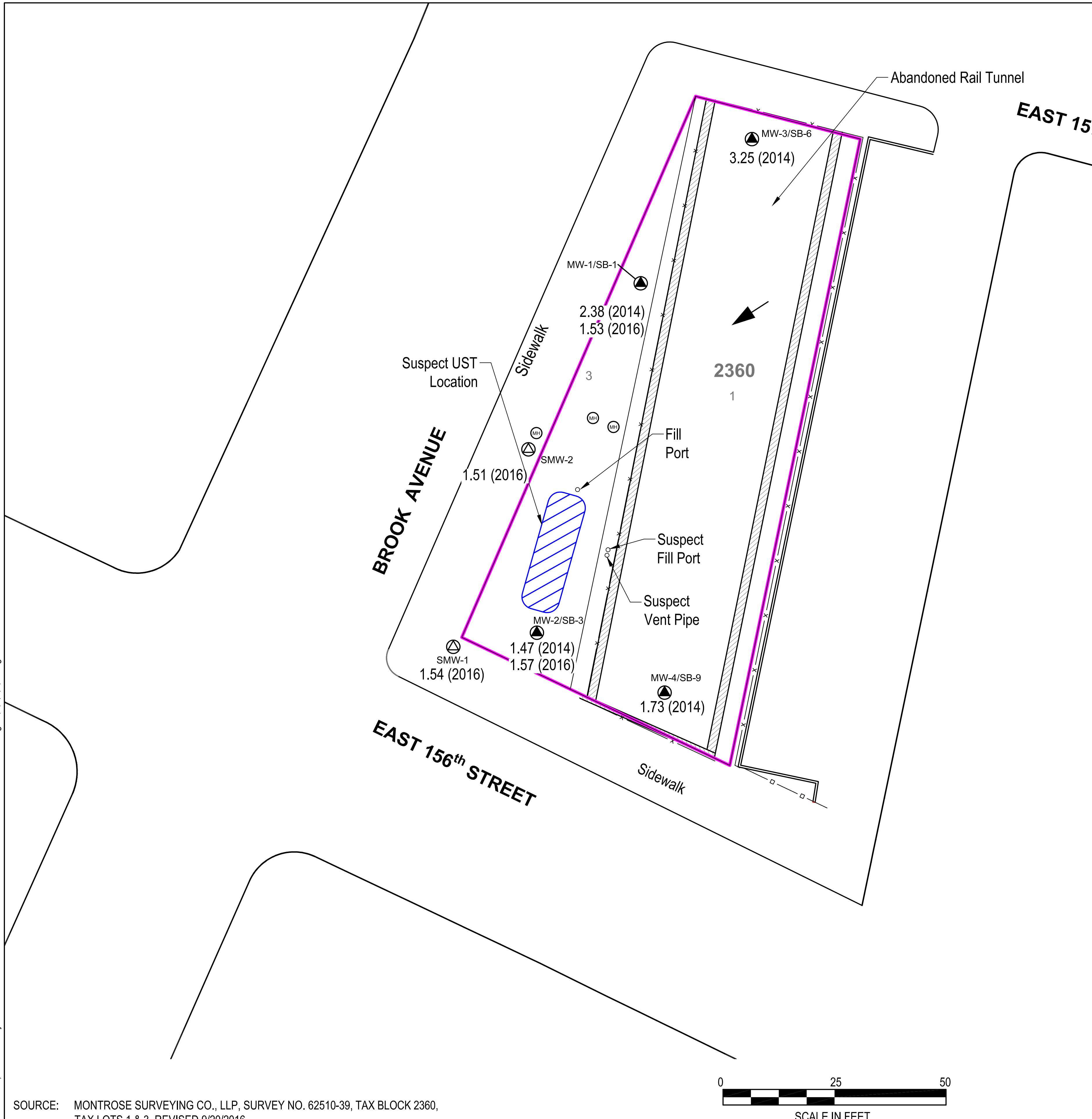
SITE AND SAMPLE LOCATION PLAN

DATE
4/23/2018

PROJECT NO.
11703

FIGURE
2



LEGEND

BCP SITE BOUNDARY

FENCE

RAIL BED RETAINING WALL

1 LOT BOUNDARY AND TAX LOT NUMBER

2360 TAX BLOCK NUMBER

REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELL LOCATION (2014)

SUPPLEMENTAL REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELL LOCATION (2016)

1.54 WATER TABLE ELEVATION IN FEET

REGIONAL GROUNDWATER FLOW DIRECTION

UTILITY MANHOLE

UST UNDERGROUND STORAGE TANK

June 10, 2014

Groundwater Monitoring Well ID	TOC Elevation (feet)	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)
MW-1	26.63	24.25	2.38
MW-2	26.17	24.70	1.47
MW-3	9.45	6.20	3.25
MW-4	8.63	6.90	1.73

September 20, 2016

Groundwater Monitoring Well ID	TOC Elevation (feet)	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)
MW-1	26.63	25.10	1.53
MW-2	26.17	24.60	1.57
SMW-1	25.81	24.27	1.54
SMW-2	26.11	24.60	1.51

Notes:

1. Elevations referenced to the Borough of the Bronx Topographical Bureau Datum, which is 2.608 feet above mean sea level.
2. TOC - Top of Casing
3. Groundwater monitoring wells MW-1 and MW-2 installed during the Remedial Investigation.
4. Groundwater monitoring wells SMW-1 and SMW-2 installed during the Supplemental Remedial Investigation.
5. Groundwater monitoring wells MW-3 and MW-4 installed during the Remedial Investigation were inaccessible during the Supplemental Remedial Investigation.

SOURCE: MONTROSE SURVEYING CO., LLP, SURVEY NO. 62510-39, TAX BLOCK 2360, TAX LOTS 1 & 3, REVISED 9/20/2016.

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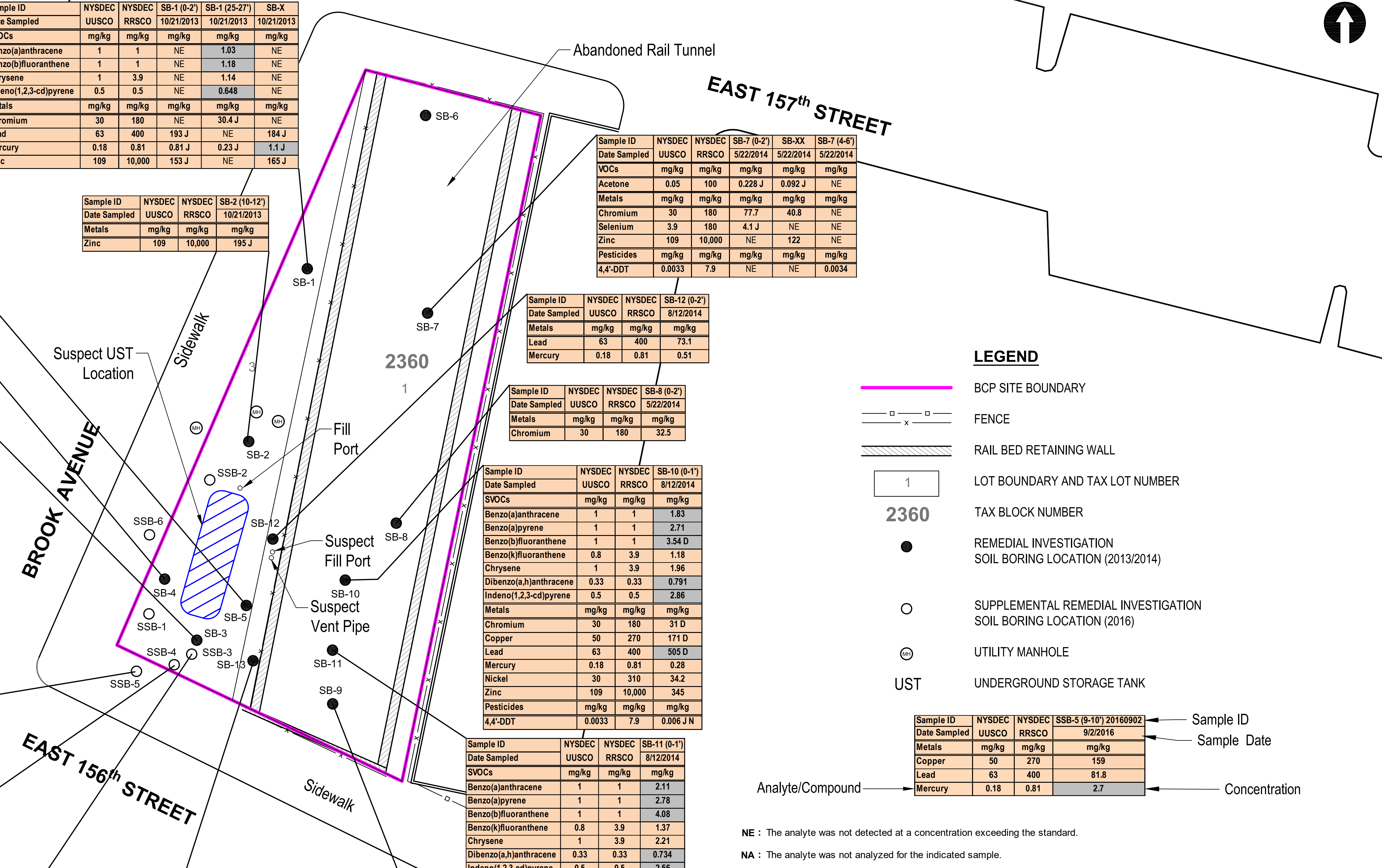
GROUNDWATER ELEVATION MAP

DATE
4/23/2018

PROJECT NO.
11703

FIGURE
3



Sample ID	NYSDEC	NYSDEC	SB-1 (0-2')	SB-1 (25-27')	SB-X
Date Sampled	UUSCO	RRSCO	10/21/2013	10/21/2013	10/21/2013
SVOCs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzo(a)anthracene	1	1	NE	1.03	NE
Benzo(b)fluoranthene	1	1	NE	1.18	NE
Chrysene	1	3.9	NE	1.14	NE
Indeno(1,2,3-cd)pyrene	0.5	0.5	NE	0.648	NE
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chromium	30	180	NE	30.4 J	NE
Lead	63	400	193 J	NE	184 J
Mercury	0.18	0.81	0.81 J	0.23 J	1.1 J
Zinc	109	10,000	153 J	NE	165 J

Sample ID	NYSDEC	NYSDEC	SB-5 (0-2')
Date Sampled	UUSCO	RRSCO	10/23/2013
Metals	mg/kg	mg/kg	mg/kg
Barium	350	400	655
Cadmium	2.5	4.3	4
Chromium	30	180	33.6 J
Copper	50	270	65.5
Lead	63	400	752 J
Mercury	0.18	0.81	0.33
Zinc	109	10,000	1,530 J
Pesticides	mg/kg	mg/kg	mg/kg
4,4'-DDT	0.0033	7.9	0.0267

Sample ID	NYSDEC	NYSDEC	SB-2 (10-12')
Date Sampled	UUSCO	RRSCO	10/21/2013
Metals	mg/kg	mg/kg	mg/kg
Zinc	109	10,000	195 J

Sample ID	NYSDEC	NYSDEC	SB-7 (0-2')	SB-XX	SB-7 (4-6')
Date Sampled	UUSCO	RRSCO	5/22/2014	5/22/2014	5/22/2014
VOCs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acetone	0.05	100	0.228 J	0.092 J	NE
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chromium	30	180	77.7	40.8	NE
Selenium	3.9	180	4.1 J	NE	NE
Zinc	109	10,000	NE	122	NE
Pesticides	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDT	0.0033	7.9	NE	NE	0.0034

Sample ID	NYSDEC	NYSDEC	SB-4 (0-4')	SB-Y
Date Sampled	UUSCO	RRSCO	10/23/2013	10/23/2013
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Copper	50	270	57.1	57.9
Lead	63	400	347 J	433 J
Mercury	0.18	0.81	0.22	0.2
Zinc	109	10,000	304 J	336 J

Sample ID	NYSDEC	NYSDEC	SB-12 (0-2')
Date Sampled	UUSCO	RRSCO	8/12/2014
Metals	mg/kg	mg/kg	mg/kg
Lead	63	400	73.1
Mercury	0.18	0.81	0.51

Sample ID	NYSDEC	NYSDEC	SB-8 (0-2')
Date Sampled	UUSCO	RRSCO	5/22/2014
Metals	mg/kg	mg/kg	mg/kg
Chromium	30	180	32.5

Sample ID	NYSDEC	NYSDEC	NYSDEC	SB-3 (0-4')	SB-3 (8-12')
Date Sampled	UUSCO	RRSCO	PGWSCO	10/23/2013	10/23/2013
VOCs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,2-Dichloroethane	0.02	3.1	NS	NE	0.0523
Benzene	0.06	4.8	0.06	NE	*4.43 D*
Ethylbenzene	1	41	1	NE	*11.1 D*
Toluene	0.7	100	0.7	NE	*26.9 D*
Xylenes (Total)	0.26	100	1.6	NE	*73.2 D*
SVOCs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzo(a)pyrene	1	1	N/A	1.13	NE
Benzo(b)fluoranthene	1	1	N/A	1.34	NE
Indeno(1,2,3-cd)pyrene	0.5	0.5	N/A	1.05	NE
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lead	63	400	N/A	95.2 J	NE
Mercury	0.18	0.81	N/A	NE	0.21
Zinc	109	10,000	N/A	159 J	NE

Sample ID	NYSDEC	NYSDEC	SB-10 (0-1')
Date Sampled	UUSCO	RRSCO	8/12/2014
SVOCs	mg/kg	mg/kg	mg/kg
Benzo(a)anthracene	1	1	1.83
Benzo(a)pyrene	1	1	2.71
Benzo(b)fluoranthene	1	1	3.54 D
Benzo(k)fluoranthene	0.8	3.9	1.18
Chrysene	1	3.9	1.96
Dibenzo(a,h)anthracene	0.33	0.33	0.791
Indeno(1,2,3-cd)pyrene	0.5	0.5	2.86
Metals	mg/kg	mg/kg	mg/kg
Chromium	30	180	31 D
Copper	50	270	171 D
Lead	63	400	505 D
Mercury	0.18	0.81	0.28
Nickel	30	310	34.2
Zinc	109	10,000	345
Pesticides	mg/kg	mg/kg	mg/kg
4,4'-DDT	0.0033	7.9	0.006 J N

Sample ID	NYSDEC	NYSDEC	SSB-5 (9-10') 20160902
Date Sampled	UUSCO	RRSCO	9/2/2016
Metals	mg/kg	mg/kg	mg/kg
Copper	50	270	159
Lead	63	400	81.8
Mercury	0.18	0.81	2.7

Sample ID	NYSDEC	NYSDEC	SSB-4 (26-27') 20160831	SSB-4 (27-28') 20160831
Date Sampled	UUSCO	RRSCO	8/31/2016	8/31/2016
SVOCs	mg/kg	mg/kg	mg/kg	mg/kg
Benzo(a)anthracene	1	1	NE	1.13
Benzo(b)fluoranthene	1	1	NE	1.12
Chrysene	1	3.9	NE	1.12
Indeno(1,2,3-c,d)pyrene	0.5	0.5	0.524	0.611
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Mercury	0.18	0.81	5	NA
Zinc	109	10,000	111	NA

Sample ID	NYSDEC	NYSDEC	SB-11 (0-1')
Date Sampled	UUSCO	RRSCO	8/12/2014
SVOCs	mg/kg	mg/kg	mg/kg
Benzo(a)anthracene	1	1	2.11
Benzo(a)pyrene	1	1	2.78
Benzo(b)fluoranthene	1	1	4.08
Benzo(k)fluoranthene	0.8	3.9	1.37
Chrysene	1	3.9	2.21
Dibenzo(a,h)anthracene	0.33	0.33	0.734
Indeno(1,2,3-cd)pyrene	0.5	0.5	2.56
Metals	mg/kg	mg/kg	mg/kg
Arsenic	13	16	14.4
Chromium	30	180	39.9 D
Copper	50	270	189 D
Lead	63	400	876 D
Mercury	0.18	0.81	0.42
Nickel	30	310	34.4
Zinc	109	10,000	567
Pesticides	mg/kg	mg/kg	mg/kg
4,4'-DDT	0.0033	7.9	0.0164 J

Sample ID	NYSDEC	NYSDEC	SSB-3 (14-15') 20160901	SSB-X 20160901
Date Sampled	UUSCO	RRSCO	9/1/2016	9/1/2016
SVOCs	mg/kg	mg/kg	mg/kg	mg/kg
Benzo(a)anthracene	1	1	2.45 J	NE
Benzo(a)pyrene	1	1	2.27 J	NE
Benzo(b)fluoranthene	1	1	2.84 J	NE
Benzo(k)fluoranthene	0.8	3.9	1.02 J	NE
Chrysene	1	3.9	2.14 J	NE
Dibenz(a,h)anthracene	0.33	0.33	0.338 J	NE
Indeno(1,2,3-c,d)pyrene	0.5	0.5	1.3 J	NE
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Mercury	0.18	0.81	1.3 J	0.67 J

Sample ID	NYSDEC	NYSDEC	SB-13 (0-2')
Date Sampled	UUSCO	RRSCO	8/12/2014
Metals	mg/kg	mg/kg	mg/kg
Cadmium	2.5	4.3	4
Copper	50	270	62.9
Lead	63	400	192
Mercury	0.18	0.81	1.1
Zinc	109	10,000	2,210

Sample ID	NYSDEC	NYSDEC	SB-9 (0-2')
Date Sampled	UUSCO	RRSCO	5/22/2014
Metals	mg/kg	mg/kg	mg/kg
Mercury	0.18	0.81	0.29

LEGEND

BCP SITE BOUNDARY

FENCE

RAIL BED RETAINING WALL

1 — LOT BOUNDARY AND TAX LOT NUMBER

2360 — TAX BLOCK NUMBER

REMEDIAL INVESTIGATION SOIL BORING LOCATION (2013/2014)

SUPPLEMENTAL REMEDIAL INVESTIGATION SOIL BORING LOCATION (2016)

UTILITY MANHOLE

UST — UNDERGROUND STORAGE TANK

Sample ID	NYSDEC	NYSDEC	SSB-5 (9-10') 20160902
Date Sampled	UUSCO	RRSCO	9/2/2016
Metals	mg/kg	mg/kg	mg/kg
Copper	50	270	159
Lead	63	400	81.8
Mercury	0.18	0.81	2.7

Sample ID

Sample Date

Analyte/Compound

Concentration

NE : The analyte was not detected at a concentration exceeding the standard.

NA : The analyte was not analyzed for the indicated sample.

N/A : The standard is not applicable to the analyte.

J : The reported concentration is approximate and may be inaccurate or imprecise.

JN : The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

D : The reported concentration was obtained from a diluted sample analysis.

Part 375 Soil Cleanup Objectives : Soil Cleanup Objectives (SCOs) listed in New York State Department of Environmental Conservation (NYSDEC) Part 375 Regulations (6 NYCRR Part 375).

Exceedances of Protection of Groundwater Soil Cleanup Objectives (PGWSCOs) are indicated in italic font.
Exceedances of Part 375 Unrestricted Soil Cleanup Objectives (UUSCOs) are indicated in bold font.
Exceedances of Part 375 Restricted Residential Soil Cleanup Objectives (RRSCOs) are indicated in gray.

mg/kg : milligrams per kilogram = parts per million (ppm)

Soil sample SSB-X 20160901 is a blind duplicate of soil sample SSB-3 (14-15') 20160901.
Soil sample SB-X is a blind duplicate of soil sample SB-1 (25-27').
Soil sample SB-Y is a blind duplicate of soil sample SB-4 (0-4').
Soil sample SB-XX is a blind duplicate of soil sample SB-7 (0-2').

0 25 50
SCALE IN FEET

SOURCE: MONTROSE SURVEYING CO., LLP, SURVEY NO. 62510-39, TAX BLOCK 2360, TAX LOTS 1 & 3, REVISED 9/20/2016.

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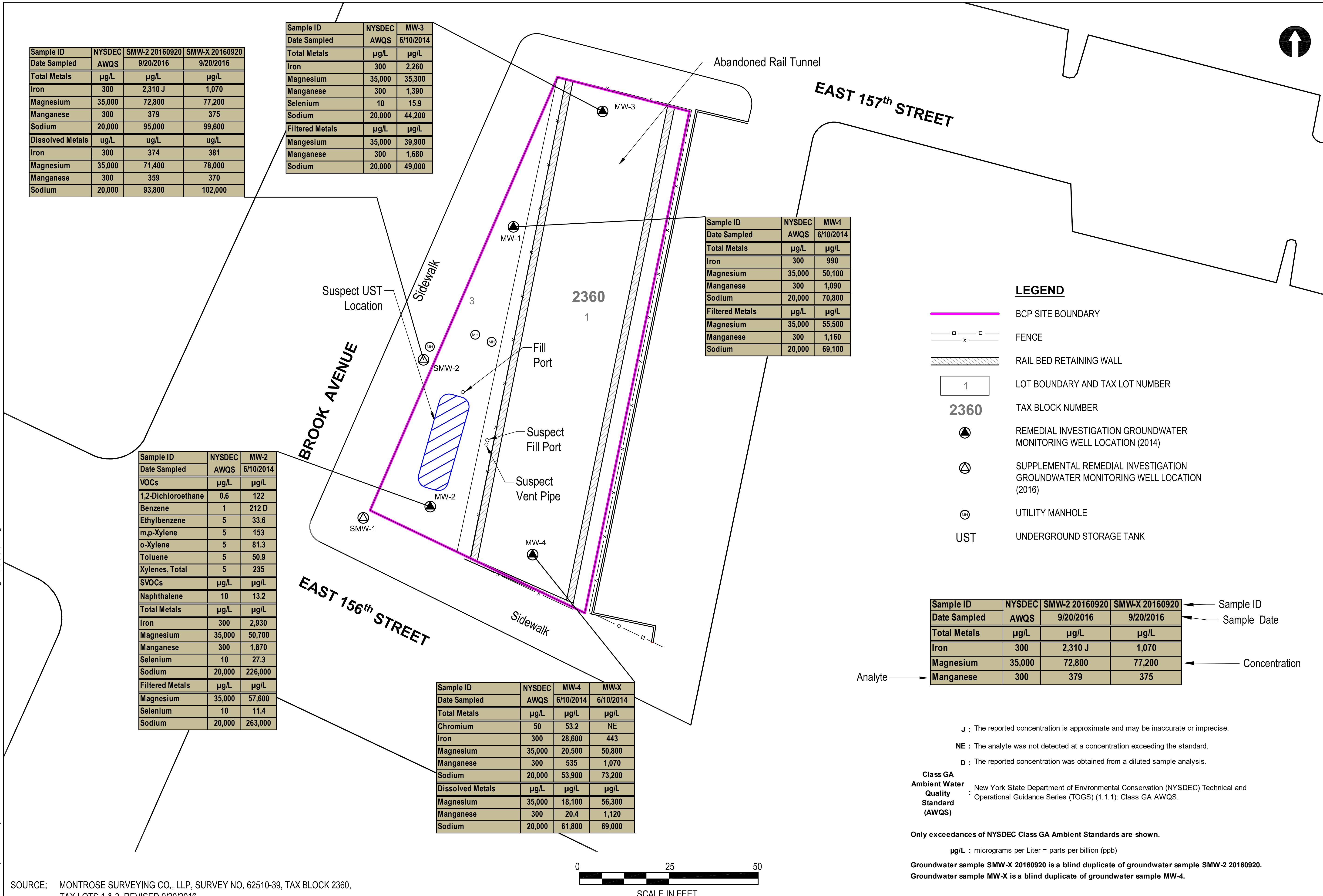
SOIL SAMPLE CONCENTRATIONS ABOVE NYSDEC UUSCOs, RRSCOs, AND/OR PGWSCOS

DATE
4/24/2018

PROJECT NO.
11703

FIGURE
4



Sample ID	NYSDEC	SMW-2 20160920	SMW-X 20160920
Date Sampled	AWQS	9/20/2016	9/20/2016
Total Metals	µg/L	µg/L	µg/L
Iron	300	2,310 J	1,070
Magnesium	35,000	72,800	77,200
Manganese	300	379	375
Sodium	20,000	95,000	99,600
Dissolved Metals	ug/L	ug/L	ug/L
Iron	300	374	381
Magnesium	35,000	71,400	78,000
Manganese	300	359	370
Sodium	20,000	93,800	102,000

Sample ID	NYSDEC	MW-3
Date Sampled	AWQS	6/10/2014
Total Metals	µg/L	µg/L
Iron	300	2,260
Magnesium	35,000	35,300
Manganese	300	1,390
Selenium	10	15.9
Sodium	20,000	44,200
Filtered Metals	µg/L	µg/L
Mangesium	35,000	39,900
Manganese	300	1,680
Sodium	20,000	49,000

Sample ID	NYSDEC	MW-1
Date Sampled	AWQS	6/10/2014
Total Metals	µg/L	µg/L
Iron	300	990
Magnesium	35,000	50,100
Manganese	300	1,090
Sodium	20,000	70,800
Filtered Metals	µg/L	µg/L
Magnesium	35,000	55,500
Manganese	300	1,160
Sodium	20,000	69,100

Sample ID	NYSDEC	MW-2
Date Sampled	AWQS	6/10/2014
VOCs	µg/L	µg/L
1,2-Dichloroethane	0.6	122
Benzene	1	212 D
Ethylbenzene	5	33.6
m,p-Xylene	5	153
o-Xylene	5	81.3
Toluene	5	50.9
Xylenes, Total	5	235
SVOCs	µg/L	µg/L
Naphthalene	10	13.2
Total Metals	µg/L	µg/L
Iron	300	2,930
Magnesium	35,000	50,700
Manganese	300	1,870
Selenium	10	27.3
Sodium	20,000	226,000
Filtered Metals	µg/L	µg/L
Magnesium	35,000	57,600
Selenium	10	11.4
Sodium	20,000	263,000

Sample ID	NYSDEC	MW-4	MW-X
Date Sampled	AWQS	6/10/2014	6/10/2014
Total Metals	µg/L	µg/L	µg/L
Chromium	50	53.2	NE
Iron	300	28,600	443
Magnesium	35,000	20,500	50,800
Manganese	300	535	1,070
Sodium	20,000	53,900	73,200
Dissolved Metals	µg/L	µg/L	µg/L
Magnesium	35,000	18,100	56,300
Manganese	300	20.4	1,120
Sodium	20,000	61,800	69,000

LEGEND

BCP SITE BOUNDARY

FENCE

RAIL BED RETAINING WALL

1 LOT BOUNDARY AND TAX LOT NUMBER

2360 TAX BLOCK NUMBER

REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELL LOCATION (2014)

SUPPLEMENTAL REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELL LOCATION (2016)

UTILITY MANHOLE

UST UNDERGROUND STORAGE TANK

Sample ID	NYSDEC	SMW-2 20160920	SMW-X 20160920
Date Sampled	AWQS	9/20/2016	9/20/2016
Total Metals	µg/L	µg/L	µg/L
Iron	300	2,310 J	1,070
Magnesium	35,000	72,800	77,200
Manganese	300	379	375

Sample ID

Sample Date

Concentration

Analyte

J : The reported concentration is approximate and may be inaccurate or imprecise.

NE : The analyte was not detected at a concentration exceeding the standard.

D : The reported concentration was obtained from a diluted sample analysis.

Class GA Ambient Water Quality Standard (AWQS) : New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series (TOGS) (1.1.1): Class GA AWQS.

Only exceedances of NYSDEC Class GA Ambient Standards are shown.

µg/L : micrograms per Liter = parts per billion (ppb)

Groundwater sample SMW-X 20160920 is a blind duplicate of groundwater sample SMW-2 20160920.
Groundwater sample MW-X is a blind duplicate of groundwater sample MW-4.

SOURCE: MONTROSE SURVEYING CO., LLP, SURVEY NO. 62510-39, TAX BLOCK 2360, TAX LOTS 1 & 3, REVISED 9/20/2016.

AKRF
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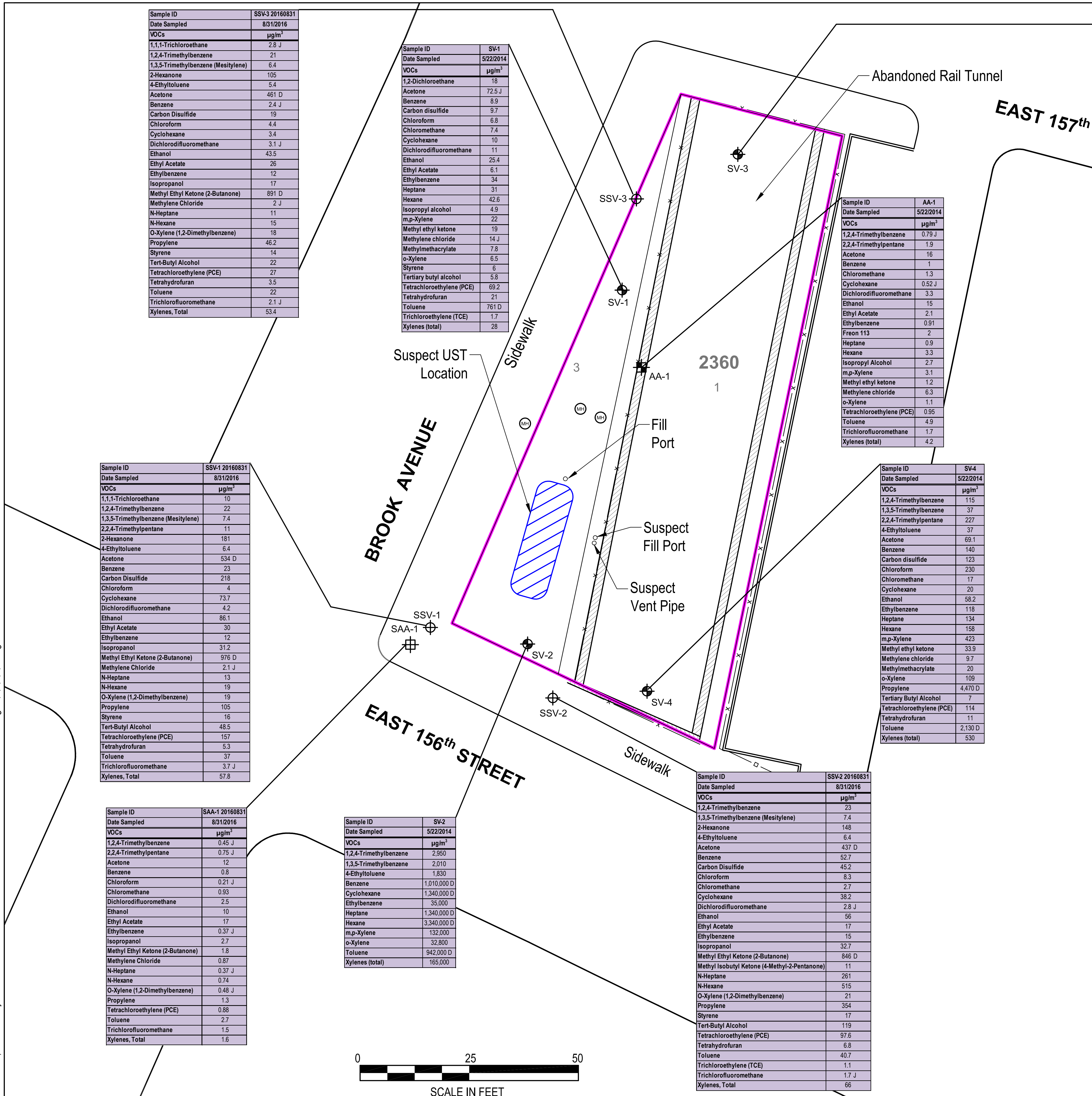
Brook 156
740 Brook Avenue
Bronx, New York

GROUNDWATER SAMPLE CONCENTRATIONS ABOVE NYSDEC AWQSs

DATE
4/23/2018

PROJECT NO.
11703

FIGURE
5



Sample ID	SSV-3 20160831
Date Sampled	8/31/2016
VOCs	µg/m³
1,1,1-Trichloroethane	2.8 J
1,2,4-Trimethylbenzene	21
1,3,5-Trimethylbenzene (Mesitylene)	6.4
2-Hexanone	105
4-Ethyltoluene	5.4
Acetone	461 D
Benzene	2.4 J
Carbon Disulfide	19
Chloroform	4.4
Cyclohexane	3.4
Dichlorodifluoromethane	3.1 J
Ethanol	43.5
Ethyl Acetate	26
Ethylbenzene	12
Isopropanol	17
Methyl Ethyl Ketone (2-Butanone)	891 D
Methylene Chloride	2 J
N-Heptane	11
N-Hexane	15
O-Xylene (1,2-Dimethylbenzene)	18
Propylene	46.2
Styrene	14
Tert-Butyl Alcohol	22
Tetrachloroethylene (PCE)	27
Tetrahydrofuran	3.5
Toluene	22
Trichlorofluoromethane	2.1 J
Xylenes, Total	53.4

Sample ID	SV-1
Date Sampled	5/22/2014
VOCs	µg/m³
1,2-Dichloroethane	18
Acetone	72.5 J
Benzene	8.9
Carbon disulfide	9.7
Chloroform	6.8
Chloromethane	7.4
Cyclohexane	10
Dichlorodifluoromethane	11
Ethanol	25.4
Ethyl Acetate	6.1
Ethylbenzene	34
Heptane	31
Hexane	42.6
Isopropyl alcohol	4.9
m,p-Xylene	22
Methyl ethyl ketone	19
Methylene chloride	14 J
Methylmethacrylate	7.8
o-Xylene	6.5
Styrene	6
Tertiary butyl alcohol	5.8
Tetrachloroethylene (PCE)	69.2
Tetrahydrofuran	21
Toluene	761 D
Trichloroethylene (TCE)	1.7
Xylenes (total)	28

Sample ID	SV-3
Date Sampled	5/22/2014
VOCs	µg/m³
1,2,4-Trimethylbenzene	189
2,2,4-Trimethylpentane	29
4-Ethyltoluene	15
Acetone	58.4
Benzene	15
Carbon disulfide	44.8
Chloroform	333
Cyclohexane	15
Dichlorodifluoromethane	3.9 J
Ethanol	25.6
Ethylbenzene	13
Heptane	24
Hexane	44.8
m,p-Xylene	46
Methyl ethyl ketone	8
Methylene chloride	13
o-Xylene	20
Propylene	1,400 D
Tertiary Butyl Alcohol	8.5
Tetrachloroethylene (PCE)	5.2
Tetrahydrofuran	43.1
Toluene	66.7
Trichloroethylene (TCE)	1.8
Xylenes (total)	65.6

Sample ID	AA-1
Date Sampled	5/22/2014
VOCs	µg/m³
1,2,4-Trimethylbenzene	0.79 J
2,2,4-Trimethylpentane	1.9
Acetone	16
Benzene	1
Chloromethane	1.3
Cyclohexane	0.52 J
Dichlorodifluoromethane	3.3
Ethanol	15
Ethyl Acetate	2.1
Ethylbenzene	0.91
Freon 113	2
Heptane	0.9
Hexane	3.3
Isopropyl Alcohol	2.7
m,p-Xylene	3.1
Methyl ethyl ketone	1.2
Methylene chloride	6.3
o-Xylene	1.1
Tetrachloroethylene (PCE)	0.95
Toluene	4.9
Trichlorofluoromethane	1.7
Xylenes (total)	4.2

Sample ID	SSV-1 20160831
Date Sampled	8/31/2016
VOCs	µg/m³
1,1,1-Trichloroethane	10
1,2,4-Trimethylbenzene	22
1,3,5-Trimethylbenzene (Mesitylene)	7.4
2,2,4-Trimethylpentane	11
2-Hexanone	181
4-Ethyltoluene	6.4
Acetone	534 D
Benzene	23
Carbon Disulfide	218
Chloroform	4
Cyclohexane	73.7
Dichlorodifluoromethane	4.2
Ethanol	86.1
Ethyl Acetate	30
Ethylbenzene	12
Isopropanol	31.2
Methyl Ethyl Ketone (2-Butanone)	976 D
Methylene Chloride	2.1 J
N-Heptane	13
N-Hexane	19
O-Xylene (1,2-Dimethylbenzene)	19
Propylene	105
Styrene	16
Tert-Butyl Alcohol	48.5
Tetrachloroethylene (PCE)	157
Tetrahydrofuran	5.3
Toluene	37
Trichlorofluoromethane	3.7 J
Xylenes, Total	57.8

Sample ID	SV-4
Date Sampled	5/22/2014
VOCs	µg/m³
1,2,4-Trimethylbenzene	115
1,3,5-Trimethylbenzene	37
2,2,4-Trimethylpentane	227
4-Ethyltoluene	37
Acetone	69.1
Benzene	140
Carbon disulfide	123
Chloroform	230
Chloromethane	17
Cyclohexane	20
Ethanol	58.2
Ethylbenzene	118
Heptane	134
Hexane	158
m,p-Xylene	423
Methyl ethyl ketone	33.9
Methylene chloride	9.7
Methylmethacrylate	20
o-Xylene	109
Propylene	4,470 D
Tertiary Butyl Alcohol	7
Tetrachloroethylene (PCE)	114
Tetrahydrofuran	11
Toluene	2,130 D
Xylenes (total)	530

Sample ID	SAA-1 20160831
Date Sampled	8/31/2016
VOCs	µg/m³
1,2,4-Trimethylbenzene	0.45 J
2,2,4-Trimethylpentane	0.75 J
Acetone	12
Benzene	0.8
Chloroform	0.21 J
Chloromethane	0.93
Dichlorodifluoromethane	2.5
Ethanol	10
Ethyl Acetate	17
Ethylbenzene	0.37 J
Isopropanol	2.7
Methyl Ethyl Ketone (2-Butanone)	1.8
Methylene Chloride	0.87
N-Heptane	0.37 J
N-Hexane	0.74
O-Xylene (1,2-Dimethylbenzene)	0.48 J
Propylene	1.3
Tetrachloroethylene (PCE)	0.88
Toluene	2.7
Trichlorofluoromethane	1.5
Xylenes, Total	1.6

Sample ID	SV-2
Date Sampled	5/22/2014
VOCs	µg/m³
1,2,4-Trimethylbenzene	2,950
1,3,5-Trimethylbenzene	2,010
4-Ethyltoluene	1,830
Benzene	1,010,000 D
Cyclohexane	1,340,000 D
Ethylbenzene	35,000
Heptane	1,340,000 D
Hexane	3,340,000 D
m,p-Xylene	132,000
o-Xylene	32,800
Toluene	942,000 D
Xylenes (total)	165,000

Sample ID	SSV-2 20160831
Date Sampled	8/31/2016
VOCs	µg/m³
1,2,4-Trimethylbenzene	23
1,3,5-Trimethylbenzene (Mesitylene)	7.4
2-Hexanone	148
4-Ethyltoluene	6.4
Acetone	437 D
Benzene	52.7
Carbon Disulfide	45.2
Chloroform	8.3
Chloromethane	2.7
Cyclohexane	38.2
Dichlorodifluoromethane	2.8 J
Ethanol	56
Ethyl Acetate	17
Ethylbenzene	15
Isopropanol	32.7
Methyl Ethyl Ketone (2-Butanone)	846 D
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	11
N-Heptane	261
N-Hexane	515
O-Xylene (1,2-Dimethylbenzene)	21
Propylene	354
Styrene	17
Tert-Butyl Alcohol	119
Tetrachloroethylene (PCE)	97.6
Tetrahydrofuran	6.8
Toluene	40.7
Trichloroethylene (TCE)	1.1
Trichlorofluoromethane	1.7 J
Xylenes, Total	66

LEGEND

BCP SITE BOUNDARY

FENCE

RAIL BED RETAINING WALL

1 — LOT BOUNDARY AND TAX LOT NUMBER

2360 — TAX BLOCK NUMBER

REMEDIAL INVESTIGATION TEMPORARY SOIL VAPOR POINT LOCATION (2014)

REMEDIAL INVESTIGATION AMBIENT AIR SAMPLE LOCATION (2014)

SUPPLEMENTAL REMEDIAL INVESTIGATION TEMPORARY SOIL VAPOR POINT LOCATION (2016)

SUPPLEMENTAL REMEDIAL INVESTIGATION AMBIENT AIR SAMPLE LOCATION (2016)

MH — UTILITY MANHOLE

UST — UNDERGROUND STORAGE TANK

Sample ID	SAA-1 20160831
Date Sampled	8/31/2016
VOCs	µg/m³
1,2,4-Trimethylbenzene	0.45 J
2,2,4-Trimethylpentane	0.75 J
Acetone	12
Benzene	0.8

Sample ID
Sample Date
Compound
Concentration

NS : A standard has not been established for the analyte.
J : The reported concentration is an estimated quantity and may be inaccurate or imprecise.
D : The reported concentrations is the result of a diluted sample analysis.
µg/m³ : Micrograms per cubic liter

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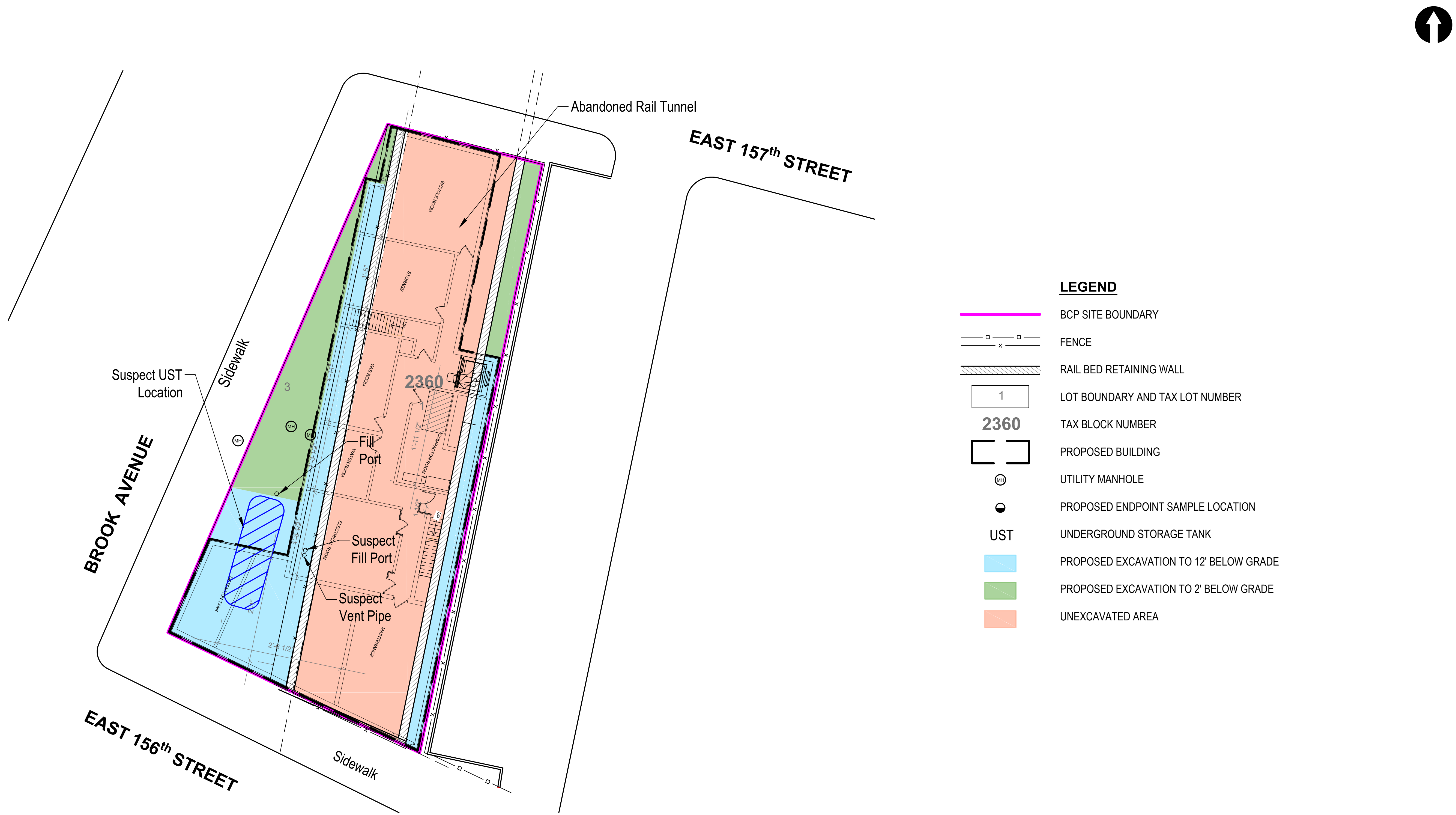
Brook 156
740 Brook Avenue
Bronx, New York

SOIL VAPOR CONCENTRATIONS

DATE
4/23/2018

PROJECT NO.
11703

FIGURE
6



SOURCE: MONTROSE SURVEYING CO., LLP, SURVEY NO. 62510-39, TAX BLOCK 2360, TAX LOTS 1 & 3, REVISED 9/20/2016.

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Brook 156
740 Brook Avenue
Bronx, New York

PROPOSED REMEDIAL EXCAVATION PLAN

DATE 4/23/2018
PROJECT NO. 11703
FIGURE 7

SOURCE: MONTROSE SURVEYING CO., LLP, SURVEY NO. 62510-39, TAX BLOCK 2360, TAX LOTS 1 & 3, REVISED 9/20/2016.

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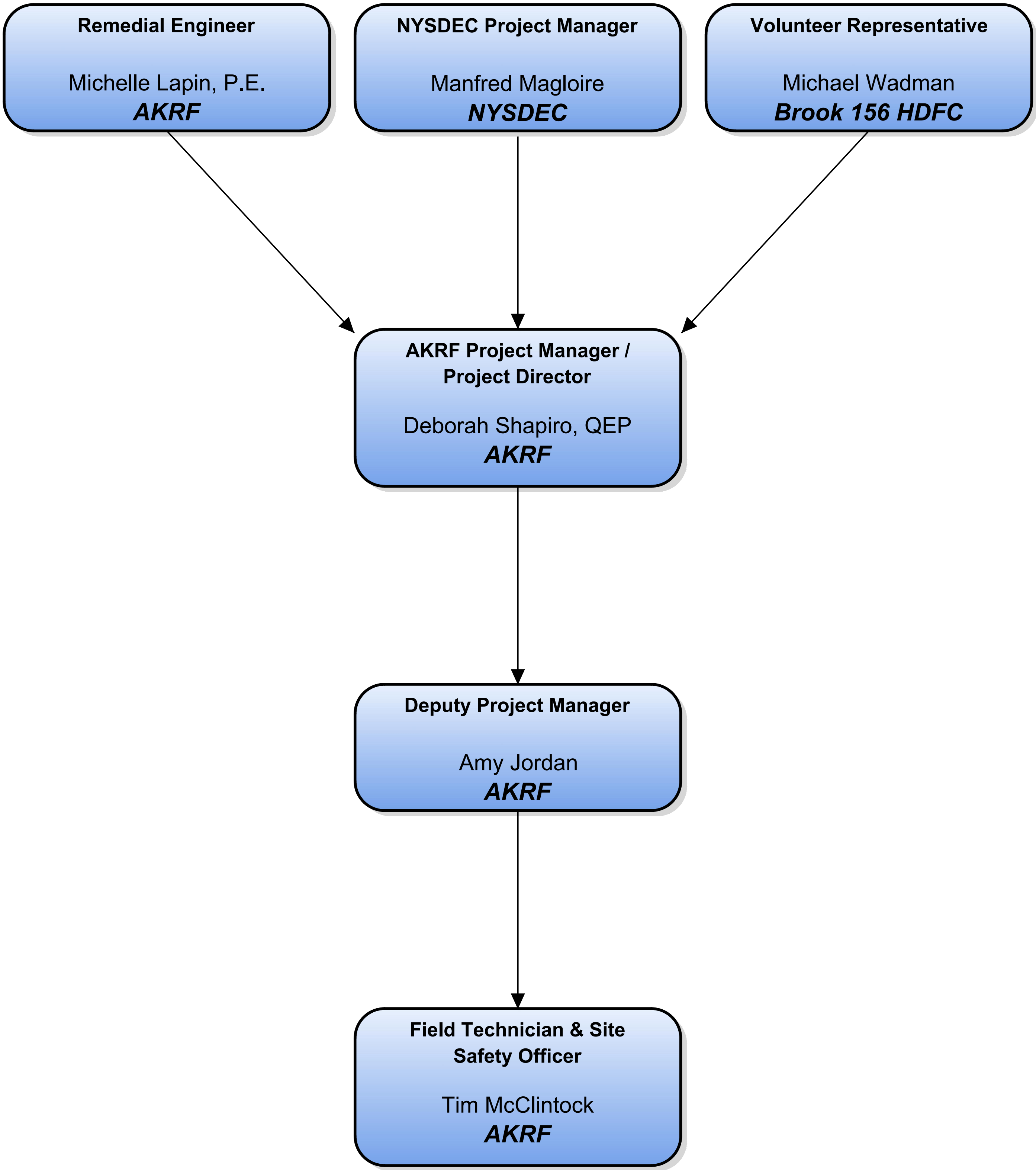
Brook 156
740 Brook Avenue
Bronx, New York

PROPOSED ENDPOINT SAMPLE LOCATION PLAN

DATE 4/23/2018
PROJECT NO. 11703
FIGURE 8



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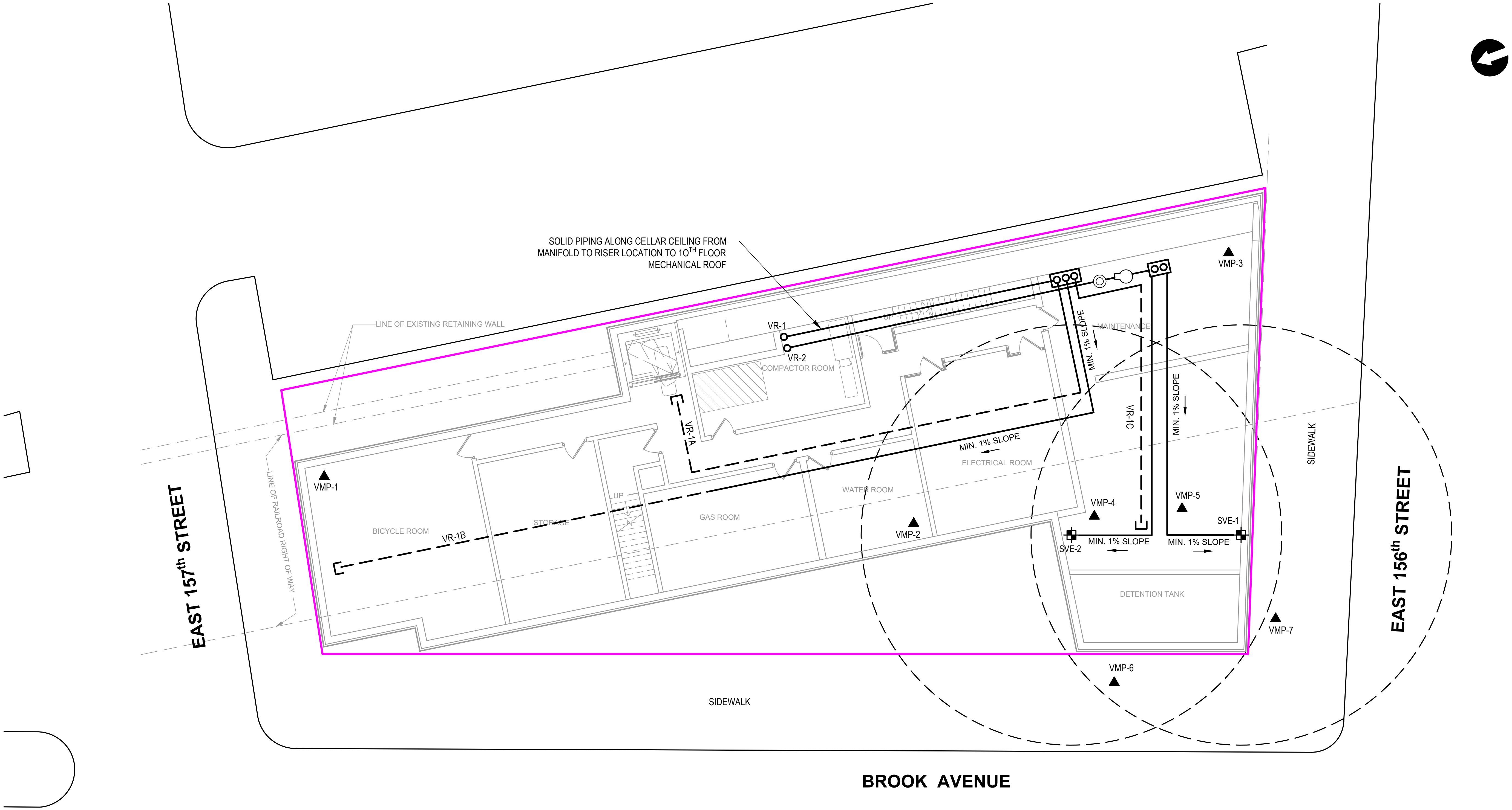
Brook 156
740 Brook Avenue
Bronx, New York

PROJECT ORGANIZATION CHART

DATE **4/18/2018**
PROJECT NO. **12492**
FIGURE **9**



LEGEND

	BCP SITE BOUNDARY
	SLOTTED 0.02" SCHEDULE 40 4" PVC PIPE BENEATH SLAB WITH ENDCAP
	SOLID SCHEDULE 40 4" PVC PIPE BENEATH SLAB
VMP-1	MONITORING POINT LOCATION WITH ID
VR-1	VERTICAL RISER PENETRATION LOCATION WITH ID
	SLAB PENETRATION / MANIFOLD
	GAC UNITS (TWO IN SERIES)
	BLOWER
MIN. 1% SLOPE	MINIMUM 1% SLOPE
	PROPOSED SOIL VAPOR EXTRACTION WELL LOCATION WITH ASSUMED MINIMUM 30' RADIUS OF INFLUENCE

0 15 30

SCALE IN FEET

AKRF

440 Park Avenue South, New York, NY 10016

Brook 156
740 Brook Avenue
Bronx, New York

PROPOSED SSDS AND SVE SYSTEM PLAN

DATE
4/24/2018

PROJECT NO.
11703

FIGURE
10

AKRF
440 Park Avenue South, New York, NY 10016

Brook 156
740 Brook Avenue
Bronx, New York

COMPOSITE COVER SYSTEM PLAN

DATE
4/23/2018
PROJECT NO.
11703
FIGURE
11

APPENDIX A
STANDARDS, CRITERIA, AND GUIDANCE

APPENDIX A

1.0 SCGS FOR SITE CHARACTERIZATION AND REMEDIAL INVESTIGATION

The following standards and criteria typically will apply to Site Characterizations and Remedial Investigations conducted in New York State:

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands Maps and Classification
- 6 NYCRR Part 257 - Air Quality Standards
- 10 NYCRR Part 5 of the State Sanitary Code - Drinking Water Supplies (May 1998)
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Characterizations and Remedial Investigations conducted in New York State:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife (July 1987)
- Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh
- The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh
- Criteria for the Development of Health Advisories for Sportfish Consumption
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)

- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

2.0 SCGS FOR REMEDY SELECTION

The following standards and criteria typically apply to the remedy selection process conducted in New York State:

- 6 NYCRR Part 375 - Environmental Remediation Programs
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources

The following guidance typically applies to the remedy selection process conducted in New York State:

- TAGM 4044 - Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills (March 1992)
- TAGM 4051 - Early Design Strategy (August 1993)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Freshwater Wetlands Regulations - Guidelines on Compensatory Mitigation (October 1993)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies:
- Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)

3.0 SCGS FOR UNDERGROUND STORAGE TANK CLOSURE

The following standards and criteria typically apply to UST closures conducted in New York State:

- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)

- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 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

The following guidance typically applies to UST closures conducted in New York State:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- Spill Response Guidance Manual
- Permanent Closure of Petroleum Storage Tanks
- 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
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

4.0 SCGS FOR REMEDIAL ACTION

The following standards and criteria typically apply to Remedial Actions conducted in New York State:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program
- 10 NYCRR Part 67 – Lead
- 12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 361 - Siting of Industrial Hazardous Waste Facilities
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)

- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS ("SPDES Regulations")
- Technical Guidance for Screening Contaminated Sediments (January 1999)

The following guidance typically applies to Remedial Actions conducted in New York State:

- TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- State Coastal Management Policies
- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

5.0 SCGS FOR SITE MANAGEMENT

The following standards and criteria typically apply to Site Management activities conducted in New York State:

- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Management activities conducted in New York State:

- Groundwater Monitoring Well Decommissioning Procedures (May 1995)
- The activity is a component of a program selected by a process complying with the public participation requirements of section 1.10, to the extent applicable.
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

APPENDIX B
METES AND BOUNDS

DESCRIPTION- SCHEDULE A
AMENDED: February 14, 2011

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

BEGINNING at a point on the northerly side of East 156th Street distant 26.98 feet easterly from the corner formed by the intersection of the northerly side of East 156th Street with the easterly side of Brook Avenue;

RUNNING THENCE easterly along the northerly side of East 156th Street, 39.60 feet to a point;

RUNNING THENCE northerly along a line forming an angle of 76 degrees 15 minutes 48 seconds on the northwest with the northerly side of East 156th Street, 143.34 feet to a point;

RUNNING THENCE westerly along a line forming an angle of 92 degrees 45 minutes 12 seconds on the southwest with the last mentioned course, 38.13 feet to a point; and

RUNNING THENCE southerly along a line forming an angle of 87 degrees 24 minutes 26 seconds on the southeast with the last mentioned course, 135.77 feet to the northerly side of East 156th Street, the point or place of BEGINNING.

___ Premises herein is or will be improved by a one or two family dwelling only.
___ Premises herein is or will be improved by one or more structures containing in the aggregate not more than six residential dwelling units each having its own separate cooking facility.
√ Premises herein is NOT improved as above.

Standard N.Y.B.T.U. Form 8002 Bargain and Sale Deed, with Covenant against Grantor's Acts. Individual or Corporation (Single Sheet)

CONSULT YOUR LAWYER BEFORE SIGNING THIS INSTRUMENT—THIS INSTRUMENT SHOULD BE USED BY LAWYERS ONLY.

558

REEL 156 PAGE 1856

THIS INDENTURE, made the 15th day of April, nineteen hundred and seventy-one

BETWEEN JOHN P. KREMENEZKY, residing at 330 East 43d Street, New York, New York,

party of the first part, and

PAUL KENT, residing at 305 East 86th Street, New York, New York, and ROBERT I. SHAPIRO, residing at 1010 Fifth Avenue, New York, New York, ~~as joint tenants with the right of survivorship~~

party of the second part,

WITNESSETH, that the party of the first part, in consideration of ten dollars and other valuable consideration paid by the party of the second part, does hereby grant and release unto the party of the second part, the heirs or successors and assigns of the party of the second part forever, an undivided 1/3d interest in

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

BEGINNING at the corner formed by the intersection of the northerly side of One Hundred and Fifty-sixth Street with the easterly side of Brook Avenue; running thence EASTERLY along the northerly side of One Hundred and Fifty-sixth Street twenty-six and ninety-five one-hundredths feet more or less to the land of the Port Morris Branch, so called, of the New York and Harlem River Railroad; running thence NORTHERLY along the westerly side of said land of said Railroad one hundred and twenty-three and fifty one-hundredths feet to the easterly side of Brook Avenue at a point thereon distant twelve and fifty-four one-hundredths feet southerly from the corner formed by the intersection of the said easterly side of Brook Avenue with the southerly side of One Hundred and Fifty-Seventh Street; thence SOUTHERLY along the easterly side of Brook Avenue one hundred and nineteen and fifty-three one-hundredths feet to the corner aforesaid the point or place of BEGINNING.

BEING the same described parcel to the grantor herein by deed dated January 25, 1965 from SOCONY MOBIL OIL COMPANY, INC., recorded on January 28, 1965 in Liber 2640 Page 282.

TOGETHER with all right, title and interest, if any, of the party of the first part in and to any streets and roads abutting the above described premises to the center lines thereof; TOGETHER with the appurtenances and all the estate and rights of the party of the first part in and to said premises; TO HAVE AND TO HOLD the premises herein granted unto the party of the second part, the heirs or successors and assigns of the party of the second part forever.

AND the party of the first part covenants that the party of the first part has not done or suffered anything whereby the said premises have been encumbered in any way whatever, except as aforesaid.

AND the party of the first part, in compliance with Section 13 of the Lien Law, covenants that the party of the first part will receive the consideration for this conveyance and will hold the right to receive such consideration as a trust fund to be applied first for the purpose of paying the cost of the improvement and will apply the same first to the payment of the cost of the improvement before using any part of the total of the same for any other purpose.

The word "party" shall be construed as if it read "parties" whenever the sense of this indenture so requires.

IN WITNESS WHEREOF, the party of the first part has duly executed this deed the day and year first above written.

IN PRESENCE OF:

[signature] ________________ (L.S.)

JOHN P. KREMENEZKY

APPENDIX C
PROPOSED REDEVELOPMENT PLANS

Brook East 156

The Phipps Houses Group
902 Broadway, 13th Floor
New York, NY 10010

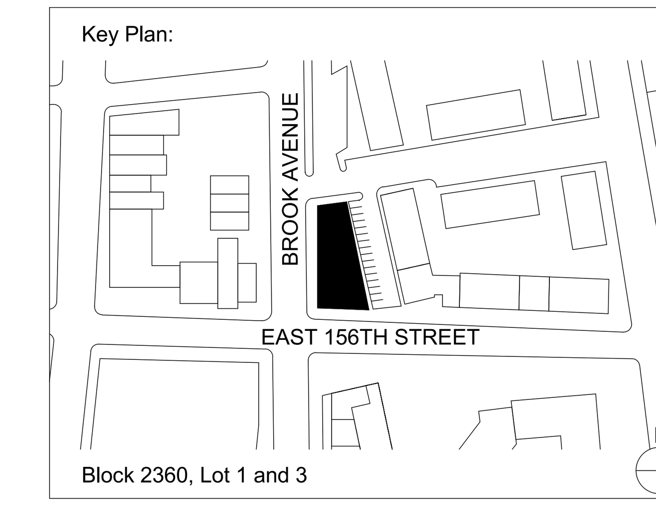
PHIPPS HOUSES

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
www.dattner.com

Revisions:

Issue: ULURP

Key Plan:



Key Plan

Title Sheet

Drawing List:

U-001	Title Sheet
U-002	Project Area Site Plan
U-003	Zoning Analysis
U-100	Zoning Lot Site Plan
U-101	Cellar Plan
U-102	Ground Floor Plan
U-103	2nd-7th Floor Plan
U-104	8th-9th Floor Plan
U-105	10th Floor Plan
U-201	Elevations
U-202	Elevations
U-203	Sections

Architectural Drawings
February 15, 2018

Date	02/15/18
Scale	
Drawn By	JS
Checked By	WS
Project No.	1760.0A
Seal	
Sheet No.:	U-001

Brook East 156

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1 ULURP Area Site Plan
1" = 30'-0"

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 15 30 60

APPLICANT'S STAMP AND SEAL CORRESPONDS TO THE INFORMATION REGARDING THE DEVELOPMENT SITE, ZONING LOT, AND RELATED CURB CUTS. INFORMATION REGARDING THE SURROUNDING PROPERTIES AND STREET TREES IS FOR ILLUSTRATIVE PURPOSES ONLY. THE DEVELOPMENT ENVELOPE, THE SHAPE AND FOOTPRINT OF THE BUILDINGS, AND NOTATIONS ARE SUBJECT TO CHANGE. INTERIOR PARTITIONING AND LAYOUTS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE. LANDSCAPE AND HARDSCAPE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY AND IS SUBJECT TO CHANGE. BUILDING ENTRANCE LOCATIONS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE.

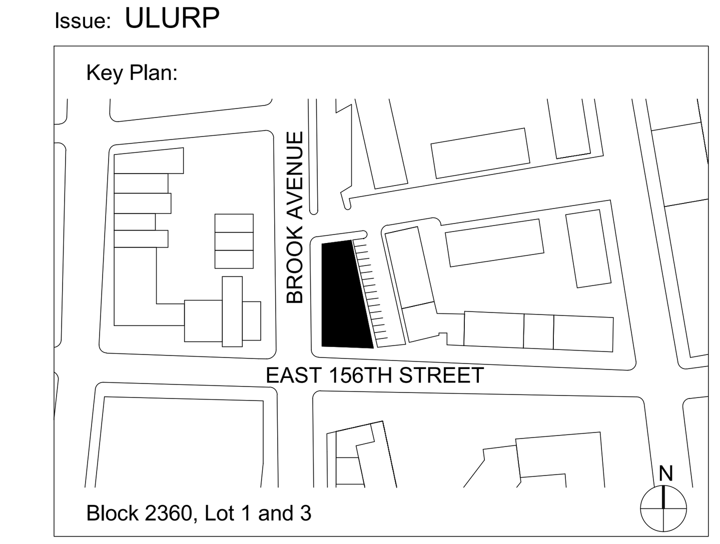
LEGEND

- Zoning District Boundary
- Zoning Lot Line Boundary
- Project Area Boundary
- Proposed Maximum Building Envelope
- Illustrative Building Envelope
- Name Elevation — Spot Elevation Tag From Base Plane
- Proposed Building
- Surrounding Buildings
- Community Facility Building Entrance
- Main Building Entry
- Proposed Street Tree & Tree Pit
- Existing Street Tree
- Existing Street Light
- Existing Fire Hydrant
- Direction of Traffic
- ⑤ Number of Stories at Existing Buildings
- R8A Zoning District

Revisions:

Issue: ULURP

Key Plan:



Key Plan

Project Area Site Plan

Date	02/15/18
Scale	1" = 30'-0"
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.: U-002

SITE DATA	
Block	2360
Lot	1 and 3
Street Address	Brook Avenue and East 156th Street, Bronx, NY
Existing District	R7-2
Proposed District	C6-2
Transit Zone	Site is within Transit Zone
Community Board	Bronx Community District 1
Zoning Sectional Map No.	6c
Zoning Lot Area (sf)	7,123

ACTIONS REQUESTED

1) Disposition of City Owned Property.
2) Re-zoning from R7-2 to C6-2
3) Special Permit to Build over Railroad Right of Way.

ZONING LOT AREA				
Dimensions:	Lot 1	135.77 x 38.13 x 143.34 x 39.60		ft.
	Lot 3	132.07 x 135.77 x 26.98		ft.
Lot Area:	Lot 1	5,343	SF	(owned by Phipps)
	Lot 3	1,780	SF	(owned by HPD)
	Total	7,123	SF	
Corner Lot:		5,625	SF	within 100 ft. of intersection of Brook Ave. & East 156th St.
Interior Lot:		1,498	SF	East 157th Street is de-mapped; not a corner lot.

ZR	ITEM/ DESCRIPTION		PERMITTED/ REQUIRED		PROPOSED		COMPLIANCE/ LACK THEREOF AND NOTES
1. Use							
22-10	Uses		1, 2, 3, 4		2, 3		Complies
2. Lot Coverage							
35-31, 23-153	Lot Coverage (Corner Lot)	Percentage	100	%	83	%	Complies
		Square Footage	5,625	sf	4,694	sf	
35-31, 23-153	Lot Coverage (Interior Lot)	Percentage	70	%	70	%	Complies
		Square Footage	1,049	sf	1,043	sf	
3. Floor Area							
35-23	Residential Bulk Regulations in C6-2 Districts	Applicable Residence District	R8				
35-31, 23-153, 23-154, 24-11	Maximum FAR	Residential (with IH Bonus) - UG 2	7.2	FAR	6.91	FAR	Complies
		Community Facility - General - UG 3	6.5	FAR	0.14	FAR	Complies
		Total	7.2	FAR	7.05	FAR	Complies
35-31, 23-153, 23-154, 24-11	Floor Area	Residential (with IH Bonus) - UG 2	51,286	sf	49,244	sf	Complies
		Community Facility - General - UG 3	46,300	sf	975	sf	Complies
		Total	51,286	sf	50,219	sf	Complies
4. Density Regulations							
35-40, 35-30, 23-20, 23-22	Density Regulations	Dwelling Unit Factor	680	Divide Proposed FA by factor			
		Maximum number of DU's	72	DU's	60	DU's	Complies
4. Height and Setback							
35-65, 35-654 (b)(1), 23-664 (a)(3)	Base Height	Maximum	105	feet	100	feet	Complies
23-664(c),Table 2	Building Height	Maximum	215	feet	100	feet	Complies
35-654 (b)(1), 23-664 (a)(3), 35-652	Setback	Minimum - Narrow Street	10	feet	NA	feet	
23-664 (c)		Minimum - Wide Street	15	feet	NA	feet	
5. Yards							
35-50, 23-52	Rear yard provisions for Shallow Interior Lots	Use Depth	38.13	feet			
		Reduction = Use Depth x 6"	26	feet reduction			
		Minimum Rear Yard Depth Required	10	feet	10	feet	Complies
35-50, 23-541	Rear Yard	No Rear Yard Required within 100 ft. of a corner	None		10	feet	Complies
6. Street Wall Location							
35-65, 35-654 (b)(1), 23-664 (a)(3), 35-651	Street Wall Articulation	Does not apply per section 35-654 (b)(1) and 23-664 (a)(3)					
6. Parking and Loading							
25-251	Permitted Automobile Parking	Within Transit Zone no accessory off-street parking shall be required for income-restricted housing units	None		0	spaces	Complies
36-711	Bicycle Parking	Minimum	1 space/2 DU	space/DU	30	spaces	Complies
7. Street Tree Planting							
26-41	Street Tree Planting	Minimum	1/25	trees/feet of frontage	8	trees	Complies; 8 planted on-site

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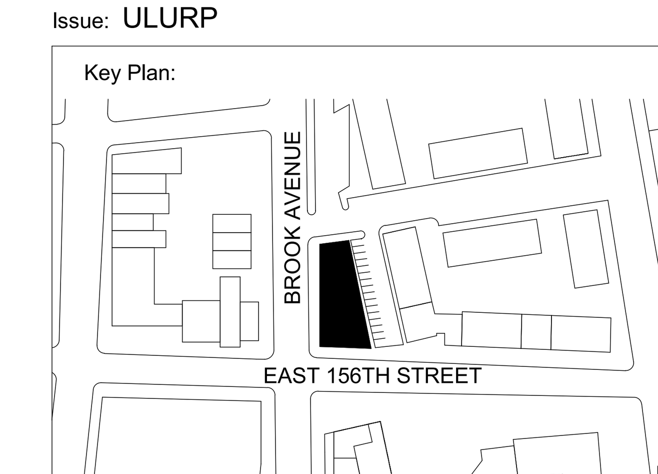
Revisions:

Issue: ULURP

Key Plan:

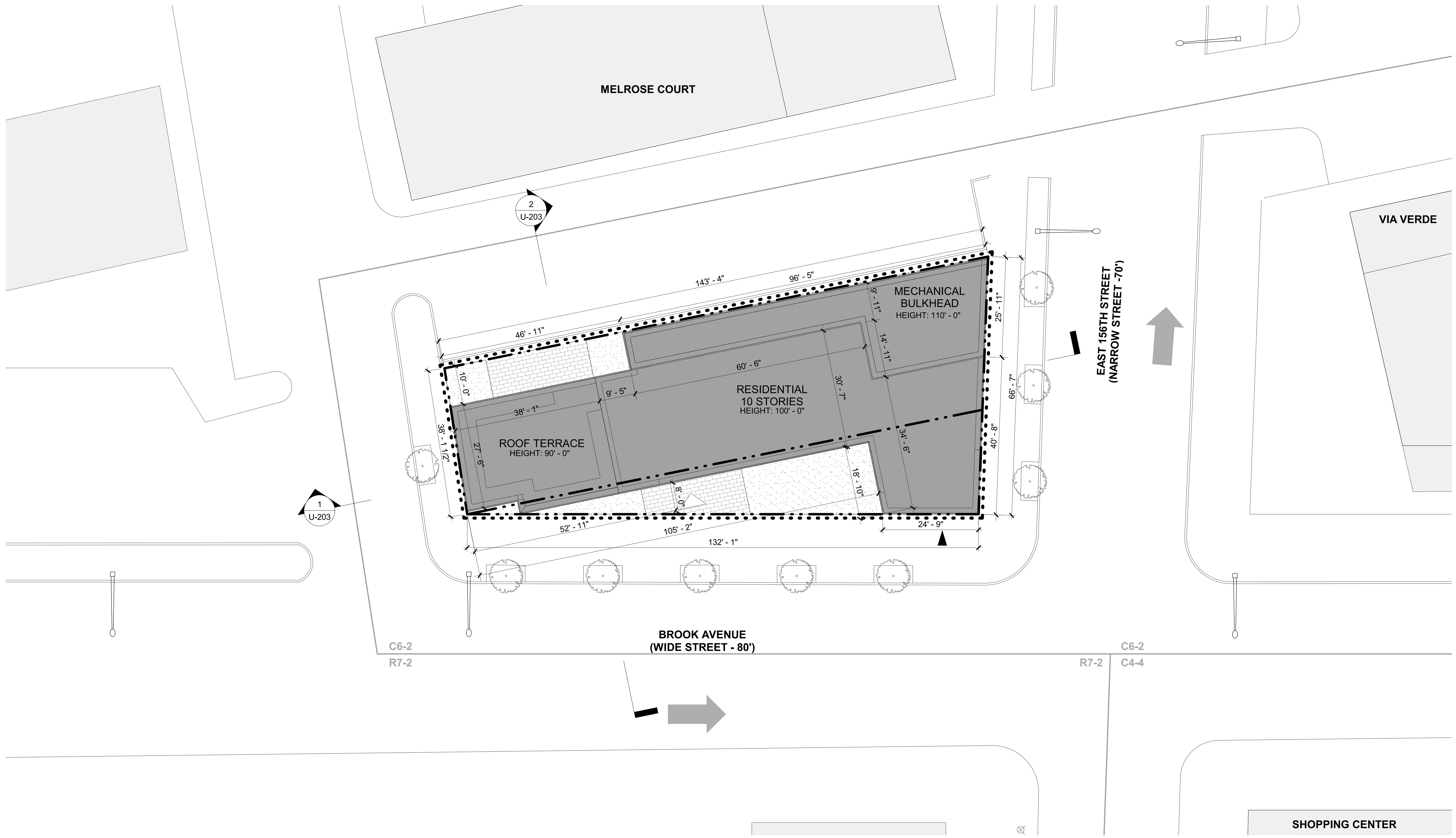


Block 2360, Lot 1 and 3

Key Plan

Zoning Analysis

Date	02/15/18
Scale	
Drawn By	JS
Checked By	WS
Project No.	1760.0A
Seal	
Sheet No.:	U-003



1 Site Plan
1/16" = 1'-0"

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 8 16 32

APPLICANT'S STAMP AND SEAL CORRESPONDS TO THE INFORMATION REGARDING THE DEVELOPMENT SITE, ZONING LOT, AND RELATED CURB CUTS. INFORMATION REGARDING THE SURROUNDING PROPERTIES AND STREET TREES IS FOR ILLUSTRATIVE PURPOSES ONLY. THE DEVELOPMENT ENVELOPE, THE SHAPE AND FOOTPRINT OF THE BUILDINGS, AND NOTATIONS ARE SUBJECT TO CHANGE. INTERIOR PARTITIONING AND LAYOUTS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE. LANDSCAPE AND HARDSCAPE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY AND IS SUBJECT TO CHANGE. BUILDING ENTRANCE LOCATIONS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE.

LEGEND

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- Zoning Lot Line Boundary
- Project Area Boundary
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- Illustrative Building Envelope
- Spot Elevation Tag From Base Plane
- Proposed Building
- Surrounding Buildings
- Community Facility Building Entrance
- Main Building Entry
- Proposed Street Tree & Tree Pit
- Existing Street Tree
- Existing Street Light
- Existing Fire Hydrant
- Direction of Traffic
- Number of Stories at Existing Buildings
- R8A Zoning District

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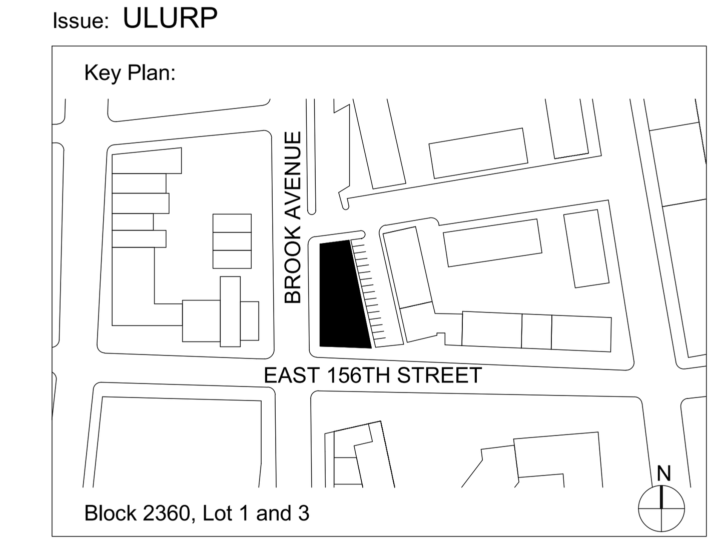


Key Plan

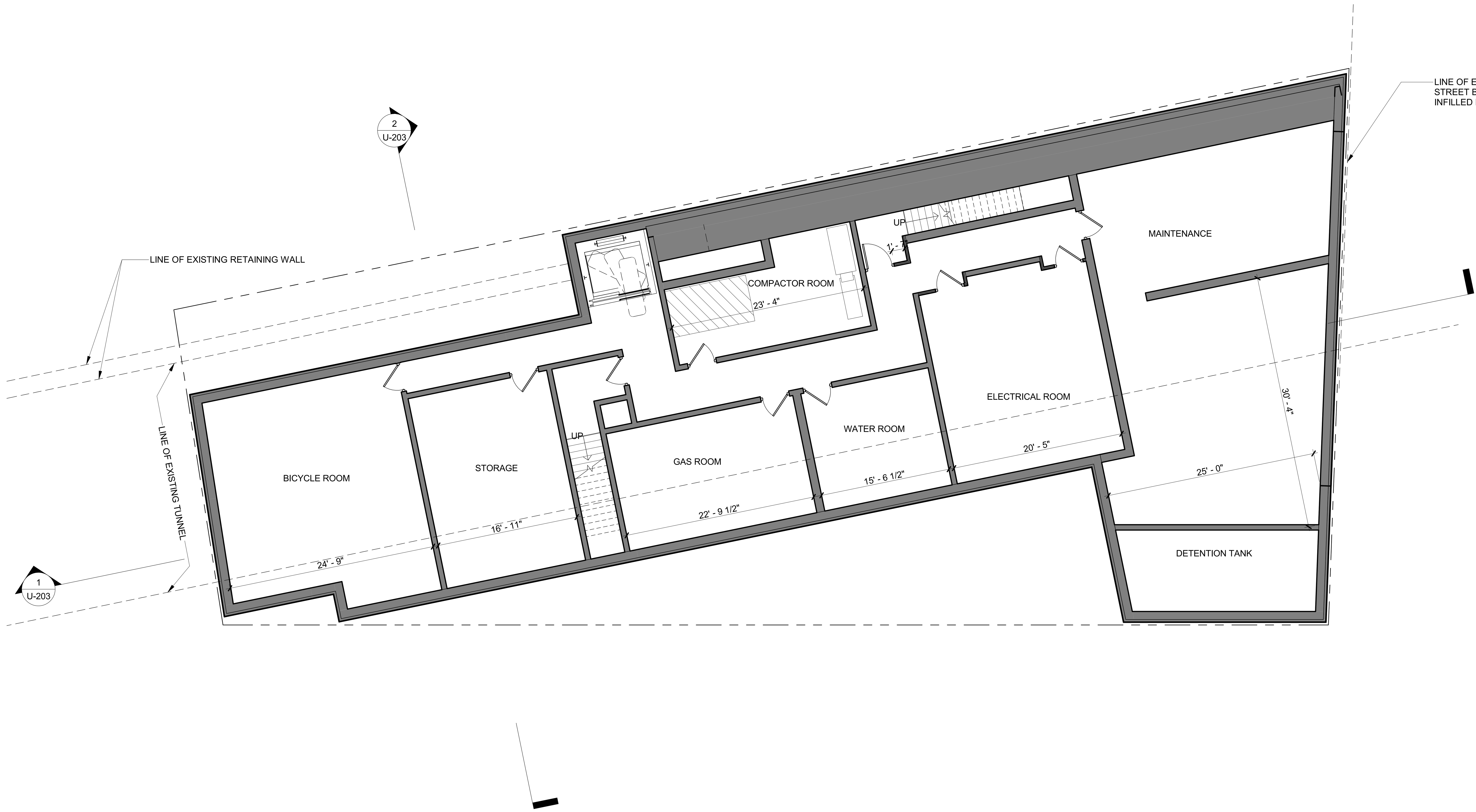
Zoning Lot Site Plan

Date	02/15/18
Scale	As indicated
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.:

U-100



1 Cellar Floor Plan
1/8" = 1'-0"

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 4 8 16

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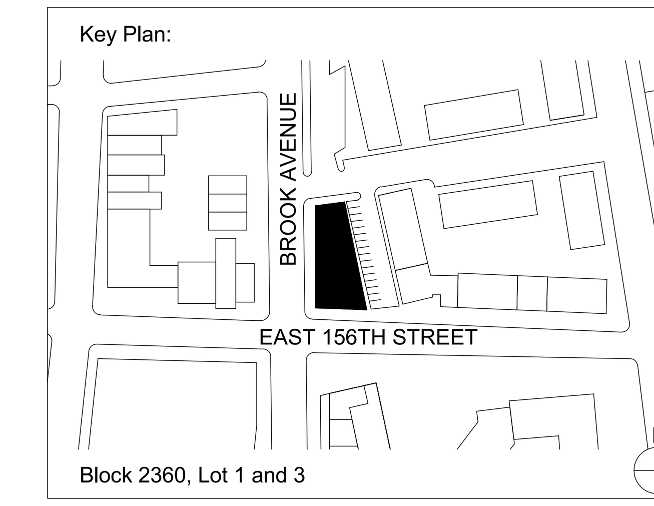


Block 2360, Lot 1 and 3

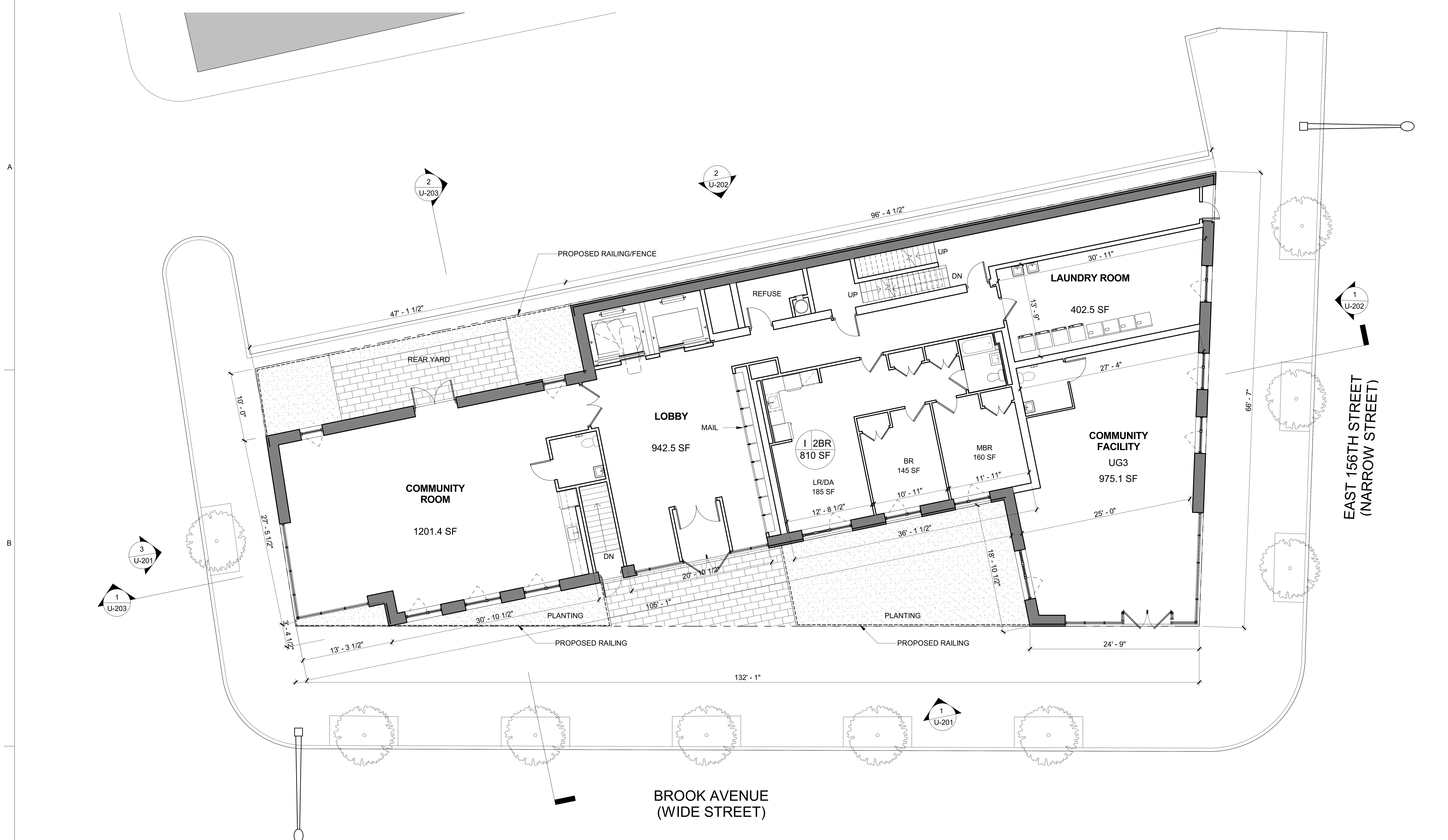
Key Plan

Cellar Plan

Date	02/15/18
Scale	1/8" = 1'-0"
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.: U-101



1 1st Floor Plan
1/8" = 1'-0"

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 4 8 16

N

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Proposed Unit Distribution

Level	0BR	1BR	2BR	3BR	Total
1st Floor	0	0	1	0	1
2nd Floor	2	3	1	1	7
3rd Floor	2	3	1	1	7
4th Floor	2	3	1	1	7
5th Floor	2	3	1	1	7
6th Floor	2	3	1	1	7
7th Floor	2	3	1	1	7
8th Floor	1	2	2	1	6
9th Floor	1	2	2	1	6
10th Floor	1	2	2	0	5
Total	15	24	13	8	60
%	25.00%	40.0%	21.7%	13.3%	100%

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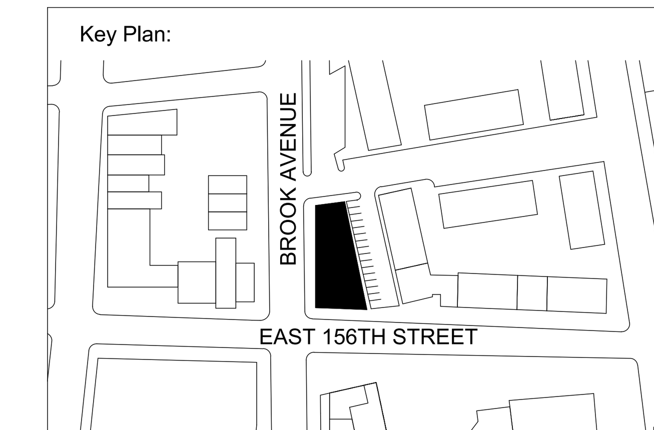


Block 2360, Lot 1 and 3

Key Plan

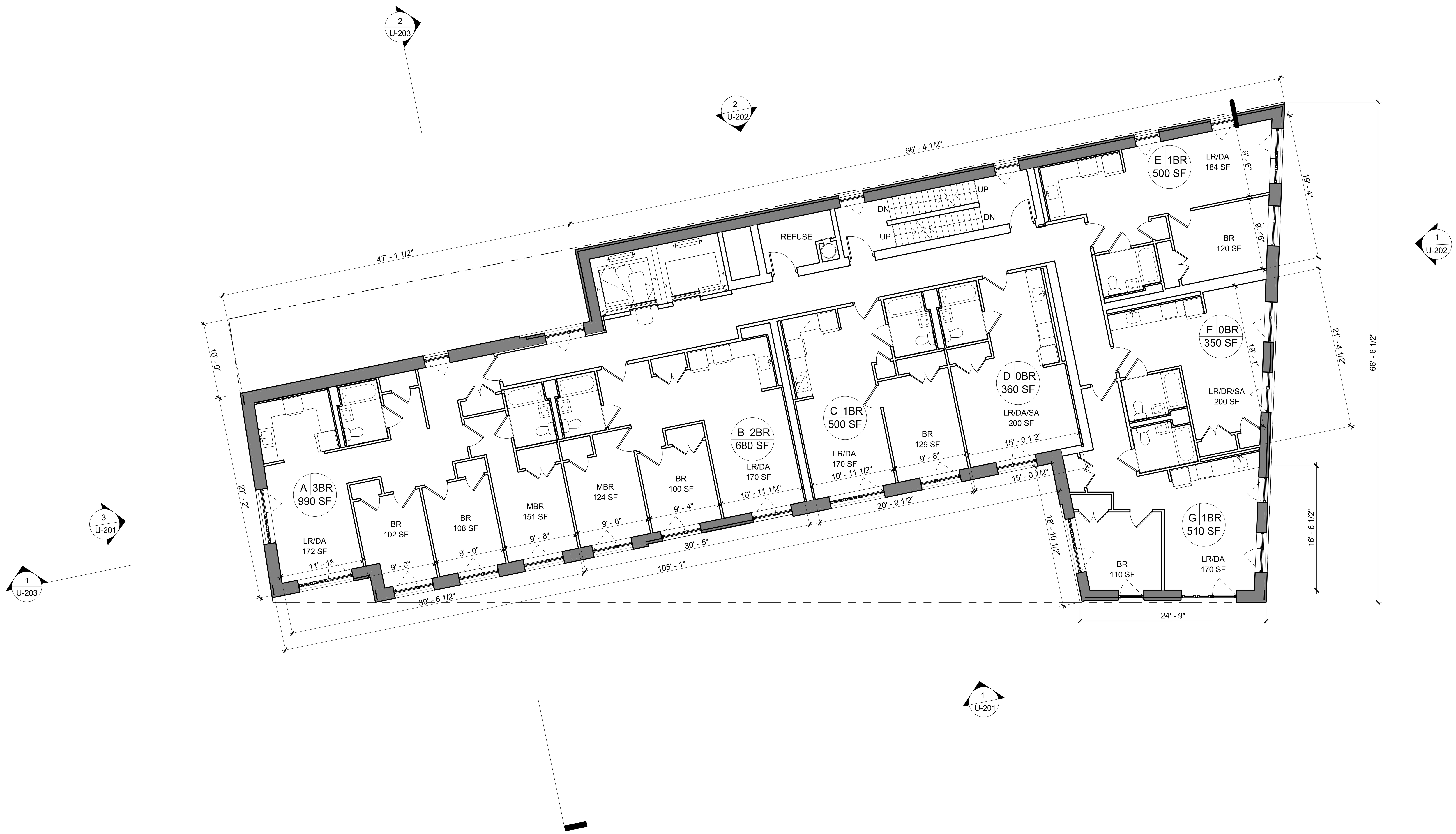
Ground Floor Plan

Date	02/15/18
Scale	1/8" = 1'-0"
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.:

U-102



1 2nd - 7th Floors
1/8" = 1'-0"

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 4 8 16

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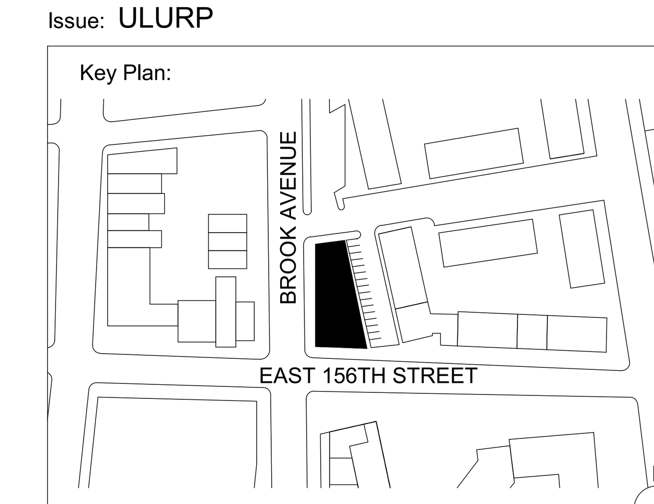


Block 2360, Lot 1 and 3

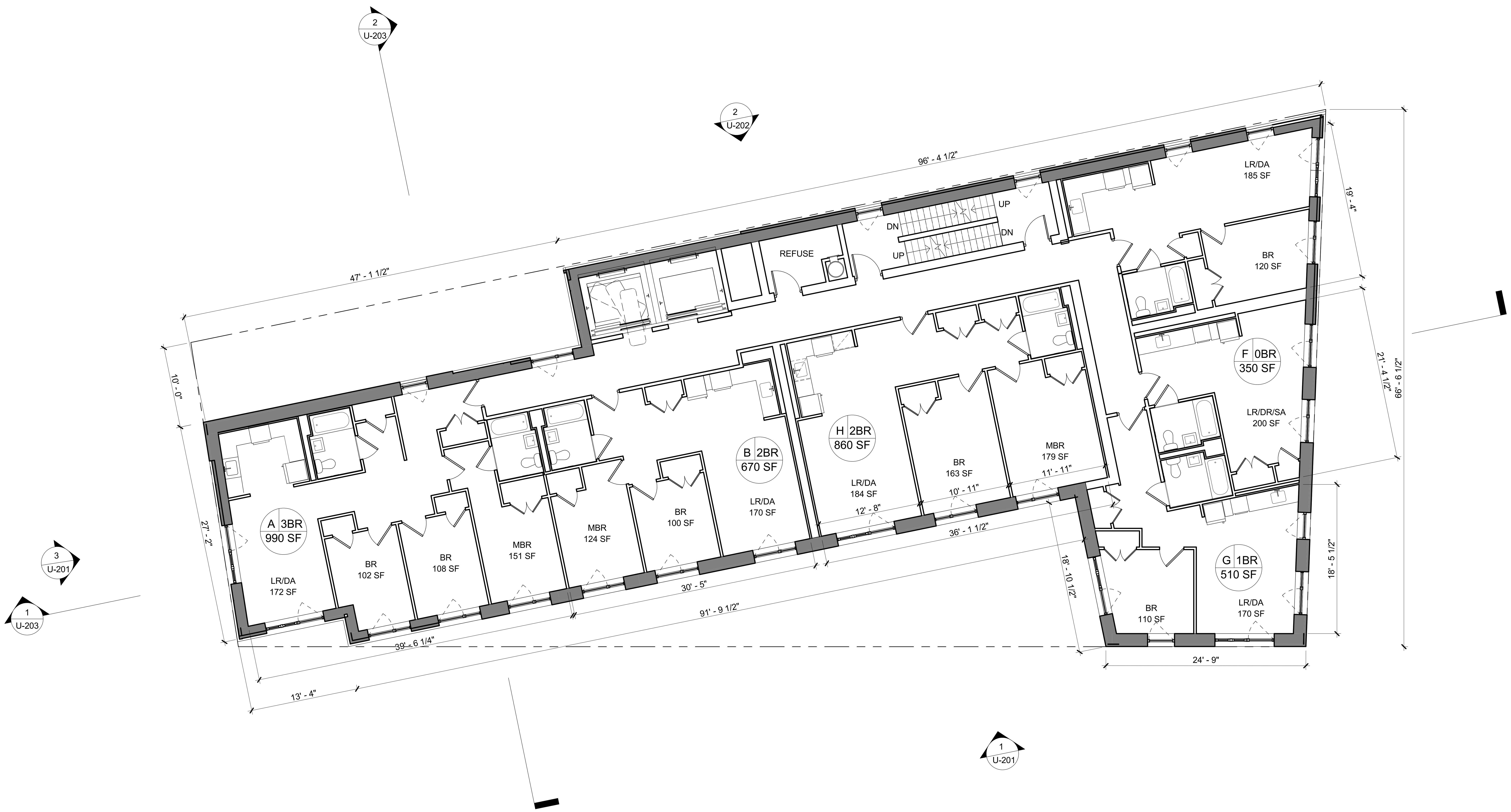
Key Plan

2nd-7th Floor Plan

Date	02/15/18
Scale	1/8" = 1'-0"
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.: U-103



1 8th - 9th Floor
1/8" = 1'-0"

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 4 8 16

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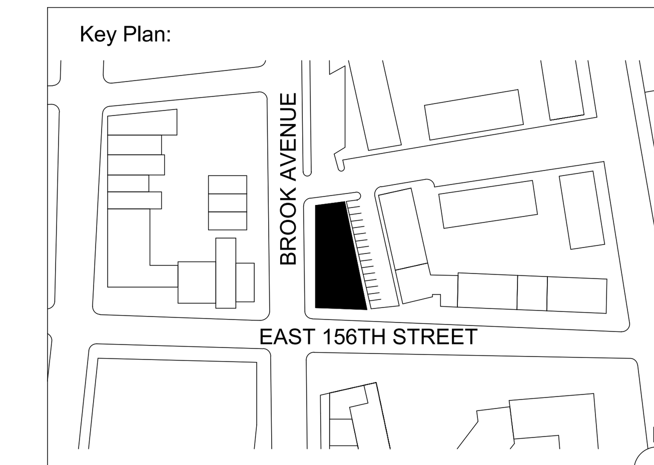


Block 2360, Lot 1 and 3

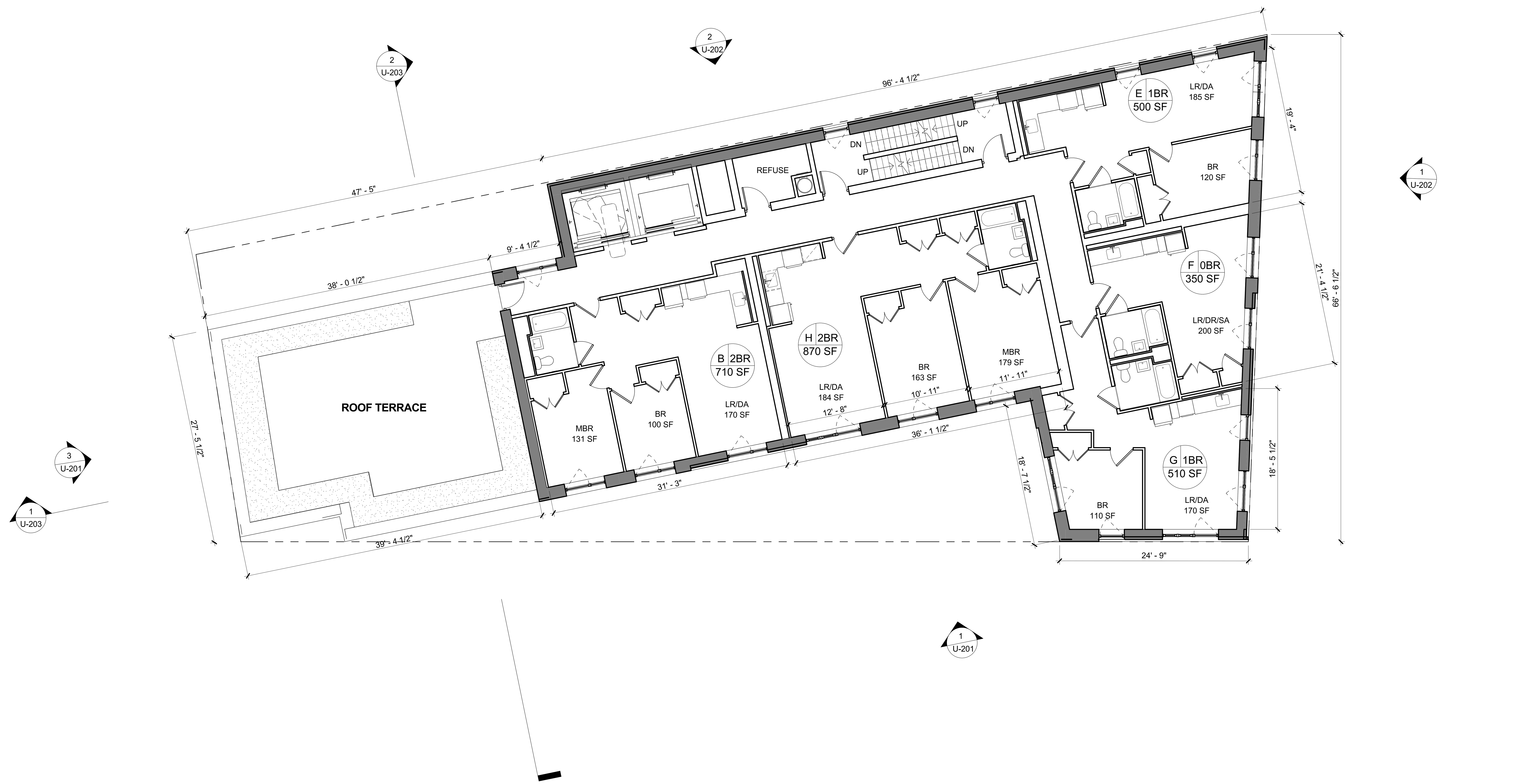
Key Plan

8th-9th Floor Plan

Date	02/15/18
Scale	1/8" = 1'-0"
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.: U-104



1 10th Floor
1/8" = 1'-0"

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 4 8 16

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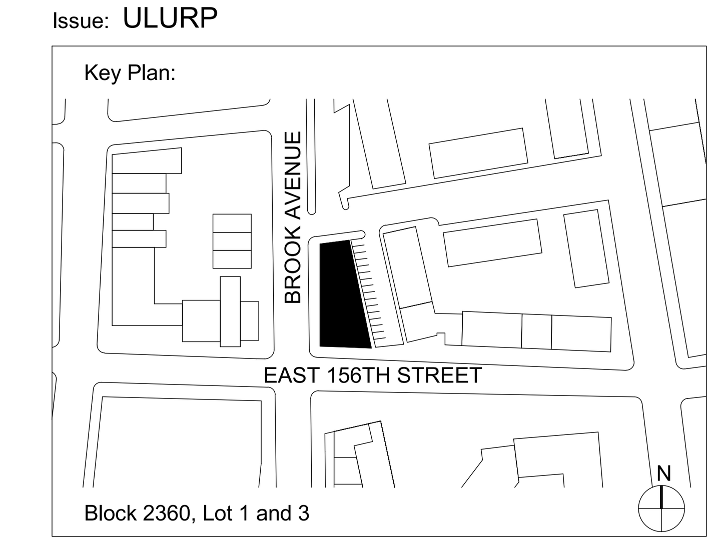


Block 2360, Lot 1 and 3

Key Plan

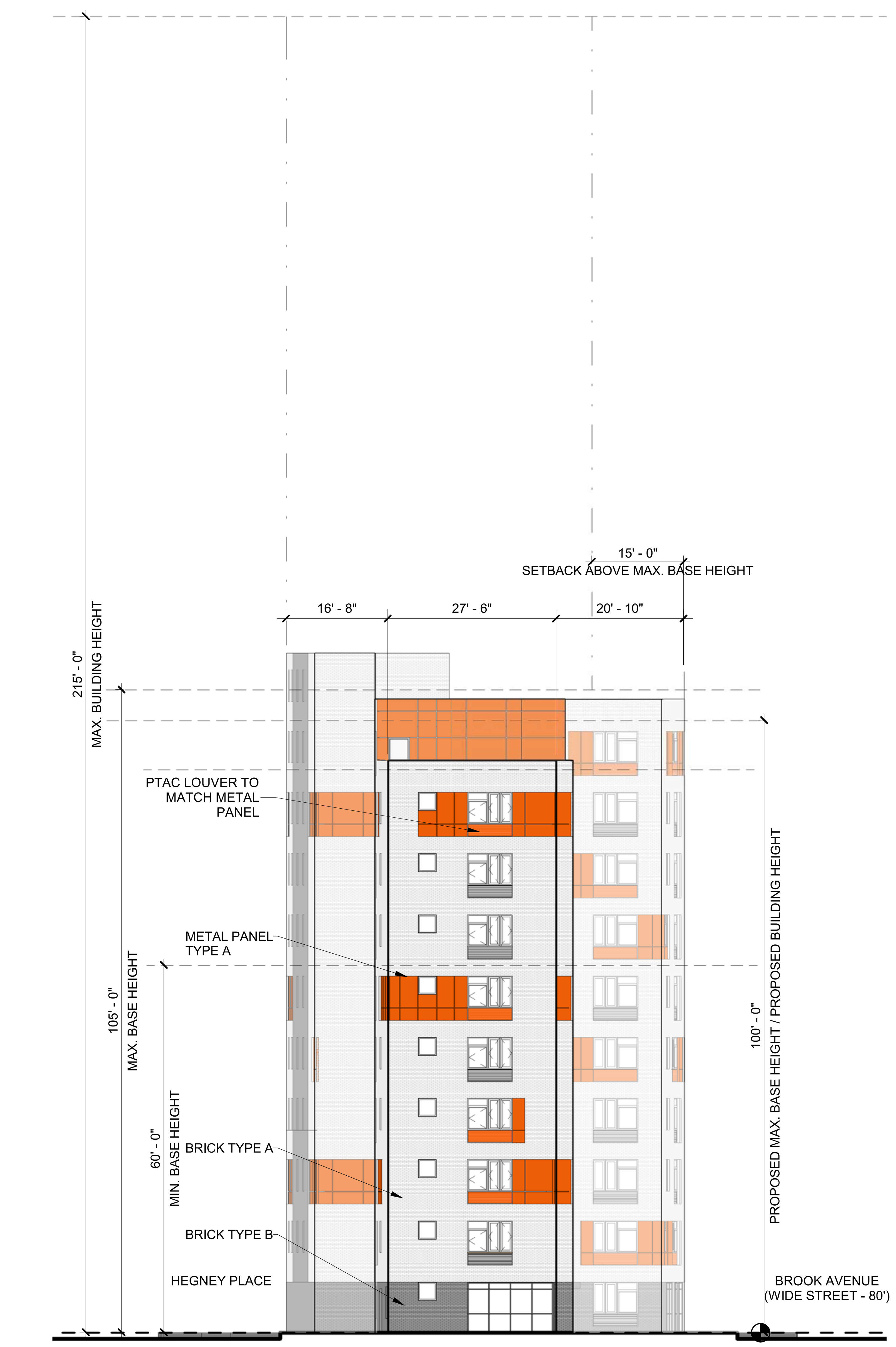
10th Floor Plan

Date	02/15/18
Scale	1/8" = 1'-0"
Drawn By	JS
Checked By	WS
Project No.	1760.0A

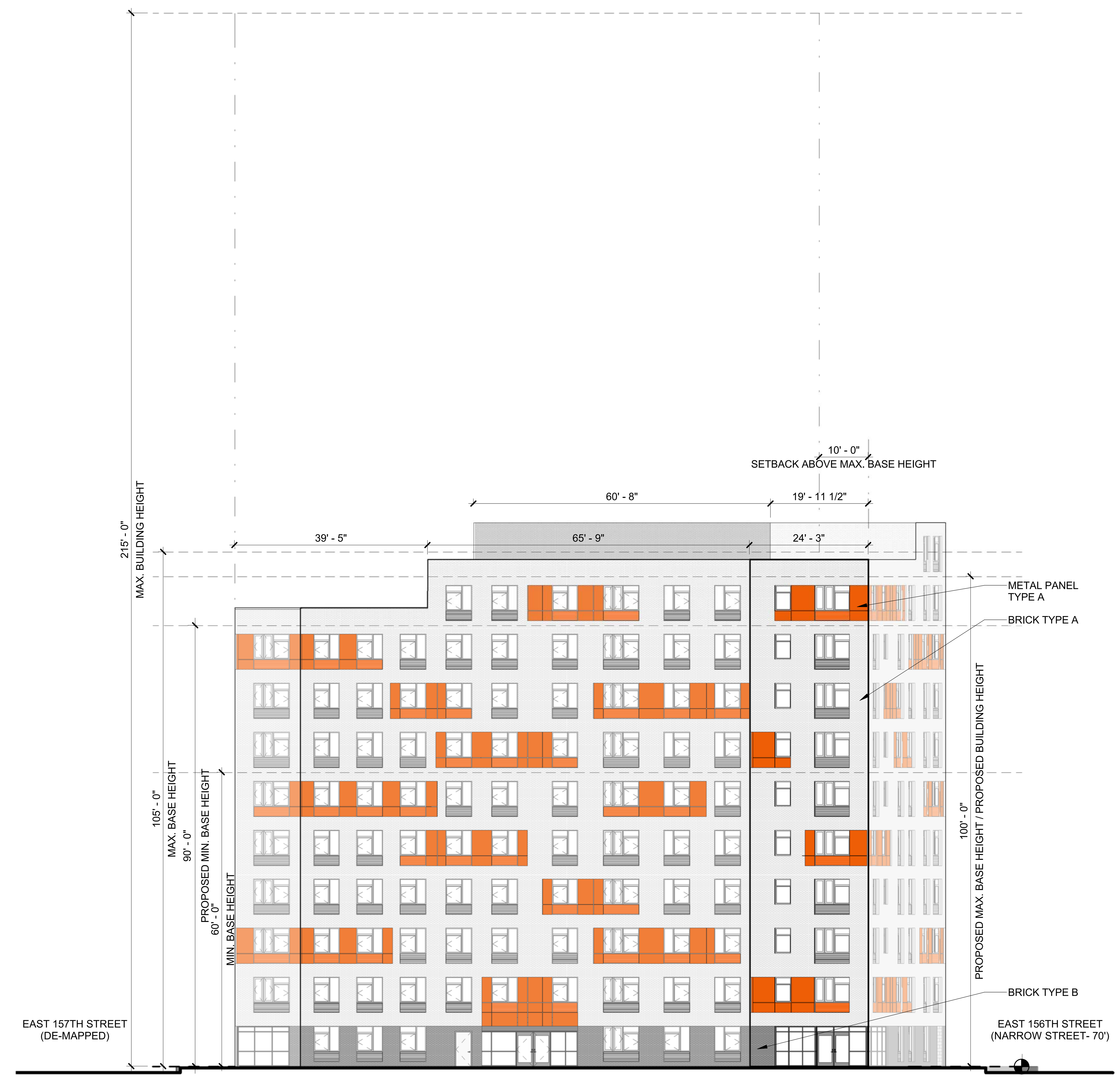
Seal

Sheet No.:

U-105



3 North Elevation
1/16" = 1'-0"



1 West Elevation
1/16" = 1'-0"

LEGEND

- Base Plane 98.85 NAVD 88
- Street Line in Elevation
- Zoning Lot Line
- Maximum As of Right Building Elevation
- Height Above Base Plane

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 8 16 32

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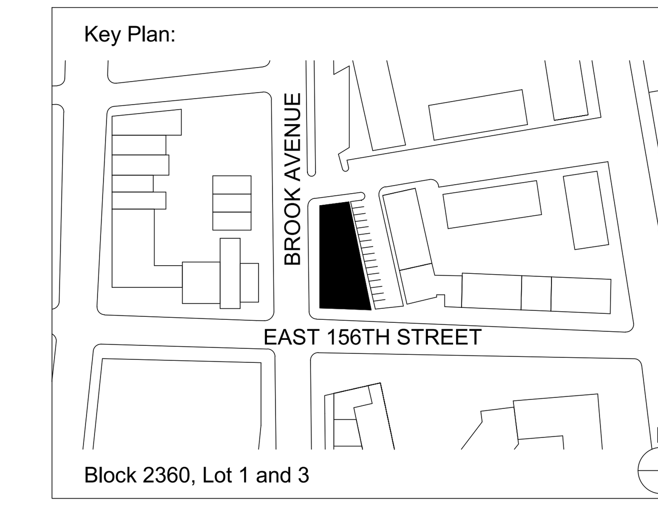
Issue: ULURP

Key Plan:



Key Plan

Elevations

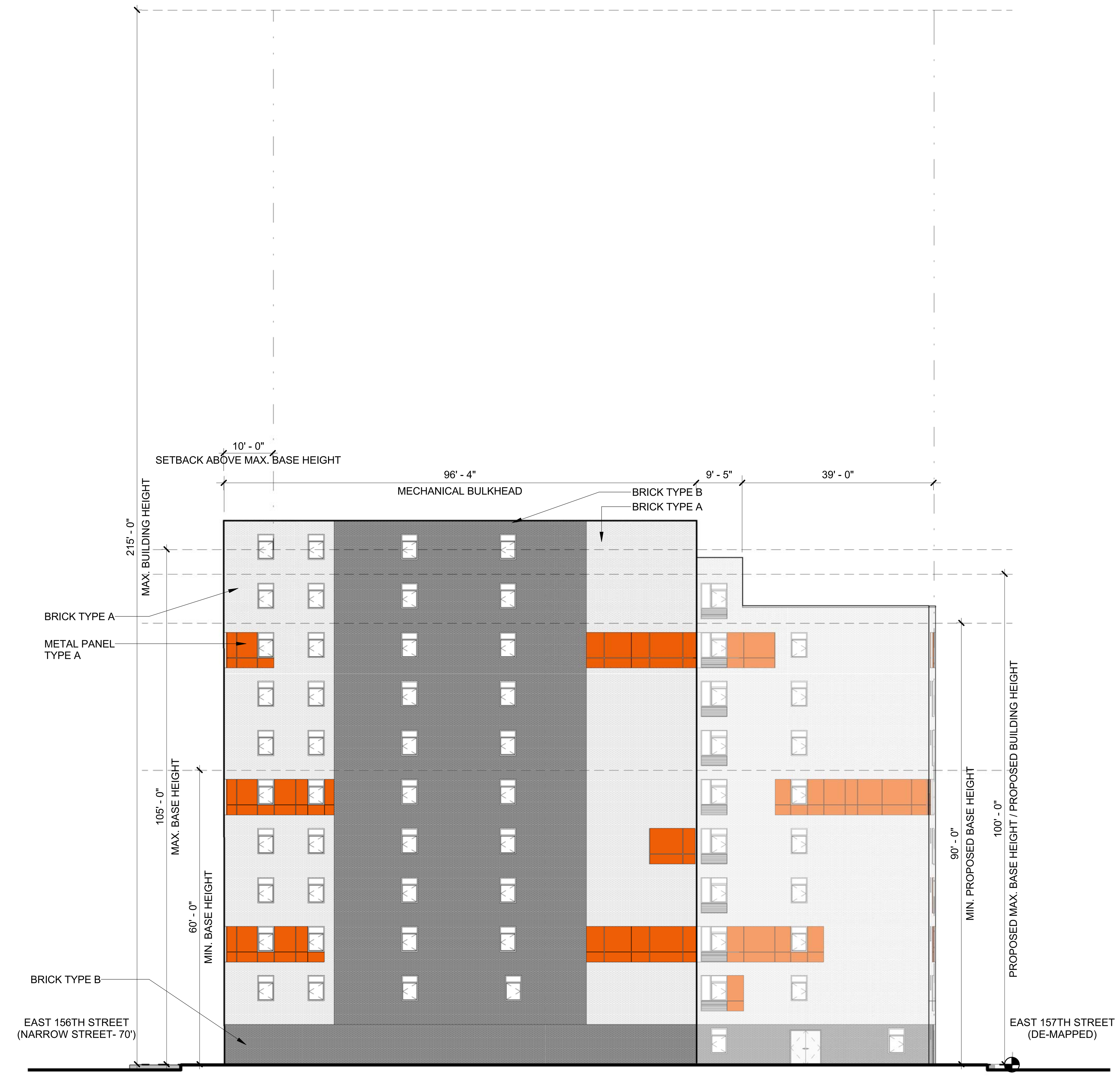
Date	02/15/18
Scale	As indicated
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.:

U-201

1 South Elevation
1/16" = 1'-0"



2 East Elevation
1/16" = 1'-0"

LEGEND

- Base Plane 98.85 NAVD 88
- Street Line in Elevation
- Zoning Lot Line
- Maximum As of Right Building Elevation
- Height Above Base Plane

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 8 16 32

APPLICANT'S STAMP AND SEAL CORRESPONDS TO THE INFORMATION REGARDING THE DEVELOPMENT SITE, ZONING LOT, AND RELATED CURB CUTS. INFORMATION REGARDING THE SURROUNDING PROPERTIES AND STREET TREES IS FOR ILLUSTRATIVE PURPOSES ONLY. THE DEVELOPMENT ENVELOPE, THE SHAPE AND FOOTPRINT OF THE BUILDINGS, AND NOTATIONS ARE SUBJECT TO CHANGE. INTERIOR PARTITIONING AND LAYOUTS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE. LANDSCAPE AND HARDSCAPE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY AND IS SUBJECT TO CHANGE. BUILDING ENTRANCE LOCATIONS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE.

Brook East 156

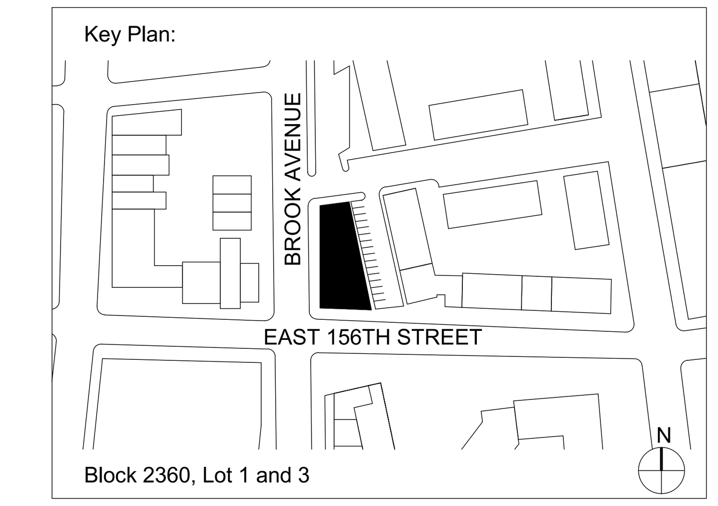
The Phipps Houses Group
902 Broadway, 13th Floor
New York, NY 10010

Dattner Architects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
www.dattner.com

Revisions:

Issue: ULURP

Key Plan:



Key Plan

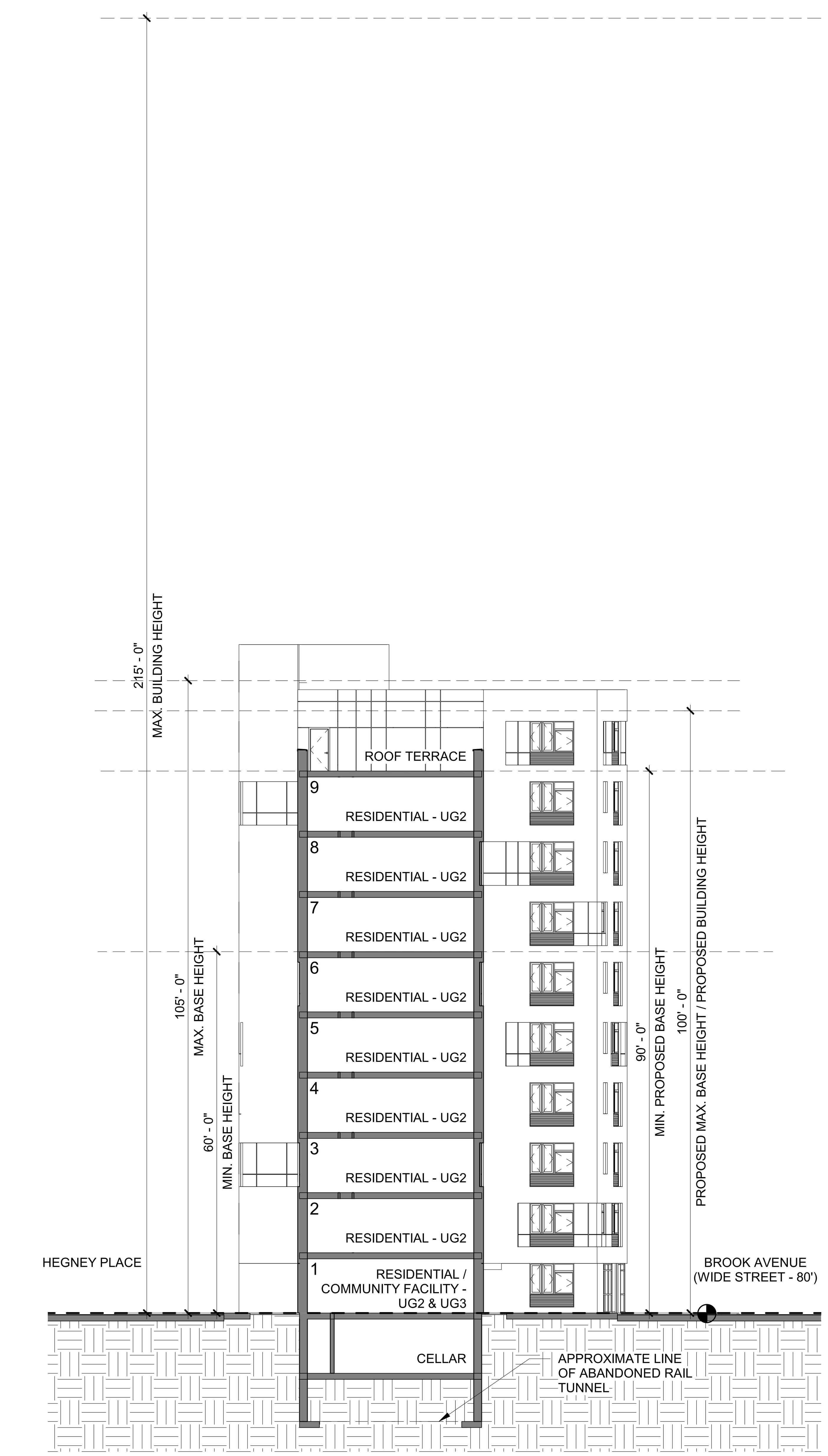
Elevations

Date	02/15/18
Scale	As indicated
Drawn By	JS
Checked By	WS
Project No.	1760.0A

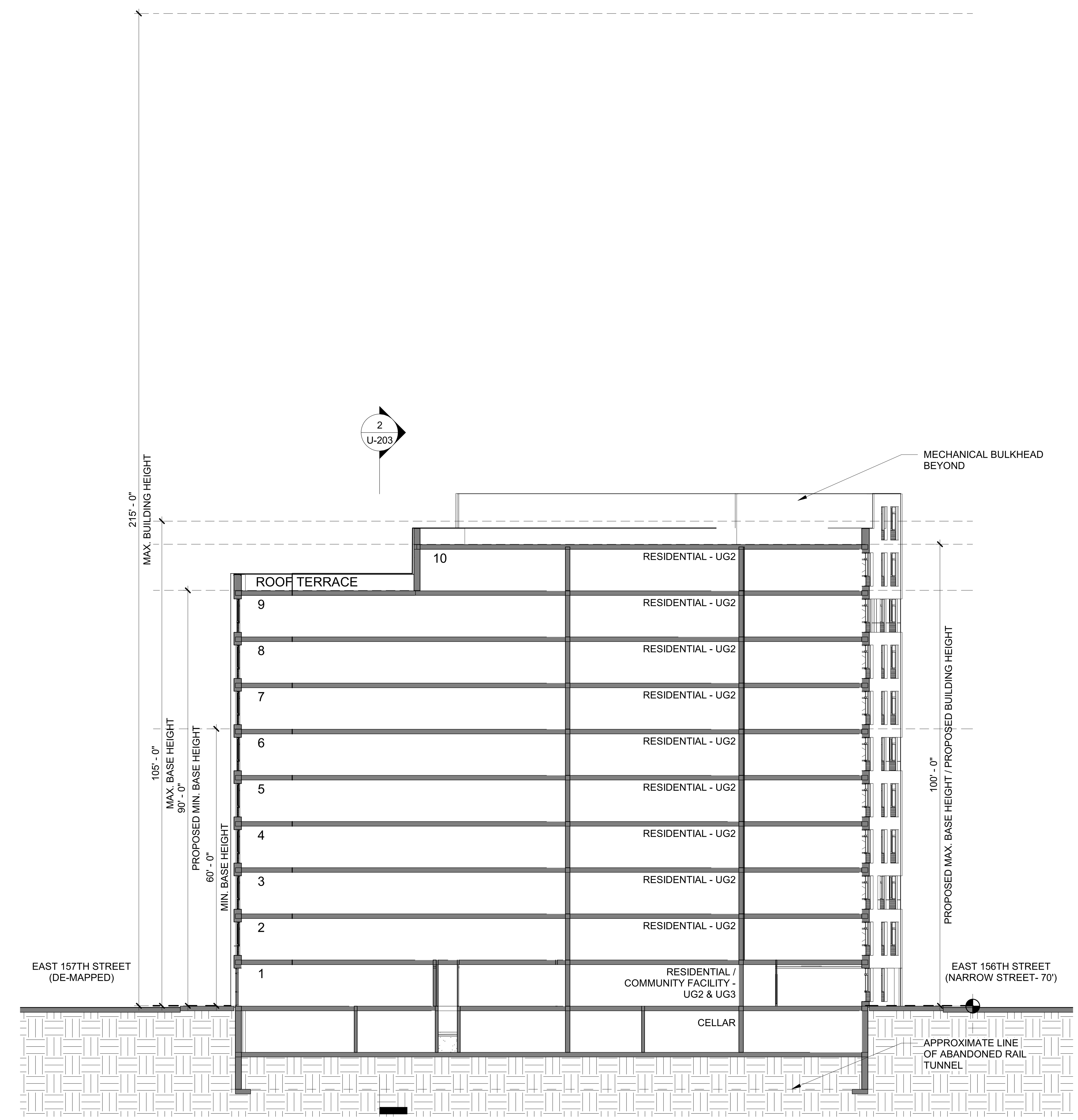
Seal

Sheet No.: U-202

Plotted: 2/14/2018 11:09:19 AM



2 Cross Section Diagram
1/16" = 1'-0"



1 Longitudinal Section Diagram
1/16" = 1'-0"

LEGEND

- Base Plane 98.85 NAVD 88
- Street Line in Elevation
- Zoning Lot Line
- Maximum As of Right Building Elevation
- Height Above Base Plane

GRAPHIC SCALE APPLICABLE TO ALL NON-DIMENSIONED ELEMENTS

0 8 16 32

APPLICANT'S STAMP AND SEAL CORRESPONDS TO THE INFORMATION REGARDING THE DEVELOPMENT SITE, ZONING LOT, AND RELATED CURB CUTS. INFORMATION REGARDING THE SURROUNDING PROPERTIES AND STREET TREES IS FOR ILLUSTRATIVE PURPOSES ONLY. THE DEVELOPMENT ENVELOPE, THE SHAPE AND FOOTPRINT OF THE BUILDINGS, AND NOTATIONS ARE SUBJECT TO CHANGE. INTERIOR PARTITIONING AND LAYOUTS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE. LANDSCAPE AND HARDSCAPE INFORMATION IS FOR ILLUSTRATIVE PURPOSES ONLY AND IS SUBJECT TO CHANGE. BUILDING ENTRANCE LOCATIONS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE.

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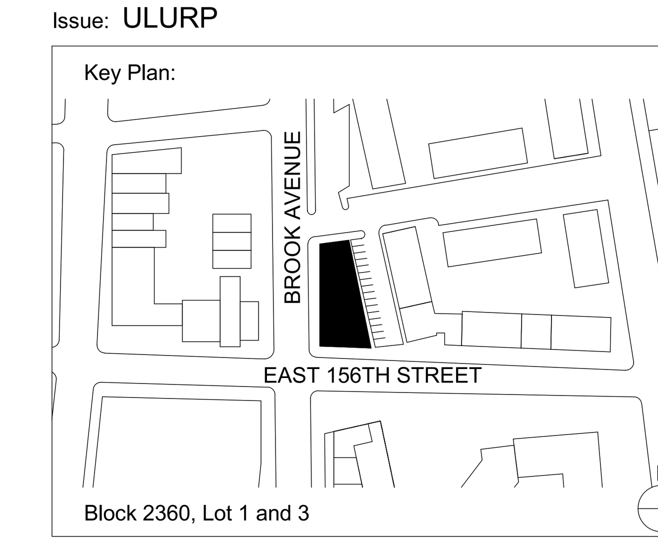
Revisions:

Issue: ULURP

Key Plan:



Key Plan

Sections

Date	02/15/18
Scale	As indicated
Drawn By	JS
Checked By	WS
Project No.	1760.0A

Seal

Sheet No.:

U-203

APPENDIX D
PREVIOUS ENVIRONMENTAL REPORTS (CD ROM)

APPENDIX E
SIGNIFICANT THREAT DETERMINATION

February 15, 2018

Gerard Burke, Director
Remedial Bureau B
Division of Environmental Remediation
NYS Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7016

Re: **Significant Threat Determination**
Brook 156
Site #C203078
Bronx / Bronx County

Dear Mr. Burke:

At your Department's request, we have reviewed the April 2017 *Supplemental Remedial Investigation Report* for the referenced site. Based on that review, I understand that on-site soil and groundwater are contaminated with petroleum related volatile organic compounds, semi-volatile organic compounds, and metals and that soil vapor is contaminated with volatile organic compounds.

The site is currently vacant with no structures and is covered with concrete and pavement. Access to most of the site is restricted by fencing. Contact with contaminated soil or groundwater is unlikely unless people dig below the surface. Contaminated groundwater is not used for drinking and the site and surrounding areas are served by a public water supply that obtains water from a different source not affected by this contamination. The potential exists for the inhalation of site contaminants due to soil vapor intrusion for future on-site buildings. I understand that a community air monitoring plan will be in place to address the potential for exposures during future remedial activities and that any redevelopment will be conducted in a manner that is protective of public health. I also understand that off-site contamination will be addressed by the NYSDEC spills program as necessary.

Based on this information, I believe the site does not represent a significant threat to public health. If you have any questions, or would like to discuss this site further, please contact me at (518) 402-7860.

Sincerely,

Justin H. Deming

Justin H. Deming
Chief, Regions 2,4 & 8
Bureau of Environmental Exposure Investigation

ec: K. Anders / S. Selmer / e-file
C. Westerman – NYSDOH MARO
C. D’Andrea – NYC DOHMH
J. O’Connell / M. Magloire – NYSDEC Region 2

NEW YORK STATE OF OPPORTUNITY. Department of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

February 15, 2018

Gerard Burke, Director
Remedial Bureau B
Division of Environmental Remediation
NYS Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7016

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Brook 156
Site #C203078
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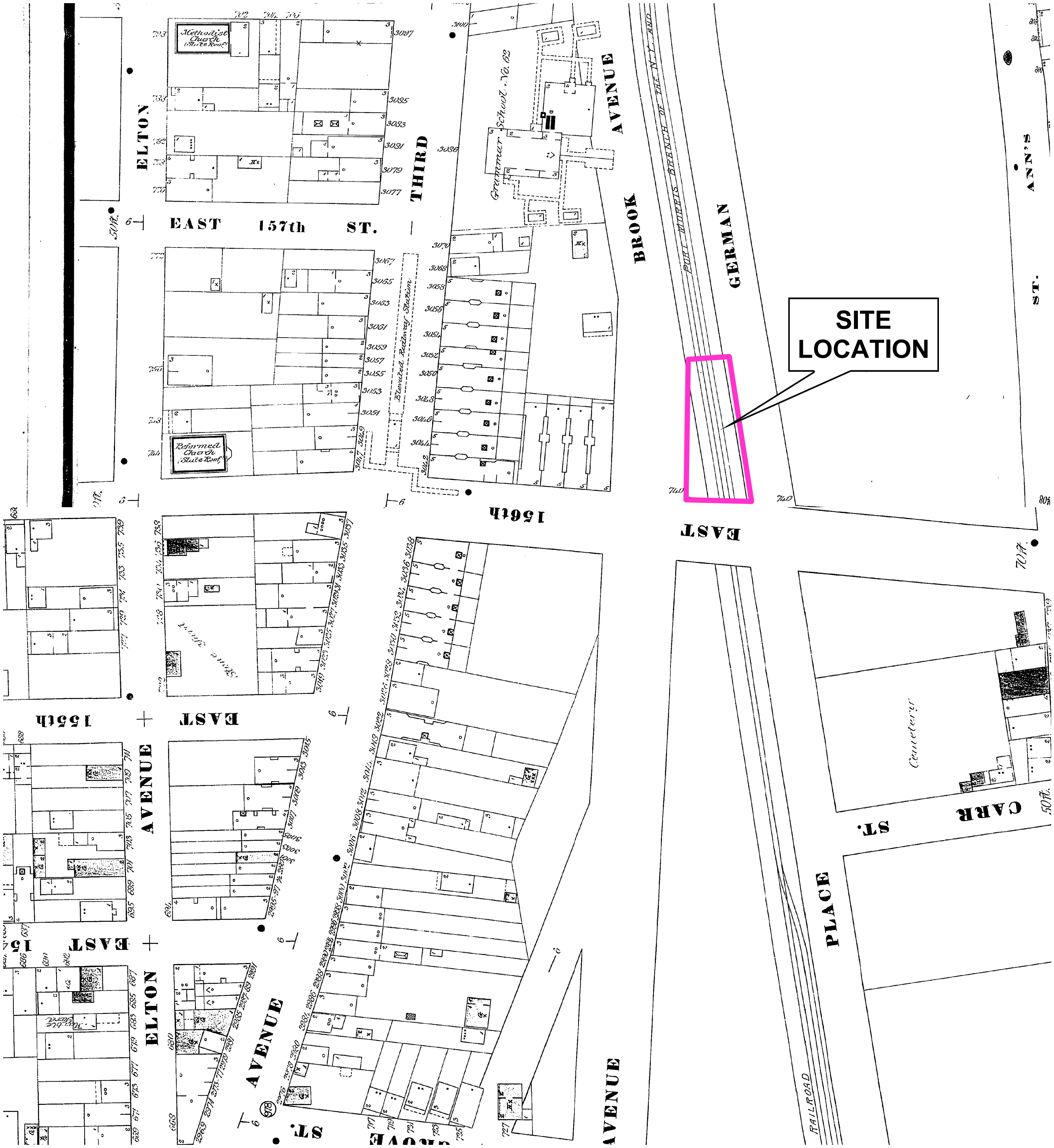
ec: K. Anders / S. Selmer / e-file
C. Westerman – NYSDOH MARO
C. D'Andrea – NYC DOHMH
J. O'Connell / M. Magloire – NYSDEC Region 2

APPENDIX F
SANBORN MAPS



LEGEND:

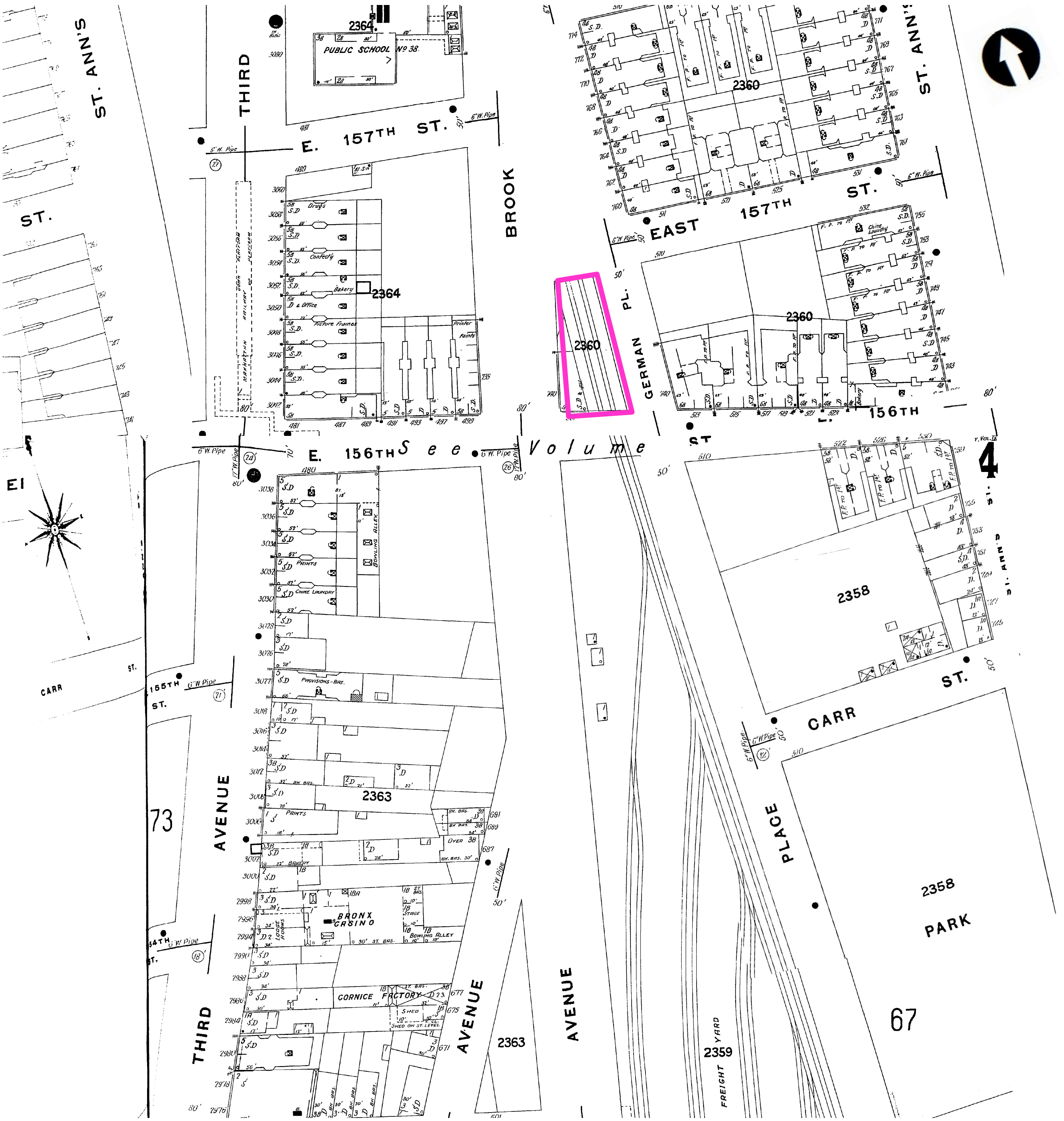
PROJECT SITE BOUNDARY

Brook 156
East 156th Street & Brook Avenue
Bronx, New York

1891 SANBORN MAP

Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE	**3.26.13**
PROJECT No.	**11703**
SCALE	**nts**
FIGURE	**Appx B**



LEGEND:

PROJECT SITE BOUNDARY

Brook 156
East 156th Street & Brook Avenue
Bronx, New York

1908-1909 SANBORN MAP

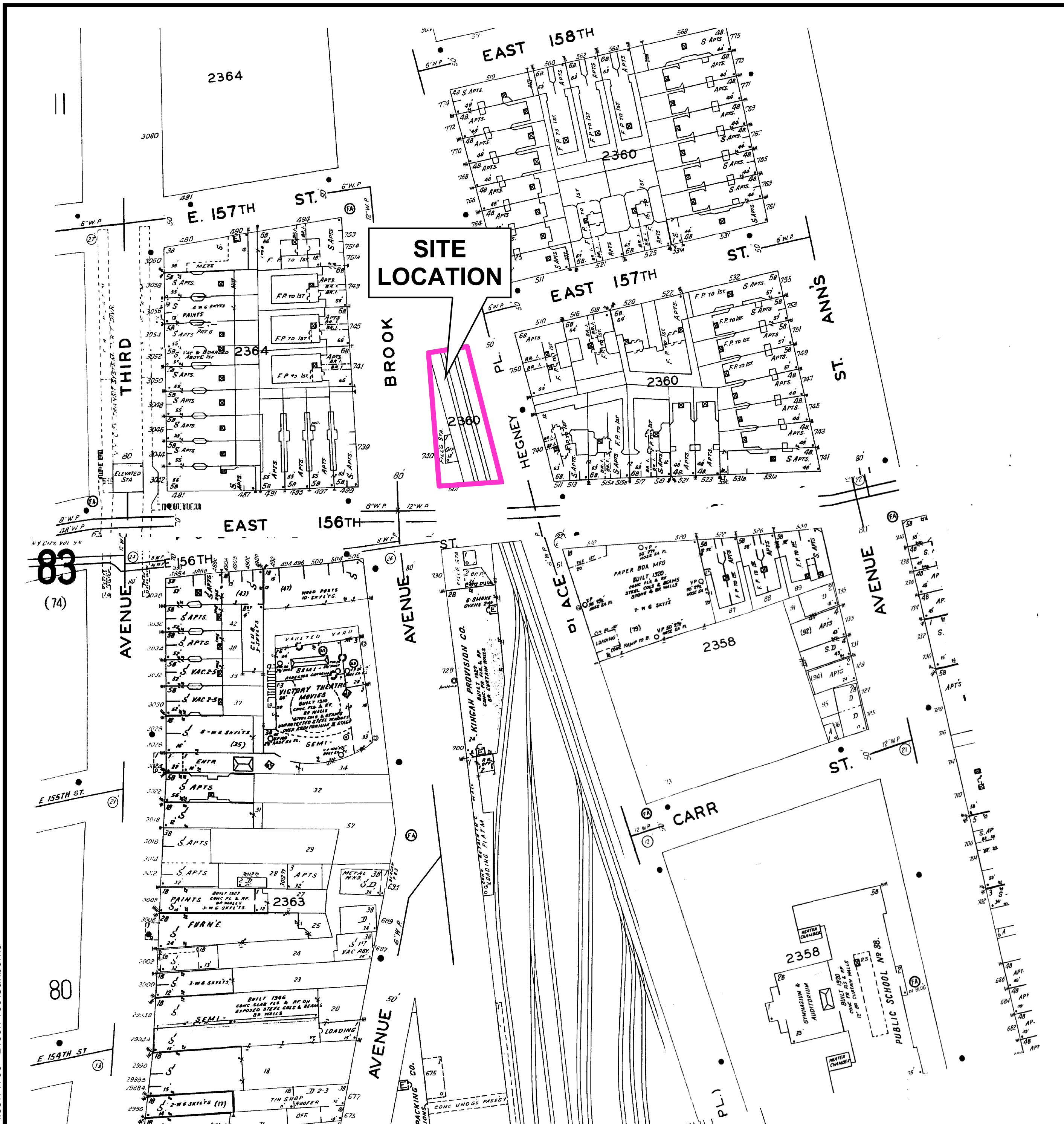
AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
3.26.13

PROJECT No.
11703

SCALE
nts

FIGURE
Appx B



LEGEND:

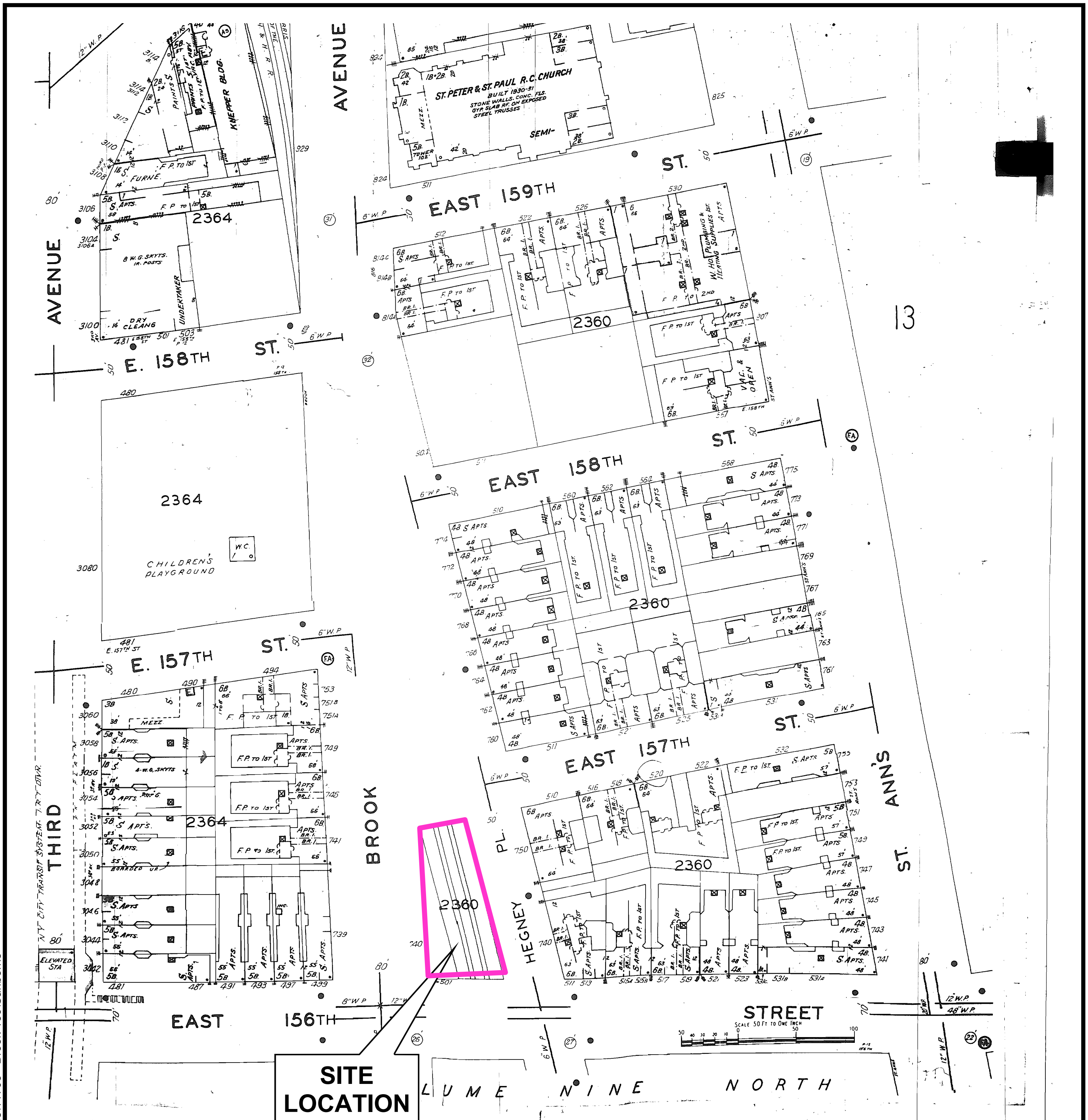
PROJECT SITE BOUNDARY

Brook 156
East 156th Street & Brook Avenue
Bronx, New York

1951-1952 SANBORN MAP

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE	3.26.13
PROJECT No.	11703
SCALE	nts
FIGURE	Appx B



LEGEND:

PROJECT SITE BOUNDARY

Brook 156
East 156th Street & Brook Avenue
Bronx, New York

1969 SANBORN MAP

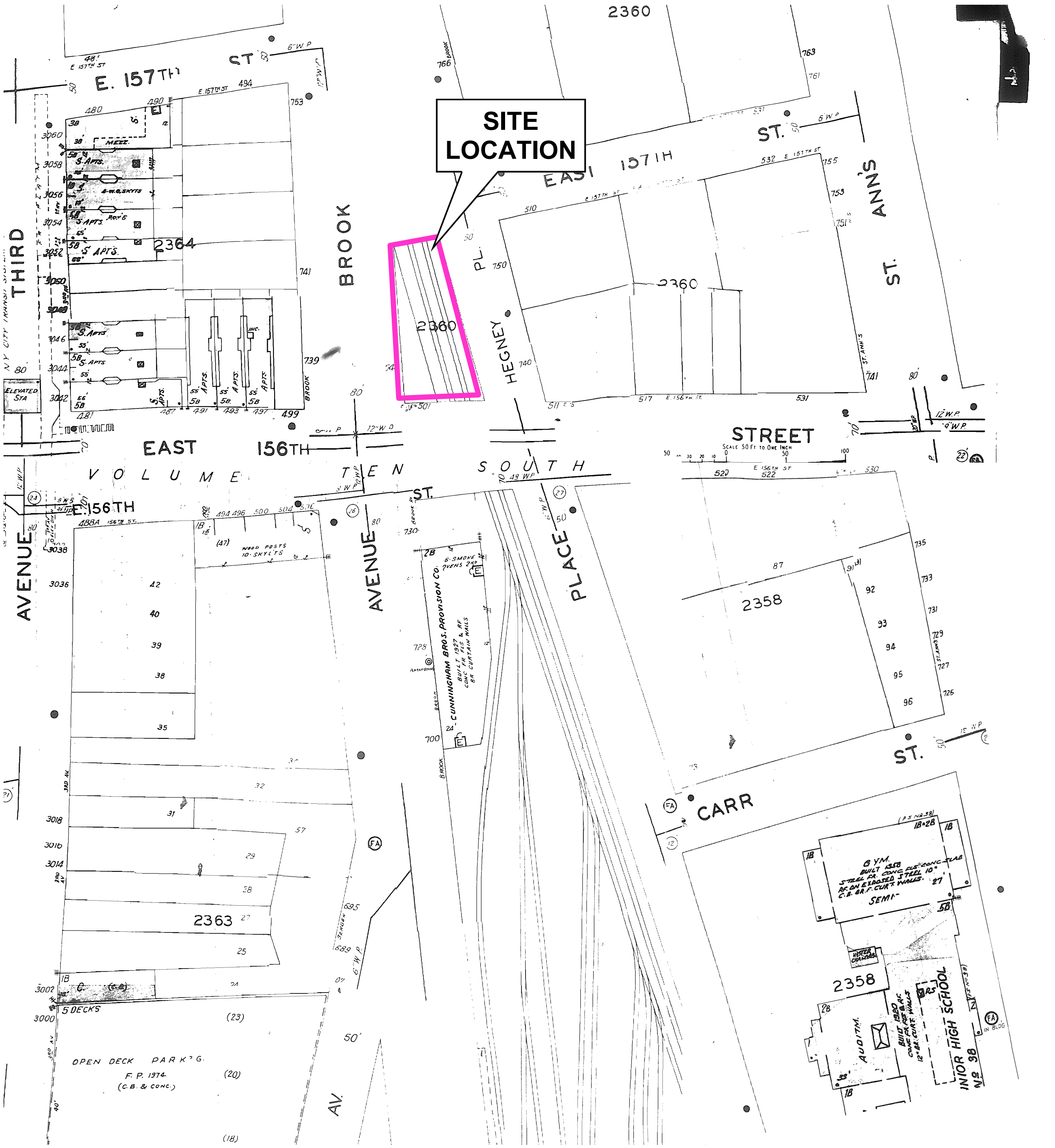
AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE 3.26.13

PROJECT No. 11703

SCALE nts

FIGURE Appx B



LEGEND:

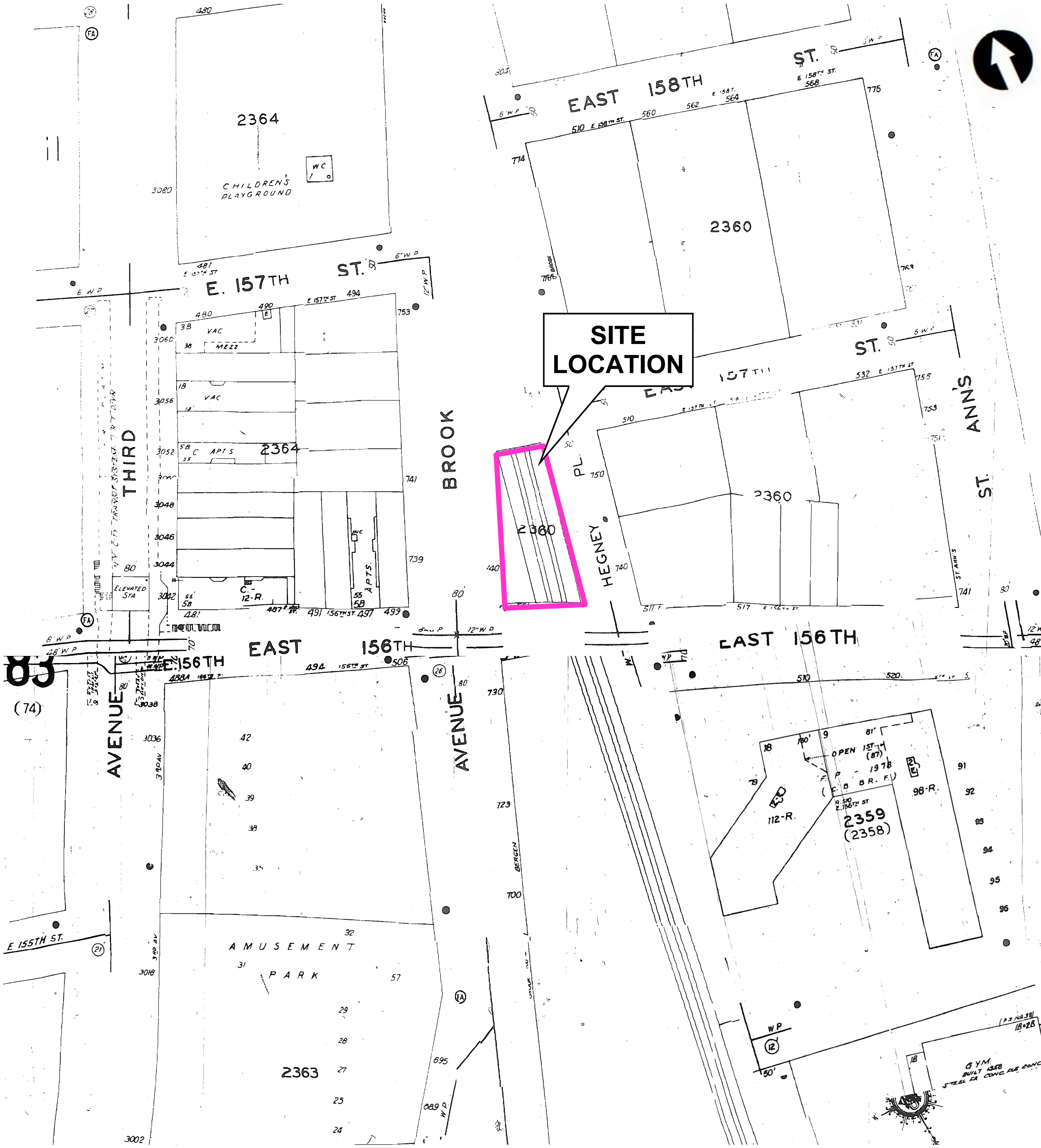
PROJECT SITE BOUNDARY

Brook 156
East 156th Street & Brook Avenue
Bronx, New York

1978 SANBORN MAP

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE	**3.26.13**
PROJECT No.	**11703**
SCALE	**nts**
FIGURE	**Appx B**



LEGEND:

PROJECT SITE BOUNDARY

Brook 156
East 156th Street & Brook Avenue
Bronx, New York

1989 SANBORN MAP

AKRF

Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
3.26.13

PROJECT No.
11703

SCALE
nts

FIGURE
Appx B

APPENDIX G
QUALITY ASSURANCE PROJECT PLAN (QAPP)

BROOK 156

740 BROOK AVENUE

BRONX, NEW YORK

Quality Assurance Project Plan

AKRF Project Number: 11703
BCP Site Number: C203078

Prepared for:

NYSDEC Region 2
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, New York 11101

On Behalf Of:

Brook 156 HDFC
902 Broadway, 13th Floor
New York, New York 10010
and
New York City Department of Housing Preservation and Development
100 Gold Street
New York, NY 10038

Prepared by:

AKRF

AKRF, Inc.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

AUGUST 2018

TABLE OF CONTENTS

IN-TEXT TABLES

ATTACHMENTS

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of all environmental sampling associated with the Remedial Action Work Plan (RAWP) at the Brook 156 site, hereafter referred to as the "Site". The Site is an approximately 7,438-square foot parcel located at 740 Brook Avenue in the Morrisania neighborhood of the Bronx, New York and is legally defined as Tax Block 2360, Lots 1 and 3 on the New York City Tax Map. Lot 1 comprises the eastern portion of the Site and consists of an approximately 5,658-square foot rail bed and tunnel, and a small grass covered area. Lot 3 comprises the western portion of the Site and consists of an approximately 1,780-square foot, irregularly-shaped, concrete-paved lot. The Site is currently enrolled in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) (BCP Site No. C203078).

The objective of this QAPP is to provide Quality Assurance (QA) and Quality Control (QC) for all environmental investigative, sampling, and remedial activities conducted under the NYSDEC-approved Remedial Action Work Plan (RAWP). Adherence to this QAPP will ensure that defensible data will be obtained during all environmental work at the Site.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel, and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

2.1 Remedial Engineer

Ms. Michelle Lapin, P.E. will serve as the remedial engineer for the RAWP. As the remedial engineer, Ms. Lapin will oversee the design of all Institutional and Engineering Controls (ICs and ECs) at the Site. Ms. Lapin's resume is included in Attachment A.

2.2 Quality Assurance/Quality Control (QA/QC) Officer

Mr. Marc Godick, LEP will serve as the QA/QC officer for the RAWP. As the QA/QC officer, Mr. Godick will be responsible for adherence to this QAPP and will review the procedures with all personnel prior to commencing any fieldwork and will conduct periodic Site visits to assess implementation of the procedures. Mr. Godick's resume is included in Attachment A.

2.3 Project Manager/Project Director

Ms. Deborah Shapiro, QEP will serve as the project manager/project director for the RAWP. Ms. Shapiro will be responsible for directing and coordinating all elements of the RAWP. The project manager will prepare reports and participate in meetings with the Site owner/Volunteer, and/or the NYSDEC. As project director/project manager, Ms. Shapiro will also be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management, and field program decision-making. The project manager/project director will communicate regularly with all members of the AKRF and NYSDEC project teams to ensure a smooth flow of information between involved parties. Ms. Shapiro's resume is included in Attachment A.

2.4 Deputy Project Manager

Ms. Amy Jordan will serve as the deputy project manager. The deputy project manager will be responsible for assisting the project manager. The deputy project manager will help prepare reports and will participate in meetings with the Site owner/Volunteer, and/or the NYSDEC. Ms. Jordan's resume is included in Attachment A.

2.5 Field Team Leader/Technician, Site Safety Officer (SSO), and Alternate

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field, and will ensure adherence to the work plan and Health and Safety Plan (HASP), included in Appendix G of the RAWP. The field team leader will also act as the field technician and Site safety officer (SSO), and will report to the project manager/project director or project manager alternate on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified and responsible person able to act professionally and promptly during environmental work at the Site. Mr. Tim McClintock will be the field team leader. The field team leader alternate is Amy Jackson of AKRF. Mr. McClintock's and Ms. Jackson's resumes are included in Attachment A.

2.6 Laboratory Quality Assurance/Quality Control (QA/QC) Officer

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. The laboratory QA/QC officer will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued, and will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be Nick Straccione of SGS Accutest Inc. (Accutest), the New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory being employed for all environmental sampling at the Site.

3.0 STANDARD OPERATING PROCEDURES (SOPS)

The following sections describe the SOPs for the remedial activities included in the RAWP. During these operations, safety monitoring will be performed as described in the HASP, included as Appendix G of the RAWP.

3.1 Sampling Equipment Decontamination

All drilling and sampling equipment will be either dedicated or decontaminated between sampling locations. Decontamination will be conducted to prevent discharge to the ground. The decontamination procedure will be as follows:

1. Scrub using tap water/Alconox® mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/ Alconox ® mixture and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment, if possible.

3.2 Management of Investigation-Derived Waste (IDW)

IDW will be containerized in New York State Department of Transportation (NYSDOT)-approved 55-gallon drums or disposed of via tri-axel trucks during excavation activities. The drums will be sealed at the end of each work day and labeled with the date, the excavation grid(s), the type of waste, and the name and phone number of an AKRF point of contact. All IDW exhibiting field evidence of contamination will be disposed of or treated according to applicable local, state, and federal regulations.

4.0 SAMPLING AND LABORATORY PROCEDURES

4.1 Soil Sampling

Soil sampling will be conducted according to the following procedures:

- Characterize the sample according to the modified Burmister soil classification system.
- Field screen the sample for evidence of contamination (e.g., odors, staining,) using visual and olfactory methods and screen for volatile organic compounds (VOCs) using a photoionization detector (PID) equipped with a 10.6 electron Volt (eV) lamp.
- Collect an aliquot of soil from each proposed sample location, place in laboratory-supplied glassware, label the sample in accordance with Section 4.5.1 of this QAPP, and place in an ice-filled cooler for shipment to the laboratory.
- Complete the proper chain of custody paperwork and seal the cooler.
- Record sample location, sample depth, and sample observations (evidence of contamination, PID readings, soil classification, etc.) in field log book and boring log data sheet, if applicable.

4.2 Groundwater Sampling

Groundwater sampling will be conducted in accordance with the United States Environmental Protection Agency (EPA) low flow methodology. Samples collected for the emerging contaminants 1,4-Dioxane and/or Perfluorinated Compounds (PFCs) will be additionally sampled and handled in accordance with the February 2018 NYSDEC-issued emerging contaminant sampling protocol included as Attachment B, with the exception that low-density polyethylene (LDPE) sampling bladders will be used, as no industry standard alternative is currently available.

4.3 Soil Vapor Sampling

Soil vapor sampling will be conducted in accordance with New York State Department of Health (NYSDOH) Final Guidance on Soil Vapor Intrusion, October 2006. Samples will be collected in either Tedlar® bags or SUMMA® canisters.

4.4 Laboratory Methods

Accutest of Dayton, New Jersey, a NYSDOH ELAP-certified laboratory subcontracted to AKRF, will be used for all chemical analyses in accordance with the Division of Environmental Remediation (DER)-10 2.1(b) and 2.1(f) with Category B Deliverables. In-Text Table 1 summarizes the laboratory methods that will be used to analyze field samples and the sample container type, preservation, and applicable holding times.

In-Text Table 1
Laboratory Analytical Methods for Analysis Groups

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
Soil	Volatile Organic Compounds (VOCs)	8260C	3 En Core® samplers and 2 oz. plastic jar	≤ 6 ºC	48 hours to extract; 14 days to analyze
	Semivolatile Organic Compounds (SVOCs)	8270D	8 oz. Glass Jar	≤ 6 ºC	14 days to extract; 40 days to analyze
	Total Analyte List (TAL) Metals, and Hexavalent Chromium	6000/7000 Series, 6010C, and 7196A	8 oz. Glass Jar	≤ 6 ºC	6 months holding time; Mercury 28 days holding time; Hexavalent chromium 30 days to extract, 7 days to analyze
	Pesticides	8081B	8 oz. Glass Jar	≤ 6 ºC	14 days to extract; 40 days to analyze
	Polychlorinated Biphenyls (PCBs)	8082A	8 oz. Glass Jar	≤ 6º C	14 days to extract; 40 days to analyze
Groundwater	VOCs	8260C	3 x 40 mL Glass Vials	HCl to pH < 2 and ≤ 6 ºC	14 days to analyze if preserved
	SVOCs	8270D	2,000 mL Amber Jar	≤ 6 ºC	7 days to extract; 40 days to analyze
	1,4-Dioxane	8270D plus Selective Ion Monitoring (SIM); 0.35 ug/L RL	1L Amber Jar	≤ 6 ºC	7 days to extract; 40 days to analyze
	TAL Metals and Hexavalent Chromium	6000/7000 Series, 6010C, and 7196A	2,000 mL Amber Jar	HNO_3 to pH < 2	6 months for metals; 28 days for mercury; 24 hours for hexavalent chromium
	Pesticides	8081B	2,000 mL Amber Jar	≤ 6 ºC	7 days to extract; 40 days to analyze
	PCBs	8082A	2,000 mL Amber Jar	≤ 6 ºC	7 days to extract; 40 days to analyze
	Perfluorinated Compounds (PFCs)	Modified 537; 0.2 ng/L RL	3 x 250mL Polypropylene Bottles	≤ 6 ºC, Trizma	14 days to analyze
Soil Vapor	VOCs	TO-15	6L SUMMA® Canister	None	14 days

Notes:
EPA - Environmental Protection Agency
Hg – Mercury
RCRA – Resource Conservation and Recovery Act
RL – Reporting Limit
Ug/L – parts per billion
Ng/L – parts per trillion
QA/QC samples will be submitted for laboratory analysis at a frequency of 1 QA/QC sample set per 20 samples per media per SDG (minimum).
Sample frequency will be determined based on field activity being conducted, as described in the RAWP.

4.5 Quality Control (QC) Sampling

In addition to the laboratory analysis of the soil samples, additional analysis will be included for QC measures, as required by the Category B sampling techniques. These samples will include field blank, trip blank, matrix spike/matrix spike duplicate (MS/MSD), and blind duplicate samples at a frequency of one sample per 20 field samples collected or per sample digestion group (SDG). QC samples will be analyzed for the same parameters as the accompanying samples, with the exception of trip blanks, which will be analyzed for the VOC list only.

4.6 Sample Handling

4.6.1 Sample Identification

All samples will be consistently identified in all field documentation, chain of custody (COC) documents, and laboratory reports. All samples will be amended with the collection date at the end of the sample name in a year, month, day (YYYYMMDD) format. Blind duplicate sample nomenclature will consist of the sample type, followed by an “X”; MS/MSD sample nomenclature will consist of the parent sample name, followed by “MS/MSD”; and trip and field blanks will consist of “TB-” and “FB-”, respectively, followed by a sequential number of the trip/field blanks collected within the SDG. In accordance with NYSDEC EQuIS™ protocol, Special characters will not be used for sample nomenclature.

4.6.1.1. Groundwater Sampling

In addition to the nomenclature detailed in Section 4.5.1, groundwater samples will be identified by the groundwater monitoring well identification. In-Text Table 2 provides examples of the sampling identification scheme for groundwater samples.

In-Text Table 2
Groundwater Sample Nomenclature

Sample Description	Sample Designation
Groundwater sample collected from monitoring well MW-1 on September 1, 2018	MW-01 20180901
Blind duplicate groundwater sample collected from monitoring well MW-1 on September 1, 2018	MW-X01 20180901
Matrix spike/matrix spike duplicate groundwater sample collected from monitoring well MW-1 on September 1, 2018	MW-01 MS/MSD 20180901

4.6.1.2. Waste Classification/Tank Excavation Endpoint/Hotspot Soil Sampling

In addition to the nomenclature detailed in Section 4.5.1, any confirmatory endpoint samples collected from a hotspot or previously unknown UST excavation will be identified by the tank number or grid area, if a hotspot, and the cardinal direction of the sidewalls. The sample(s) collected from the bottom of the excavation will be amended with a “B-”, followed by the number of bottom samples collected from the excavation in sequential order. Waste classification samples will be amended with “WC-” and the waste classification grid identification. Five-point composite samples will be amended with “C-” and grab samples to be analyzed for VOCs will be amended with “G-”. Additionally, samples will be amended with the depth the sample was collected in feet below grade in parentheses. In-Text Table 3 provides examples of the sampling identification scheme for proposed waste classification samples and tank/hotspot endpoint samples.

In-Text Table 3
Waste Classification/Tank Excavation/Hot Spot Sample Nomenclature

Sample Description	Sample Designation
Waste classification composite sample collected between grade and 5 feet below grade on September 1, 2018	WC-01-C (0-5) 20180901
Waste classification grab sample collected between grade and 5 feet below grade on September 1, 2018	WC-01-G (0-5) 20180901
Soil sample collected from the northern sidewall of the second tank grave encountered at 4 feet below grade on September 1, 2018	UST-02-N (4) 20180901
Third soil sample collected from the base of the second tank grave encountered at 10 feet below grade on September 1, 2018	UST-02-B3 (10) 20180901

4.6.1.3. Endpoint Soil Sampling

In addition to the nomenclature detailed in Section 4.5.1, soil endpoint samples will be identified with "EP-" and the endpoint sample number in sequential order that the endpoint sample was collected, and the depth below grade the sample was collected from in parentheses. In-Text Table 4 provides examples of the sampling identification scheme for the proposed post-excavation endpoint samples.

In-Text Table 4
Endpoint Sample Nomenclature

Sample Description	Sample Designation
Excavation endpoint soil sample EP-1 collected from two feet below grade on February 1, 2019	EP-01 (2) 20190201
Matrix spike/matrix spike duplicate sample of excavation endpoint soil sample EP-1 collected from two feet below grade on February 1, 2019	EP-01 (2) MS/MSD 20190201
First blind duplicate collected with SDG of excavation endpoint soil sample EP-1 collected from two feet below grade on February 1, 2019	EP-X01 (2) 20190201
First trip blank collected with SDG during the endpoint sampling on February 1, 2019	EP-TB-01 20190201
First field blank collected with SDG during the endpoint sampling on February 1, 2019	EP-FB-01 20190201

4.6.1.4. Import Soil Sampling

In addition to the nomenclature detailed in Section 4.5.1, soil import samples will be identified with "ISP-" and the import sample number in sequential order that the import sample was collected. In-Text Table 5 provides examples of the sampling identification scheme for import soil samples.

In-Text Table 5
Import Soil Sample Nomenclature

Sample Description	Sample Designation
Import soil sample ISP-1 collected on July 1, 2019	ISP-01 20190701
Matrix spike/matrix spike duplicate sample of import soil sample ISP-1 collected on July 1, 2019	ISP-01 MS/MSD 20190701
Blind duplicate of import soil sample ISP-1 collected on July 1, 2019	ISP-X01 20190701

Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification, including Site name, BCP Site number, Site address
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. All samples will be shipped to the laboratory within 24 hours of collection. At the start and end of each workday, field personnel will add ice to the cooler(s) as needed.

The samples will be prepared for shipment by placing each sample in laboratory-supplied glassware, then wrapping each container in bubble wrap to prevent breakage, and adding freezer packs and/or fresh ice in sealable plastic bags. The COC form will be properly completed by the sampler in ink, and all sample shipment transactions will be documented with signatures, and the date and time of custody transfer. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the samples remain under strict COC protocol.

Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on COC forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

4.7 Field Instrumentation

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Site for referencing proper operation, maintenance, and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be equipped with a 10.6 electron volt (eV) lamp and will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas in accordance with the manufacturer's standards.

4.8 Quality Assurance (QA)

All laboratory analytical data will be reviewed by a third-party validator and a Data Usability Summary Report (DUSR) will be prepared to document the usability and validity of the data. The Final Engineering Report (FER) will include a detailed description of endpoint sampling activities, data summary tables, concentration map showing endpoint sample locations and concentrations, DUSR, and laboratory reports. The third-party data validator's resume is included in Attachment A.

ATTACHMENT A

RESUMES OF PROJECT DIRECTOR, QA/QC OFFICER, PROJECT MANAGER, DEPUTY PROJECT MANAGER, AND FIELD TEAM LEADER

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

Michelle Lapin is a Senior Vice President with more than 25 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's Hazardous Materials group and offers extensive experience providing strategic planning and management for clients. Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, air and geotechnical problems. Her other duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

Ms. Lapin's hydrogeologic experience includes groundwater investigations, formulation and administration of groundwater monitoring programs and remediation throughout the Northeast. Her experience with groundwater contamination includes Level B hazardous waste site investigations; leaking underground storage tank studies, including hazardous soil removal and disposal and associated soil and water issues; soil gas/vapor intrusion surveys; and wetlands issues. Ms. Lapin is experienced in coordinating and monitoring field programs concerning hazardous waste cell closures. She has directed hundreds of Phase I, Phase II, and Phase III investigations and remediations, many of them in conjunction with developers, law firms, lending institutions, and national retail chains. She is also experienced in the cleanup of contaminated properties under Brownfield Cleanup Program (BCP) regulations.

BACKGROUND

Education

M.S., Civil Engineering, Syracuse University, 1985
B.S., Civil Engineering, Clarkson University, 1983

Professional Licenses/Certifications

New York State P.E.
State of Connecticut P.E.

Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters
Member, American Society of Civil Engineers (ASCE), National and CT Chapters
Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)
Member, Environmental Professionals' Organization of Connecticut (EPOC)
Board Member, New York City Brownfield Partnership

Years of Experience

Year started in company: 1994
Year started in industry: 1986

RELEVANT EXPERIENCE

West 61st Street Rezoning/Residential Development, New York, NY

Ms. Lapin is directing the firm's hazardous materials work for this mixed-use development in Manhattan. The Algin Management Company hired AKRF to prepare an environmental impact statement (EIS) for the proposed rezoning of the western portion of the block between West 60th and 61st Streets, between Amsterdam and West

End Avenues. The purpose of the proposed action was to facilitate the development of two 30-story residential towers with accessory parking spaces, and landscaped open space. The EIS examined a "worst case" condition for rezoning the block, which allowed Algin to build a residential building of approximately 375,000 square feet at their site. The building now contains 475 apartments, 200 accessory parking spaces, a health club, and community facility space. This site, with the services of AKRF, entered into New York State's Brownfield Cleanup Program (BCP). On-site issues included underground storage tanks remaining from previous on-site buildings, petroleum contamination from these tanks and possibly from off-site sources, and other soil contaminants (metals, semi-volatile organic compounds, etc.) from fill materials and previous on-site buildings. AKRF oversaw the adherence to the Construction Health and Safety Plan (HASP), which was submitted to and approved by the New York State Department of Environmental Conservation (NYSDEC), and monitored the waste streams, to ensure that the different types of waste were disposed of at the correct receiving facilities. This oversight also included confirmation and characteristic soil sampling for the receiving facilities and NYSDEC. A "Track 1" Clean up of the majority of the property (the portion including the buildings) was completed and the final Engineering Report was approved by the NYSDEC. AKRF has also completed a smaller portion of the property as a "Track 4" cleanup, which includes a tennis court and landscaped areas.

Hudson River Park, New York, NY
Ms. Lapin is directing AKRF's hazardous materials work during construction of Hudson River Park, a five-mile linear park along Manhattan's West Side. As the Hudson River Park Trust's (HRPT's) environmental consultant, AKRF is overseeing preparation and implementation of additional soil and groundwater investigations (working with both NYSDEC and the New York City Department of Environmental Protection (NYCDEP)), all health and safety activities, and removal of both known underground storage tanks and those encountered during construction. Previously, the firm performed hazardous materials assessments as part of the environmental impact statement (EIS) process, including extensive database and historical research, and soil and groundwater investigations. Ms. Lapin has been the senior consultant for the soil and groundwater investigations and remediation, and the asbestos investigations and abatement oversight.

Roosevelt Union Free School District – District-wide Improvement Program, Roosevelt, NY
Ms. Lapin managed the hazardous materials investigation for the Draft and Final EISs for the improvement program, which included the demolition of three existing elementary schools and portions of the junior-senior high school, and the reconstruction of three replacement elementary schools, a separate replacement middle school, and renovations to the high school. Following the EIS, additional hazardous materials investigations were completed, including comprehensive asbestos and lead surveys; Phase I and Phase II Environmental Site Assessments; the preparation of asbestos, lead, hazardous materials and demolition specifications; and obtaining site-specific variances from the New York State Department of Labor (NYSDOL). The middle school remediation was conducted through coordination with the NYSDEC, New York State Department of Health (NYSDOH), the New York State Education Department (NYSED) and the local school district. After project approval and completion of construction/renovation of the new middle school, the school opened for the Fall 2008 semester as planned. AKRF continues to provide oversight for ongoing abatement at a number of the schools, and overall environmental consulting to the school district.

Fiterman Hall Deconstruction and Decontamination Project, New York, NY
The 15-story Fiterman Hall building, located at 30 West Broadway, originally constructed as an office building in the 1950s, had served as an extension of the City University of New York (CUNY) Borough of Manhattan Community College (BMCC) since 1993. The building was severely damaged during the September 11, 2001, World Trade Center (WTC) attack when 7 WTC collapsed and struck the south façade of the building, resulting in the partial collapse of the southwest corner of the structure. The building was subsequently stabilized, with breaches closed and major debris removed. Because extensive mold and WTC dust contaminants remain within the building, it must be taken down. The project required the preparation of two environmental assessment statements (EASs)—one for the deconstruction and decontamination of Fiterman Hall and one for the construction of a replacement building on the site. AKRF prepared the EAS for the Deconstruction and Decontamination project, which included the decontamination of the interior and exterior of the building, the

removal and disposal of all building contents, and the deconstruction of the existing, approximately 377,000-gross-square-foot partially collapsed structure. Ms. Lapin reviewed the EAS's deconstruction and decontamination plans. The cleanup plan was submitted to the United States Environmental Protection Agency (USEPA).

Columbia University Manhattanville Academic Mixed-Use Development, New York, NY
Ms. Lapin served as Hazardous Materials Task Leader on this EIS for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University's existing Morningside campus. The Hazardous Materials work included Phase I Environmental Site Assessments for the properties within the site boundaries, and estimates for a Subsurface (Phase II) Investigation of the entire development area. The firm's Hazardous Materials group has performed over 30 individual Phase I Environmental Site Assessments for properties within the development area. In addition, a Preliminary Environmental Site Assessment (PESA) was completed in conjunction with the EIS. Based on the Phase I studies, AKRF conducted a subsurface (Phase II) investigation in accordance with an NYCDEP-approved investigative work plan and health and safety plan. Subsurface activities included the advancement of soil borings, groundwater monitor wells, and the collection of soil and groundwater samples for laboratory analysis. This study estimated costs to remediate contaminated soil, groundwater and hazardous building materials, including lead-based paint and asbestos-containing materials.

Yonkers Waterfront Redevelopment Project, Yonkers, NY
For this redevelopment along Yonkers' Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I assessments of 12 parcels, investigations of underground storage tank removals and associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, which enabled construction of mixed-use retail, residential development, and parking.

Davids Island Site Investigations, New Rochelle, NY
Ms. Lapin managed the hazardous materials investigation of Westchester County's Davids Island, The island, which features pre- and post-Civil War military buildings and parade grounds and is viewed as a major heritage, tourism, and recreational amenity, was planned for county park purposes. The investigation included a Phase I site assessment, with historical research dating to the 17th century, a Phase II (Subsurface) Investigation, underground storage tank investigations, asbestos surveys, and conditions surveys of all remaining structures. Cost estimates were submitted to Westchester County for soil remediation, asbestos abatement, and building demolition.

Site Selection and Installation of 11 Turbine Generators, New York and Long Island, NY
AKRF was retained by the New York Power Authority (NYPA) to assist in the State Environmental Quality Review Act (SEQRA) review of the proposed siting, construction, and operation of 11 single-cycle gas turbine generators in the New York metropolitan area. Ms. Lapin managed the hazardous materials investigation of the sites. The work included Phase I site assessments, subsurface investigations, and construction health and safety plans.

Cross Westchester (I-287) Expressway Phases V and VI, Westchester County, NY
Ms. Lapin served as Project Manager for the New York State Department of Transportation's (NYSDOT) reconstruction of Westchester County's major east-west artery and was responsible for directing the contaminated materials aspect of the final design effort. As part of her duties, she managed the asbestos investigations at eight bridges and wetland delineation along the entire corridor, wrote the scope of work and provided general project management.

Supermarket Redevelopment, New Fairfield, CT
AKRF provided consulting services to the developer and owner of a 9-acre site including conducting a remedial investigation and remediation of a site contaminated from former dry cleaning operations and off-site gasoline spills. The investigation included the installation of monitoring wells in three distinct aquifers, geophysical logging, pump tests, and associated data analysis. Ms. Lapin presented the environmental issues and planned remediation to local and state officials during the early stages of the planning process to incorporate their comments into the final remedial design. A remedial action work plan (RAWP) was completed and approved by the Connecticut

Department of Environmental Protection within a year to enable redevelopment work for a new supermarket and shopping center. The RAWP included the remediation of soil within the source area and a multi-well pump and treat system for the recovery of non-aqueous and dissolved phase contamination in groundwater. The design of the recovery well system included extensive groundwater modeling to ensure capture of the contaminant plume and the appropriate quantity and spacing of the wells. Ms. Lapin directed the soil removal remedial activities and monitoring for additional potential contamination during construction. In addition, AKRF performed comprehensive pre-demolition asbestos and lead-based paint surveys of the former site structures, conducted abatement, air monitoring and oversight, and provided environmental consulting support for the development of the site. The groundwater remediation system was installed during site development and began operation once development was complete.

East 75th/East 76th Street Site, New York, NY

Ms. Lapin served as Senior Manager for this project that encompassed coordination and direct remediation efforts of this former dry cleaning facility and parking garage prior to the sale of the property and its ultimate redevelopment for use as a private school. A preliminary site investigation identified 20 current and former petroleum and solvent tanks on the property. A soil and groundwater testing program was designed and implemented to identify the presence and extent of contamination resulting from potential tank spills. This investigation confirmed the presence of subsurface petroleum contamination in the soil and solvent contamination from former dry cleaning activities in the bedrock. AKRF completed oversight of the remediation under the State's Voluntary Cleanup Program. Remediation, consisting of tank removals and excavation of contaminated soil and the removal of solvent-contaminated bedrock down to 30 feet below grade, has been completed. AKRF completed oversight of the pre-treatment of groundwater prior to discharge to the municipal sewer system and an off-site study to determine impacts to groundwater in downgradient locations.

Home Depot, Various Locations, NY

Ms. Lapin, serving as either Project Manager or Senior Manager, has managed the investigations and remediation at multiple Home Depot sites in the five boroughs, Long Island, and Connecticut. The investigations have included Phase I and II site assessments, asbestos and lead paint surveys, abatement specifications and oversight, and soil and groundwater remediation.

Avalon on the Sound, New Rochelle, NY

For Avalon Bay Communities, Ms. Lapin managed the investigations and remediation of two luxury residential towers and an associated parking garage. Remediation of the first phase of development (the first residential tower and the parking garage) included gasoline contamination from a former taxi facility, fuel oil contamination from multiple residential underground storage tanks, and chemical contamination from former on-site manufacturing facilities. The remediation and closure of the tank spills was coordinated with the New York State Department of Environmental Conservation (NYSDEC). The initial investigation of the Phase II development—an additional high-rise luxury residential building—detected petroleum contamination. A second investigation was conducted to delineate the extent of the contamination and estimate the costs for remediation. AKRF oversaw the remediation and conducted the Health and Safety monitoring. The remediation was completed with closure and approvals of the NYSDEC.

East River Science Park, New York, NY

Originally, New York University School of Medicine (NYUSOM) retained the firm to prepare a full Environmental Impact Statement (EIS) for its proposed East River Science Park (ERSP). As originally contemplated, the proposed complex was to occupy a portion of the Bellevue Hospital campus between East 30th Street and approximately East 28th Street and would have included a clinical practice, research, and biotech facilities, housing units, a child care center, and a conference center and parking.

Ms. Lapin managed the Phase I Environmental Site Assessment and other hazardous materials-related issues. Events relating to September 11, 2001 delayed the project for several years. When it resurfaced with a new developer and a diminished scope, Ms. Lapin updated the hazardous materials issues and consulted with the new developer regarding remediation strategies and involvement of regulatory agencies. For the actual remediation/development, the city requested oversight by AKRF to represent its interests (the city is retaining ownership of the land). Ms. Lapin completed directing the remediation oversight on behalf of the City of New York for the remediation of this former psychiatric hospital building, laundry building and parking areas. The new 550,000 square-foot development includes a biotechnology center, street level retail, and an elevated plaza.

MARC S. GODICK, LEP

SR. VICE PRESIDENT

Marc S. Godick, a Senior Vice President of the firm, has over 25 years of experience in the environmental consulting industry. Mr. Godick has broad-based environmental experience includes expertise in brownfield redevelopment, site assessment, remedial investigation, design and implementation of remedial measures, compliance assessment, and litigation support.

Education

M.E., Engineering Science/Environmental Engineering, Pennsylvania State University, 1998

B.S., Chemical Engineering, Carnegie Mellon University, 1989

Licenses/Certifications

Licensed Environmental Professional (License # 396) – State of Connecticut – 2003 - Present

40 Hour HAZWOPER and Annual Refresher Training, 1990 - Present

Supervisors of Hazardous Waste Operations (8 Hour), 1990

Professional Memberships

Chairman, Village of Larchmont/Town of Mamaroneck Coastal Zone Management Commission, 1997 – Present

Member, Westchester County Stormwater Advisory Board, 2011 – Present

Chairman/Member, Westchester County Soil and Water Conservation District, 2005 - 2010

Board of Directors, Sheldrake Environmental Center, Larchmont, New York, 2006 - 2008

Member, NYSDEC Risk-Based Corrective Action (RBCA) Advisory Group for Petroleum-Impacted Sites, 1997

Community Leadership Alliance, Pace University School of Law, 2001

Years of Experience

Year started in company: 2002

Year started in industry: 1990

RELEVANT EXPERIENCE

On-Call Environmental Consulting Services (Various Locations), New York City Mayor's Office of Environmental Remediation (OER) (administered by NYCEDC)

Mr. Godick is managing an on-call contract with the OER for brownfields environmental assessment and remediation. The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by EPA grants. The work plans and investigation reports were completed in accordance with OER and EPA requirements. AKRF also developed a remedial plan for a former gas station site in the Bronx and implemented a remedial plan for capping a park site in Staten Island.

Remedial Design, Gowanus Canal First Street Turning Basin, New York City Department of Design and Construction (DDC)

Mr. Godick is managing the remedial design for restoration of the filled-in former First Street Turning Basin in Brooklyn, New York. The remediation is being conducted as part of an Order of Consent between the City of New York and EPA for the Gowanus Canal Superfund Site. The remedial design will include removal of fill and sediment within the fill-in basing in an approximately 475-foot by 50-foot area. The restored basin will provide enhanced waterfront access to the community and a boat launch for canoes and kayaks. Design considerations include geotechnical concerns related to adjacent buildings and new and existing bulkheads; soil and water management; landscape design; and access/construction logistics. The design in anticipated to be completed in late 2017.

On-Call Environmental Consulting (Various Locations), New York City School Construction Authority

Mr. Godick is managing an on-call contract with the SCA for environmental assessment, remedial design, and plumbing disinfection. For new school sites, initial due diligence involves conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school and remediation requirements and associated costs. Once design for a school is underway, AKRF would prepare remediation plans and construction specifications and oversee the construction activities. For existing school sites, the work can involve conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, investigation and remediation of spills, and development of remediation cost estimates. AKRF also oversees plumbing disinfection work, which is required prior to new plumbing being placed into service. The assignments involve reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of a report documenting the work was conducted in accordance with the specifications and applicable requirements. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

Remediation & Litigation Support, 3200 Jerome Avenue, Bronx, NY (Former PS 151)

Mr. Godick managed the investigation and remediation of a former public school in the Bronx under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP). The site was contaminated with trichloroethylene (TCE) from historic operations at the property prior to use as a school. The remedial investigation included soil, groundwater, and vapor intrusion assessment both on-site and off-site. The remedial design included excavation of the source area, in-situ chemical oxidation of groundwater, and installation of a sub-slab depressurization system (SSDS) to address to potential vapor intrusion. Implementation of the remedy was complete in late 2014. The completed remediation allows for future multi-family residential, educational, childcare, and/or medical uses. Mr. Godick has also been providing litigation support and will serve as a fact witness and potentially an expert witness in connection with a cost recovery claim against the former operator of the site.

Remediation & Litigation Support, Queens West Project, Avalon Bay Communities, Queens, NY

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF prepared an Environmental Impact Statement (EIS) that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. As part of this project, Mr. Godick managed one of the largest remediation projects completed under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP) that was contaminated by coal tar and petroleum. The remedy included the installation of a hydraulic barrier (sheet pile cut off wall), excavation of contaminated soil under a temporary structure to control odors during remediation, a vapor mitigation system below the buildings, and implementation of institution controls. The investigation, remediation design, and remedy implementation, and final sign-off (issuance of Certificate of Completion) were completed in two years. Total remediation costs were in excess of $13 million. Following completion of the remediation, Mr. Godick developed a cost allocation model and provided litigation support for a cost recovery action against a former operator of the site, including participation in a deposition as a fact witness prior to settlement between the parties.

Remediation, Former Industrial Laundry/Dry Cleaning Plant, 2350 Fifth Avenue. New York, NY

Mr. Godick managed the assessment, cleanup and post-remedial operations, maintenance and monitoring of the only NYSDEC listed inactive hazardous waste (State Superfund) site in Manhattan, a former laundry/dry cleaning plant in Harlem. Remedial investigation included evaluation of soil, groundwater, soil vapor, indoor air, and building materials. Interim remediation included the removal of contaminated building materials and operation of a sub-slab vapor extraction system retrofitted into the existing building. Mr. Godick coordinated with the regulatory agencies, site owner and occupants; and managed the investigation, remedial design, and remedial implementation activities. Phase 1 of the Remedial Action Work Plan consisted of further removal of contaminated building materials. Phase 2 of the remediation included a sub-slab depressurization system (SSDS) retrofitted into the existing building, soil vapor extraction (SVE) system, and chemical oxidation injection. Remedial action work was completed in 2014 and documented in a Final Engineering Report. NYSDEC issued Certificate of Completion in January 2015 and the site has been reclassified to a "Class 4" site (site properly closed – requires continued management). Mr. Godick continues to manage the project, including operations, maintenance and monitoring of the SSDS and SVE system under the NYSDEC-approved Site Management Plan.

606 West 57th Street, New York, NY, TF Cornerstone

AKRF has been retained by TF Cornerstone to provide environmental services for the proposed redevelopment of a portion of the block bounded by Eleventh and Twelfth Avenues and West 56th and 57th Streets. The proposed actions included a zoning map amendment, zoning text amendments, a special permit, and an authorization to facilitate development of approximately 1.2 million square feet of residential and retail space. AKRF prepared an Environmental Impact Statement (EIS) for the New York City Department of City Planning (DCP) to analyze the effects of the proposed actions and development of the proposed building. The EIS addressed the full range of environmental impacts associated with the proposed development.

Mr. Godick was responsible for the elements of the EIS pertaining to hazardous materials, including coordination of a Phase I ESA and summarizing pertinent site information for the hazardous materials and construction chapters. Mr. Godick provided pre-acquisition support to TF Cornerstone, which included development of a remedial cost estimate report to outline remediation cost during site development. Mr. Godick also managed work related to the subsurface investigation, localized remediation (chemical injection and limited excavation beneath the building basement) and regulatory closure of a petroleum spill on a portion of the project site to satisfy NYSDEC requirements. After EIS certification, Mr. Godick coordinated approvals with NYCOER, the regulatory agency overseeing remedial measures related to the redevelopment of the site. The Site has an (E) Designation and is participating in the New York City Voluntary Cleanup Program. Mr. Godick managed the preparation of a Phase II Investigation Work Plan, Remedial Investigation Report, Remedial Action Work Plan, and contractor specifications for soil management and tank and hydraulic lift removal. Mr. Godick is continuing to manage the project during remediation and construction.

NYCDEP Permit Resource Division On-Call Contract, New York, NY

Under subcontract to a national engineering firm, and as part of three successive on-call contracts, AKRF provided support in a wide range of technical areas related to environmental and engineering permits for NYCDEP capital projects. These services fall into two major categories: preparing detailed guidance documents that will be used by project designers and construction managers on future projects, in order to expedite permit approvals and prevent delays; and providing expert review and guidance regarding permits for current projects, in order to ensure completeness of permit applications and effective coordination with regulatory agencies. The technical areas covered by AKRF include: wetlands, groundwater, surface water, and other natural resources; hazardous materials; traffic and transportation; air quality; noise and vibration; historic and archaeological resources; stormwater management; open space and parkland; and a broad range of permits and approvals from the New York City Fire Department (FDNY), the New York City Police Department (NYPD), the New York City Department of Buildings (NYCDOB), and other municipal agencies. AKRF also helped NYCDEP improve the overall process for tracking environmental and engineering permits and approvals, from the planning and design phases of a project to construction and long-term operation. Mr. Godick served as the hazardous materials task leader under this contract.

77 Commercial Street, Brooklyn, NY, Clipper Realty

Mr. Godick managing various environmental consulting services in connection with the proposed affordable housing development at 77 Commercial Street as part of ongoing revitalization of the Greenpoint waterfront. The project comprises the redevelopment of an approximately 110,000-squarefoot former industrial parcel into a mixed-use commercial/residential development including public waterfront esplanade, affordable housing, and three interconnected buildings ranging from 2 to 40 stories. The site is being remediated under the New York City Mayor's Office of Environmental Remediation (OER), and is listed with an E-Designation for Hazardous Materials, Air Quality, and Noise. The Remedial Investigation (RI) included 38 soil samples, 6 groundwater samples, and 11 soil vapor samples. Based on the results of the RI, AKRF prepared a Remedial Action Work Plan (RAWP) that included excavation of approximately 90,000 tons of soil, the installation of a vapor barrier beneath the entire building, and design of a sub-slab depressurization system (SSDS) for a portion of the building. Upon approval of the RAWP, the project was enrolled into OER's Voluntary Cleanup Program (VCP) to enable an exemption from hazardous waste disposal taxes, as well as to capitalize on additional community involvement provided by OER. AKRF, OER, and community leaders developed proactive measures to limit the potential disturbances from construction. AKRF conducted extensive waste characterization testing of the soil to pre-classify the material for disposal. The project is expected to break-ground in late 2015/early 2016.

164 Kent Avenue, Brooklyn, NY (AKA Northside Piers and 1 North 4th Place), RD Management, L&M Development, Toll Brothers, and Douglaston Development

The project was a multi-phase development consisting of a large waterfront block in the Williamsburg Rezoning Area. The project site has been developed with a mixed-use residential-commercial high rise towers with an esplanade and a pier along the East River. AKRF provided acquisition and development support, including performing Phase I and II environmental site assessments and development of remedial cost estimates for development, and preparation of Remedial Action Plans (RAPs) and Construction Health and Safety Plan (CHASPs) for approval by DEP and OER. AKRF provided assistance with construction oversight during soil handling activities and managing the Community Air Monitoring Plan (CAMP) activities. To date, closure reports have been prepared and occupancy now achieved for all four buildings under the project.

National Grid – Halesite Manufactured Gas Plant Site Remediation, Town of Huntington, NY

Mr. Godick managed the remedial design and engineering work associated with remediation of National Grid's former manufactured gas plant (MGP) located in the Town of Huntington. The site is situated in a sensitive location along the waterfront, surrounded by commercial and residential properties, and half the property where the remediation was conducted was a steep slope. The remedy consisted of soil removal, oxygen injection, and non-aqueous phase liquid recovery. Mr. Godick was responsible for the development of the remedial work plans, design/construction documents, landscape architecture, confirmatory sampling, air monitoring, supervision, and preparation of close-out documentation in accordance with NYSDEC requirements.

Underground Storage Tank Closure and Site Remediation–Program Management, Con Edison, New York, NY

Mr. Godick provided technical assistance to Con Edison in developing technical submittals and budgets associated with tank closures at over 50 facilities. Technical summaries were prepared for submittal of contractor-prepared closure reports to the NYSDEC. The summaries included a review of historic pre-closure assessments, tank closure data, and provided recommendations for additional assessment, remediation or closure. Subsequently, a three-year program budget was developed for implementation of the UST investigation/remedial program, which Con Edison utilized for internal budgeting purposes.

Site Investigation–Over 20 Facilities, Con Edison, New York, NY

Mr. Godick managed site investigations associated with petroleum, dielectric fluid, and PCB releases at over 20 Con Edison facilities including service centers, substations, generating stations, and underground transmission and distribution systems. Site investigations have included due diligence site reviews, soil boring installation, monitoring well installation, hydrogeologic testing, and water quality sampling. Risk-based closures were proposed for several sites.

Verizon, Investigation & Remediation, Various Locations, NY, PA and DE

Mr. Godick managed over 50 environmental investigations and remediation projects related to petroleum releases at various facilities. Responsibilities included annual budgeting, day-to-day project management, development and implementation of soil and ground water investigation workplans, ground water modeling, risk evaluation, remedial action work plans, remedial design, system installation, waste disposal, well abandonment, and operation and maintenance. Many of the assessment and remedial projects followed a risk-based approach. Remedial technologies implemented included air sparging, soil vapor extraction, bioremediation, pump and treat, soil excavation, and natural attenuation.

Storage Tank Management, Verizon, Various Locations, NY, PA, DE, and MA

Mr. Godick managed the removal and replacement of underground and aboveground storage tank systems for Verizon in New York, Pennsylvania, Delaware, and Massachusetts. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction oversight, project budget, and documentation. For selected AST sites, managed the development of Spill Control, Contingency and Countermeasures (SPCC) plans.

Litigation Support, Cost Recovery Action, Federal Superfund Site, New York

Mr. Godick is currently providing technical support to one of the 40+ potential responsible parties (PRPs) associated with a Federal Superfund site in New York State, which includes conducting a liability assessment for the various parties and development of a cost allocation model.

Litigation Support, Cost Recovery Action, New York State Superfund Site

Mr. Godick provided technical support for the former owner of a New York State Superfund site in upstate New York. Current owner of the property brought a cost recovery action against client as a potential responsibility party. Completed technical review of draft Remedial Investigation/Feasibility Study prepared by opposing party's consultant to develop more cost effective remedial strategy and to better position the client for liability allocation as part of future settlement negotiations. Developed cost allocation paper and model for settlement negotiations, as well as participated in mediation.

Litigation Support & Remediation, Former Service Station, Brooklyn, New York

Mr. Godick took over management of remediation of an inactive service station (formerly conducted by another firm). His approach outlined additional characterization and remediation efforts which resulted in successful closure of the spill by NYSDEC within two years. Mr. Godick testified as an expert witness at a hearing in the New York State Supreme Court of Kings County to determine the adequacy of the remediation efforts.

Litigation Support, Cost Recovery Action, Town of Carmel, New York

Mr. Godick served as an expert witness representing the owner of a property in a landlord-tenant dispute, which was used as a gasoline station and oil change facility. Mr. Godick prepared exhibits, testified, and participated in meetings with NYSDEC to support the landlord's claim that the oil change tenant's practices were poor and were adversely affecting the environment and the overall facility systems at the site.

Litigation Support, Cost Recovery Action, New York State Petroleum Spill Site, New York, NY

Mr. Godick provided technical support for the former owner of a New York City multi-unit residential apartment building. The State of New York brought a cost recovery action against our client as a result of a previous spill from a former underground storage tank. Reviewed invoices and project documentation to dispute work performed by the NYSDEC, which provided the basis for settlement at a fraction of the initial claim.

Litigation Support, Class Action Lawsuit, Confidential Client, NJ

Mr. Godick provided technical support for a class action suit involving a petroleum-impacted community water supply in southern New Jersey. The technical assistance included analysis of expert testimony and coordination with legal counsel in preparing for cross-examination of the opposing party's lead expert witness.

DEBORAH SHAPIRO, QEP

VICE PRESIDENT

Deborah Shapiro is a Vice President with 17 years of experience in the assessment and remediation of hazardous waste issues. Ms. Shapiro supervises project teams and manages all aspects of assessment and remediation projects. Ms. Shapiro works with developers, non-profit organizations, architects, local community groups, local businesses, and government agencies. Her projects fall under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER including the New York State Brownfield Cleanup Program (BCP), New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, RCRA/UIC closures, and NYCOER's E-designation program. Ms. Shapiro has also assisted commercial and industrial property owners with maintaining the integrity of their portfolios by providing compliance related cleanup and chemical storage management services.

Ms. Shapiro manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management. In addition, her experience includes groundwater investigations, monitoring, and sampling programs; Brownfield and hazardous waste site investigations; In-Situ Chemical Oxidation; underground storage tank studies, including soil contamination delineation, classification, removal and disposal; waste characterization sampling; exposure assessments; on-going remedial action (especially AS/SVE), and permitting.

Prior to joining AKRF, Ms. Shapiro was a Senior Project Manager at CA RICH Consultants, Inc. in Plainview, New York. She was responsible for the design, implementation, and management of environmental assessment, investigation and remediation projects on Long Island and across the New York Metropolitan Area. Ms. Shapiro has also been a moderator and panelist at numerous conferences.

BACKGROUND

Education

M.S., Environmental Science, American University, 2001
B.A., Environmental Studies, American University, 1998

Professional Licenses/Certifications

Qualified Environmental Professional
Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120
OSHA 10 Hour Occupational Construction Safety and Health

Professional Memberships

Past President, New York City Brownfield Partnership
Board Member, Residents for a More Beautiful Port Washington
Member, Institute of Professional Environmental Practitioners (IPEP)

Awards

Big Apple Brownfield Award recipient as part of the Courtlandt Crescent redevelopment team 2013
Big Apple Brownfield Award recipient as part of the Via Verde redevelopment team 2012
Big Apple Brownfield Award recipient as part of the Cornerstone B1 (LaTerraza) redevelopment team 2011

Years of Experience

Year started in company: 2013
Year started in industry: 1998

Relevant Experience

Elton Crossing, Bronx, NY

AKRF is currently providing environmental consulting services in connection with the Elton Crossing site in the Bronx, NY. The work initially involved the preparation of a Phase I Environmental Site Assessment and Phase II subsurface investigation including soil and soil vapor testing to determine if the site would be eligible for the New York State Brownfield Cleanup Program (NYSBCP) based on its historic usage. AKRF prepared a NYCBCP Application and the site was accepted in to the NYSBCP. AKRF managed all aspects of the brownfield cleanup including; development of Remedial Investigation (RI) and Supplemental Remedial Investigation (SRI) Work Plans, conducting the RI and SRI and preparing the associated reports, preparation of a Citizen Participation Plan, distribution of public notices, and preparation of a Remedial Action Work Plan (RAWP). AKRF managed all aspects of the remediation, including providing guidance for the closure of two petroleum spills; the registration, removal, and closure of six petroleum storage tanks encountered during excavation; and waste characterization and disposal of soil with contaminants including hazardous lead, petroleum, and pesticides, and design of a Sub-Slab Depressurization System (SSDS). AKRF prepared and submitted a Site Management Plan (SMP) and a Final Engineering Report (FER), which documented compliance with the RAWP. The SMP and FER were approved by NYS in 2016. AKRF is currently providing long-term site management in accordance with the NYSBCP.

On-Call Environmental Consulting Services (Various Locations), New York City Mayor's Office of Environmental Remediation (OER) (administered by NYCEDC)

Ms. Shapiro is managing an on-call contract with the OER for brownfields environmental assessment and remediation. The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by EPA grants. The work plans and investigation reports were completed in accordance with OER and EPA requirements. AKRF also implemented a remedial plan for capping a park site in Staten Island. In addition, Ms. Shapiro is providing support to OER and an affordable housing developer to expedite an application for entry into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), as well as preparation and implementation of the remedial investigation and remedial plan.

Atlantic Chestnut, Brooklyn, NY

AKRF was retained by Phipps Houses to provide environmental consulting services in connection with the purchase and development of former burned manufacturing buildings encompassing an entire city block in Brooklyn, New York. As part of due diligence, AKRF prepared a Phase I Environmental Site Assessment (ESA) Report for the property. After acquisition, the property was divided into three separate sites (3264 Fulton Street, 235 Chestnut Street, and 3301 Atlantic Avenue). AKRF prepared a Subsurface (Phase II) Investigation Work Plans and conducted Phase IIs at each of the sites, which included the collection and analysis of soil, soil vapor, and groundwater samples. Based on the results of the Phase IIs, which were documented in Subsurface (Phase II) Reports, New York State Brownfield Cleanup Program (NYSBCP) applications were prepared for each of the sites. After acceptance into the NYSBCP, AKRF prepared Citizen Participation Plans (CPPs) and distributed public notices. AKRF prepared Remedial Investigation (RI) Work Plans (RIWPs) for each of the sites to further investigate contaminated media at the site prior to redevelopment, conducted the RIs, and is in the process of preparing the RI Reports (RIRs).

Second Farms, Bronx, NY

AKRF, Inc. was contracted by the New York City Office of Environmental Remediation (NYCOER) to conduct a subsurface investigation of a 1.12-acre parcel in the Bronx, New York under the United States Environmental Protection Agency (USEPA) Brownfield Assessment Grant program. The investigation included a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples.

Brook 156, Bronx, NY

AKRF was retained by Phipps Houses to provide environmental consulting services in connection with the purchase and development of two lots located at 740 Brook Avenue in the Bronx, NY. AKRF prepared a Phase I Environmental Site Assessment (ESA) of the NYC-owned former gasoline service station and a former railroad. A Tier 1 Vapor Encroachment Screening was also conducted to satisfy HUD's vapor intrusion requirements. AKRF prepared a Remedial Investigation Work Plan (RIWP) and conducted a Remedial Investigation (RI) at the site, which included the collection and analysis of soil, soil vapor, and groundwater. The results of the RI, which were documented in a Remedial Investigation Report (RIR), were used to prepare a New York City Brownfield Cleanup Program (NYCBCP) application. The site was accepted into the New York State Brownfield Cleanup Program (NYSBCP). AKRF prepared a Citizen Participation Plan (CPP), distributed public notices, and is in the process of preparing a Supplemental Remedial Investigation Work Plan (SRIWP) to further investigate soil, soil vapor, and groundwater at the site prior to redevelopment.

Warbrook Portfolio, Manhattan, NY

AKRF provided environmental consulting services to Genesis Y15 Developer LLC and the Abyssinian Development Corporation (ADC) for the proposed rehabilitation of 30 parcels in Central Harlem for low- and moderate-income tenants. The parcels comprise two vacant lots and 28 residential buildings, including several buildings that are vacant or partially vacant. The client is seeking 4% Low-Income Housing Tax Credits issued by the New York City Housing Development Corporation (HDC) through the New York City Department of Housing Preservation & Development (HPD) to rehabilitate the 30 parcels. AKRF prepared a Phase I Environmental Site Assessment for all parcels. The Phase I summarized environmental issues based on a review of available environmental reports, a review of regulatory records, and on-site inspections. Limited Phase II Environmental Site Assessments were conducted at parcels where recognized environmental concerns were identified. Based on evidence of suspect mold associated with the Property parcels, AKRF also prepared a mold specification section for use during renovation of the Property.

Courtlandt Crescent, Bronx, NY

Ms. Shapiro directed all Phases of this NYS Brownfield Cleanup Program project in the Melrose Commons section of the Bronx from the initial Phase I and II through the Certificate of Completion and is currently managing the implementation of the Site Management Plan. A New York State Brownfield Cleanup Program (BCP) Application was submitted simultaneously with the Remedial Investigation Report (RIR) and Remedial Action Work Plan (RAWP), which sped up the timetable so that the remediation could be implemented concurrently with the planned site redevelopment activities. The site comprised an entire city block whose historic usage included a gasoline filling station, auto repair shop, machine shop, auto junkyard, iron works, boiler repair shop, brass fabricator shop, universal machinery manufacturing, waste paper company, cosmetic company, and a saw works. The investigation included soil and soil vapor testing as well as the installation and sampling of groundwater monitoring wells. The remedial activities included the removal of underground storage tanks and hydraulic lifts, soil waste classification testing, the excavation and removal of approximately 23,000 tons of non-hazardous petroleum and metals contaminated soil as well as hazardous soil containing lead, in-situ chemical oxidation, and installation of a composite cover system. In addition, site dewatering activities allowed the elevator pits to be advanced into the groundwater table. A vapor barrier (and water-proofing for the elevator pits) was installed beneath the two new buildings' foundations and a sub-slab depressurization system (SSDS) was incorporated into the buildings' foundations to eliminate the potential exposure pathway for soil vapor into the new affordable housing residential buildings. Ms. Shapiro directed the remedial activities and monitoring under a construction health and safety plan, which included a community air monitoring program. Site management activities include post-remedial groundwater monitoring and sampling, SSDS start-up testing and operations and maintenance, and annual institutional control/engineering control inspections. The project was the recipient of the 2013 Big Apple Brownfield Award.

ExxonMobil, Multiple Locations, NY

Ms. Shapiro has managed the investigation and remediation of numerous ExxonMobil retail service stations in the five boroughs and Long Island. The investigations have included Phase I, II, and III site assessments, regulatory compliance, emergency spill response, UST removals, and soil and groundwater remediation.

AMY T. JORDAN

GEOLOGIST

Amy Jordan is a Geologist with 6 years of environmental consulting experience related to site assessment and remediation. Ms. Jordan works with non-profit organizations, affordable housing developers, for-profit developers, and government agencies under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER. She works with projects enrolled in the New York State Brownfield Cleanup Program (BCP), the New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, and NYCOER's E-designation program. Ms. Jordan conducts and manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management.

BACKGROUND

Education

B.A. Geosciences, Franklin and Marshall College, Lancaster, PA, 2011

Licenses/Certifications

40 Hour OSHA HAZWOPER Certified

OSHA 10 Hour Occupational Construction Safety and Health

NYSDEC Erosion and Sediment Control Inspector

Amtrak Track Training

NYS Asbestos Inspector

Years of Experience

Year started in company: 2012
Year started in industry: 2011

RELEVANT EXPERIENCE

12 Eckford Street, Brooklyn, New York

AKRF is providing environmental consulting services in connection with the redevelopment of the New 470 Project into a mix of affordable and market-rate residences located at 12 Eckford Street in Brooklyn, New York. Ms. Jordan developed and conducted several investigations at the property under the oversight of NYCOER. Ms. Jordan is currently preparing a BCP Application and designing the remedial action for the site, which will include the design and installation of a sub-slab depressurization system (SSDS) and soil vapor extraction (SVE) system; hazardous waste delineation and disposal; construction oversight; and ongoing remedial monitoring under the oversight of the NYSDEC. The work will culminate with a Final Engineering Report to document the completion of remedial actions and to establish protocol for site monitoring.

Elton Crossing, Bronx, New York

AKRF provided environmental consulting services in connection with the purchase and redevelopment of the Elton Crossing site at 899 Elton Avenue in the Bronx, New York. The work initially involved the preparation of a Phase II subsurface investigation including soil and soil vapor testing to determine if the site would be eligible for the BCP under NYSDEC oversight. Upon completion of the investigation, Ms. Jordan prepared a NYCBCP Application and the site was accepted in to the NYSBCP. Ms. Jordan prepared an updated Phase I Environmental Site Assessment Report and managed all aspects of the brownfield cleanup including development of a Supplemental Investigation Work Plan, performing a Supplemental Remedial Investigation and preparing a Supplemental Investigation Report, preparation of a Citizen Participation Plan, distribution of public notices, and preparation of a Remedial Action Work Plan (RAWP). AKRF oversaw all remediation at the Site, which included the removal of numerous underground oil tanks, and waste characterization and disposal of soil with contaminants including hazardous lead, petroleum, and pesticides. The project will be completed in Fall 2016 with the preparation of a Final Engineering Report to document the remedial activities and installation of institutional controls including a vapor barrier and AKRF-designed sub-slab depressurization system.

3363 and 3365 Third Avenue, Bronx, New York

AKRF is providing environmental consulting services in connection with the purchase and redevelopment of this property into affordable housing units under NYCOER's VCP. Ms. Jordan prepared two Phase I ESAs in accordance with New York City Acquisition Fund (NYCAF) protocol; conducted several subsurface investigations and waste classification sampling; prepared a VCP Application; and manages all aspects of the construction phase of this project.

Atlantic Chestnut Lots 1, 2, and 3, Brooklyn, New York

AKRF is providing environmental consulting services in connection with the purchase and redevelopment of these three lots from a burned factory into affordable housing units. For this project, Ms. Jordan prepared a Phase I ESA, conducted three subsurface investigations, and prepared three BCP Applications. Ms. Jordan will oversee the redevelopment, remediation, and ongoing remedial monitoring for these three sites comprising an entire city block.

New York City School Construction Authority, Various Locations, New York City

Under an on-call contract, AKRF provides the New York City School Construction Authority (NYCSCA) with hazardous materials consulting services. Ms. Jordan is involved with various due diligence and environmental assessment projects including Phase I Environmental Site Assessments (ESAs); Phase II (Subsurface) Environmental Site Investigations (soil, groundwater and soil vapor intrusion investigations); Indoor Air Quality (IAQ) Assessments; Underground Storage Tank (UST) and Aboveground Storage Tank (AST) inspections relating to boiler conversions; and peer review of other consultant's due diligence reports.

TIMOTHY MCCLINTOCK

ENVIRONMENTAL SCIENTIST

Mr. McClintock has over 9 years of environmental consulting experience, including implementing and managing Phase I Environmental Site Assessments, Phase II Environmental Site Investigations and Remedial Investigations, overseeing remedial action programs including soil excavation, groundwater handling, remediation system installation, operation and maintenance, and project management and reporting. He has successfully remediated projects and obtained closure from several northeast authorities, including the New York State Department of Environmental Conservation (NYSDEC), New Jersey Department of Environmental Protection (NJDEP), Pennsylvania Department of Department of Environmental Protection (PADEP), Connecticut Department of Energy & Environmental Protection (CTDEEP) and Massachusetts Department of Environmental Protection (MassDEP).

BACKGROUND

Education
B.S. Environmental Science/Earth Science, University at Albany, 2008

Licenses & Certifications
OSHA 40-hour Health & Safety Training for Hazardous Waste Operations (September, 2019)
OSHA 10-hour Health and Safety Training for Construction Safety and Health
NJDEP Subsurface Evaluator & UST Closure (December, 2019)
NYSDOH Certified Asbestos Inspector (March, 2019)
NYSDOH Mold Assessor (November, 2018)

Years of Experience
Date started at AKRF: August, 2017
Prior industry experience: Dorson Environmental Management, Inc. – August 2008 to August 2017 (9 years)

RELEVANT EXPERIENCE

Former Farm Gasoline Underground Storage Tank Remediation, Somerset County, NJ

Mr. McClintock serves as the field team leader and deputy project manager for the LSRP-led remediation of a former gasoline UST located on a farm property in the Watchung Mountain region of New Jersey. Following a site investigation (contamination screening), AKRF is currently conducting an investigation to bioremediate groundwater at the site, which contains residual benzene and MTBE. Mr. McClintock is integral to the preparation of a Remedial Action Workplan (RAWP), for the carrying out of groundwater sampling investigations, a biotreatability study, and the evaluation of data resulting from the site work.

1-65 North 12th Street, Brooklyn, New York

The former Bayside Fuel Oil Company operated a commercial petroleum bulk storage facility at the property for several decades. Soil and groundwater contamination resultant of on-site and off-site petroleum releases, off-site manufactured gas plant (MGP) releases, and historic fill have been identified throughout the property. Mr. McClintock assisted senior AKRF project staff with the evaluation of historical assessment information, the preparation of a Remedial Action Plan (RAP), and a Construction Health and Safety Plan (CHASP) for this site.

Confidential Client: New York City Institutional Site - Soil Classification:

Mr. McClintock is the field team leader for the soil classification work associated with the proposed development of an addition at a New York City institutional site. He assisted senior project staff with the coordination of site work, and directed the field effort including the collection of soil samples to characterize the current subsurface conditions. Mr. McClintock's role included evaluating soil analytical data and project reporting.

White Plains Mall, 200 Hamilton Avenue, White Plains, New York - Spill Investigation and Brownfield Cleanup Program Enrollment

Mr. McClintock served as the field team leader for the Spill Investigation work associated with historic gasoline stations at the White Plains Mall. He assisted senior project staff with the evaluation of historical assessment information, and the development and implementation of a Spill Investigation to delineate the extent of petroleum-contaminated soil and groundwater. He directed field sampling, including soil and groundwater samples, and evaluated the data and associated reporting. The project would apply for the NYSDEC Brownfield Cleanup Program.

Proposed Public School, Queens, New York - Phase II Investigation

Mr. McClintock served as field team leader for the Phase II Investigation work associated with proposed development of NYCDOE Public School at a vacant lot in Queens, New York. He assisted senior project staff with the evaluation of historical assessment information, the development and implementation of the Phase II Investigation to characterize the current subsurface conditions, and directed the field effort including the collection of soil, soil vapor, and groundwater samples. Mr. McClintock evaluated analytical data, and contributed to the reporting effort.

Petroleum Release/Oil Tank Remediation Projects – New York, New Jersey, Pennsylvania and Connecticut (2008 – 2017)

Mr. McClintock completed the design and implementation of environmental investigations and remediation projects associated with petroleum releases at residential and commercial sites throughout the northeast. Tasks included project design, site investigation, project direction and oversight, soil and groundwater sampling, data evaluation, client and contractor coordination, regulatory agency interaction and associated reporting and deliverable production.

Phase I Environmental Site Assessment and Phase II Environmental Site Investigation Projects – New York and New Jersey (2008 – 2017)

Mr. McClintock completed Phase I and Phase II environmental site assessments (ESAs) and investigations (ESIs) at residential and commercial properties associated with real estate transactions. Tasks included site inspections, historic environmental data report and regulatory record evaluations, environmental media sampling, client and contractor coordination, and associated reporting and deliverable production.

Storm Water Investigation Projects – New York (2008 – 2017)

Mr. McClintock assisted senior project staff with the investigation of actual and suspected storm water discharges at various sites throughout New York while at Dorson Environmental Management, Inc. Tasks included investigation into suspected non-permitted storm water discharges for environmental attorneys, preparation of Storm Water Pollution Prevention Plans (SWPPP) to assist property owners with obtaining the NYSDEC General Permit for Storm Water Discharges, storm water sampling, storm water drainage mapping, data evaluation, and associated reporting and deliverable production.

Former Flamingo Cleaners, 149 North Avenue, New Rochelle, New York

Mr. McClintock completed site investigations, developed a Remedial Action Work Plan (RAWP), provided remediation oversight and regulatory agency interaction, conducted environmental media sampling, and prepared report packages associated with comingled petroleum and chlorinated contamination at a former dry cleaning facility. The work was conducted in accordance with the NYSDEC Brownfield Cleanup Program and included site characterization, excavation and disposal of contaminated source material, removal and treatment of contaminated groundwater, in situ chemical oxidation of residual contamination and the implementation of institutional and engineering controls.

Former Gasoline Station, 66 Milton Road, Rye, NY

Mr. McClintock designed and implemented a site investigation and remedial excavation program to address historic contamination at a former gasoline station. The site work included the delineation of the residual soil and groundwater contamination, excavation of contaminated source material, removal of contaminated groundwater, post-remedial soil and groundwater sampling and associated reporting to close the NYSDEC spill number associated with the property. All site work was coordinated through the current building management and tenant association, the NYSDEC and the City of Rye.

Water and Mold Damage Investigation and Remediation Projects – New York, New Jersey, and Connecticut (2008 – 2017)

Mr. McClintock completed the design and implementation of environmental investigations, cause and origin analyses, and remedial projects associated with water and mold damage claims for various insurance carriers during his tenure with Dorson Environmental Management. Tasks included site investigation, cause and origin determination, project direction and oversight, environmental media sampling, data evaluation, client and contractor coordination, and associated reporting and deliverable production.

AMY JACKSON

ENVIRONMENTAL ENGINEER

Ms. Jackson is an Environmental Engineer at AKRF. Her skills include technical writing and presenting; groundwater, soil, and soil vapor sampling; community air monitoring; electron microscopy, light microscopy, and general laboratory practices. She is proficient in AutoCAD, ArcGIS, gINT, HEC-HMS, HEC-RAS, EPANET, Visual MODFLOW, MS Office, Open Office, PDF Editing, Fortran and Matlab programming. She has Russian and German Language Certificates (Advanced Level) from the American Council for the Teaching of Foreign Languages.

BACKGROUND

Education

M.S., Environmental Engineering, New York University, 2017

B.S., Physics, German, Brigham Young University, 2012

Certifications

OSHA 40-hour Health & Safety Training for Hazardous Waste Operations, September 2017

OSHA 10-hour Health & Safety Training for Hazardous Waste Operations, September 2017

Years of Experience

Year started in company: 2017

Year started in industry: 2016

RELEVANT EXPERIENCE - AKRF

Larkin Plaza, Yonkers, NY – Remedial Investigation, Construction Oversight

AKRF was hired to perform a Remedial Investigation to support the Brownfield Cleanup Program application submitted for this property, and to prepare a Remedial Action Work Plan (RAWP). As part of the Remedial Investigation, Ms. Jackson collected soil and groundwater samples and assisted in the preparation of the Remedial Investigation Report. Ms. Jackson also served as an on-site environmental monitor to ensure the appropriate execution of the RAWP, to conduct community and work zone air monitoring, and to oversee excavation and export of soil.

Skyview Parc, Flushing, NY – Construction Oversight

Remediation of the former automotive repair shop is being conducted under the New York State Brownfield Cleanup Program (BCP). AKRF completed a Remedial Investigation, and prepared a Remedial Action Work Plan (RAWP) to address subsurface contamination during site redevelopment. For this project, Ms. Jackson conducted work zone air monitoring and oversaw excavation and export of soil.

3500 Park Avenue, Bronx, NY – Brownfield Cleanup Program Application

Ms. Jackson reviewed pertinent historical records and previous environmental investigations, and prepared the Brownfield Cleanup Program application for the property.

1888 Bathgate Avenue, Bronx, NY – Supplemental Remedial Investigation, Construction Oversight

AKRF was hired to perform a Supplemental Remedial Investigation to support the Brownfield Cleanup Program application submitted for this property, and to prepare a Remedial Action Work Plan (RAWP). As part of the Supplemental Remedial Investigation, Ms. Jackson collected groundwater samples. Ms. Jackson also served as an on-site environmental monitor to ensure the appropriate execution of the RAWP, to conduct community and work zone air monitoring, and to oversee excavation and export of soil.

2 North 6th Place, Brooklyn, NY – Construction Oversight

AKRF provided environmental services during the redevelopment of this residential property. Ms. Jackson served as an on-site environmental monitor who oversaw soil import and final installation of waterfront landscaping elements.

Grand Street Housing Development Guild, Manhattan, NY – Phase I Environmental Site Assessment

Ms. Jackson prepared a Phase I Environmental Site Assessment for this residential and commercial use property. As part of the assessment, Ms. Jackson performed site reconnaissance, reviewed federal and state regulatory databases, and evaluated historical and topographic maps and building records from the City of New York to identify recognized environmental conditions (RECs) and environmental concerns.

145 President Street, Brooklyn, NY – Construction Oversight

Redevelopment of former residential properties is being conducted. AKRF completed Phase I and Phase II Environmental Site Assessments, and prepared a Soil Management Plan (SMP) to address subsurface contamination during site redevelopment. For this project, Ms. Jackson oversaw excavation and export of soil.

Bronx Commons, Bronx, NY – Construction Oversight

AKRF provided environmental services during the redevelopment of this property. Ms. Jackson served as an on-site environmental monitor who oversaw the cutting, cleaning, and removal of several tanks uncovered in the course of site-wide excavation activities. Ms. Jackson also conducted waste classification sampling of stockpiles at the site.

Astoria Park, Queens, NY – Subsurface Investigation

Ms. Jackson collected soil samples in the course of a subsurface investigation which AKRF was hired to conduct to determine whether subsurface conditions had been affected by former on- or off-site activities.

Frick Collection, Manhattan, NY – Phase I Environmental Site Assessment

AKRF was hired to complete an Environmental Impact Statement (EIS) to support the re-zoning and expansion of the Frick Collection and Art Reference Library. As part of this effort, Ms. Jackson prepared a Phase I Environmental Site Assessment, including site reconnaissance, review of federal and state regulatory databases, and evaluation of historical and topographic maps and building records from the City of New York to identify recognized environmental conditions (RECs) and environmental concerns.

810 Fulton Street, Brooklyn, NY – Construction Oversight

Ms. Jackson served as an on-site environmental monitor who oversaw soil excavation and export, and conducted community and work zone air monitoring.

Caton Flats, Brooklyn, NY – Phase II Environmental Site Assessment

AKRF conducted a Phase II Environmental Site Assessment to determine whether subsurface conditions had been affected by former on-site or off-site activities. As part of the Phase II investigation Ms. Jackson collected groundwater samples from permanent geotechnical wells.

235-247 Cherry Street, Manhattan, NY – Phase II Environmental Site Assessment

AKRF conducted a Phase II Environmental Site Assessment to determine whether subsurface conditions had been affected by former on- or off-site activities. As part of the Phase II investigation Ms. Jackson collected soil, groundwater, and soil vapor samples, and coordinated with the driller and the property owner for successful completion of the work. Ms. Jackson also prepared a report to summarize the findings of the investigation.

120 Glen Avenue, Mount Vernon, NY – Limited Subsurface Investigation

AKRF was hired to perform a Limited Subsurface Investigation following the discovery of a leaking underground storage tank (UST) and subsequent spill report at a private residence in Mount Vernon. Ms. Jackson collected soil and groundwater samples to delineate the extent of contamination, and coordinated with the driller and the property owner for successful completion of the work. Ms. Jackson also prepared a Limited Subsurface Investigation Report to summarize the findings of the investigation.

1675 Westchester Avenue, Bronx, NY – Phase II Environmental Site Assessment

AKRF conducted a Phase II Environmental Site Assessment to determine whether subsurface conditions had been affected by former on- or off-site activities. As part of the Phase II investigation Ms. Jackson collected soil, groundwater, and soil vapor samples, and coordinated with the driller and the property owner for successful completion of the work. Ms. Jackson also prepared a report to summarize the findings of the investigation.

144-74 Northern Boulevard, Flushing, NY – Phase II Environmental Site Assessment

AKRF conducted a Phase II Environmental Site Assessment to determine whether subsurface conditions had been affected by former on- or off-site activities. As part of the Phase II investigation Ms. Jackson collected soil samples and coordinated with the driller and the property owner for successful completion of the work.

2036 Webster Avenue, Bronx, NY – Phase II Environmental Site Assessment

AKRF conducted a Phase II Environmental Site Assessment to determine whether subsurface conditions had been affected by former on- or off-site activities. As part of the Phase II investigation Ms. Jackson collected soil, groundwater, and soil vapor samples, and coordinated with the driller and the property owner for successful completion of the work. Ms. Jackson also prepared a report to summarize the findings of the investigation.

East Fordham Road, Bronx, NY – Environmental Oversight

AKRF was hired to oversee site clean-up following a tank failure and subsequent oil spill. Ms. Jackson supervised dewatering activities and the removal of contaminated soil from the cellar of the property, and conducted community and work zone air monitoring.

211 East 70th Street, Manhattan, NY – Waste Classification

AKRF was hired to conduct waste classification sampling in connection with the renovation and landscaping of this residential property. Ms. Jackson coordinated with the property owner for successful completion of the work, collected soil samples, and prepared a waste classification report to summarize the findings of the sampling.

OTHER RELEVANT EXPERIENCE

FedEx Ground Sort Facility, Queens, NY – Construction Monitoring

While at another firm, Ms. Jackson served as an on-site environmental and geotechnical monitor who oversaw pile installation, inspecting piles for integrity, and periodically collected inclinometer measurements along a retaining wall on Newtown Creek to monitor the impact of construction activities on the wall's structural integrity.

420 Kent Avenue, Williamsburg, NY – Construction Monitoring

While at another firm, Ms. Jackson served as an on-site environmental monitor who ensured appropriate execution of the RAWP and oversaw soil excavation and export.

Brooklyn Navy Yard, Brooklyn, NY – Construction Monitoring

While at another firm, Ms. Jackson served as an on-site environmental monitor who ensured appropriate execution of the RAWP, oversaw soil excavation and export, and conducted community air monitoring.

481 Wortman Avenue, East New York, NY – SSDS Inspection and Groundwater Sampling

While at another firm, Ms. Jackson performed quarterly sub-surface depressurization system inspections and groundwater sampling at a site with a history of solvent contamination and industrial use.

1525 Bedford Avenue, Brookln, NY – Construction Monitoring

While at another firm, Ms. Jackson served as an on-site environmental monitor who ensured appropriate execution of the RAWP, oversaw soil excavation and export, and conducted community air monitoring.

ABC, 5-39 46th Avenue, Long Island, City, NY – Phase I and II Environmental Site Assessments

While at another firm, Ms. Jackson assisted in conducting a Phase I Site reconnaissance of the property, and subsequently collected soil and groundwater samples, performed field NAPL tests on sample media, and prepared a Subsurface Investigation Report to summarize the findings of the investigation.

Form **W-9**
(Rev. December 2011)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)
L.A.B VALIDATION CORP

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification:
☐ Individual/sole proprietor ☐ C Corporation ☒ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶

☐ Other (see instructions) ▶

☐ Exempt payee

Address (number, street, and apt. or suite no.)
14 WEST POINT DRIVE

Requester's name and address (optional)

City, state, and ZIP code
EAST NORTHPORT, New York 11731

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Social security number
☐☐☐ - ☐☐ - ☐☐☐☐

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Employer identification number
58 - 2381714

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here Signature of U.S. person ▶ Lori A. Berger Date ▶ 01/18/13

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

Lori A. Beyer

SUMMARY: General Manager/Laboratory Director with a solid technical background combined with Management experience in environmental testing industry. Outstanding organizational, leadership, communication and technical skills. Customer focused, quality oriented professional with consistently high marks in customer/employee satisfaction.

EXPERIENCE:

1998-Present L.A.B. Validation Corporation, 14 West Point Drive, East Northport, NY
President

- Perform Data Validation activities relating to laboratory generated Organic and Inorganic Environmental Data.

1998-Present American Analytical Laboratories, LLC. 56 Toledo Street, Farmingdale, NY
Laboratory Director/Technical Director

- Plan, direct and control the operation, development and implementation of programs for the entire laboratory in order to meet AAL's financial and operational performance standards.
- Ensures that all operations are in compliance with AAL's QA manual and other appropriate regulatory requirements.
- Actively maintains a safe and healthy working environmental that is demanded by local laws/regulations.
- Monitors and manages group's performance with respect to data quality, on time delivery, safety, analyst development/goal achievement and any other key performance indices.
- Reviews work for accuracy and completeness prior to release of results to customers.

1996-1998 Nytest Environmental, Inc. (NEI) Port Washington, New York
General Manager

- Responsible for controlling the operation of an 18,000 square foot facility to meet NEI's financial and operational performance standards.
- Management of 65 FTEs including Sales and Operations
- Ensure that all operations are in compliance with NEI's QA procedures
- Ensures that productivity indicators, staffing levels and other cost factors are held within established guidelines
- Maintains a quantified model of laboratory's capacity and uses this model as the basis for controlling the flow of work into and through the lab so as to ensure that customer requirements and lab's revenue and contribution targets are achieved.

1994-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Technical Project Manager

- Responsible for the coordination and implementation of environmental testing programs requirements between NEI and their customers
- Supervise Customer Service Department
- Assist in the development of major proposals
- Complete management of all Federal and State Contracts and assigned commercial contracts
- Provide technical assistance to the customer, including data validation and interpretation
- Review and implement Project specific QAPP's.

1995-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Corporate QA/QC Officer

- Responsible for the implementation of QA practices as required in the NJDEP and EPA Contracts
- Primary contact for NJDEP QA/QC issues including SOP preparation, review and approval
- Responsible for review, verification and adherence to the Contract requirements and NEI QA Plan

1992-1994 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Manager

- Responsible for the accurate compilation, review and delivery of analytical data to the company's customers. Directly and effectively supervised a department of 22 personnel.
- Managed activities of the data processing software including method development, form creation, and production
- Implement new protocol requirements for report and data management formats
- Maintained control of data storage/archival areas as EPA/CLP document control officer

1987-1991 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Specialist

- Responsible for the review of GC, GC/MS, Metals and Wet Chemistry data in accordance with regulatory requirements
- Proficient with USEPA, NYSDEC, NJDEP and NEESA requirements
- Review data generated in accordance with SW846, NYSDEC ASP, EPA/CLP and 40 CFR Methodologies

1986-1987 Nytest Environmental, Inc (NEI) Port Washington, New York
GC/MS VOA Analyst

EDUCATION:

1982-1985 State University of New York at Stony Brook, New York; BS Biology/Biochemistry
1981-1982 University of Delaware; Biology/Chemistry
5/91 Rutgers University; Mass Spectral Data Interpretation Course, GC/MS Training
8/92 Westchester Community College; Organic Data Validation Course
9/93 Westchester Community College; Inorganic Data Validation Course

Westchester Community College

Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

ORGANIC DATA VALIDATION COURSE (35 HOURS)

Dr. John Samuelian

Date AUGUST 1992

Assistant Dean
Professional Development Center

President

The Professional Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

Westchester Community College
Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

INORGANIC DATA VALIDATION

Instructor: Dale Boshart

Date MARCH 1993

Assistant Dean
Professional Development Center

President

The Professional
Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

July 8, 1992

Ms. Elaine Sall
Program Coordinator
Westchester Community College
Valhalla, NY 10595-1698

Dear Elaine,

Thank you for your letter of June 29, 1992. I have reviewed the course outline for organic data validation, qualifications for teachers and qualifications for students. The course that you propose to offer would be deemed equivalent to that which is offered by EPA. The individuals who successfully complete the course and pass the final written exam would be acceptable to perform the task of organic data validation for the Department of Environmental Conservation, Division of Hazardous Waste Remediation.

As we have discussed in our conversation of July 7, 1992, you will forward to me prior to the August course deadline, the differences between the EPA SOW/90 and the NYSDEC ASP 12/91. You stated these differences will be compiled by Mr. John Samulian.

I strongly encourage you to offer an inorganic data validation course. I anticipate the same list of candidates would be interested in an inorganic validation course as well, since most of the data to be validated consists of both organic and inorganic data.

Thank you for you efforts and please contact me if I can be of any further assistance.

Sincerely,

Maureen P. Serafini

Maureen P. Serafini
Environmental Chemist II
Division of Hazardous Waste
Remediation

The Professional
Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

October 2, 1992

Ms. Lori Beyer
3 sparkill Drive
East Northport, NY 11731

Dear Ms. Beyer:

Congratulations upon successful completion of the Organic Data Validation course held August 17 - 21, 1992, through Westchester Community College, Professional Development Center. This course has been deemed by New York State Department of Environmental Conservation as equivalent to EPA's Organic Data Validation Course.

Enclosed is your Certificate. Holders of this Certificate are deemed competent to perform organic data validation for the New York State DEC Division of Hazardous Waste Remediation.

The Professional Development Center at Westchester Community College plans to continue to offer courses and seminars which will be valuable to environmental engineers, chemists and related personnel. Current plans include a TCLP seminar on November 17th and a conference on Environmental Monitoring Regulations on November 18th.

We look forward to seeing you again soon at another environmental program or event. Again, congratulations.

Very truly yours,

Passing Grade is 70%
Your Grade is 99%

Elaine Sall
Program Coordinator

ES/bf

The Professional
Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

June 21, 1993

Dear Ms. Beyer:

Enclosed is your graded final examination in the Inorganic Data Validation course you completed this past March. A score of 70% was required in order to receive a certificate of satisfactory completion. Persons holding this certificate are deemed acceptable to perform Inorganic Data Validation for the New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation.

I am also enclosing a course evaluation for you to complete if you have not already done so. The information you provide will greatly aid us in structuring further courses. We wish to make these course offerings as relevant, targeted and comprehensive as possible. Your evaluation is vital to that end.

Congratulations on your achievement. I look forward to seeing you again at another professional conference or course. We will be co-sponsoring an environmental monitoring conference on October 21, 1993 with the New York Water Pollution Control Association, Lower Hudson Chapter, at IBM's Yorktown Heights, NY site. Information regarding this event will be going out in August.

Very truly yours,

Elaine Sall

Elaine Sall
Program Coordinator

ES/bf

Enclosures

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

ATTACHMENT B

FEBRUARY 2018 NYSDEC-ISSUED EMERGING CONTAMINANT SAMPLING PROTOCOL

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 2
47-40 21st Street, Long Island City, NY 11101
P: (718) 482-4995
www.dec.ny.gov

April 4, 2018

Brook 156 Housing Development Fund Corporation
Attn: Matthew Kelly
902 Broadway, 13th Floor
New York, NY 10010

New York City Housing Preservation and Development
Attn: Rona Reodica
100 Gold Street, Rm 7 -02
New York, NY 10038

Re: Brook 156
Brownfield Cleanup Program Site No. C203078
Request for Sampling of Emerging Contaminants

Dear Messrs Kelly and Reodica,

The New York State Department of Environmental Conservation (the Department) is undertaking a Statewide evaluation of remediation sites to better understand the risk posed to New Yorkers by 1,4-dioxane and per- and poly-fluoroalkyl substances (PFAS). PFAS have historically not been evaluated at remediation sites, and 1,4-dioxane has not been evaluated at the levels that are now thought to represent a health concern. This initiative is being undertaken as a result of these “emerging contaminants” having been found in a number of drinking water supplies in New York. The Department is requesting that you test the water for these chemicals utilizing existing monitoring wells.

The enclosed guidance provides information on the analytical methods and reporting requirements. A second guidance document describes special precautions that need to be considered when sampling for PFAS. Please submit a revised Quality Assurance Project Plan (QAPP) and a schedule for sampling no later than 45 days from the date of this letter. The sampling should occur no later than 45 days after the Department approves the revised QAPP.

If you have any questions please feel free to contact me at, (718) 482-4078 or manfred.magloire@dec.ny.gov.

Sincerely,

Manfred Magloire
Project Manager

Enclosure: Emerging Contaminant Sampling Guidance

ec: Jane O'Connell, Sondra Martinkat, John Nehila – NYSDEC
Justin Deming, Stephanie Selmer – NYSDOH
Deborah Shapiro, Amy Jordan – AKRF, Inc.
Oliver Chase – Hirshen Singer & Epstein LLP

Groundwater Sampling for Emerging Contaminants

February 2018

Issue: NYSDEC has committed to analyzing representative groundwater samples at remediation sites for emerging contaminants (1,4-dioxane and PFAS) as described in the below guidance.

Implementation

NYSDEC project managers will be contacting site owners to schedule sampling for these chemicals. Only groundwater sampling is required. The number of samples required will be similar to the number of samples where “full TAL/TCL sampling” would typically be required in a remedial investigation. If sampling is not feasible (e.g., the site no longer has any monitoring wells in place), sampling may be waived on a site-specific basis after first considering potential sources of these chemicals and whether there are water supplies nearby.

Upon a new site being brought into any program (i.e., SSF, BCP), PFAS and 1,4-dioxane will be incorporated into the investigation of groundwater as part of the standard “full TAL/TCL” sampling. Until an SCO is established for PFAS, soil samples do not need to be analyzed for PFAS unless groundwater contamination is detected. Separate guidance will be developed to address sites where emerging contaminants are found in the groundwater. The analysis currently performed for SVOCs in soil is adequate for evaluation of 1,4-dioxane, which already has an established SCO.

Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by a data validator.

The work plan should explicitly describe analysis and reporting requirements.

PFAS sample analysis: Samples should be analyzed by an environmental laboratory certified by ELAP to use EPA method 537 or ISO 25101. ELAP does not currently offer certification for PFAS analysis of non-drinking water samples (including groundwater, soil and sediment), so there is no requirement to use an ELAP certified method. The preferred method is the modified EPA Method 537. Labs have been able to achieve reporting limits for PFOA and PFOS of 2 ng/l (part per trillion). If labs are not able to achieve similar reporting limits, the NYSDEC project manager will make case-by-case decisions as to whether the analysis can meet the needs for the specific site.

PFAS sample reporting: DER has developed a PFAS target analyte list (below) with the intent of achieving reporting consistency between labs for commonly reportable analytes. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. This list may be updated in the future as new information is learned and as labs develop new capabilities. If lab and/or matrix specific issues are encountered for any particular compounds, the NYSDEC project manager will make case-by-case decisions as to whether particular analytes may be temporarily or permanently discontinued from analysis for each site. Any technical lab issues should be brought to the attention of a NYSDEC chemist.

Some sampling using this full PFAS target analyte list is needed to understand the nature of contamination. It may also be critical to differentiate PFAS compounds associated with a site from other sources of these chemicals. Like routine refinements to parameter lists based on investigative findings, the full PFAS target analyte list may not be needed for all sampling intended to define the extent of

Collection of Groundwater Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) from Monitoring Wells Sample Protocol

Samples collected using this protocol are intended to be analyzed for perfluorooctanoic acid (PFOA) and other perfluorinated compounds by Modified (Low Level) Test Method 537.

The procedure used must be consistent with the NYSDEC March 1991 Sampling Guidelines and Protocols http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf with the following materials limitations.

At this time acceptable materials for sampling include: stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Equipment blanks should be generated at least daily. Additional materials may be acceptable if pre-approved by NYSDEC. Requests to use alternate equipment should include clean equipment blanks. **NOTE: Grunfos pumps and bladder pumps are known to contain PFC materials (e.g. Teflon™ washers for Grunfos pumps and LDPE bladders for bladder pumps).** <u>All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.</u> Standard two step decontamination using detergent and clean water rinse will be performed for equipment that does come in contact with PFC materials. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and “plumbers thread seal tape” contain PFCs.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory.

1. Fill two pre-cleaned 500 mL HDPE or polypropylene bottle with the sample.
2. Cap the bottles with an acceptable cap and liner closure system.
3. Label the sample bottles.
4. Fill out the chain of custody.
5. Place in a cooler maintained at 4 ± 2º Celsius.

Collect one equipment blank for every sample batch, not to exceed 20 samples.

Collect one field duplicate for every sample batch, not to exceed 20 samples.

Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, not to exceed 20 samples.

Request appropriate data deliverable (Category A or B) and an electronic data deliverable.

contamination. Project managers may approve a shorter analyte list (e.g., just the UCMR3 list) for some reporting on a case by case basis.

<u>1,4-Dioxane Analysis and Reporting:</u> The method detection limit (MDL) for 1,4-dioxane should be no higher than 0.28 µg/l (ppb). ELAP offers certification for both EPA Methods 8260 and 8270. In order to get the appropriate detection limits, the lab would need to run either of these methods in “selective ion monitoring” (SIM) mode. DER is advising PMS to use 8270, since this method provides a more robust extraction procedure, uses a larger sample volume, and is less vulnerable to interference from chlorinated solvents (we acknowledge that 8260 has been shown to have a higher recovery in some studies).

Full PFAS Target Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	**Perfluorobutanesulfonic acid**	**PFBS**	**375-73-5**
	Perfluorohexanesulfonic acid	**PFHxS**	**355-46-4**
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanessulfonic acid	**PFOS**	**1763-23-1**
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	**PFHpA**	**375-85-9**
	Perfluorooctanoic acid	**PFOA**	**335-67-1**
	Perfluorononanoic acid	**PFNA**	**375-95-1**
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

Bold entries depict the 6 original UCMR3 chemicals

Appendix H
Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP)

BROOK 156

740 BROOK AVENUE

BRONX, NEW YORK

Health and Safety Plan and Community Air Monitoring Plan

AKRF Project Number: 11703
BCP Site Number: C203078

Prepared for:

NYSDEC Region 2
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, New York 11101

On Behalf Of:

Brook 156 HDFC
902 Broadway, 13th Floor
New York, New York 10010
and
New York City Department of Housing Preservation and Development
100 Gold Street
New York, NY 10038

Prepared by:

AKRF, Inc.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

APRIL 2018

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FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) were prepared by AKRF, Inc. (AKRF) on behalf of Brook 156 HDFC and the New York City Department of Housing Preservation and Development (NYCDHPD) (the Volunteers) for implementation of the Remedial Action Work Plan (RAWP) at the Brook 156 site, hereafter referred to as the "Site". The Site is an approximately 7,438-square foot parcel located at 740 Brook Avenue in the Morrisania neighborhood of the Bronx, New York and is legally defined as Tax Block 2360, Lots 1 and 3 on the New York City Tax Map. The Site is currently enrolled in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) (BCP Site No. C203078).

Lot 1 comprises the eastern portion of the Site and consists of an approximately 5,658-square foot rail bed and tunnel, and a small grass covered area. Lot 3 comprises the western portion of the Site and consists of an approximately 1,780-square foot, irregularly-shaped, concrete-paved lot. The Site is abutted to the north by East 157th Street, to the east by a parking lot followed by Hegney Place, to the south by East 156th Street followed by a residential and commercial building ("Via Verde"), and to the west by Brook Avenue, followed by a residential and commercial building. The surrounding area is developed primarily with residential and commercial buildings. A Site Location Map is provided as Figure 1.

Historic records indicate that Lot 3 was developed historically as a gasoline station with a one-story lubrication office, and used automobile sales lot between 1949 and 1969. A suspect underground storage tank (UST) system(s) and fill/vent piping were identified during AKRF's field work in 2013 and 2014, and were detailed in AKRF's 2013 Phase I Environmental Assessment (ESA) Report, 2015 Remedial Investigation Report (RIR), and 2017 Supplemental Remedial Investigation Report (SRIR). Lot 1 was occupied by the Port Morris branch of the New York and Harlem Railroad since at least 1891 and was abandoned circa 1999.

The findings from Remedial Investigation (RI) and Supplemental Remedial Investigation (SRI) conducted at the Site identified contaminated soil, groundwater, and soil vapor at the Site. On-site soil is contaminated with the chlorinated solvent 1,2-dichloroethane, petroleum-related volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), the pesticide DDT, and metals. Groundwater beneath the Site was contaminated with the 1,2-dichloroethane, petroleum-related VOCs, naphthalene, and metals. Elevated concentrations of petroleum-related VOCs and the chlorinated solvent tetrachloroethylene (PCE) were present in the soil vapor at the Site. The elevated levels of petroleum-related VOCs, naphthalene, chlorinated solvents, and PCBs, elevated photoionization detector (PID) readings, petroleum staining, and petroleum odors were attributed to the former use of the Site as a gasoline station and lubritorium. The greatest concentration of petroleum-related compounds was found downgradient of the suspect UST(s). The semivolatile organic compounds (SVOCs) and metals present in the soil were attributed to the historic use of the Site as a railroad, and the demolition of the former gasoline station building. The elevated levels of DDT indicated the prior usage of pesticides at the Site.

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

2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES

2.1 Hazard Evaluation

2.1.1 Hazards of Concern

Table 1
Hazards of Concern

X	Organic Chemicals	X	Inorganic Chemicals		Radiological
	Biological		Explosive/Flammable		Oxygen Deficient Atm.
X	Heat Stress	X	Cold Stress		Carbon Monoxide
Comment: No personnel without confined space entry permits may to enter confined spaces.					

2.1.2 Physical Characteristics

Table 2
Physical Characteristics

X	Liquid	X	Solid		Sludge
X	Vapors		Unknown		Other

2.1.3 Hazardous Materials

Table 3
Hazardous Materials

Chemicals		Solids		Solvents		Oils	
	Acids		Ash		Halogens		Transformer
	Caustics		Asbestos	X	Petroleum		Motor
X	Pesticides		Tailings	X	Chlorinated Solvents		Hydraulic
X	Petroleum	X	Fill Material			X	Gasoline
	Inks					X	Fuel
X	PCBs						Waste
X	Metals						
X	SVOCs						
	Ammonia						

2.1.4 Chemicals of Concern

Table 4
Chemicals Of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
1,2-Dichloroethane	REL = 1 ppm PEL = 50 ppm	Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen].
Barium	PEL = 0.5 mg/m^3 REL = 0.5 mg/m^3	Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Cadmium	PEL = 0.005 mg/m^3	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen].
Chromium	REL = 0.5 mg/m^3 PEL - 1 mg/m^3	Irritation eyes, skin; lung fibrosis (histologic).
Copper	REL = 1 mg/m^3 PEL = 1 mg/m^3	Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; in animals: lung, liver, kidney damage; anemia
DDT (pesticide)	REL = 0.5 mg/m^3 PEL = 1 mg/m^3 [skin]	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; potential carcinogen.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Fuel Oil	REL = 350 mg/m^3 PEL = 400 ppm	Nausea, irritation – eyes, hypertension, headache, light-headedness, loss of appetite, poor coordination; long-term exposure – kidney damage, blood clotting problems; potential carcinogen.
Lead	REL = 0.05 mg/m^3 PEL = 0.05 mg/m^3	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension.
Mercury	REL = 0.1 mg/m^3 PEL = 0.05 mg/m^3	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.

Table 4
Chemicals Of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Naphthalene	REL = 15 ppm PEL = 10 ppm	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage.
Polycyclic Aromatic Hydrocarbons (PAHs)	PEL = 5 mg/m^3	Harmful effects to skin, bodily fluids, and ability to fight disease, reproductive problems; potential carcinogen.
Tetrachloroethylene (PCE)	PEL = 100 ppm STEL = 200 ppm	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen].
Trichloroethylene (TCE)	PEL = 100 ppm	Lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen].
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, poor coordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Particulates	PEL = 15 mg/m^3 (total) PEL = 5 mg/m^3 (respirable)	Irritation eyes, skin, throat, upper respiratory system.
Notes: REL = National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit		

2.2 Designated Personnel

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

2.3 Training

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

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

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

2.4 Medical Surveillance Program

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

2.5 Site Work Zones

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

The Exclusion Zone is defined as the area where exposure to impacted media could be encountered. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support Zone is the area where support facilities such as vehicles, fire extinguisher, and first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all workers on-site would assemble in the event of an emergency. A summary of these areas is provided below. These zones may be changed by the SSO, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.

Appropriate barriers will be set up to secure the area and prevent any unauthorized personnel from approaching within 15 feet of the work area.

Table 5
Site Work Zones

Task	Exclusion Zone	CRZ	Support Zone
Soil Excavation and Storage Tank Removal Areas	15 feet from excavation border and excavation equipment or vehicles	15 feet from excavation border and excavation equipment or vehicles	As Needed

2.6 Air Monitoring Program

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

2.6.1 Work Zone Air Monitoring

Real time air monitoring of volatile organic compounds (VOCs) and particulates will be performed in the work zone during all intrusive Site activities. Work zone air monitoring for VOCs will be performed with a photoionization detector (PID). The PID will be calibrated with 100 parts per million (ppm) isobutylene standard in accordance with the manufacturer's instructions at the start of each work day. Work zone air monitoring for particulates will be conducted using a MIE 1000 Personal DataRam or equivalent to measure the concentration of airborne respirable particulates less than 10 micrometers in size (PM_{10}).

The SSO shall set up the equipment and confirm that it is working properly. His/her designee may oversee the air measurements during the day. Measurements will be taken prior to commencement of work and continuously during the work. Measurements will be made as close to the workers as practicable and at the breathing height of the workers. The action levels and required responses are listed in the following table:

Table 6
Work Zone Air Monitoring Action Levels

Instrument	Action Level	Response Action
PID	Less than 5 ppm in breathing zone	Level D or D-Modified
	Between 5 ppm and 10 ppm	Level C
	More than 10 ppm	Stop work. Resume work when readings are less than 50 ppm
Particulate Monitor (MIE 1000 Personal DataRam™ or equivalent)	Less than 1.25 $\mu g/m^3$ above background in breathing zone	Level D or D-Modified
	More than 1.25 $\mu g/m^3$ above background in breathing zone	Stop work. Resume work when readings are less than 1.25 $\mu g/m^3$.
Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million		

2.6.2 Community Air Monitoring Plan

Community air monitoring will be conducted during all intrusive Site activities in compliance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP). Real-time air monitoring for VOCs and dust at the perimeter of the exclusion zone will be performed as described below.

2.6.2.1. Roving Air Monitoring

VOC Monitoring

Continuous monitoring for VOCs will be conducted during all ground intrusive activities, including excavation and tank removal activities. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a PID equipped with a 10.6 electron Volt (eV) lamp capable of calculating 15-minute running average concentrations.

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of excavation endpoint soil samples. Periodic monitoring may include obtaining measurements upon arrival at a location and upon leaving the location.

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

Particulate Monitoring

Continuous monitoring for particulates will be conducted during all ground intrusive activities, which will involve the measurement of respirable dust. Community air monitoring for dust particulates will be conducted using a MIE 1000 Personal DataRam or equivalent to measure the concentration of airborne respirable particulates less than 10 micrometers in size (PM_{10}). The dust monitor will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate exceedance of action levels. Background readings and any readings that trigger response actions will be recorded in the project logbook, which will be available on site for NYSDOH and/or NYSDEC review.

2.6.2.2. Fixed Air Monitoring Stations

Fixed air monitoring stations will be set up at the upwind and downwind perimeters of the exclusion zone during all ground intrusive activities and will continuously log VOC and particulate levels. Each fixed monitoring station will be fully enclosed and equipped with the following:

- A PID equipped with a 10.6 eV lamp capable of calculating 15-minute running average VOC concentrations;
- A TSI 8530 DustTrak II or equivalent dust monitor capable of measuring the concentration of airborne respirable particulates less than 10 micrometers in size (PM_{10}) and calculating 15-minute running average particulate concentrations; and
- A Netronix™ Thiamus™ ICU-820 or equivalent Global System for Mobile Communication (GSM)/Global Positioning System (GPS) device capable of recording air monitoring and location data.

Each monitoring station will be capable of sending e-mail alerts to the SSO to indicate an exceedance of action levels. Additionally, the SSO will conduct an inspection of the monitoring stations on at least an hourly basis. Upon completion of Site activities, all air monitoring data will be available to download via the iEnvironet® website. All air monitoring data recorded at the fixed monitoring stations will be available for NYSDOH and/or NYSDEC review and will be included in the Final Engineering Report (FER).

2.6.2.3. Community Air Monitoring Action Levels

VOC Action Levels

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

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average.
- If the total organic vapor level is above 25 ppm at the perimeter of the exclusion zone, activities will be shutdown.

Particulate Action Levels

The following actions will be taken based on particulate levels measured:

- If the downwind particulate concentrations are greater than 100 micrograms per cubic meter ($\mu g/m^3$) above background (upwind concentrations), and no other obvious source is apparent, then it will be assumed that the elevated particulate concentrations are a result of site activities. In such instances, dust suppression measures will be implemented and monitoring will be continued. Work will be allowed to continue with dust suppression if downwind particulate levels do not exceed 150 $\mu g/m^3$ above the background (upwind concentration) and provided that no visible dust is migrating from the work area.
- If particulate levels persist at 150 $\mu g/m^3$ above the background, work must be stopped until dust suppression measures bring particulate levels to below 150 $\mu g/m^3$ above background.

Major Vapor Emission Response Plan

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

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

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

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

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

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

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

2.6.3 Personal Protection Equipment (PPE)

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

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

Table 7
Personal Protection Equipment Requirements

LEVEL OF PROTECTION & PPE		**All Tasks**
Level D (**X**) Steel Toe Shoes (**X**) Hard Hat (within 25 ft. of excavator) (**X**) Work Gloves	(**X**) Safety Glasses ( ) Face Shield (**X**) Ear Plugs (within 25 ft. of excavator) (**X**) Nitrile Gloves (**X**) Tyvek for tank contractor if NAPL present	Yes
Level C *(in addition to Level D)* (**X**) Half-Face Respirator (**X**) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge ( ) Organic Cartridge (**X**) Dual Organic/ Particulate Cartridge	If PID > 10 ppm or particulate > 5 μg/m^3 in breathing zone
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breath or any odors detected). PAPR = powered air purifying respirator		

2.7 General Work Practices

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

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

3.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

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

3.1 Hospital Directions

Table 8
Hospital Directions

Hospital Name:	Lincoln Hospital
Phone Number:	718-579-5000
Address/Location:	234 East 149th Street, Bronx, NY 10451
Directions:	1. Head west East 156th Street toward Brook Avenue. 2. Turn right onto East 149th Street. 3. Turn left onto Park Avenue. 4. Emergency Room entrance will be on the left.

3.2 Emergency Contacts

Table 9
Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF	Michelle Lapin, P.E.	Remedial Engineer	646-388-9520 (office)
	Deborah Shapiro, QEP	Project Manager and Project Director	646-388-9544 (office)
	Amy Jordan	Project Manager Alternate	646-388-9864 (office)
	Timothy McClintock	Site Safety Officer (SSO)	914-439-1629 (cell)
	George Kokaliaris	Site Safety Officer (SSO) Alternate	718-530-5738 (cell)
Brook 156 HDFC	Matt Kelly	Client Representative	212-243-9090 ext. 290
Ambulance, Fire Department, & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

4.0 APPROVAL & ACKNOWLEDGMENTS OF HASP

Signed: ________________________________ Date: ________________________________

AKRF Project Manager

Signed: ________________________________ Date: ________________________________

AKRF Health and Safety Officer

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

AFFIDAVIT

I,________________________(name), of______________________________(company name), have read the Health and Safety Plan (HASP) for Brook 156 located at 740 Brook Avenue in Bronx, New York. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the Site.

Signed: ________________________ Company: ______________________ Date: __________

Signed: ________________________ Company: ______________________ Date: __________

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ATTACHMENT A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CADMIUM
CAS # 7440-43-9

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

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

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

What is cadmium?

(Pronounced kăd′mē-əm)

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

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

What happens to cadmium when it enters the environment?

- ❑ Cadmium enters air from mining, industry, and burning coal and household wastes.
- ❑ Cadmium particles in air can travel long distances before falling to the ground or water.
- ❑ It enters water and soil from waste disposal and spills or leaks at hazardous waste sites.
- ❑ It binds strongly to soil particles.
- ❑ Some cadmium dissolves in water.
- ❑ It doesn't break down in the environment, but can change forms.
- ❑ Fish, plants, and animals take up cadmium from the environment.
- ❑ Cadmium stays in the body a very long time and can build up from many years of exposure to low levels.

How might I be exposed to cadmium?

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

How can cadmium affect my health?

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

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

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

How likely is cadmium to cause cancer?

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

How can cadmium affect children?

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

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

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

How can families reduce the risk of exposure to cadmium?

In the home, store substances that contain cadmium safely, and keep nickel-cadmium batteries out of reach of young children. If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.

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

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

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

Has the federal government made recommendations to protect human health?

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

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

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

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CHROMIUM

CAS # 7440-47-3

Division of Toxicology and Environmental Medicine ToxFAQs™ **September 2008**

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

HIGHLIGHTS: Exposure to chromium occurs from ingesting contaminated food or drinking water or breathing contaminated workplace air. Chromium(VI) at high levels can damage the nose and cause cancer. Ingesting high levels of chromium(VI) may result in anemia or damage to the stomach or intestines. Chromium(III) is an essential nutrient. Chromium has been found in at least 1,127 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is chromium?

Chromium is a naturally occurring element found in rocks, animals, plants, and soil. It can exist in several different forms. Depending on the form it takes, it can be a liquid, solid, or gas. The most common forms are chromium(0), chromium(III), and chromium(VI). No taste or odor is associated with chromium compounds.

The metal chromium, which is the chromium(0) form, is used for making steel. Chromium(VI) and chromium(III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving.

What happens to chromium when it enters the environment?

❏ Chromium can be found in air, soil, and water after release from the manufacture, use, and disposal of chromium-based products, and during the manufacturing process.
❏ Chromium does not usually remain in the atmosphere, but is deposited into the soil and water.
❏ Chromium can easily change from one form to another in water and soil, depending on the conditions present.
❏ Fish do not accumulate much chromium in their bodies from water.

How might I be exposed to chromium?

❏ Eating food containing chromium(III).
❏ Breathing contaminated workplace air or skin contact during use in the workplace.
❏ Drinking contaminated well water.
❏ Living near uncontrolled hazardous waste sites containing chromium or industries that use chromium.

How can chromium affect my health?

Chromium(III) is an essential nutrient that helps the body use sugar, protein, and fat.

Breathing high levels of chromium(VI) can cause irritation to the lining of the nose, nose ulcers, runny nose, and breathing problems, such as asthma, cough, shortness of breath, or wheezing. The concentrations of chromium in air that can cause these effects may be different for different types of chromium compounds, with effects occurring at much lower concentrations for chromium(VI) compared to chromium(III).

The main health problems seen in animals following ingestion of chromium(VI) compounds are irritation and ulcers in the stomach and small intestine and anemia. Chromium(III) compounds are much less toxic and do not appear to cause these problems.

Sperm damage and damage to the male reproductive system have also been seen in laboratory animals exposed to chromium(VI).

Skin contact with certain chromium(VI) compounds can cause skin ulcers. Some people are extremely sensitive to chromium(VI) or chromium(III). Allergic reactions consisting of severe redness and swelling of the skin have been noted.

How likely is chromium to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Reseach on Cancer (IARC), and the EPA have determined that chromium(VI) compounds are known human carcinogens. In workers, inhalation of chromium(VI) has been shown to cause lung cancer. Chromium(VI) also causes lung cancer in animals. An increase in stomach tumors was observed in humans and animals exposed to chromium(VI) in drinking water.

How can chromium affect children?

It is likely that health effects seen in children exposed to high amounts of chromium will be similar to the effects seen in adults.

We do not know if exposure to chromium will result in birth defects or other developmental effects in people. Some developmental effects have been observed in animals exposed to chromium(VI).

How can families reduce the risks of exposure to chromium?

❏ Children should avoid playing in soils near uncontrolled hazardous waste sites where chromium may have been discarded.
❏ Chromium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.
❏ Although chromium(III) is an essential nutrient, you should avoid excessive use of dietary supplements containing chromium.

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

Since chromium(III) is an essential element and naturally occurs in food, there will always be some level of chromium in your body. Chromium can be measured in hair, urine, and blood.

Higher than normal levels of chromium in blood or urine may indicate that a person has been exposed to chromium. However, increases in blood and urine chromium levels cannot be used to predict the kind of health effects that might develop from that exposure.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to chromium in drinking water at concentrations of 1 mg/L for up to 10 days is not expected to cause any adverse effects in a child.

The FDA has determined that the chromium concentration in bottled drinking water should not exceed 1 mg/L.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 0.0005 mg/m^3 chromium(VI), 0.5 mg/m^3 chromium(III), and 1.0 mg/m^3 chromium(0) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Chromium (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

COPPER
CAS # 7440-50-8

Division of Toxicology ToxFAQs™ September 2002

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

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

What is copper?

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

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

What happens to copper when it enters the environment?

❑ Copper can enter the environment from the mining of copper and other metals and from factories that make or use metallic copper or copper compounds.
❑ It can also enter the environment through domestic waste water, combustion of fossil fuels and wastes, wood production, phosphate fertilizer production, and natural sources (e.g., windblown dust from soils, volcanoes, decaying vegetation, forest fires, and sea spray).
❑ Copper in soil strongly attaches to organic material and minerals.
❑ Copper that dissolves in water becomes rapidly bound to particles suspended in the water.
❑ Copper does not typically enter groundwater.
❑ Copper carried by particles emitted from smelters and ore processing plants is carried back to the ground by gravity or in rain or snow.
❑ Copper does not break down in the environment.

How might I be exposed to copper?

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

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

How can copper affect my health?

Copper is essential for good health, but high amounts can be harmful. Long-term exposure to copper dust can irritate your nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhea.
Drinking water with higher than normal levels of copper may cause vomiting, diarrhea, stomach cramps, and nausea. Intentionally high intakes of copper can cause liver and kidney damage and even death.

How likely is copper to cause cancer?

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

How can copper affect children?

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

How can families reduce the risk of exposure to copper?

❑ The greatest potential source of copper exposure is through drinking water, especially in water that is first drawn in the morning after sitting in copper pipes and brass faucets overnight.
❑ To reduce exposure, run the water for at least 15-30 seconds before using it.
❑ If you are exposed to copper at work, you may carry copper home on your skin, clothes, or tools. You can avoid this by showering, and changing clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

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

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

Has the federal government made recommendations to protect human health?

The EPA has determined that drinking water should not contain more than 1.3 milligrams of copper per liter of water (1.3 mg/L).
The Occupational Safety and Health Administration (OSHA) has set a limit of 0.1 mg per cubic meter (0.1 mg/m^3) of copper fumes (vapor generated from heating copper) and 1 mg/m^3 of copper dusts (fine metallic copper particles) and mists (aerosol of soluble copper) in workroom air during an 8-hour work shift, 40-hour workweek.
The Food and Nutrition Board of the Institute of Medicine recommends dietary allowances (RDAs) of 340 micrograms (340 µg) of copper per day for children aged 1-3 years, 440 µg/day for children aged 4-8 years, 700 µg/day for children aged 9-13 years, 890 µg/day for children aged 14-18 years, and 900 µg/day for adults.

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

DDT, DDE, AND DDD

CAS # 50-29-3, 72-55-9, 72-54-8

Division of Toxicology ToxFAQs™ **September 2002**

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

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

What are DDT, DDE, and DDD?

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

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

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

❏ DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.
❏ DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.
❏ DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.
❏ They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2-15 years, depending on the type of soil.
❏ Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.
❏ DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

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

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

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

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

breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in breast milk had an increased chance of having premature babies.

In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

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

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer.

The Department of Health and Human Services (DHHS) determined that DDT may reasonable be anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

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

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

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

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

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

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

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

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

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m^3) in the workplace for an 8-hour shift, 40-hour workweek.

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

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ETHYLBENZENE
CAS # 100-41-4

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

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

What is ethylbenzene?
(Pronounced ĕth′ əl bĕn′ zēn′)

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

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

What happens to ethylbenzene when it enters the environment?

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

How might I be exposed to ethylbenzene?

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

How can ethylbenzene affect my health?

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

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

How likely is ethylbenzene to cause cancer?

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

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

How can ethylbenzene affect children?

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

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

How can families reduce the risk of exposure to ethylbenzene?

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

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

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

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

References

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

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

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FUEL OILS

CAS # 8008-20-6, 70892-10-3, 68476-30-2, 68476-34-6, 68476-31-3

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

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

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

What are fuel oils?
(Pronounced fyo͞o′əl oilz)

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

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

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

What happens to fuel oils when they enter the environment?

- ❑ Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.
- ❑ Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.
- ❑ Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.
- ❑ Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.
- ❑ Some of the chemicals found in fuel oils may build up significantly in plants and animals.

How might I be exposed to fuel oils?

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

How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene stoves for cooking do not seem to have any health problems related to their exposure.

Breathing some fuel oils for short periods may cause nausea, eye irritation, increased blood pressure, headache, lightheadedness, loss of appetite, poor coordination, and difficulty concentrating. Breathing diesel fuel vapors for long periods may cause kidney damage and lower your blood's ability to clot.

Drinking small amounts of kerosene may cause vomiting, diarrhea, coughing, stomach swelling and cramps, drowsiness, restlessness, painful breathing, irritability, and unconsciousness. Drinking large amounts of kerosene may cause convulsions, coma, or death. Skin contact with kerosene for short periods may cause itchy, red, sore, or peeling skin.

How likely are fuel oils to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans, but for other fuel oils (light) there is not enough information to make a determination. IARC has also determined that occupational exposures to fuel oils during petroleum refining are probably carcinogenic in humans.

Some studies with mice have suggested that repeated contact with fuel oils may cause liver or skin cancer. However, other mouse studies have found this not to be the case. No studies are available in other animals or in people on the carcinogenic effects of fuel oils.

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

There is no medical test that shows if you have been exposed to fuel oils. Tests are available to determine if some of the chemicals commonly found in fuel oils are in your blood. However, the presence of these chemicals in blood may not necessarily mean that you have been exposed to fuel oils.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) and the Air Force Office of Safety and Health (AFOSH) have set a permissible exposure level (PEL) of 400 parts of petroleum distillates per million parts of air (400 ppm) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m^3) for a 40-hour workweek.

The Department of Transportation (DOT) lists fuel oils as hazardous materials and, therefore, regulates their transportation.

Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for fuel oils. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

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LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

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

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

❑ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
❑ When lead is released to the air, it may travel long distances before settling to the ground.
❑ Once lead falls onto soil, it usually sticks to soil particles.
❑ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

❑ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
❑ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
❑ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
❑ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

❑ Avoid exposure to sources of lead.

❑ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.

❑ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❑ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❑ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

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

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (μg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 μg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

MERCURY
CAS # 7439-97-6

Agency for Toxic Substances and Disease Registry ToxFAQs **April 1999**

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

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?
(Pronounced mũr′kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.
- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

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

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

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

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

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

NAPHTHALENE
CAS # 91-20-3

1-METHYLNAPHTHALENE
CAS # 90-12-0

2-METHYLNAPHTHALENE
CAS # 91-57-6

Division of Toxicology ToxFAQs™ **August 2005**

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

HIGHLIGHTS: Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?

❑ Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.

❑ Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.

❑ Naphthalene can become weakly attached to soil or pass through soil into underground water.

❑ In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.

❑ Naphthalene does not accumulate in the flesh of animals or fish that you might eat.

❑ 1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❑ Breathing low levels in outdoor air.

❑ Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.

❑ Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.

❑ Drinking water from contaminated wells.

❑ Touching fabrics that are treated with moth repellents containing naphthalene.

❑ Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer. However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Humans Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❏ Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using fireplaces or heating appliances in the their homes.

❏ If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

❏ Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

❏ Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

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

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

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

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

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

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

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TETRACHLOROETHYLENE
CAS # 127-18-4

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1997**

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

HIGHLIGHTS: Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing. Exposure to very high concentrations of tetrachloroethylene can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Tetrachloroethylene has been found in at least 771 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is tetrachloroethylene?
(Pronounced tĕt′rə-klôr′ ō-ĕth′ə-lēn′)

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

What happens to tetrachloroethylene when it enters the environment?

- Much of the tetrachloroethylene that gets into water or soil evaporates into the air.
- Microorganisms can break down some of the tetrachloroethylene in soil or underground water.
- In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.
- It does not appear to collect in fish or other animals that live in water.

How might I be exposed to tetrachloroethylene?

- When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- When you drink water containing tetrachloroethylene, you are exposed to it.

How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethylene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

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

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be performed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

Has the federal government made recommendations to protect human health?

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

References

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

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

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TOLUENE
CAS # 108-88-3

Division of Toxicology ToxFAQs™ **February 2001**

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

HIGHLIGHTS: Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

What happens to toluene when it enters the environment?

❏ Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petrolieum products as well as from leasking underground storage tanks at gasoline stations and other facilities.

❏ When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.

❏ Toluene does not usually stay in the environment long.

❏ Toluene does not concentrate or buildup to high levels in animals.

How might I be exposed to toluene?

❏ Breathing contaminated workplace air or automobile exhaust.

❏ Working with gasoline, kerosene, heating oil, paints, and lacquers.

❏ Drinking contaminated well-water.

❏ Living near uncontrolled hazardous waste sites containing toluene products.

How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

How likely is toluene to cause cancer?

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

How can toluene affect children?

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults.
Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

How can families reduce the risk of exposure to toluene?

❑ Use toluene-containing products in well-ventilated areas.

❑ When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

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

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TRICHLOROETHYLENE

CAS # 79-01-6

Division of Toxicology ToxFAQs™ **July 2003**

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

HIGHLIGHTS: Trichloroethylene is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of trichloroethylene may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Trichloroethylene has been found in at least 852 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is trichloroethylene?

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers.

Trichloroethylene is not thought to occur naturally in the environment. However, it has been found in underground water sources and many surface waters as a result of the manufacture, use, and disposal of the chemical.

What happens to trichloroethylene when it enters the environment?

- Trichloroethylene dissolves a little in water, but it can remain in ground water for a long time.
- Trichloroethylene quickly evaporates from surface water, so it is commonly found as a vapor in the air.
- Trichloroethylene evaporates less easily from the soil than from surface water. It may stick to particles and remain for a long time.
- Trichloroethylene may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- Trichloroethylene does not build up significantly in plants and animals.

How might I be exposed to trichloroethylene?

- Breathing air in and around the home which has been contaminated with trichloroethylene vapors from shower water or household products such as spot removers and typewriter correction fluid.
- Drinking, swimming, or showering in water that has been contaminated with trichloroethylene.
- Contact with soil contaminated with trichloroethylene, such as near a hazardous waste site.
- Contact with the skin or breathing contaminated air while manufacturing trichloroethylene or using it at work to wash paint or grease from skin or equipment.

How can trichloroethylene affect my health?

Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating.

Breathing large amounts of trichloroethylene may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage.

ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html

Drinking large amounts of trichloroethylene may cause nausea, liver damage, unconsciousness, impaired heart function, or death.

Drinking small amounts of trichloroethylene for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear.

Skin contact with trichloroethylene for short periods may cause skin rashes.

How likely is trichloroethylene to cause cancer?

Some studies with mice and rats have suggested that high levels of trichloroethylene may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of trichloroethylene in drinking water or in workplace air have found evidence of increased cancer. Although, there are some concerns about the studies of people who were exposed to trichloroethylene, some of the effects found in people were similar to effects in animals.

In its 9th Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is "reasonably anticipated to be a human carcinogen." The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is "probably carcinogenic to humans."

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

If you have recently been exposed to trichloroethylene, it can be detected in your breath, blood, or urine. The breath test, if it is performed soon after exposure, can tell if you have been exposed to even a small amount of trichloroethylene.

Exposure to larger amounts is assessed by blood and urine tests, which can detect trichloroethylene and many of its breakdown products for up to a week after exposure. However, exposure to other similar chemicals can produce the same breakdown products, so their detection is not absolute proof of exposure to trichloroethylene. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level for trichloroethylene in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5 parts of TCE per billion parts water.

The EPA has also developed regulations for the handling and disposal of trichloroethylene.

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

Glossary

Carcinogenicity: The ability of a substance to cause cancer.
CAS: Chemical Abstracts Service.
Evaporate: To change into a vapor or gas.
Milligram (mg): One thousandth of a gram.
Nonflammable: Will not burn.
ppm: Parts per million.
Sediment: Mud and debris that have settled to the bottom of a body of water.
Solvent: A chemical that dissolves other substances.

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

XYLENE
CAS # 1330-20-7

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

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

SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is xylene?

(Pronounced zī′lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

What happens to xylene when it enters the environment?

- Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- It evaporates quickly from the soil and surface water into the air.
- In the air, it is broken down by sunlight into other less harmful chemicals.
- It is broken down by microorganisms in soil and water.
- Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

How might I be exposed to xylene?

- Breathing xylene in workplace air or in automobile exhaust.
- Breathing contaminated air.
- Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- Breathing cigarette smoke that has small amounts of xylene in it.
- Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- The amount of xylene in food is likely to be low.

How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

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

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

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

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

1,2-DICHLOROETHANE

CAS #107-06-2

Division of Toxicology ToxFAQs™ **September 2001**

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

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

What is 1,2-dichloroethane?

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

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

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

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

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

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

How can 1,2-dichloroethane affect my health?

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

In laboratory animals, breathing or ingesting large amounts of 1,2-dichloroethane have also caused nervous system disorders and liver, kidney, and lung effects. Animal studies also suggest that 1,2-dichloroethane may damage the immune system. Kidney disease has also been seen in animals ingesting low doses of 1,2-dichloroethane for a long time. Studies in animals indicate that 1,2-dichloroethane does not affect reproduction.

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

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

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

How can 1,2-dichloroethane affect children?

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

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

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

The general population is not likely to be exposed to large amounts of 1,2-dichloroethane. In the past, it was used in small amounts in household products such as cleaning agents, pesticides, and wallpaper and carpet glue. Risk of exposure from this source could be eliminated if these older products were immediately discarded.

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

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

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

Has the federal government made recommendations to protect human health?

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

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

References

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

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

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BARIUM AND COMPOUNDS

CAS # 7440-39-3

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

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

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

What is barium?

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

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

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

What happens to barium when it enters the environment?

❑ Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
❑ The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
❑ Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.
❑ Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).
❑ Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

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

How can barium affect my health?

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

ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html

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

How likely is barium to cause cancer?

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

How can barium affect children?

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

How can families reduce the risks of exposure to barium?

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

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

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

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

Has the federal government made recommendations to protect human health?

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

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m^3) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m^3 of total dust and 5 mg/m^3 for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m^3 for soluble barium compounds. The NIOSH has set RELs of 10 mg/m^3 (total dust) for barium sulfate and 5 mg/m^3 (respirable fraction).

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE
CAS # 71-43-2

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1997**

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

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

What is benzene?
(Pronounced bĕn′zēn′)

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

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

What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

How might I be exposed to benzene?

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

How can benzene affect my health?

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

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

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

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

How likely is benzene to cause cancer?

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

Glossary

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

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

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

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

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

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

Attachment B

West Nile Virus/St. Louis Encephalitis Prevention

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

The following section is based upon information provided by the Center for Disease Control (CDC) Division of Vector-Borne Infectious Diseases. Symptoms of West Nile Virus include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands, with most infections being mild. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. Most infections of St. Louis encephalitis are mild without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially infants) and spastic (but rarely flaccid) paralysis. The only way to avoid infection of West Nile Virus and St. Louis Encephalitis is to avoid mosquito bites. To reduce the chance of mosquito contact:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (N, N-diethyl-meta-toluamide), since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's directions for use, as printed on the product.

ATTACHMENT C

REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: ____________ Project Name/Number: Brook 156

Report Date: ____________ Project Manager Name: Deborah Shapiro/Amy Jordan

Summary of any violations of procedures occurring that week:

____

____

____

Summary of any job related injuries, illnesses, or near misses that week:

____

____

____

____

Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

____

____

____

Comments:

____

____

____

Name: ____________________ Company: ____________________

Signature: ____________________ Title: ____________________

INCIDENT REPORT FORM

Date of Report: ______________________________

Injured: ______________________________

Employer: ______________________________

Site: Brook 156 Site Location: 740 Brook Avenue, Bronx, NY

Report Prepared By: ______________________ ______________________
Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

___Injury	___ Illness	___ Near Miss
__ Property Damage	___ Fire	___ Chemical Exposure
__ On-site Equipment	___ Motor Vehicle	___ Electrical
__ Mechanical	___ Spill	___ Other

DATE AND TIME OF ACCIDENT/INCIDENT: Narrative report of accident/incident: Identify: 1) actions leading to or contributing to the accident/incident; 2) the accident/incident occurrence; and 3) actions following the accident/incident.

WITNESS TO ACCIDENT/INCIDENT:

Name:	______________	Company:	______________
Address:	______________	Address:	______________
Phone No.:	______________	Phone No.:	______________
Name:	______________	Company:	______________
Address:	______________	Address:	______________
Phone No.:	______________	Phone No.:	______________

INJURED - ILL:

Name: ____________________ SSN: ____

Address: ____________________ Age: ____

Length of Service: ____________________ Time on Present Job: ______________________________

Time/Classification: ____

SEVERITY OF INJURY OR ILLNESS:

____ Disabling ___ Non-disabling ___ Fatality

____ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: ______________________________

NATURE OF INJURY OR ILLNESS: ____

____

____

____

CLASSIFICATION OF INJURY:

__ Abrasions ______ Dislocations ____ Punctures

__ Bites ______ Faint/Dizziness ____ Radiation Burns

__ Blisters ______ Fractures ____ Respiratory Allergy

__ Bruises ______ Frostbite ____ Sprains

__ Chemical Burns ______ Heat Burns ____ Toxic Resp. Exposure

__ Cold Exposure ______ Heat Exhaustion ____ Toxic Ingestion

__ Concussion ______ Heat Stroke ____ Dermal Allergy

__ Lacerations

Part of Body Affected: ____

Degree of Disability: ____

Date Medical Care was Received: ____

Where Medical Care was Received: ____

Address (if off-site): ____

(If two or more injuries, record on separate sheets)

PROPERTY DAMAGE:

Description of Damage: ____

____

Cost of Damage: $ ____

ACCIDENT/INCIDENT LOCATION: ____

ACCIDENT/INCIDENT ANALYSIS: Causative agent most directly related to accident/incident (Object, substance, material, machinery, equipment, conditions)

____

____

____

____

Was weather a factor?:____

____

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

____

____

____

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

____

____

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

____

____

Modifications:

____

Was injured using required equipment?:

____

____

If not, how did actual equipment use differ from plan?:

____

____

ACTION TAKEN TO PREVENT RECURRENCE: (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?

____

____

____

____

____

ACCIDENT/INCIDENT REPORT REVIEWED BY:

______________________________ ______________________________

SSO Name Printed SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

______________________________ ______________________________

Signature Title

______________________________ ______________________________

Signature Title

______________________________ ______________________________

Signature Title

ACCIDENT/INCIDENT FOLLOW-UP: Date: ______________________________

Outcome of accident/incident: ______________________________________

____

____

____

Physician's recommendations: ______________________________________

____

____

____

Date injured returned to work: ______________________________

Follow-up performed by:

______________________________ ______________________________

Signature Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT D

EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH!


Hand gripping throat

LEAVE AREA IMMEDIATELY, NO DEBATE!

(No Picture) Grip partner's wrist or place both hands around waist

NEED ASSISTANCE!


Hands on top of head

OKAY! – I'M ALL RIGHT!

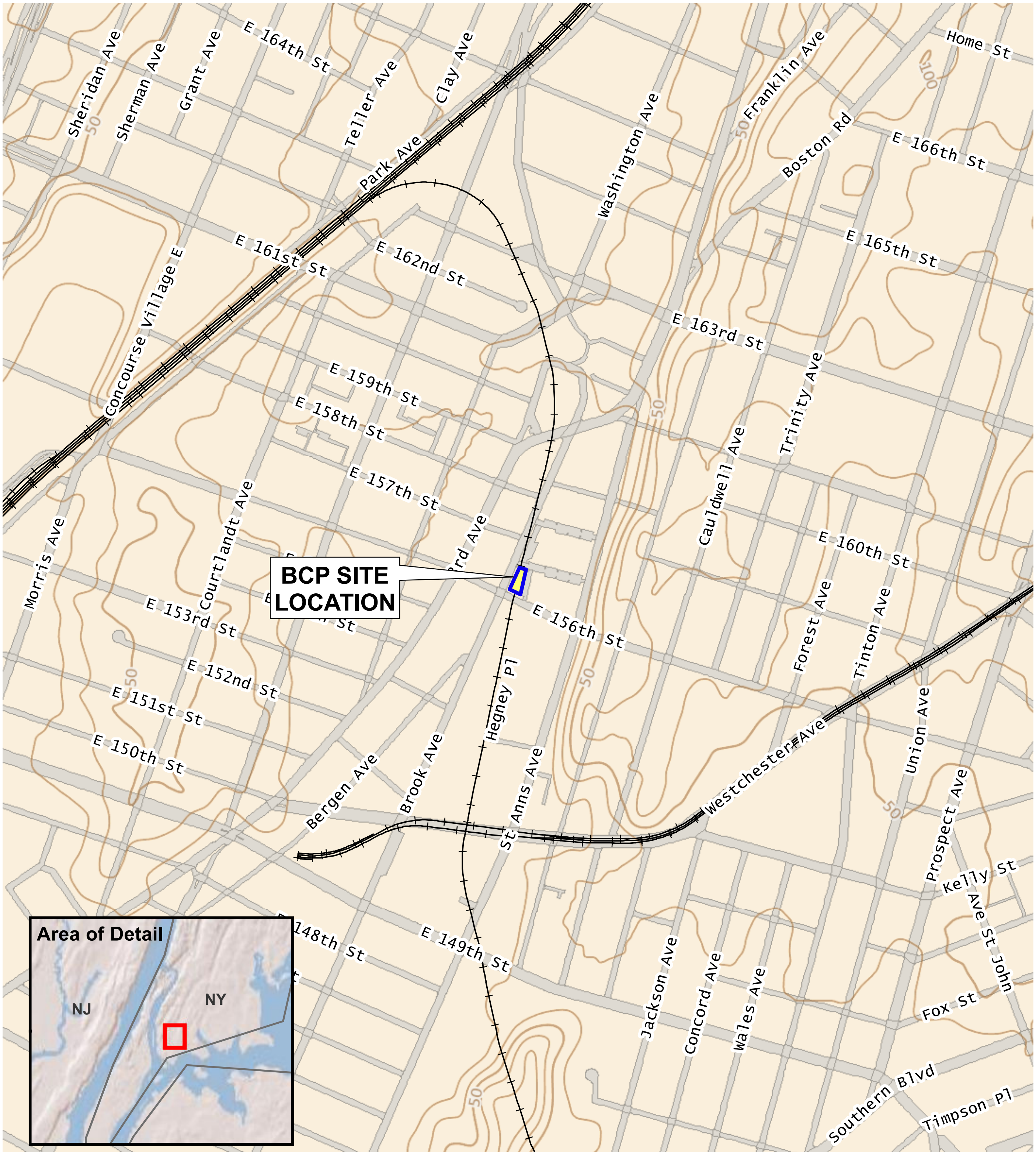
- I UNDERSTAND!


Thumbs up

NO! - NEGATIVE!


Thumbs down

Figures



Map Source: USGS Topo base map service from The National Map

0 800 1,600

SCALE IN FEET

AKRF

440 Park Avenue South, New York, NY 10016

Brook 156
740 Brook Avenue
Bronx, New York

BROWNFIELD CLEANUP PROGRAM
SITE LOCATION

DATE	2/14/2018
PROJECT NO.	11703
FIGURE	1

Legend

- Route to Hospital
- Project Site Location
- Hospital Location

Feet
0 300 600 1,200

Lincoln Hospital
234 East 149th Street
Bronx, NY 10451

AKRF 440 Park Avenue South, New York, NY 10016	**Brook 156** **740 Brook Avenue** New York, New York	DATE **12/6/2017**
		PROJECT NO. **11703**
	HOSPITAL ROUTE MAP	FIGURE 2

APPENDIX I
CITIZEN PARTICIPATION PLAN (CPP)

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Brook 156

740 Brook Avenue
Bronx, NY 10451

July 2015; updated March 2016

TABLE OF CONTENTS

* * * * *

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 brownfield site's remedial process.

Applicant: **Brook 156 Housing Development Fund Corporation and New York City Housing Preservation and Development ("Applicant")**
Site Name: **Brook 156 ("Site")**
Site Address: **740 Brook Avenue**
Site County: **Bronx**
Site Number: **C203078**

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 that 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/brownfields.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 interest in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment.
- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process.
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process.
- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community.
- Encouraging dialogue to promote the exchange of information among the affected/interested public, state agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision-making.

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

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom to 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 location of the reports and information related to the Site's investigation and cleanup program 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 website. If this occurs, NYSDEC will inform the public in fact sheets distributed about the Site and by other means, as appropriate.

Site Contact List

Appendix B contains the Site contact list. This list has been developed to keep the community informed about, and involved in, the Site's investigation and cleanup process. The Site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the Site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The Site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town, and village in which the Site is located;
- 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; and
- 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.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the Site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the Site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a Site, and the nature and progress of efforts to investigate and clean up a Site.
- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a Site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the Site's investigation and cleanup process with questions, comments, or requests for information.

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 is generally 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.

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:

Citizen Participation Requirements (Activities)	Timing of CP Activity(ies)
Application Process:	
• Prepare Site contact list • Establish document repositories	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:	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation
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 proposed 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 summarizes the Final Engineering Report • Distribute fact sheet to Site contact list announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets are combined if possible if there is not a delay in issuing the COC.

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.

Current Issues

The Site is part of Census Tract 71. According to the 2000 Census, 32.8% of the families in Census Tract 71 are living below the poverty line, compared to the national poverty rate of 11.3% and the New York State poverty rate of 15.3%. The unemployment rate for Census Tract 71 is 18.74%, which is almost three times the New York City unemployment rate of 6.6% (as of November 2014) and the national unemployment rate of 5.6% (as of December 2014). This Site is within an area designated as an Environmental Zone or En-Zone. Designation of Environmental Zones is limited to those census tracts with a poverty rate of at least 20%, according to the 2000 Census, and an unemployment rate of at least 8.868%.

In addition, the Site is located in an Environmental Justice Area. 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.
Because the Site is located in an area with a large Hispanic-American community, all future fact sheets will be translated into Spanish.

It is likely that the Site has been underutilized and/or vacant since 1969. The South Bronx has suffered economically since the 1960s and 1970s when a wave of arson combined with suburban flight ravaged the community. Most of the original housing stock was structurally damaged by the arson and eventually demolished by the city. In addition, the City of New York dismantled the Third Avenue El train in 1973, leaving portions of the southwestern Bronx underserved by public transportation. There is a direct correlation between the economic disparity of the neighborhoods adjacent to Third Avenue and the lack of viable subway access. In addition, the South Bronx, is plagued by gang activity, drug use, prostitution, and homelessness. The economic conditions of the Site have contributed to its remaining underutilized and/or vacant. The Site has also remained underutilized and/or vacant due to the perceived or real threat of contamination.

Lot 1/east consists of an approximately 5,658-square foot railbed and tunnel, and a small grass covered area. Lot 3/west consists of an approximately 1,780-square foot irregularly-shaped vacant lot. The Site is not affecting the use and enjoyment of any local amenities or nearby projects; however, the Site is considered to be an unattractive blight on the community in its current condition.

The development plan will transform the vacant blighted lots into one new affordable residential building with a community room. As part of the redevelopment, the existing railbed and footbridge will be demolished prior to the start of remedial activities. Redevelopment of the Site in accordance with the Project Plan will eliminate the current concerns in connection with the Site's current blighted condition while providing affordable housing, community resources, and open space.

Potential Remediation/ Construction-Related Issues

Issues of concern during the on-site remediation phase will likely include those related to the on-site handling and off-site disposal of contaminated soil. The likely concern to the surrounding community will be the possibility of the generation of vapors or dust from the Site during remediation. On-site air quality and dust levels will be monitored during any soil excavation and removal activity in accordance with a Site-specific Health and Safety Plan (HASP) that will be included as part of the Remedial Work Plan (RWP). Dust suppression techniques will be employed to prevent the generation of dust. All air and dust monitoring will be performed in accordance with NYSDOH's Community Air Monitoring Program (CAMP).

A likely additional remediation/construction concern will be the potential presence of trucks traveling through the community, and parking or idling at or near the project Site during soil excavation and disposal. The RWP will include provisions for on-site soil handling techniques that minimize the number of trucks and duration of time within or near the Site. In addition, provisions will be included to restrict truck traffic (to the extent possible) to designated routes along main roads while minimizing traffic within the community.

The concern over construction-related noise is a common one for communities in which redevelopment is occurring. Construction plans will minimize noise to the extent possible and the operation of heavy equipment will be restricted to normal working hours as will be set forth in the required NY City-issued permits.

Other Issues

As there is a presence of a limited English-proficient population in the area, all Fact Sheets related to the Site will be distributed in both English and Spanish. The Citizen Participation process will be used to communicate any issues and milestones that may arise to the public. If additional major issues of public concern are identified in the future, this Plan will be revised accordingly.

4. Site Information

Site Description

The Site is composed of two lots located at the northeastern corner of Brook Avenue and East 156th Street in the Bronx, New York. The legal identifier of the Site is Block 2360, Lots 1 and 3 in the Bronx, NY. The Site is irregular in shape, and is bound to the north by East 157th Street, to the east by Hegney Place, to the south by East 156th Street, and to the west by Brook Avenue. Lot 1/east consists of an approximately 5,658-square foot railbed and tunnel, and a small grass covered area. Lot 3/west consists of an approximately 1,780-square foot irregularly-shaped vacant lot. The Site is approximately 0.171 acre in size and is located in a developed area predominantly consisting of residential and commercial buildings. Appendix C contains a map identifying the location of the Site.

History of Site Use, Investigation, and Cleanup

Historic records indicated that the western portion of the Site (Lot 3) was developed with a gasoline station with a one-story lubritorium and used auto sales lot in 1949. According to City Directory records, the gasoline filling station was called the Brook Service Station in 1949 and the J&L Service Station from 1956 through at least 1961. The gasoline station was vacated by 1969. The eastern portion of the Site (Lot 1) consisted of the Port Morris branch of the New York and Harlem Railroad.

AKRF conducted a Remedial Investigation (RI) at the Site in 2014, which included a geophysical survey and utility mark-outs, the installation of 13 soil borings with the collection and analysis of 22 soil samples, the installation of 4 soil vapor probes with the collection and analysis of 4 soil vapor samples and one ambient air sample, and the installation of 4 groundwater monitoring wells with the collection and analysis of 4 groundwater samples to evaluate areas of concern at the Site. An anomaly consistent with that of an Underground Storage Tank (UST), measuring approximately 8.5 feet by 27 feet, along with a fill port and vent pipe, were detected on the southeastern portion of the Lot 3/west. Based on the size of the anomaly, it is possible that more than one UST may be present.

The RI documented that the Site is underlain by up to 12 feet of historic fill. Analytical data from the RI indicated that contaminated soil, groundwater, and soil vapor were present at the Site. The elevated levels of petroleum-related VOCs, naphthalene, chlorinated solvents, and PCBs and field evidence of contamination (i.e., elevated PID readings, petroleum staining and odors) seem to be associated with former use of the Site as a gasoline station and lubritorium. The greatest concentration of petroleum-related compounds was found downgradient of the suspect UST(s). The SVOCs and metals present in the soil seem to be attributed to the historic use at the Site as a railroad and subsequent demolition of the former gasoline station building. The elevated levels of DDT indicate the prior usage of pesticides at the Site. Based on the elevated levels of petroleum-related VOCs in the soil and groundwater, a spill was reported to NYSDEC and spill number 1404448 was assigned to the Site.

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 on-site, and must conduct a qualitative exposure assessment, a process that characterizes the actual or potential exposures of people, fish, and wildlife to contaminants on the Site and to contamination that has migrated from the Site.

The Applicant in its Application proposes that the Site will be used for restricted residential purposes. To achieve this goal, the Applicant will conduct investigation 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 completed a Remedial Investigation before it entered into the BCP. The Applicant will develop a Supplemental Remedial Investigation Work Plan (SRIWP), which is subject to public comment as noted in Appendix D. After the SRIWP has been performed, NYSDEC will determine if the investigation goals and requirements of the BCP have been met or if additional work is needed before a remedy can be selected.

The goals of the supplemental investigation will be as follows:

1. Define the nature and extent of contamination in soil, groundwater, and any other affected media;
2. Identify the source(s) of the contamination;
3. Assess the impact of the contamination on public health and/or the environment; and
4. Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

When the supplemental 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 supplemental investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the supplemental 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.

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 supplemental 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 supplemental investigation report. NYSDEC would then issue a Certificate of Completion (described below) to the Applicant.

or

2. The Applicant may recommend in its supplemental investigation report that action needs to be taken to address Site contamination. After NYSDEC approves the supplemental 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 proposed Remedial Work Plan for approval, NYSDEC would announce the availability of the proposed 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 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 (FER) 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 FER. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for Site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the Site after it receives a COC.

Site Management

Site management is the last phase of the Site cleanup program. This phase begins when the COC is issued. Site management may be conducted by the Applicant under NYSDEC oversight, if contamination will remain in place. 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 is pumping and treating groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the Site's remedial program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Manfred Magloire Project Manager NYSDEC Region 2 1 Hunters Point Plaza 47-40 21st Street Long Island City, NY 11101 (718) 482-4078	Thomas Panzone Citizen Participation Specialist NYSDEC Region 2 1 Hunters Point Plaza 47-40 21st Street Long Island City, NY 11101 (718) 482-4958

New York State Department of Health (NYSDOH):

Wendy Kuehner, Project Manager
New York State Department of Health
Bureau of Environmental Exposure
Investigation
Empire State Plaza – Coming Tower Room
1787
Albany, NY 12237
(518) 402-7860
Email: beei@health.ny.gov

Appendix B
Site Contact List

1. Local, State, and Federal Officials

Hon. Bill de Blasio Mayor of New York City City of New York 1 Centre Street New York, New York 10007-1200	Hon. Scott M. Stringer New York City Comptroller Office of the Comptroller 1 Centre Street New York, NY 10007
Hon. Ruben Diaz Jr. Bronx Borough President 851 Grand Concourse, Suite 301 Bronx, New York 10451	Hon. Ruben Diaz NY State Senator 900 Rogers Place Bronx, NY 10459
Hon. Maria del Carmen Arroyo New York City Council – District 17 384 E. 149th Street, Suite 300 Bronx, NY 10455	Carl Weisbrod, Commissioner NYC Department of City Planning 22 Reade Street New York, New York 10007-1216
NYC Department of City Planning Bronx Borough Office One Fordham Plaza, 5th Floor Bronx, New York 10458-5891	Daniel Walsh, Director Mayor's Office of Environmental Remediation 100 Gold Street, 2nd Floor New York, New York, 10038
Hon. Jose Serrano U.S. House of Representatives 1231 Lafayette Avenue, 4th Floor Bronx, NY 10474	Hon. Charles Schumer U.S. Senate 780 Third Avenue, Suite 2301 New York, NY 10017
Luis M. Diaz, County Clerk Bronx County Clerk's Office 851 Grand Concourse, Room 118 Bronx, NY 10451	Hon. Kirsten Gillibrand U.S. Senate 780 Third Avenue, Suite 2601 New York, NY 10017
John Wuthenow Office of Environmental Assessment & Planning NYC Dept. of Environmental Protection 96-05 Horace Harding Expressway Flushing, NY 11373	Emily Lloyd Commissioner, NYC Dept. of Environmental Protection 59-17 Junction Boulevard Flushing, NY 11373

2. Current Owners and Occupants of the Subject Site and Adjacent Sites

The Site comprises Block 3260, Lots 1 and 3 in the Bronx, NY. Lot 1 is currently owned by Brook 156 Housing Development Fund Corporation and is currently vacant. Lot 3 is currently owned by the New York City Department of Housing Preservation and Development and is currently vacant.

Adjacent to the north:

Block 2360, Lots 1001-1265
Multiple Addresses
Bronx, NY 10451
Melrose Court Condominiums Corporation
(Owner/Operator)
450 7th Avenue
New York, NY 10001

Adjacent to the northwest:

Block 2364, Lot 13
755 Brook Avenue
Bronx, NY 10451
Vacant
City of New York
℅ Department of Housing
Preservation and Development
(Owner/Operator)
100 Gold Street
New York, NY 10038

Block 2364, Lot 15
749 Brook Avenue
Bronx, NY 10451
Vacant
℅ Department of Housing
Preservation and Development
(Owner/Operator)
100 Gold Street
New York, NY 10038

Block 2364, Lot 17
741 Brook Avenue
Bronx, NY 10451
Residential
Jillian Dillah
(Owner/Operator)
1425 Amsterdam Avenue
New York, NY 10027

Adjacent to the east:

Block 2360, Lots 1001-1265
526 East 159th Street
Bronx, NY 10451
Residential
Melrose Court Condominium Corporation
(Owner/Operator)
811 Saint Anns Avenue
Bronx, NY 10456

Adjacent to the south:

Block 2359, Lots 1001-1004
700-704 Brook Avenue
Bronx, NY 10455
Via Verde Apartment Corporation, Via Verde HDFC, Via Verde Homes HDFC, and Via Verde Rental Associates LP
(Owner/Operator)
℅ Phipps Houses
902 Broadway, 13th Floor
New York, NY 10010

Block 2359, Lot 210
510 East 156th Street
Bronx, NY 10451
NYCHA Triborough Preservation HDFC
(Owner/Operator)
250 West Broadway, 9th Floor
New York, NY 10007

Adjacent to the southwest:

Block 2363, Lot 24
700-704 Brook Avenue
Bronx, NY 10455
Related Retail Hub, LLC
(Owner/Operator)
℅ Related Retail Corporation
60 Columbus Circle
New York, NY 10023

Adjacent to the west:

Block 2364, Lot 18
743 Brook Avenue
Bronx, NY 10451
Residential
Lloyd Meltzer
(Owner/Operator)
743 Brook Avenue
Bronx, NY 10451

Block 2364, Lot 19
741 Brook Avenue
Bronx, NY 10451
Residential
Nesredin Yassin
(Owner/Operator)
741 Brook Avenue
New York, NY 10451

Block 2364, Lot 21
739 Brook Avenue
Bronx, NY 10451
Juan P. Baez (Owner/Operator)
2564 Pearsall Avenue
Bronx, NY 10451

3. Local

Inner City Press
PO Box 580188, Mount Carmel Station
Bronx, NY 10458
Bronx Times Reporter
900 East 132nd Street
Bronx, NY 10454
Email: bronxtimes@cnglobal.com

News 12 The Bronx
930 Soundview Avenue
Bronx, NY 10473
Email: news12bx@news12.com

New York 1 News
75 Ninth Avenue
New York, NY 10011
Email: ny1news@ny1.com

New York Post
1211 Avenue of the Americas
New York, NY 10036

Hoy Nueva York
1 MetroTech Center, 18th Floor
Brooklyn, NY 11201

New York Daily News
4 New York Plaza
New York, NY 10004

El Diario La Prensa
1 MetroTech Center, 18th Floor
Brooklyn, NY 11201

4. Public Water Supply

Public water is provided by The City of New York, Department of Environmental Protection (Consumer Service Center, 59-17 Junction Boulevard, 10th Floor, Flushing, NY 11373).

5. Additional Contacts: None

6. Schools and Day Care Centers

Northside Center for Child Development, Inc.
609 East 156th Street
Bronx, New York 10455
Hilde Mosse
(347) 926-5400
Distance: Approximately 690 feet east of the Site

St. Adalbert School
419 East 155th Street
Bronx, New York 10455
Sister Teresilla
(718) 424-2376
Distance: Approximately 830 feet east of the Site

The Salvation Army
425 East 159th Street
Bronx, New York 10451
Valerie Toon
(718) 742-2346
Distance: Approximately 1,150 feet northwest of the Site

1332 Fulton Avenue Day Care, Inc.
421 East 161st Street
Bronx, New York 10451
Louise Burroughs
(718) 378-1330
Distance: Approximately 1,650 feet northwest of the Site

Southeast Bronx Neighborhood Centers, Inc.
3261 Third Avenue
Bronx, New York 10456
Isaura Pena
(718) 292-4774
Distance: Approximately 1,975 feet north of the Site

The following schools have been identified near the Site:

P.S. 157 Grove Hill
757 Cauldwell Avenue
Bronx, New York 10456
Ramona Duran
(718) 292-5255
Distance: Approximately 825 feet east of the Site

Mott Haven Village Prep High School
701 Saint Ann's Avenue
Bronx, New York 10455
Melanie Williams
(718) 402-0571
Distance: Approximately 640 feet southeast of the Site

University Heights High School
701 Saint Ann's Avenue
Bronx, New York 10455
Hazel Joseph Roseboro
(718) 292-0578
Distance: Approximately 640 feet southeast of the Site

New Explorers High School
701 Saint Ann's Avenue
Bronx, New York 10455
Jacob Hobson
(718) 292-4150
Distance: Approximately 640 feet southeast of the Site

Urban Assembly School for Career in Sports
701 Saint Ann's Avenue
Bronx, New York 10455
Johanny Garcia
(718) 292-7110
Distance: Approximately 640 feet southeast of the Site

Crotona Academy High School
639-55 Saint Anns Avenue
Bronx, NY 10455
Anthony Harris
(718) 402-8378
Distance: Approximately 0.3 mile southeast of the Site

Green Dot Charter School (University Prep Charter School)
600 Saint Anns Avenue
Bronx, NY 10455
Leticia Pineiro
(718) 292-6543
Distance: Approximately 0.5 mile southeast of the Site

Little Angels Head Start
402-404 East 152nd Street, 2nd Floor
Bronx, NY 10455-2504
Dr. Reva Gershen Lowy
(718) 402-0081-248
Distance: Approximately 0.5 mile southeast of the Site

Immaculate Conception School
378 E 151st Street
Bronx, NY 10455
Sr. Patrice
(718) 585-4843
Distance: Approximately 0.7 mile southwest of the Site

PS 29 Middle School
758 Courtlandt Avenue
Bronx, NY 10451
Meredith Gotlin
(718) 292-3785
Distance: Approximately 0.3 mile west of the Site

Saints Peter and Paul School
838 Brook Avenue
Bronx, NY 10451
Sister Michelle McKeon, S.C.
(718) 665-2056
Distance: Approximately 0.1 mile north of the Site

NYC Charter High School for Architecture, Engineering and Construction Industries
838 Brook Avenue
Bronx, NY 10451
Eugene Foley
(646) 400-5566
Distance: Approximately 0.1 mile north of the Site

The New Life School
831 Eagle Avenue
Bronx, NY 10456
Robert Barbo
(718) 665-2760
Distance: Approximately 0.3 mile northeast of the Site

PS X140, The Eagle School
916 Eagle Ave
Bronx, NY 10456
Paul Cannon
(718) 585-1205
Distance: Approximately 0.3 mile northeast of the Site

MS 301
890 Cauldwell Avenue
Bronx, NY 10456
Benjamin Basile
(718) 585-2950
Distance: Approximately 0.4 mile northeast of the Site

7. Local Community Board

Bronx Community Board 1
3024 Third Avenue
Bronx, NY 10455
(718) 402-2270

8. Local Document Repositories

Melrose New York Public Library
910 Morris Avenue
Bronx, NY 10451
(718) 588-0110
Attn: Sadeqwa Atkinson

Bronx Community Board 1
3024 Third Avenue
Bronx, NY 10455
(718) 402-2270
Attn: Cedric Loftin

8. Civic, Religious, and other Educational Institutions

Management Development Office
Bronxchester Houses (NYCHA)
5775-514 East 156th Street
Bronx, NY 10455

Resident Association
Bronxchester Houses (NYCHA)
5775-514 East 156th Street
Bronx, NY 10455

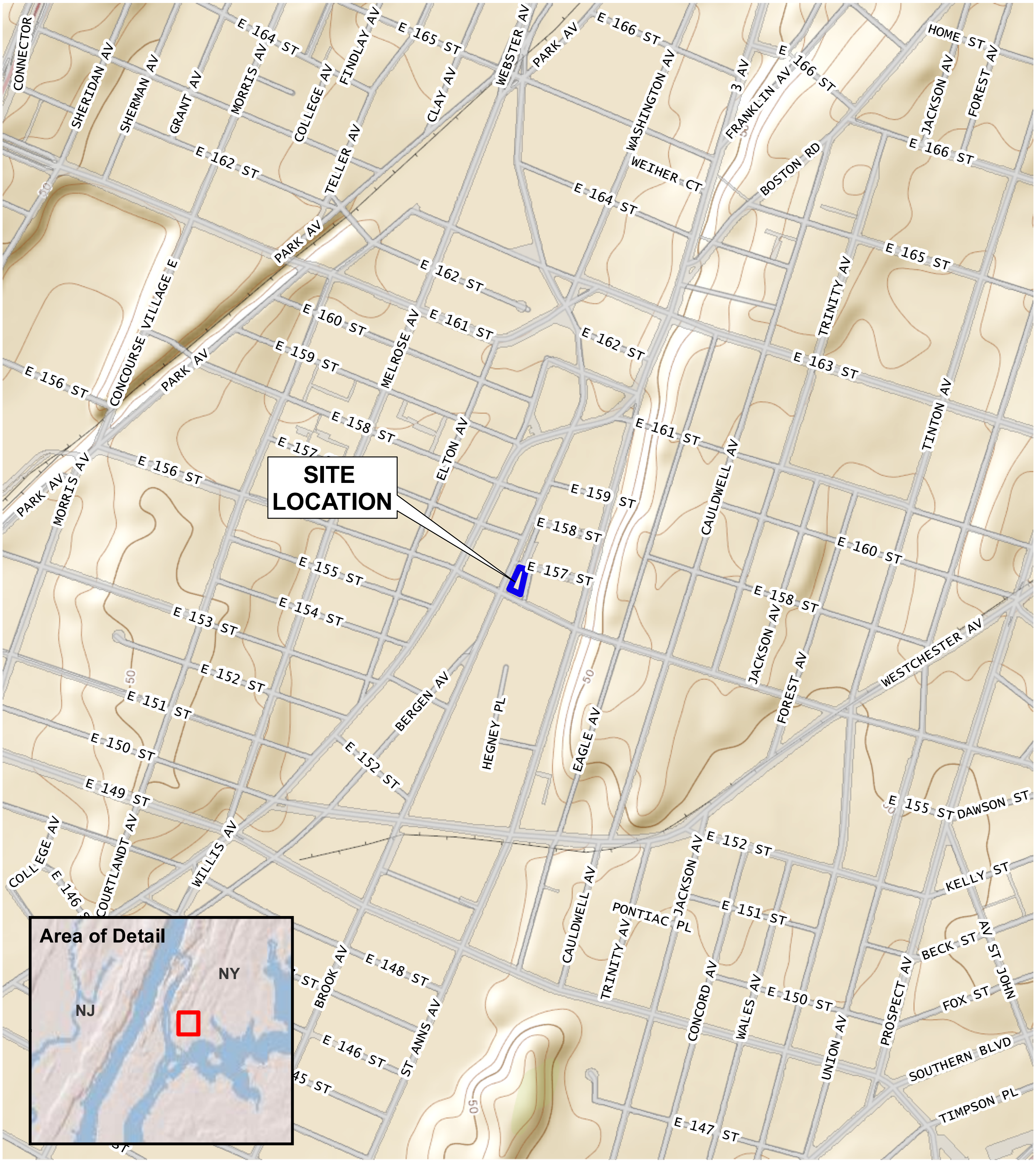
Greater Eternal Baptist Church
746 Elton Street
Bronx, NY 10451
Attn: Pastor

	A	B	C	D	E	F	G	H	I	J
1										
2	Site Contact List									
3	Site #: C203078									
4	Site Name: Brook 156 Site			List Last Updated: 11-30-15						
5	Current Occupant	Name, Title	Address 1	Address 2	Address 3	Street Address	City	State	Zip	Site Name (County)
6	Current Occupant	Hon. Bill de Blasio	NYC Mayor			City Hall	New York	NY	10007	Brook 156 (Bronx)
7	Current Occupant	Hon. Scott Stringer	NYC Comptroller			1 Centre Street	New York	NY	10007	Brook 156 (Bronx)
8	Current Occupant	Hon. Letitia James	Public Advocate			1 Centre Street	New York	NY	10007	Brook 156 (Bronx)
9	Current Occupant	Carl Weisbrod	Commissioner, NYC Dept. of City Planning			22 Reade Street	New York	NY	10007	Brook 156 (Bronx)
10		Emily Lloyd	Commissioner, NYC Dept. of Environmental Protection			59-17 Junction Boulevard	Flushing	NY	11373	Brook 156 (Bronx)
11		Nilda Mesa, Director	NYC Office of Environmental Sustainability			100 Gold Street - 2nd Floor	New York	NY	10038	Brook 156 (Bronx)
12		John Wuthenow	Office of Environmental Assessment & Plannin	NYC Dept. of Environmental Protection		96-05 Horace Harding Expressway	Flushing	NY	11373	Brook 156 (Bronx)
13		Hon. Ruben Diaz Jr.	Bronx Borough President			851 Grand Concourse, Suite 301	Bronx	NY	10451	Brook 156 (Bronx)
14		Hon. Ruben Diaz	NYS Senator			900 Rogers Place	Bronx	NY	10459	Brook 156 (Bronx)
15		Hon. Maria del Carmen Arroyo	New York City Council – District 17			384 E. 149th Street, Suite 300	Bronx	NY	10455	Brook 156 (Bronx)
16		NYC Department of City Planning	Bronx Borough Office			One Fordham Plaza, 5th Floor	Bronx	NY	10458	Brook 156 (Bronx)
17		Daniel Walsh, Director	Mayor's Office of Environmental Remediation			100 Gold Street, 2nd Floor	New York	NY	10038	Brook 156 (Bronx)
18		Luis M. Diaz, County Clerk	Bronx County Clerk's Office			851 Grand Concourse, Room 118	Bronx	NY	10451	Brook 156 (Bronx)
19		Hon. Charles Schumer	U.S. Senator			780 Third Avenue, Suite 2301	New York	NY	10017	Brook 156 (Bronx)
20		Hon. Kirsten Gillibrand	U.S. Senator			780 Third Avenue, Suite 2601	New York	NY	10017	Brook 156 (Bronx)
21		Hon. Jose Serrano	U.S. House of Representatives			1231 Lafayette Avenue, 4th Floor	Bronx	NY	10474	Brook 156 (Bronx)
22		Manfred Magloire	NYSDEC Project Manager			47-40 21st Street	Long Island City	NY	11101	Brook 156 (Bronx)
23		Thomas V. Panzone	NYSDEC Regional Citizen Participation Specialist			47-40 21st Street	Long Island City	NY	11101	Brook 156 (Bronx)
24		Wnedy Kuehner	NYSDOH Public Health Specialist		Empire State Plaza	Corning Tower, Room 1787	Albany	NY	12237	Brook 156 (Bronx)
25		Larry Ennist	NYSDEC			625 Broadway	Albany	NY	12233	Brook 156 (Bronx)
26		NYC Department of Housing Preservation & Development				100 Gold Street	New York	NY	10038	Brook 156 (Bronx)
27		Resident				749 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
28		Resident				741 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
29		Jillian Dillah				1425 Amsterdam Avenue	New York	NY	10027	Brook 156 (Bronx)
30		Resident				526 East 159th Street	Bronx	NY	10451	Brook 156 (Bronx)
31		Melrose Court Condominium Corporation				811 Saint Anns Avenue	Bronx	NY	10456	Brook 156 (Bronx)
32		Via Verde Apartment Corporation, Via Verde HDFC, Via Verde Homes HDFC, and Via Verde Rental Associates LP				700-704 Brook Avenue	Bronx	NY	10455	Brook 156 (Bronx)
33		Phipps Houses				902 Broadway, 13th Floor	New York	NY	10010	Brook 156 (Bronx)
34		Resident				510 East 156th Street	Bronx	NY	10451	Brook 156 (Bronx)
35		Related Retail Hub, LLC				700-704 Brook Avenue	Bronx	NY	10455	Brook 156 (Bronx)
36		Residential				743 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
37		Lloyd Meltzer				743 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
38		Residential				741 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
39		Nesredin Yassin				741 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
40		Residential				739 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
41		Juan P. Baez				2564 Pearsall Avenue	Bronx	NY	10451	Brook 156 (Bronx)
42		Inner City Press				PO Box 580188, Mount Carmel Station	Bronx	NY	10458	Brook 156 (Bronx)
43		Bronx Times Reporter				900 East 132nd Street	Bronx	NY	10454	Brook 156 (Bronx)
44		New York 1 News				75 Ninth Avenue	New York	NY	10011	Brook 156 (Bronx)
45		New York Post				1211 Avenue of the Americas	New York	NY	10036	Brook 156 (Bronx)
46		New York Daily News				4 New York Plaza	New York	NY	10004	Brook 156 (Bronx)
47		Hoy Nueva York				1 MetroTech Center, 18th Floor	Brooklyn	NY	11201	Brook 156 (Bronx)
48		El Diario La Prensa				1 MetroTech Center, 18th Floor	Brooklyn	NY	11201	Brook 156 (Bronx)
49		George Rodriguez, Chairman	Bronx Community Board # 1			3024 Third Avenue	Bronx	NY	10455	Brook 156 (Bronx)
50		Cedric Loftin, District Manager	Bronx Community Board # 1			3024 Third Avenue	Bronx	NY	10455	Brook 156 (Bronx)
51		Environmental Committee Chair	Bronx Community Board # 1			3024 Third Avenue	Bronx	NY	10455	Brook 156 (Bronx)
52		Management Development Office	Bronxchester Houses (NYCHA)			5775-514 East 156th Street	Bronx	NY	10455	Brook 156 (Bronx)
53		Resident Association	Bronxchester Houses (NYCHA)			5775-514 East 156th Street	Bronx	NY	10455	Brook 156 (Bronx)
54		Greater Eternal Baptist Church	Attn: Pastor			746 Elton Street	Bronx	NY	10451	Brook 156 (Bronx)
55		Mott Haven Village Preparatory High School	Melanie Williams, Principal			701 St. Ann's Avenue	Bronx	NY	10455	Brook 156 (Bronx)
56		Northside Center for Child Development, Inc				609 East 156th Street	Bronx	NY	10455	Brook 156 (Bronx)
57		St. Adalbert School				419 East 155th Street	Bronx	NY	10455	Brook 156 (Bronx)
58		The Salvation Army	Valerie Toon			425 East 159th Street	Bronx	NY	10451	Brook 156 (Bronx)
59		1332 Fulton Avenue Day Care, Inc.	Louise Burroughs			421 East 161st Street	Bronx	NY	10451	Brook 156 (Bronx)
60		Southeast Bronx Neighborhood Centers, Inc.	Isaura Pena			3261 Third Avenue	Bronx	NY	10456	Brook 156 (Bronx)
61		P.S. 157 Grove Hill	Attn: Ramona Duran			757 Cauldwell Avenue	Bronx	NY	10456	Brook 156 (Bronx)
62		University Heights High School	Hazel Joseph Roseboro			701 Saint Ann's Avenue	Bronx	NY	10455	Brook 156 (Bronx)

	A	B	C	D	E	F	G	H	I	J
63		New Explorers High School	Jacob Hobson			701 Saint Ann's Avenue	Bronx	NY	10455	Brook 156 (Bronx)
64		Urban Assembly School for Career in Sports	Johanny Garcia			701 Saint Ann's Avenue	Bronx	NY	10455	Brook 156 (Bronx)
65		Crotona Academy High School	Anthony Harris			639-55 Saint Anns Avenue	Bronx	NY	10455	Brook 156 (Bronx)
66		Green Dot Charter School	Leticia Pineiro			600 Saint Anns Avenue	Bronx	NY	10455	Brook 156 (Bronx)
67		Little Angels Head Start	Dr. Reva Gershen Lowy			402-404 East 152nd Street, 2nd Floor	Bronx	NY	10455	Brook 156 (Bronx)
68		Immaculate Conception School	Sr. Patrice			378 E 151st Street	Bronx	NY	10455	Brook 156 (Bronx)
69		PS 29 Middle School	Meredith Gotlin			758 Courtlandt Avenue	Bronx	NY	10451	Brook 156 (Bronx)
70		Saints Peter and Paul School	Sister Michelle McKeon, S.C.			838 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
71		NYC Charter High School for Architecture, E	Eugene Foley			838 Brook Avenue	Bronx	NY	10451	Brook 156 (Bronx)
72		The New Life School	Robert Barbo			831 Eagle Avenue	Bronx	NY	10456	Brook 156 (Bronx)
73		PS X140, The Eagle School	Paul Cannon			916 Eagle Ave	Bronx	NY	10456	Brook 156 (Bronx)
74		MS301	Benjamin Basile			890 Cauldwell Avenue	Bronx	NY	10456	Brook 156 (Bronx)
75		RESIDENT/BUSINESS OWNER			701	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
76		RESIDENT/BUSINESS OWNER			3146	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
77		RESIDENT/BUSINESS OWNER			3172	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
78		RESIDENT/BUSINESS OWNER			526A	EAST 159 STREET	BRONX	NY	10451	Brook 156 (Bronx)
79		RESIDENT/BUSINESS OWNER			487	EAST 153 STREET	BRONX	NY	10455	Brook 156 (Bronx)
80		RESIDENT/BUSINESS OWNER			2976	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
81		RESIDENT/BUSINESS OWNER			2980	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
82		RESIDENT/BUSINESS OWNER			2984	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
83		RESIDENT/BUSINESS OWNER			3042	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
84		RESIDENT/BUSINESS OWNER			3044	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
85		RESIDENT/BUSINESS OWNER			3046	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
86		RESIDENT/BUSINESS OWNER			3052	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
87		RESIDENT/BUSINESS OWNER			3054	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
88		RESIDENT/BUSINESS OWNER			3056	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
89		RESIDENT/BUSINESS OWNER			3058	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
90		RESIDENT/BUSINESS OWNER			3060	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
91		RESIDENT/BUSINESS OWNER			745	BROOK AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
92		RESIDENT/BUSINESS OWNER			741	BROOK AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
93		RESIDENT/BUSINESS OWNER			499	EAST 156 STREET	BRONX	NY	10455	Brook 156 (Bronx)
94		RESIDENT/BUSINESS OWNER			497	EAST 156 STREET	BRONX	NY	10455	Brook 156 (Bronx)
95		RESIDENT/BUSINESS OWNER			3100	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
96		RESIDENT/BUSINESS OWNER			3108	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
97		RESIDENT/BUSINESS OWNER			3110	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
98		RESIDENT/BUSINESS OWNER			3015	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
99		RESIDENT/BUSINESS OWNER			3009	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
100		RESIDENT/BUSINESS OWNER			2997	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
101		RESIDENT/BUSINESS OWNER			2995	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
102		RESIDENT/BUSINESS OWNER			724	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
103		RESIDENT/BUSINESS OWNER			726	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
104		RESIDENT/BUSINESS OWNER			3037	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
105		RESIDENT/BUSINESS OWNER			3027	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
106		RESIDENT/BUSINESS OWNER			3025	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
107		RESIDENT/BUSINESS OWNER			3023	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
108		RESIDENT/BUSINESS OWNER			3021	3 AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
109		RESIDENT/BUSINESS OWNER			728	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
110		RESIDENT/BUSINESS OWNER			730	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
111		RESIDENT/BUSINESS OWNER			732	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
112		RESIDENT/BUSINESS OWNER			734	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
113		RESIDENT/BUSINESS OWNER			736	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
114		RESIDENT/BUSINESS OWNER			738	ELTON AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
115		RESIDENT/BUSINESS OWNER			748	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
116		RESIDENT/BUSINESS OWNER			752	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
117		RESIDENT/BUSINESS OWNER			3061	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
118		RESIDENT/BUSINESS OWNER			3047	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
119		RESIDENT/BUSINESS OWNER			754	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
120		RESIDENT/BUSINESS OWNER			756	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
121		RESIDENT/BUSINESS OWNER			758	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
122		RESIDENT/BUSINESS OWNER			760	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
123		RESIDENT/BUSINESS OWNER			762	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
124		RESIDENT/BUSINESS OWNER			764	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
125		RESIDENT/BUSINESS OWNER			766	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
126		RESIDENT/BUSINESS OWNER			3065	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
127		RESIDENT/BUSINESS OWNER			776	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
128		RESIDENT/BUSINESS OWNER			456	EAST 158 STREET	BRONX	NY	10451	Brook 156 (Bronx)

	A	B	C	D	E	F	G	H	I	J
129		RESIDENT/BUSINESS OWNER			462	EAST 158 STREET	BRONX	NY	10451	Brook 156 (Bronx)
130		RESIDENT/BUSINESS OWNER			3097	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
131		RESIDENT/BUSINESS OWNER			3087	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
132		RESIDENT/BUSINESS OWNER			459	EAST 157 STREET	BRONX	NY	10451	Brook 156 (Bronx)
133		RESIDENT/BUSINESS OWNER			778	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
134		RESIDENT/BUSINESS OWNER			780	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
135		RESIDENT/BUSINESS OWNER			782	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
136		RESIDENT/BUSINESS OWNER			784	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
137		RESIDENT/BUSINESS OWNER			804	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
138		RESIDENT/BUSINESS OWNER			3103	3 AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
139		RESIDENT/BUSINESS OWNER			806	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
140		RESIDENT/BUSINESS OWNER			808	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
141		RESIDENT/BUSINESS OWNER			810	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
142		RESIDENT/BUSINESS OWNER			812	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
143		RESIDENT/BUSINESS OWNER			814	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
144		RESIDENT/BUSINESS OWNER			816	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
145		RESIDENT/BUSINESS OWNER			818	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
146		RESIDENT/BUSINESS OWNER			820	ELTON AVENUE	BRONX	NY	10451	Brook 156 (Bronx)
147		RESIDENT/BUSINESS OWNER			696	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
148		RESIDENT/BUSINESS OWNER			702	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
149		RESIDENT/BUSINESS OWNER			710	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
150		RESIDENT/BUSINESS OWNER			712	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
151		RESIDENT/BUSINESS OWNER			716	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
152		RESIDENT/BUSINESS OWNER			720	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
153		RESIDENT/BUSINESS OWNER			730	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
154		RESIDENT/BUSINESS OWNER			734	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
155		RESIDENT/BUSINESS OWNER			736	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
156		RESIDENT/BUSINESS OWNER			738	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
157		RESIDENT/BUSINESS OWNER			740	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
158		RESIDENT/BUSINESS OWNER			729	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
159		RESIDENT/BUSINESS OWNER			725	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
160		RESIDENT/BUSINESS OWNER			723	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
161		RESIDENT/BUSINESS OWNER			721	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
162		RESIDENT/BUSINESS OWNER			719	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
163		RESIDENT/BUSINESS OWNER			715	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
164		RESIDENT/BUSINESS OWNER			711	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
165		RESIDENT/BUSINESS OWNER			707	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
166		RESIDENT/BUSINESS OWNER			705	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
167		RESIDENT/BUSINESS OWNER			695	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
168		RESIDENT/BUSINESS OWNER			689	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
169		RESIDENT/BUSINESS OWNER			687	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
170		RESIDENT/BUSINESS OWNER			685	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
171		RESIDENT/BUSINESS OWNER			717	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
172		RESIDENT/BUSINESS OWNER			709	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
173		RESIDENT/BUSINESS OWNER			683	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
174		RESIDENT/BUSINESS OWNER			698	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
175		RESIDENT/BUSINESS OWNER			700	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
176		RESIDENT/BUSINESS OWNER			704	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
177		RESIDENT/BUSINESS OWNER			708	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
178		RESIDENT/BUSINESS OWNER			714	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
179		RESIDENT/BUSINESS OWNER			718	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
180		RESIDENT/BUSINESS OWNER			722	ST ANN'S AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
181		RESIDENT/BUSINESS OWNER			703	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
182		RESIDENT/BUSINESS OWNER			697	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
183		RESIDENT/BUSINESS OWNER			693	EAGLE AVENUE	BRONX	NY	10455	Brook 156 (Bronx)
184		RESIDENT/BUSINESS OWNER			800	ST ANN'S AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
185		RESIDENT/BUSINESS OWNER			820	ST ANN'S AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
186		RESIDENT/BUSINESS OWNER			823	EAGLE AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
187		RESIDENT/BUSINESS OWNER			805	EAGLE AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
188		RESIDENT/BUSINESS OWNER			842	ST ANN'S AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
189		RESIDENT/BUSINESS OWNER			844	ST ANN'S AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
190		RESIDENT/BUSINESS OWNER			586	EAST 161 STREET	BRONX	NY	10456	Brook 156 (Bronx)
191		RESIDENT/BUSINESS OWNER			861	EAGLE AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
192		RESIDENT/BUSINESS OWNER			869	EAGLE AVENUE	BRONX	NY	10456	Brook 156 (Bronx)
193		RESIDENT/BUSINESS OWNER			831	EAGLE AVENUE	BRONX	NY	10456	Brook 156 (Bronx)

Appendix C
Site Location Map



SOURCE
USGS 7.5 Minute Topographic Map
Central Park Quad 2011

0 1,000 2,000 Feet

Brook 156
East 156th Street & Brook Avenue
Bronx, New York

SITE LOCATION

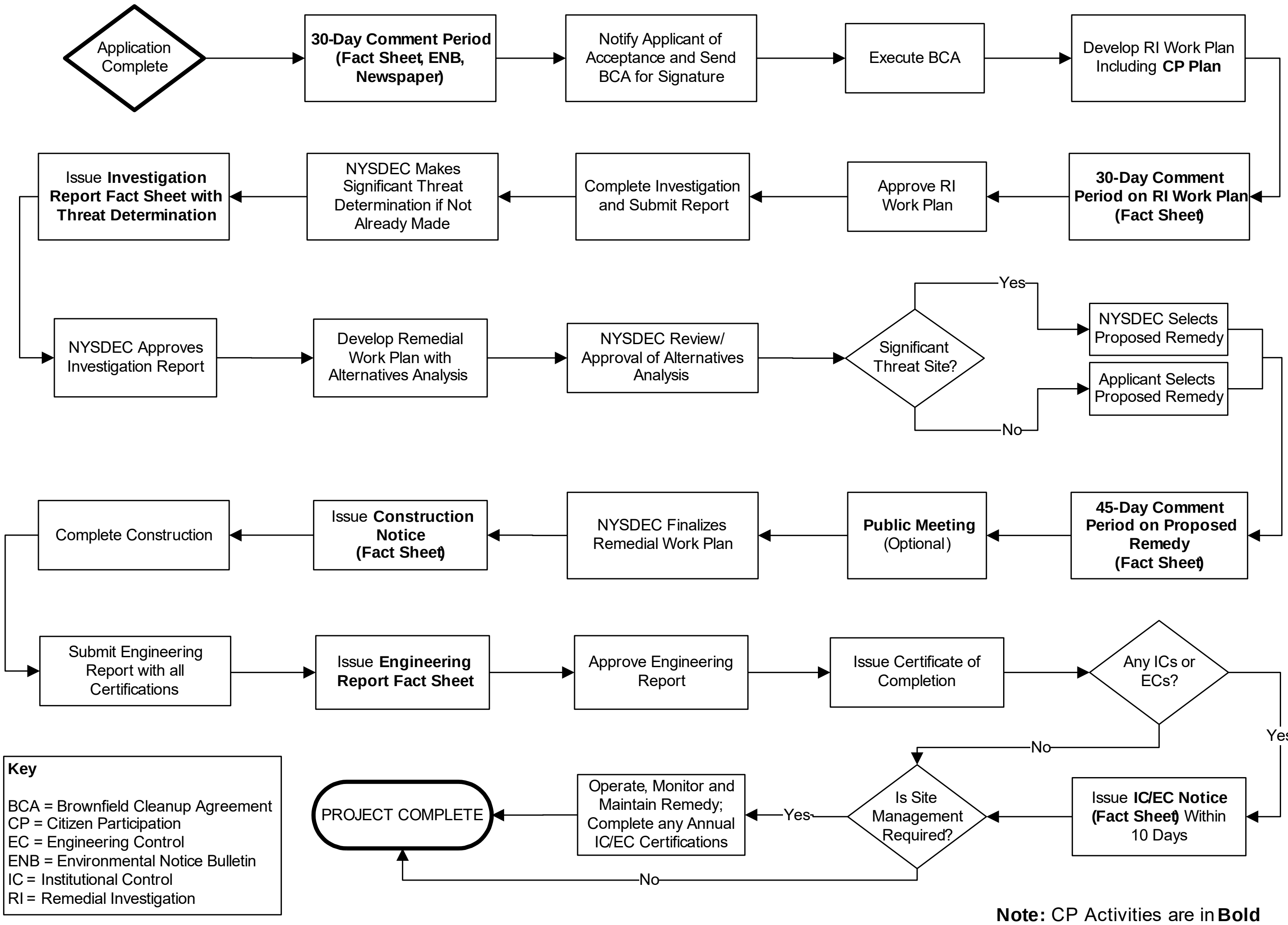
AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
5/19/2015

PROJECT No.
11703

APPENDIX
C

Appendix D– Brownfield Cleanup Program Process



APPENDIX J
RESUMES AND CERTIFICATIONS OF KEY PERSONNEL

MARC S. GODICK, LEP

SR. VICE PRESIDENT

Marc S. Godick, a Senior Vice President of the firm, has over 25 years of experience in the environmental consulting industry. Mr. Godick has broad-based environmental experience includes expertise in brownfield redevelopment, site assessment, remedial investigation, design and implementation of remedial measures, compliance assessment, and litigation support.

Education

M.E., Engineering Science/Environmental Engineering, Pennsylvania State University, 1998

B.S., Chemical Engineering, Carnegie Mellon University, 1989

Licenses/Certifications

Licensed Environmental Professional (License # 396) – State of Connecticut – 2003 - Present

40 Hour HAZWOPER and Annual Refresher Training, 1990 - Present

Supervisors of Hazardous Waste Operations (8 Hour), 1990

Professional Memberships

Chairman, Village of Larchmont/Town of Mamaroneck Coastal Zone Management Commission, 1997 – Present

Member, Westchester County Stormwater Advisory Board, 2011 – Present

Chairman/Member, Westchester County Soil and Water Conservation District, 2005 - 2010

Board of Directors, Sheldrake Environmental Center, Larchmont, New York, 2006 - 2008

Member, NYSDEC Risk-Based Corrective Action (RBCA) Advisory Group for Petroleum-Impacted Sites, 1997

Community Leadership Alliance, Pace University School of Law, 2001

Years of Experience

Year started in company: 2002

Year started in industry: 1990

RELEVANT EXPERIENCE

On-Call Environmental Consulting Services (Various Locations), New York City Mayor's Office of Environmental Remediation (OER) (administered by NYCEDC)

Mr. Godick is managing an on-call contract with the OER for brownfields environmental assessment and remediation. The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by EPA grants. The work plans and investigation reports were completed in accordance with OER and EPA requirements. AKRF also developed a remedial plan for a former gas station site in the Bronx and implemented a remedial plan for capping a park site in Staten Island.

Remedial Design, Gowanus Canal First Street Turning Basin, New York City Department of Design and Construction (DDC)

Mr. Godick is managing the remedial design for restoration of the filled-in former First Street Turning Basin in Brooklyn, New York. The remediation is being conducted as part of an Order of Consent between the City of New York and EPA for the Gowanus Canal Superfund Site. The remedial design will include removal of fill and sediment within the fill-in basing in an approximately 475-foot by 50-foot area. The restored basin will provide enhanced waterfront access to the community and a boat launch for canoes and kayaks. Design considerations include geotechnical concerns related to adjacent buildings and new and existing bulkheads; soil and water management; landscape design; and access/construction logistics. The design in anticipated to be completed in late 2017.

On-Call Environmental Consulting (Various Locations), New York City School Construction Authority

Mr. Godick is managing an on-call contract with the SCA for environmental assessment, remedial design, and plumbing disinfection. For new school sites, initial due diligence involves conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school and remediation requirements and associated costs. Once design for a school is underway, AKRF would prepare remediation plans and construction specifications and oversee the construction activities. For existing school sites, the work can involve conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, investigation and remediation of spills, and development of remediation cost estimates. AKRF also oversees plumbing disinfection work, which is required prior to new plumbing being placed into service. The assignments involve reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of a report documenting the work was conducted in accordance with the specifications and applicable requirements. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

Remediation & Litigation Support, 3200 Jerome Avenue, Bronx, NY (Former PS 151)

Mr. Godick managed the investigation and remediation of a former public school in the Bronx under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP). The site was contaminated with trichloroethylene (TCE) from historic operations at the property prior to use as a school. The remedial investigation included soil, groundwater, and vapor intrusion assessment both on-site and off-site. The remedial design included excavation of the source area, in-situ chemical oxidation of groundwater, and installation of a sub-slab depressurization system (SSDS) to address to potential vapor intrusion. Implementation of the remedy was complete in late 2014. The completed remediation allows for future multi-family residential, educational, childcare, and/or medical uses. Mr. Godick has also been providing litigation support and will serve as a fact witness and potentially an expert witness in connection with a cost recovery claim against the former operator of the site.

Remediation & Litigation Support, Queens West Project, Avalon Bay Communities, Queens, NY

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF prepared an Environmental Impact Statement (EIS) that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. As part of this project, Mr. Godick managed one of the largest remediation projects completed under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP) that was contaminated by coal tar and petroleum. The remedy included the installation of a hydraulic barrier (sheet pile cut off wall), excavation of contaminated soil under a temporary structure to control odors during remediation, a vapor mitigation system below the buildings, and implementation of institution controls. The investigation, remediation design, and remedy implementation, and final sign-off (issuance of Certificate of Completion) were completed in two years. Total remediation costs were in excess of $13 million. Following completion of the remediation, Mr. Godick developed a cost allocation model and provided litigation support for a cost recovery action against a former operator of the site, including participation in a deposition as a fact witness prior to settlement between the parties.

Remediation, Former Industrial Laundry/Dry Cleaning Plant, 2350 Fifth Avenue. New York, NY

Mr. Godick managed the assessment, cleanup and post-remedial operations, maintenance and monitoring of the only NYSDEC listed inactive hazardous waste (State Superfund) site in Manhattan, a former laundry/dry cleaning plant in Harlem. Remedial investigation included evaluation of soil, groundwater, soil vapor, indoor air, and building materials. Interim remediation included the removal of contaminated building materials and operation of a sub-slab vapor extraction system retrofitted into the existing building. Mr. Godick coordinated with the regulatory agencies, site owner and occupants; and managed the investigation, remedial design, and remedial implementation activities. Phase 1 of the Remedial Action Work Plan consisted of further removal of contaminated building materials. Phase 2 of the remediation included a sub-slab depressurization system (SSDS) retrofitted into the existing building, soil vapor extraction (SVE) system, and chemical oxidation injection. Remedial action work was completed in 2014 and documented in a Final Engineering Report. NYSDEC issued Certificate of Completion in January 2015 and the site has been reclassified to a "Class 4" site (site properly closed – requires continued management). Mr. Godick continues to manage the project, including operations, maintenance and monitoring of the SSDS and SVE system under the NYSDEC-approved Site Management Plan.

606 West 57th Street, New York, NY, TF Cornerstone

AKRF has been retained by TF Cornerstone to provide environmental services for the proposed redevelopment of a portion of the block bounded by Eleventh and Twelfth Avenues and West 56th and 57th Streets. The proposed actions included a zoning map amendment, zoning text amendments, a special permit, and an authorization to facilitate development of approximately 1.2 million square feet of residential and retail space. AKRF prepared an Environmental Impact Statement (EIS) for the New York City Department of City Planning (DCP) to analyze the effects of the proposed actions and development of the proposed building. The EIS addressed the full range of environmental impacts associated with the proposed development.

Mr. Godick was responsible for the elements of the EIS pertaining to hazardous materials, including coordination of a Phase I ESA and summarizing pertinent site information for the hazardous materials and construction chapters. Mr. Godick provided pre-acquisition support to TF Cornerstone, which included development of a remedial cost estimate report to outline remediation cost during site development. Mr. Godick also managed work related to the subsurface investigation, localized remediation (chemical injection and limited excavation beneath the building basement) and regulatory closure of a petroleum spill on a portion of the project site to satisfy NYSDEC requirements. After EIS certification, Mr. Godick coordinated approvals with NYCOER, the regulatory agency overseeing remedial measures related to the redevelopment of the site. The Site has an (E) Designation and is participating in the New York City Voluntary Cleanup Program. Mr. Godick managed the preparation of a Phase II Investigation Work Plan, Remedial Investigation Report, Remedial Action Work Plan, and contractor specifications for soil management and tank and hydraulic lift removal. Mr. Godick is continuing to manage the project during remediation and construction.

NYCDEP Permit Resource Division On-Call Contract, New York, NY

Under subcontract to a national engineering firm, and as part of three successive on-call contracts, AKRF provided support in a wide range of technical areas related to environmental and engineering permits for NYCDEP capital projects. These services fall into two major categories: preparing detailed guidance documents that will be used by project designers and construction managers on future projects, in order to expedite permit approvals and prevent delays; and providing expert review and guidance regarding permits for current projects, in order to ensure completeness of permit applications and effective coordination with regulatory agencies. The technical areas covered by AKRF include: wetlands, groundwater, surface water, and other natural resources; hazardous materials; traffic and transportation; air quality; noise and vibration; historic and archaeological resources; stormwater management; open space and parkland; and a broad range of permits and approvals from the New York City Fire Department (FDNY), the New York City Police Department (NYPD), the New York City Department of Buildings (NYCDOB), and other municipal agencies. AKRF also helped NYCDEP improve the overall process for tracking environmental and engineering permits and approvals, from the planning and design phases of a project to construction and long-term operation. Mr. Godick served as the hazardous materials task leader under this contract.

77 Commercial Street, Brooklyn, NY, Clipper Realty

Mr. Godick managing various environmental consulting services in connection with the proposed affordable housing development at 77 Commercial Street as part of ongoing revitalization of the Greenpoint waterfront. The project comprises the redevelopment of an approximately 110,000-squarefoot former industrial parcel into a mixed-use commercial/residential development including public waterfront esplanade, affordable housing, and three interconnected buildings ranging from 2 to 40 stories. The site is being remediated under the New York City Mayor's Office of Environmental Remediation (OER), and is listed with an E-Designation for Hazardous Materials, Air Quality, and Noise. The Remedial Investigation (RI) included 38 soil samples, 6 groundwater samples, and 11 soil vapor samples. Based on the results of the RI, AKRF prepared a Remedial Action Work Plan (RAWP) that included excavation of approximately 90,000 tons of soil, the installation of a vapor barrier beneath the entire building, and design of a sub-slab depressurization system (SSDS) for a portion of the building. Upon approval of the RAWP, the project was enrolled into OER's Voluntary Cleanup Program (VCP) to enable an exemption from hazardous waste disposal taxes, as well as to capitalize on additional community involvement provided by OER. AKRF, OER, and community leaders developed proactive measures to limit the potential disturbances from construction. AKRF conducted extensive waste characterization testing of the soil to pre-classify the material for disposal. The project is expected to break-ground in late 2015/early 2016.

164 Kent Avenue, Brooklyn, NY (AKA Northside Piers and 1 North 4th Place), RD Management, L&M Development, Toll Brothers, and Douglaston Development

The project was a multi-phase development consisting of a large waterfront block in the Williamsburg Rezoning Area. The project site has been developed with a mixed-use residential-commercial high rise towers with an esplanade and a pier along the East River. AKRF provided acquisition and development support, including performing Phase I and II environmental site assessments and development of remedial cost estimates for development, and preparation of Remedial Action Plans (RAPs) and Construction Health and Safety Plan (CHASPs) for approval by DEP and OER. AKRF provided assistance with construction oversight during soil handling activities and managing the Community Air Monitoring Plan (CAMP) activities. To date, closure reports have been prepared and occupancy now achieved for all four buildings under the project.

National Grid – Halesite Manufactured Gas Plant Site Remediation, Town of Huntington, NY

Mr. Godick managed the remedial design and engineering work associated with remediation of National Grid's former manufactured gas plant (MGP) located in the Town of Huntington. The site is situated in a sensitive location along the waterfront, surrounded by commercial and residential properties, and half the property where the remediation was conducted was a steep slope. The remedy consisted of soil removal, oxygen injection, and non-aqueous phase liquid recovery. Mr. Godick was responsible for the development of the remedial work plans, design/construction documents, landscape architecture, confirmatory sampling, air monitoring, supervision, and preparation of close-out documentation in accordance with NYSDEC requirements.

Underground Storage Tank Closure and Site Remediation–Program Management, Con Edison, New York, NY

Mr. Godick provided technical assistance to Con Edison in developing technical submittals and budgets associated with tank closures at over 50 facilities. Technical summaries were prepared for submittal of contractor-prepared closure reports to the NYSDEC. The summaries included a review of historic pre-closure assessments, tank closure data, and provided recommendations for additional assessment, remediation or closure. Subsequently, a three-year program budget was developed for implementation of the UST investigation/remedial program, which Con Edison utilized for internal budgeting purposes.

Site Investigation–Over 20 Facilities, Con Edison, New York, NY

Mr. Godick managed site investigations associated with petroleum, dielectric fluid, and PCB releases at over 20 Con Edison facilities including service centers, substations, generating stations, and underground transmission and distribution systems. Site investigations have included due diligence site reviews, soil boring installation, monitoring well installation, hydrogeologic testing, and water quality sampling. Risk-based closures were proposed for several sites.

Verizon, Investigation & Remediation, Various Locations, NY, PA and DE

Mr. Godick managed over 50 environmental investigations and remediation projects related to petroleum releases at various facilities. Responsibilities included annual budgeting, day-to-day project management, development and implementation of soil and ground water investigation workplans, ground water modeling, risk evaluation, remedial action work plans, remedial design, system installation, waste disposal, well abandonment, and operation and maintenance. Many of the assessment and remedial projects followed a risk-based approach. Remedial technologies implemented included air sparging, soil vapor extraction, bioremediation, pump and treat, soil excavation, and natural attenuation.

Storage Tank Management, Verizon, Various Locations, NY, PA, DE, and MA

Mr. Godick managed the removal and replacement of underground and aboveground storage tank systems for Verizon in New York, Pennsylvania, Delaware, and Massachusetts. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction oversight, project budget, and documentation. For selected AST sites, managed the development of Spill Control, Contingency and Countermeasures (SPCC) plans.

Litigation Support, Cost Recovery Action, Federal Superfund Site, New York

Mr. Godick is currently providing technical support to one of the 40+ potential responsible parties (PRPs) associated with a Federal Superfund site in New York State, which includes conducting a liability assessment for the various parties and development of a cost allocation model.

Litigation Support, Cost Recovery Action, New York State Superfund Site

Mr. Godick provided technical support for the former owner of a New York State Superfund site in upstate New York. Current owner of the property brought a cost recovery action against client as a potential responsibility party. Completed technical review of draft Remedial Investigation/Feasibility Study prepared by opposing party's consultant to develop more cost effective remedial strategy and to better position the client for liability allocation as part of future settlement negotiations. Developed cost allocation paper and model for settlement negotiations, as well as participated in mediation.

Litigation Support & Remediation, Former Service Station, Brooklyn, New York

Mr. Godick took over management of remediation of an inactive service station (formerly conducted by another firm). His approach outlined additional characterization and remediation efforts which resulted in successful closure of the spill by NYSDEC within two years. Mr. Godick testified as an expert witness at a hearing in the New York State Supreme Court of Kings County to determine the adequacy of the remediation efforts.

Litigation Support, Cost Recovery Action, Town of Carmel, New York

Mr. Godick served as an expert witness representing the owner of a property in a landlord-tenant dispute, which was used as a gasoline station and oil change facility. Mr. Godick prepared exhibits, testified, and participated in meetings with NYSDEC to support the landlord's claim that the oil change tenant's practices were poor and were adversely affecting the environment and the overall facility systems at the site.

Litigation Support, Cost Recovery Action, New York State Petroleum Spill Site, New York, NY

Mr. Godick provided technical support for the former owner of a New York City multi-unit residential apartment building. The State of New York brought a cost recovery action against our client as a result of a previous spill from a former underground storage tank. Reviewed invoices and project documentation to dispute work performed by the NYSDEC, which provided the basis for settlement at a fraction of the initial claim.

Litigation Support, Class Action Lawsuit, Confidential Client, NJ

Mr. Godick provided technical support for a class action suit involving a petroleum-impacted community water supply in southern New Jersey. The technical assistance included analysis of expert testimony and coordination with legal counsel in preparing for cross-examination of the opposing party's lead expert witness.

NAME: Marc S. Godick

REGISTRATION NO.: 162-44-4802

SIGNATURE:

Course Director | Date 5/11/90

Verification of Course Completion

The bearer of this card has successfully completed the prescribed course of study for hazardous waste site activities

40-hour initial health and safety training

AKRF, Inc.

440 Park Avenue South New York, New York 10016

(212) 696-0670

This is to certify that

Marc Godick

has successfully completed the course entitled Annual Refresher Course on Health and Safety for Hazardous Waste Site Investigation Personnel 8 Hour OSHA Refresher - Hazwoper Training Course Per 29 CFR 1910.120

Presented

September 28, 2017

Marcus Simons

Safety Officer

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

Michelle Lapin is a Senior Vice President with more than 25 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's Hazardous Materials group and offers extensive experience providing strategic planning and management for clients. Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, air and geotechnical problems. Her other duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

Ms. Lapin's hydrogeologic experience includes groundwater investigations, formulation and administration of groundwater monitoring programs and remediation throughout the Northeast. Her experience with groundwater contamination includes Level B hazardous waste site investigations; leaking underground storage tank studies, including hazardous soil removal and disposal and associated soil and water issues; soil gas/vapor intrusion surveys; and wetlands issues. Ms. Lapin is experienced in coordinating and monitoring field programs concerning hazardous waste cell closures. She has directed hundreds of Phase I, Phase II, and Phase III investigations and remediations, many of them in conjunction with developers, law firms, lending institutions, and national retail chains. She is also experienced in the cleanup of contaminated properties under Brownfield Cleanup Program (BCP) regulations.

BACKGROUND

Education

M.S., Civil Engineering, Syracuse University, 1985
B.S., Civil Engineering, Clarkson University, 1983

Professional Licenses/Certifications

New York State P.E.
State of Connecticut P.E.

Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters
Member, American Society of Civil Engineers (ASCE), National and CT Chapters
Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)
Member, Environmental Professionals' Organization of Connecticut (EPOC)
Board Member, New York City Brownfield Partnership

Years of Experience

Year started in company: 1994
Year started in industry: 1986

RELEVANT EXPERIENCE

West 61st Street Rezoning/Residential Development, New York, NY

Ms. Lapin is directing the firm's hazardous materials work for this mixed-use development in Manhattan. The Algin Management Company hired AKRF to prepare an environmental impact statement (EIS) for the proposed rezoning of the western portion of the block between West 60th and 61st Streets, between Amsterdam and West

End Avenues. The purpose of the proposed action was to facilitate the development of two 30-story residential towers with accessory parking spaces, and landscaped open space. The EIS examined a "worst case" condition for rezoning the block, which allowed Algin to build a residential building of approximately 375,000 square feet at their site. The building now contains 475 apartments, 200 accessory parking spaces, a health club, and community facility space. This site, with the services of AKRF, entered into New York State's Brownfield Cleanup Program (BCP). On-site issues included underground storage tanks remaining from previous on-site buildings, petroleum contamination from these tanks and possibly from off-site sources, and other soil contaminants (metals, semi-volatile organic compounds, etc.) from fill materials and previous on-site buildings. AKRF oversaw the adherence to the Construction Health and Safety Plan (HASP), which was submitted to and approved by the New York State Department of Environmental Conservation (NYSDEC), and monitored the waste streams, to ensure that the different types of waste were disposed of at the correct receiving facilities. This oversight also included confirmation and characteristic soil sampling for the receiving facilities and NYSDEC. A "Track 1" Clean up of the majority of the property (the portion including the buildings) was completed and the final Engineering Report was approved by the NYSDEC. AKRF has also completed a smaller portion of the property as a "Track 4" cleanup, which includes a tennis court and landscaped areas.

Hudson River Park, New York, NY

Ms. Lapin is directing AKRF's hazardous materials work during construction of Hudson River Park, a five-mile linear park along Manhattan's West Side. As the Hudson River Park Trust's (HRPT's) environmental consultant, AKRF is overseeing preparation and implementation of additional soil and groundwater investigations (working with both NYSDEC and the New York City Department of Environmental Protection (NYCDEP)), all health and safety activities, and removal of both known underground storage tanks and those encountered during construction. Previously, the firm performed hazardous materials assessments as part of the environmental impact statement (EIS) process, including extensive database and historical research, and soil and groundwater investigations. Ms. Lapin has been the senior consultant for the soil and groundwater investigations and remediation, and the asbestos investigations and abatement oversight.

Roosevelt Union Free School District – District-wide Improvement Program, Roosevelt, NY

Ms. Lapin managed the hazardous materials investigation for the Draft and Final EISs for the improvement program, which included the demolition of three existing elementary schools and portions of the junior-senior high school, and the reconstruction of three replacement elementary schools, a separate replacement middle school, and renovations to the high school. Following the EIS, additional hazardous materials investigations were completed, including comprehensive asbestos and lead surveys; Phase I and Phase II Environmental Site Assessments; the preparation of asbestos, lead, hazardous materials and demolition specifications; and obtaining site-specific variances from the New York State Department of Labor (NYSDOL). The middle school remediation was conducted through coordination with the NYSDEC, New York State Department of Health (NYSDOH), the New York State Education Department (NYSED) and the local school district. After project approval and completion of construction/renovation of the new middle school, the school opened for the Fall 2008 semester as planned. AKRF continues to provide oversight for ongoing abatement at a number of the schools, and overall environmental consulting to the school district.

Fiterman Hall Deconstruction and Decontamination Project, New York, NY

The 15-story Fiterman Hall building, located at 30 West Broadway, originally constructed as an office building in the 1950s, had served as an extension of the City University of New York (CUNY) Borough of Manhattan Community College (BMCC) since 1993. The building was severely damaged during the September 11, 2001, World Trade Center (WTC) attack when 7 WTC collapsed and struck the south façade of the building, resulting in the partial collapse of the southwest corner of the structure. The building was subsequently stabilized, with breaches closed and major debris removed. Because extensive mold and WTC dust contaminants remain within the building, it must be taken down. The project required the preparation of two environmental assessment statements (EASs)—one for the deconstruction and decontamination of Fiterman Hall and one for the construction of a replacement building on the site. AKRF prepared the EAS for the Deconstruction and Decontamination project, which included the decontamination of the interior and exterior of the building, the removal and disposal of all building contents, and the deconstruction of the existing, approximately 377,000-gross-square-foot partially collapsed structure. Ms. Lapin reviewed the EAS's deconstruction and decontamination plans. The cleanup plan was submitted to the United States Environmental Protection Agency (USEPA).

Columbia University Manhattanville Academic Mixed-Use Development, New York, NY
Ms. Lapin served as Hazardous Materials Task Leader on this EIS for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University's existing Morningside campus. The Hazardous Materials work included Phase I Environmental Site Assessments for the properties within the site boundaries, and estimates for a Subsurface (Phase II) Investigation of the entire development area. The firm's Hazardous Materials group has performed over 30 individual Phase I Environmental Site Assessments for properties within the development area. In addition, a Preliminary Environmental Site Assessment (PESA) was completed in conjunction with the EIS. Based on the Phase I studies, AKRF conducted a subsurface (Phase II) investigation in accordance with an NYCDEP-approved investigative work plan and health and safety plan. Subsurface activities included the advancement of soil borings, groundwater monitor wells, and the collection of soil and groundwater samples for laboratory analysis. This study estimated costs to remediate contaminated soil, groundwater and hazardous building materials, including lead-based paint and asbestos-containing materials.

Yonkers Waterfront Redevelopment Project, Yonkers, NY
For this redevelopment along Yonkers' Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I assessments of 12 parcels, investigations of underground storage tank removals and associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, which enabled construction of mixed-use retail, residential development, and parking.

Davids Island Site Investigations, New Rochelle, NY
Ms. Lapin managed the hazardous materials investigation of Westchester County's Davids Island, The island, which features pre- and post-Civil War military buildings and parade grounds and is viewed as a major heritage, tourism, and recreational amenity, was planned for county park purposes. The investigation included a Phase I site assessment, with historical research dating to the 17th century, a Phase II (Subsurface) Investigation, underground storage tank investigations, asbestos surveys, and conditions surveys of all remaining structures. Cost estimates were submitted to Westchester County for soil remediation, asbestos abatement, and building demolition.

Site Selection and Installation of 11 Turbine Generators, New York and Long Island, NY
AKRF was retained by the New York Power Authority (NYPA) to assist in the State Environmental Quality Review Act (SEQRA) review of the proposed siting, construction, and operation of 11 single-cycle gas turbine generators in the New York metropolitan area. Ms. Lapin managed the hazardous materials investigation of the sites. The work included Phase I site assessments, subsurface investigations, and construction health and safety plans.

Cross Westchester (I-287) Expressway Phases V and VI, Westchester County, NY
Ms. Lapin served as Project Manager for the New York State Department of Transportation's (NYSDOT) reconstruction of Westchester County's major east-west artery and was responsible for directing the contaminated materials aspect of the final design effort. As part of her duties, she managed the asbestos investigations at eight bridges and wetland delineation along the entire corridor, wrote the scope of work and provided general project management.

Supermarket Redevelopment, New Fairfield, CT
AKRF provided consulting services to the developer and owner of a 9-acre site including conducting a remedial investigation and remediation of a site contaminated from former dry cleaning operations and off-site gasoline spills. The investigation included the installation of monitoring wells in three distinct aquifers, geophysical logging, pump tests, and associated data analysis. Ms. Lapin presented the environmental issues and planned remediation to local and state officials during the early stages of the planning process to incorporate their comments into the final remedial design. A remedial action work plan (RAWP) was completed and approved by the Connecticut

Department of Environmental Protection within a year to enable redevelopment work for a new supermarket and shopping center. The RAWP included the remediation of soil within the source area and a multi-well pump and treat system for the recovery of non-aqueous and dissolved phase contamination in groundwater. The design of the recovery well system included extensive groundwater modeling to ensure capture of the contaminant plume and the appropriate quantity and spacing of the wells. Ms. Lapin directed the soil removal remedial activities and monitoring for additional potential contamination during construction. In addition, AKRF performed comprehensive pre-demolition asbestos and lead-based paint surveys of the former site structures, conducted abatement, air monitoring and oversight, and provided environmental consulting support for the development of the site. The groundwater remediation system was installed during site development and began operation once development was complete.

East 75th/East 76th Street Site, New York, NY

Ms. Lapin served as Senior Manager for this project that encompassed coordination and direct remediation efforts of this former dry cleaning facility and parking garage prior to the sale of the property and its ultimate redevelopment for use as a private school. A preliminary site investigation identified 20 current and former petroleum and solvent tanks on the property. A soil and groundwater testing program was designed and implemented to identify the presence and extent of contamination resulting from potential tank spills. This investigation confirmed the presence of subsurface petroleum contamination in the soil and solvent contamination from former dry cleaning activities in the bedrock. AKRF completed oversight of the remediation under the State's Voluntary Cleanup Program. Remediation, consisting of tank removals and excavation of contaminated soil and the removal of solvent-contaminated bedrock down to 30 feet below grade, has been completed. AKRF completed oversight of the pre-treatment of groundwater prior to discharge to the municipal sewer system and an off-site study to determine impacts to groundwater in downgradient locations.

Home Depot, Various Locations, NY

Ms. Lapin, serving as either Project Manager or Senior Manager, has managed the investigations and remediation at multiple Home Depot sites in the five boroughs, Long Island, and Connecticut. The investigations have included Phase I and II site assessments, asbestos and lead paint surveys, abatement specifications and oversight, and soil and groundwater remediation.

Avalon on the Sound, New Rochelle, NY

For Avalon Bay Communities, Ms. Lapin managed the investigations and remediation of two luxury residential towers and an associated parking garage. Remediation of the first phase of development (the first residential tower and the parking garage) included gasoline contamination from a former taxi facility, fuel oil contamination from multiple residential underground storage tanks, and chemical contamination from former on-site manufacturing facilities. The remediation and closure of the tank spills was coordinated with the New York State Department of Environmental Conservation (NYSDEC). The initial investigation of the Phase II development—an additional high-rise luxury residential building—detected petroleum contamination. A second investigation was conducted to delineate the extent of the contamination and estimate the costs for remediation. AKRF oversaw the remediation and conducted the Health and Safety monitoring. The remediation was completed with closure and approvals of the NYSDEC.

East River Science Park, New York, NY

Originally, New York University School of Medicine (NYUSOM) retained the firm to prepare a full Environmental Impact Statement (EIS) for its proposed East River Science Park (ERSP). As originally contemplated, the proposed complex was to occupy a portion of the Bellevue Hospital campus between East 30th Street and approximately East 28th Street and would have included a clinical practice, research, and biotech facilities, housing units, a child care center, and a conference center and parking.

Ms. Lapin managed the Phase I Environmental Site Assessment and other hazardous materials-related issues. Events relating to September 11, 2001 delayed the project for several years. When it resurfaced with a new developer and a diminished scope, Ms. Lapin updated the hazardous materials issues and consulted with the new developer regarding remediation strategies and involvement of regulatory agencies. For the actual remediation/development, the city requested oversight by AKRF to represent its interests (the city is retaining ownership of the land). Ms. Lapin completed directing the remediation oversight on behalf of the City of New York for the remediation of this former psychiatric hospital building, laundry building and parking areas. The new 550,000 square-foot development includes a biotechnology center, street level retail, and an elevated plaza.

Certificate Of Completion

This Certifies That

Michelle Lapin

has completed the 40 hour course:

OSHA 40 Hour Personnel Protection & Safety Course

Presented by

HAZCO

Spanning the Hazardous Materials
Health and Safety Horizons

April 24-27, 1987

Date

Training Director

AKRF, Inc.
440 Park Avenue South New York, New York 10016
(212) 696-0670

This is to certify that

Michelle Lapin

has successfully completed the course entitled Annual Refresher Course on Health and Safety for Hazardous Waste Site Investigation Personnel 8 Hour OSHA Refresher - Hazwoper Training Course Per 29 CFR 1910.120

Presented
September 28, 2017

Marcus Simons
Safety Officer

DEBORAH SHAPIRO, QEP

VICE PRESIDENT

Deborah Shapiro is a Vice President with 17 years of experience in the assessment and remediation of hazardous waste issues. Ms. Shapiro supervises project teams and manages all aspects of assessment and remediation projects. Ms. Shapiro works with developers, non-profit organizations, architects, local community groups, local businesses, and government agencies. Her projects fall under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER including the New York State Brownfield Cleanup Program (BCP), New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, RCRA/UIC closures, and NYCOER's E-designation program. Ms. Shapiro has also assisted commercial and industrial property owners with maintaining the integrity of their portfolios by providing compliance related cleanup and chemical storage management services.

Ms. Shapiro manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management. In addition, her experience includes groundwater investigations, monitoring, and sampling programs; Brownfield and hazardous waste site investigations; In-Situ Chemical Oxidation; underground storage tank studies, including soil contamination delineation, classification, removal and disposal; waste characterization sampling; exposure assessments; on-going remedial action (especially AS/SVE), and permitting.

Prior to joining AKRF, Ms. Shapiro was a Senior Project Manager at CA RICH Consultants, Inc. in Plainview, New York. She was responsible for the design, implementation, and management of environmental assessment, investigation and remediation projects on Long Island and across the New York Metropolitan Area. Ms. Shapiro has also been a moderator and panelist at numerous conferences.

BACKGROUND

Education

M.S., Environmental Science, American University, 2001
B.A., Environmental Studies, American University, 1998

Professional Licenses/Certifications

Qualified Environmental Professional
Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120
OSHA 10 Hour Occupational Construction Safety and Health

Professional Memberships

Past President, New York City Brownfield Partnership
Board Member, Residents for a More Beautiful Port Washington
Member, Institute of Professional Environmental Practitioners (IPEP)

Awards

Big Apple Brownfield Award recipient as part of the Courtlandt Crescent redevelopment team 2013
Big Apple Brownfield Award recipient as part of the Via Verde redevelopment team 2012
Big Apple Brownfield Award recipient as part of the Cornerstone B1 (LaTerraza) redevelopment team 2011

Years of Experience

Year started in company: 2013
Year started in industry: 1998

Relevant Experience

Elton Crossing, Bronx, NY

AKRF is currently providing environmental consulting services in connection with the Elton Crossing site in the Bronx, NY. The work initially involved the preparation of a Phase I Environmental Site Assessment and Phase II subsurface investigation including soil and soil vapor testing to determine if the site would be eligible for the New York State Brownfield Cleanup Program (NYSBCP) based on its historic usage. AKRF prepared a NYCBCP Application and the site was accepted in to the NYSBCP. AKRF managed all aspects of the brownfield cleanup including; development of Remedial Investigation (RI) and Supplemental Remedial Investigation (SRI) Work Plans, conducting the RI and SRI and preparing the associated reports, preparation of a Citizen Participation Plan, distribution of public notices, and preparation of a Remedial Action Work Plan (RAWP). AKRF managed all aspects of the remediation, including providing guidance for the closure of two petroleum spills; the registration, removal, and closure of six petroleum storage tanks encountered during excavation; and waste characterization and disposal of soil with contaminants including hazardous lead, petroleum, and pesticides, and design of a Sub-Slab Depressurization System (SSDS). AKRF prepared and submitted a Site Management Plan (SMP) and a Final Engineering Report (FER), which documented compliance with the RAWP. The SMP and FER were approved by NYS in 2016. AKRF is currently providing long-term site management in accordance with the NYSBCP.

On-Call Environmental Consulting Services (Various Locations), New York City Mayor's Office of Environmental Remediation (OER) (administered by NYCEDC)

Ms. Shapiro is managing an on-call contract with the OER for brownfields environmental assessment and remediation. The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by EPA grants. The work plans and investigation reports were completed in accordance with OER and EPA requirements. AKRF also implemented a remedial plan for capping a park site in Staten Island. In addition, Ms. Shapiro is providing support to OER and an affordable housing developer to expedite an application for entry into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), as well as preparation and implementation of the remedial investigation and remedial plan.

Atlantic Chestnut, Brooklyn, NY

AKRF was retained by Phipps Houses to provide environmental consulting services in connection with the purchase and development of former burned manufacturing buildings encompassing an entire city block in Brooklyn, New York. As part of due diligence, AKRF prepared a Phase I Environmental Site Assessment (ESA) Report for the property. After acquisition, the property was divided into three separate sites (3264 Fulton Street, 235 Chestnut Street, and 3301 Atlantic Avenue). AKRF prepared a Subsurface (Phase II) Investigation Work Plans and conducted Phase IIs at each of the sites, which included the collection and analysis of soil, soil vapor, and groundwater samples. Based on the results of the Phase IIs, which were documented in Subsurface (Phase II) Reports, New York State Brownfield Cleanup Program (NYSBCP) applications were prepared for each of the sites. After acceptance into the NYSBCP, AKRF prepared Citizen Participation Plans (CPPs) and distributed public notices. AKRF prepared Remedial Investigation (RI) Work Plans (RIWPs) for each of the sites to further investigate contaminated media at the site prior to redevelopment, conducted the RIs, and is in the process of preparing the RI Reports (RIRs).

Second Farms, Bronx, NY

AKRF, Inc. was contracted by the New York City Office of Environmental Remediation (NYCOER) to conduct a subsurface investigation of a 1.12-acre parcel in the Bronx, New York under the United States Environmental Protection Agency (USEPA) Brownfield Assessment Grant program. The investigation included a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples.

Brook 156, Bronx, NY

AKRF was retained by Phipps Houses to provide environmental consulting services in connection with the purchase and development of two lots located at 740 Brook Avenue in the Bronx, NY. AKRF prepared a Phase I Environmental Site Assessment (ESA) of the NYC-owned former gasoline service station and a former railroad. A Tier 1 Vapor Encroachment Screening was also conducted to satisfy HUD's vapor intrusion requirements. AKRF prepared a Remedial Investigation Work Plan (RIWP) and conducted a Remedial Investigation (RI) at the site, which included the collection and analysis of soil, soil vapor, and groundwater. The results of the RI, which were documented in a Remedial Investigation Report (RIR), were used to prepare a New York City Brownfield Cleanup Program (NYCBCP) application. The site was accepted into the New York State Brownfield Cleanup Program (NYSBCP). AKRF prepared a Citizen Participation Plan (CPP), distributed public notices, and is in the process of preparing a Supplemental Remedial Investigation Work Plan (SRIWP) to further investigate soil, soil vapor, and groundwater at the site prior to redevelopment.

Warbrook Portfolio, Manhattan, NY

AKRF provided environmental consulting services to Genesis Y15 Developer LLC and the Abyssinian Development Corporation (ADC) for the proposed rehabilitation of 30 parcels in Central Harlem for low- and moderate-income tenants. The parcels comprise two vacant lots and 28 residential buildings, including several buildings that are vacant or partially vacant. The client is seeking 4% Low-Income Housing Tax Credits issued by the New York City Housing Development Corporation (HDC) through the New York City Department of Housing Preservation & Development (HPD) to rehabilitate the 30 parcels. AKRF prepared a Phase I Environmental Site Assessment for all parcels. The Phase I summarized environmental issues based on a review of available environmental reports, a review of regulatory records, and on-site inspections. Limited Phase II Environmental Site Assessments were conducted at parcels where recognized environmental concerns were identified. Based on evidence of suspect mold associated with the Property parcels, AKRF also prepared a mold specification section for use during renovation of the Property.

Courtlandt Crescent, Bronx, NY

Ms. Shapiro directed all Phases of this NYS Brownfield Cleanup Program project in the Melrose Commons section of the Bronx from the initial Phase I and II through the Certificate of Completion and is currently managing the implementation of the Site Management Plan. A New York State Brownfield Cleanup Program (BCP) Application was submitted simultaneously with the Remedial Investigation Report (RIR) and Remedial Action Work Plan (RAWP), which sped up the timetable so that the remediation could be implemented concurrently with the planned site redevelopment activities. The site comprised an entire city block whose historic usage included a gasoline filling station, auto repair shop, machine shop, auto junkyard, iron works, boiler repair shop, brass fabricator shop, universal machinery manufacturing, waste paper company, cosmetic company, and a saw works. The investigation included soil and soil vapor testing as well as the installation and sampling of groundwater monitoring wells. The remedial activities included the removal of underground storage tanks and hydraulic lifts, soil waste classification testing, the excavation and removal of approximately 23,000 tons of non-hazardous petroleum and metals contaminated soil as well as hazardous soil containing lead, in-situ chemical oxidation, and installation of a composite cover system. In addition, site dewatering activities allowed the elevator pits to be advanced into the groundwater table. A vapor barrier (and water-proofing for the elevator pits) was installed beneath the two new buildings' foundations and a sub-slab depressurization system (SSDS) was incorporated into the buildings' foundations to eliminate the potential exposure pathway for soil vapor into the new affordable housing residential buildings. Ms. Shapiro directed the remedial activities and monitoring under a construction health and safety plan, which included a community air monitoring program. Site management activities include post-remedial groundwater monitoring and sampling, SSDS start-up testing and operations and maintenance, and annual institutional control/engineering control inspections. The project was the recipient of the 2013 Big Apple Brownfield Award.

ExxonMobil, Multiple Locations, NY

Ms. Shapiro has managed the investigation and remediation of numerous ExxonMobil retail service stations in the five boroughs and Long Island. The investigations have included Phase I, II, and III site assessments, regulatory compliance, emergency spill response, UST removals, and soil and groundwater remediation.

CERTIFICATE OF TRAINING

Deborah Kaplan

Has Successfully Completed A Course Of Instruction On

40-Hour HAZWOPER

AS REQUIRED BY OSHA (29 CFR 1910.1210)

Friday, December 07, 2001

MILLER ENVIRONMENTAL GROUP INC.

538 Edwards Ave.
Calverton, NY 11933 USA

Course Number: 2001149
Certificate Number: 2001149-5793

Scott Welsh

Instructor

George Wallace III

Director of Training

AKRF, Inc.
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(212) 696-0670

This is to certify that

Deborah Shapiro

has successfully completed the course entitled Annual Refresher Course on Health and Safety for Hazardous Waste Site Investigation Personnel 8 Hour OSHA Refresher - Hazwoper Training Course Per 29 CFR 1910.120

Presented
September 28, 2017

Marcus Simons
Safety Officer

AMY T. JORDAN

GEOLOGIST

Amy Jordan is a Geologist with 6 years of environmental consulting experience related to site assessment and remediation. Ms. Jordan works with non-profit organizations, affordable housing developers, for-profit developers, and government agencies under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER. She works with projects enrolled in the New York State Brownfield Cleanup Program (BCP), the New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, and NYCOER's E-designation program. Ms. Jordan conducts and manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management.

BACKGROUND

Education

B.A. Geosciences, Franklin and Marshall College, Lancaster, PA, 2011

Licenses/Certifications

40 Hour OSHA HAZWOPER Certified

OSHA 10 Hour Occupational Construction Safety and Health

NYSDEC Erosion and Sediment Control Inspector

Amtrak Track Training

NYS Asbestos Inspector

Years of Experience

Year started in company: 2012
Year started in industry: 2011

RELEVANT EXPERIENCE

12 Eckford Street, Brooklyn, New York

AKRF is providing environmental consulting services in connection with the redevelopment of the New 470 Project into a mix of affordable and market-rate residences located at 12 Eckford Street in Brooklyn, New York. Ms. Jordan developed and conducted several investigations at the property under the oversight of NYCOER. Ms. Jordan is currently preparing a BCP Application and designing the remedial action for the site, which will include the design and installation of a sub-slab depressurization system (SSDS) and soil vapor extraction (SVE) system; hazardous waste delineation and disposal; construction oversight; and ongoing remedial monitoring under the oversight of the NYSDEC. The work will culminate with a Final Engineering Report to document the completion of remedial actions and to establish protocol for site monitoring.

Elton Crossing, Bronx, New York

AKRF provided environmental consulting services in connection with the purchase and redevelopment of the Elton Crossing site at 899 Elton Avenue in the Bronx, New York. The work initially involved the preparation of a Phase II subsurface investigation including soil and soil vapor testing to determine if the site would be eligible for the BCP under NYSDEC oversight. Upon completion of the investigation, Ms. Jordan prepared a NYCBCP Application and the site was accepted in to the NYSBCP. Ms. Jordan prepared an updated Phase I Environmental Site Assessment Report and managed all aspects of the brownfield cleanup including development of a Supplemental Investigation Work Plan, performing a Supplemental Remedial Investigation and preparing a Supplemental Investigation Report, preparation of a Citizen Participation Plan, distribution of public notices, and preparation of a Remedial Action Work Plan (RAWP). AKRF oversaw all remediation at the Site, which included the removal of numerous underground oil tanks, and waste characterization and disposal of soil with contaminants including hazardous lead, petroleum, and pesticides. The project will be completed in Fall 2016 with the preparation of a Final Engineering Report to document the remedial activities and installation of institutional controls including a vapor barrier and AKRF-designed sub-slab depressurization system.

3363 and 3365 Third Avenue, Bronx, New York

AKRF is providing environmental consulting services in connection with the purchase and redevelopment of this property into affordable housing units under NYCOER's VCP. Ms. Jordan prepared two Phase I ESAs in accordance with New York City Acquisition Fund (NYCAF) protocol; conducted several subsurface investigations and waste classification sampling; prepared a VCP Application; and manages all aspects of the construction phase of this project.

Atlantic Chestnut Lots 1, 2, and 3, Brooklyn, New York

AKRF is providing environmental consulting services in connection with the purchase and redevelopment of these three lots from a burned factory into affordable housing units. For this project, Ms. Jordan prepared a Phase I ESA, conducted three subsurface investigations, and prepared three BCP Applications. Ms. Jordan will oversee the redevelopment, remediation, and ongoing remedial monitoring for these three sites comprising an entire city block.

New York City School Construction Authority, Various Locations, New York City

Under an on-call contract, AKRF provides the New York City School Construction Authority (NYCSCA) with hazardous materials consulting services. Ms. Jordan is involved with various due diligence and environmental assessment projects including Phase I Environmental Site Assessments (ESAs); Phase II (Subsurface) Environmental Site Investigations (soil, groundwater and soil vapor intrusion investigations); Indoor Air Quality (IAQ) Assessments; Underground Storage Tank (UST) and Aboveground Storage Tank (AST) inspections relating to boiler conversions; and peer review of other consultant's due diligence reports.

Training Course Completion Card

Safety Unlimited, Inc.

Certifies That

AMELIA JORDAN

has sucessfully completed

OSHA 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29CFR 1910.120(e)

And State OSHA/EPA Regulations as well

(See back side for more information)

111127153834	11/27/2011	Jules Griggs
Certificate #	Date Issued	Training Director

AKRF, Inc.
440 Park Avenue South New York, New York 10016
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This is to certify that

Amelia Jordan

has successfully completed the course entitled Annual Refresher Course on Health and Safety for Hazardous Waste Site Investigation Personnel 8 Hour OSHA Refresher - Hazwoper Training Course Per 29 CFR 1910.120

Presented
September 28, 2017

Marcus Simons
Safety Officer

TIMOTHY MCCLINTOCK

ENVIRONMENTAL SCIENTIST

Mr. McClintock has over 9 years of environmental consulting experience, including implementing and managing Phase I Environmental Site Assessments, Phase II Environmental Site Investigations and Remedial Investigations, overseeing remedial action programs including soil excavation, groundwater handling, remediation system installation, operation and maintenance, and project management and reporting. He has successfully remediated projects and obtained closure from several northeast authorities, including the New York State Department of Environmental Conservation (NYSDEC), New Jersey Department of Environmental Protection (NJDEP), Pennsylvania Department of Department of Environmental Protection (PADEP), Connecticut Department of Energy & Environmental Protection (CTDEEP) and Massachusetts Department of Environmental Protection (MassDEP).

BACKGROUND

Education
B.S. Environmental Science/Earth Science, University at Albany, 2008

Licenses & Certifications
OSHA 40-hour Health & Safety Training for Hazardous Waste Operations (September, 2019)
OSHA 10-hour Health and Safety Training for Construction Safety and Health
NJDEP Subsurface Evaluator & UST Closure (December, 2019)
NYSDOH Certified Asbestos Inspector (March, 2019)
NYSDOH Mold Assessor (November, 2018)

Years of Experience
Date started at AKRF: August, 2017
Prior industry experience: Dorson Environmental Management, Inc. – August 2008 to August 2017 (9 years)

RELEVANT EXPERIENCE

Former Farm Gasoline Underground Storage Tank Remediation, Somerset County, NJ

Mr. McClintock serves as the field team leader and deputy project manager for the LSRP-led remediation of a former gasoline UST located on a farm property in the Watchung Mountain region of New Jersey. Following a site investigation (contamination screening), AKRF is currently conducting an investigation to bioremediate groundwater at the site, which contains residual benzene and MTBE. Mr. McClintock is integral to the preparation of a Remedial Action Workplan (RAWP), for the carrying out of groundwater sampling investigations, a biotreatability study, and the evaluation of data resulting from the site work.

1-65 North 12th Street, Brooklyn, New York

The former Bayside Fuel Oil Company operated a commercial petroleum bulk storage facility at the property for several decades. Soil and groundwater contamination resultant of on-site and off-site petroleum releases, off-site manufactured gas plant (MGP) releases, and historic fill have been identified throughout the property. Mr. McClintock assisted senior AKRF project staff with the evaluation of historical assessment information, the preparation of a Remedial Action Plan (RAP), and a Construction Health and Safety Plan (CHASP) for this site.

Confidential Client: New York City Institutional Site - Soil Classification:

Mr. McClintock is the field team leader for the soil classification work associated with the proposed development of an addition at a New York City institutional site. He assisted senior project staff with the coordination of site work, and directed the field effort including the collection of soil samples to characterize the current subsurface conditions. Mr. McClintock's role included evaluating soil analytical data and project reporting.

White Plains Mall, 200 Hamilton Avenue, White Plains, New York - Spill Investigation and Brownfield Cleanup Program Enrollment

Mr. McClintock served as the field team leader for the Spill Investigation work associated with historic gasoline stations at the White Plains Mall. He assisted senior project staff with the evaluation of historical assessment information, and the development and implementation of a Spill Investigation to delineate the extent of petroleum-contaminated soil and groundwater. He directed field sampling, including soil and groundwater samples, and evaluated the data and associated reporting. The project would apply for the NYSDEC Brownfield Cleanup Program.

Proposed Public School, Queens, New York - Phase II Investigation

Mr. McClintock served as field team leader for the Phase II Investigation work associated with proposed development of NYCDOE Public School at a vacant lot in Queens, New York. He assisted senior project staff with the evaluation of historical assessment information, the development and implementation of the Phase II Investigation to characterize the current subsurface conditions, and directed the field effort including the collection of soil, soil vapor, and groundwater samples. Mr. McClintock evaluated analytical data, and contributed to the reporting effort.

Petroleum Release/Oil Tank Remediation Projects – New York, New Jersey, Pennsylvania and Connecticut (2008 – 2017)

Mr. McClintock completed the design and implementation of environmental investigations and remediation projects associated with petroleum releases at residential and commercial sites throughout the northeast. Tasks included project design, site investigation, project direction and oversight, soil and groundwater sampling, data evaluation, client and contractor coordination, regulatory agency interaction and associated reporting and deliverable production.

Phase I Environmental Site Assessment and Phase II Environmental Site Investigation Projects – New York and New Jersey (2008 – 2017)

Mr. McClintock completed Phase I and Phase II environmental site assessments (ESAs) and investigations (ESIs) at residential and commercial properties associated with real estate transactions. Tasks included site inspections, historic environmental data report and regulatory record evaluations, environmental media sampling, client and contractor coordination, and associated reporting and deliverable production.

Storm Water Investigation Projects – New York (2008 – 2017)

Mr. McClintock assisted senior project staff with the investigation of actual and suspected storm water discharges at various sites throughout New York while at Dorson Environmental Management, Inc. Tasks included investigation into suspected non-permitted storm water discharges for environmental attorneys, preparation of Storm Water Pollution Prevention Plans (SWPPP) to assist property owners with obtaining the NYSDEC General Permit for Storm Water Discharges, storm water sampling, storm water drainage mapping, data evaluation, and associated reporting and deliverable production.

Former Flamingo Cleaners, 149 North Avenue, New Rochelle, New York

Mr. McClintock completed site investigations, developed a Remedial Action Work Plan (RAWP), provided remediation oversight and regulatory agency interaction, conducted environmental media sampling, and prepared report packages associated with comingled petroleum and chlorinated contamination at a former dry cleaning facility. The work was conducted in accordance with the NYSDEC Brownfield Cleanup Program and included site characterization, excavation and disposal of contaminated source material, removal and treatment of contaminated groundwater, in situ chemical oxidation of residual contamination and the implementation of institutional and engineering controls.

Former Gasoline Station, 66 Milton Road, Rye, NY

Mr. McClintock designed and implemented a site investigation and remedial excavation program to address historic contamination at a former gasoline station. The site work included the delineation of the residual soil and groundwater contamination, excavation of contaminated source material, removal of contaminated groundwater, post-remedial soil and groundwater sampling and associated reporting to close the NYSDEC spill number associated with the property. All site work was coordinated through the current building management and tenant association, the NYSDEC and the City of Rye.

Water and Mold Damage Investigation and Remediation Projects – New York, New Jersey, and Connecticut (2008 – 2017)

Mr. McClintock completed the design and implementation of environmental investigations, cause and origin analyses, and remedial projects associated with water and mold damage claims for various insurance carriers during his tenure with Dorson Environmental Management. Tasks included site investigation, cause and origin determination, project direction and oversight, environmental media sampling, data evaluation, client and contractor coordination, and associated reporting and deliverable production.

GEORGE KOKALIARIS, EIT

ENVIRONMENTAL ENGINEER

Mr. Kokaliaris is an Environmental Engineer with three years of experience in the field. His experience includes remediation system operations and maintenance (O&M), remedial technologies including soil vapor extraction (SVE), subsurface depressurization systems (SSDS), and groundwater treatment systems. Mr. Kokaliaris also has experience in urban and groundwater hydrology, construction and installation oversight, and health and safety.

BACKGROUND

Education

Candidate for M.S., Water Resources and Environmental Engineering, Villanova University
B.S., Chemical Engineering, Villanova University, 2015
Fordham University, 2011-2012

Licenses & Certifications

Engineer-in-Training
OSHA-10 Hour Occupational Construction Health and Safety
HAZWOPER-40
Amtrak Track Training
Loss Prevention System Supervisor
NYSDEC Erosion and Sediment Control Inspector

Years of Experience

Year started in company: 2018
Year started in industry: 2015

RELEVANT EXPERIENCE

145 West Street, Greenpoint, NY

At the former Huxley Envelope site in Greenpoint, Brooklyn, Mr. Kokaliaris assisted with the post remediation efforts including park construction oversight, including implementation of the Community Air Monitoring Plan and oversight of soil removal. Currently, Mr. Kokaliaris ensures compliance with the Site Management Plan (SMP), and assisted with the site inspection for the Periodic Review Report (PRR).

111-10 Astoria Boulevard, Queens NY.

Mr. Kokaliaris assisted with the remedial construction efforts, including implementation of the Community Air Monitoring Plan, oversight of soil removal, soil classification sampling, confirmatory endpoint sampling, and daily reporting.

Confidential Client: New York City Institutional Site - Soil Classification:

Mr. Kokaliaris lead portions of the field effort at the proposed development of an addition at a New York City institutional site. Mr. Kokaliaris assisted in the collection of soil samples, soil characterization, and an air monitoring Plan.

Multimillion-gallon Petroleum Hydrocarbon Release from Former Refinery and Storage Terminal, Greenpoint, NY

Mr. Kokaliaris served as a Staff Engineer overseeing the operations and maintenance of two groundwater treatment, and one soil vapor extraction system. His responsibilities included obtaining and analyzing field data to optimize system performance and quantify free-product recovery. He also drafted and updated process and instrumentation diagrams (P&ID) process flow diagrams, coordinated system maintenance and upgrades, correlated iron concentration with turbidity to evaluate iron removal and quantify mass loading across treatment system, and oversaw a vacuum-enhanced recovery (VER) pilot study at several dual pump liquid-extraction recovery wells. Additional responsibilities included quantifying stormwater runoff that merged with treatment system effluent/discharge, prepare discharge monitoring reports for submittal to NYSDEC, ensure regulatory compliance with State Pollution Discharge Elimination System (SPDES) permit, manage markout requests for underground utilities, and evaluating health and safety metrics.

Vapor Mitigation System Installation, Woodridge, NJ

Mr. Kokaliaris served as the field manager for the installation of a vapor mitigation system (VMS) to relieve chlorinated solvents present in the subsurface of a 1.5 million ft^2 commercial warehouse in Woodridge, NJ. Primary responsibilities included designing piping layout to optimize blower efficiency, performing initial head loss calculations for piping layout design, the installation oversight of 620 vapor extraction points across multiple tenant spaces, and scheduling and coordinating with subcontractors.

Roux Associates, Inc., Islandia, NY

As a Staff Engineer, Mr. Kokaliaris was primarily responsible for operations, maintenance, and management of remediation systems, groundwater treatment systems, soil vapor extraction systems, and subsurface depressurization systems (SSDS). Additional responsibilities included ensuring regulatory compliance with city and state regulators, performing construction and installation oversight, community air monitoring programs, and performing groundwater, soil, and soil-vapor investigations. He evaluated health and safety metrics.

Student Affiliation:
Roux Associates Inc
99061974

Compliance Solutions
"Today's Training...Tomorrow's Solution"

3980 Quebec St., 2nd Floor, Denver CO 80207-1633 800-711-2706

Certificate of Completion

This is to certify that

George Kokaliaris

has been tested and successfully meets the training requirements for

40-Hour HAZWOPER
as per 29 CFR 1910.120(e)

Presented
Sunday, September 20, 2015

Compliance Solutions Occupational Trainers, Inc.

Neval Gupta
Vice President

Jeffrey E. Kline
President/CEO

Certificate Number: 754908711

ROUX ASSOCIATES, INC.

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

George Kokaliaris

HAS SUCCESSFULLY COMPLETED 8-HOURS OF INSTRUCTION IN

OSHA 29 CFR 1910.120
HAZARDOUS WASTE REFRESHER TRAINING

Prepared and Conducted by Roux Associates, Inc.
Training Conducted and Credited for 2017

Joseph W. Gentile

Joseph W. Gentile, CIH
CORPORATE HEALTH AND SAFETY MANAGER

APPENDIX K
CONSTRUCTION QUALITY ASSURANCE PLAN (CQAP)

BROOK 156
740 BROOK AVENUE
BRONX, NEW YORK

Construction Quality Assurance Project Plan

AKRF Project Number: 11703
BCP Site Number: C203078

Prepared for:

NYSDEC Region 2
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, New York 11101

On Behalf Of:

Brook 156 HDFC
902 Broadway, 13th Floor
New York, New York 10010
and
New York City Housing Preservation and Development
100 Gold Street
New York, NY 10038

Prepared by:

AKRF, Inc.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

APRIL 2018

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LIST OF ACRONYMS

Acronym	Definition
CQAP	Construction Quality Assurance Plan
FER	Final Engineering Report
NYSDEC	New York State Department of Environmental Conservation
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAWP	Remedial Action Work Plan
SSDS	Sub-Slab Depressurization System

1.0 INTRODUCTION

This Construction Quality Assurance Plan (CQAP) has been prepared for the remedial activities to be performed under the Remedial Action Work Plan (RAWP) that will be performed at the Brook 156 redevelopment site ("the Site") located at 740 Brook Avenue, Bronx, New York (Tax Block 2360, Lots 1 and 3) under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), Site No. C203078. This CQAP supplements the NYSDEC-approved RAWP and provides monitoring, inspection, testing, and documentation protocols and procedures.

The following information is provided:

1. Responsibility, Authority, and Qualifications – The responsibility, authority, and qualifications of the key personnel involved in the project.
2. Inspection and Testing Activities – Inspections and tests that will be used to verify that construction activities meet or exceed all design criteria and federal, state, and local regulations and requirements.
3. Meetings – The requirements for project coordination meetings between the Volunteers and their representatives, the remedial or environmental Contractors, and other involved parties.
4. Documentation and Reporting – Field documentation and reporting requirements.

2.0 RESPONSIBILITY AND AUTHORITY

Measures will be implemented to ensure that a functional quality control (QC) organization is active during the project and to provide support for the construction QC system in conducting inspections, tests, and retesting (in the event of failure of any item of work). This includes oversight of subcontractors and compliance with contract provisions. Construction QC includes, but is not limited to, the inspections and tests required in the RAWP and approved submittals and will cover all project operations. A consultant hired by the BCP Volunteers (Volunteers) will manage field activities and coordinate the contractor's activities.

2.1 Volunteers

Brook 156 HDFC and the New York City Department of Housing Preservation and Development (NYCDHPD) (the Volunteers) are responsible for coordinating the project, including activities of the Site consultant, contractor(s), and subcontractor(s), to comply with the requirements of the RAWP and regulatory agencies. The Volunteers are also responsible for completing and submitting documentation required by the RAWP, the CQAP, and the Quality Assurance Project Plan (QAPP) and have the authority to accept or reject the materials and workmanship of any subcontractors at the Site.

2.2 Construction Quality Assurance (QA) Officer (Consultant)

The Construction QA Officer will perform activities that are necessary to assure the quality of construction. He/she will be on-site as required during construction activities and will have the authority to take any action necessary to maintain compliance with the RAWP and approved submittals and to monitor construction quality.

Specific responsibilities of the Construction QA Officer include:

- Supporting the Volunteers and the consultant's field staff;

- Evaluating construction activities and activities of the field staff;
- Verifying that remedial activities are performed in accordance with the RAWP, approved submittals, and with federal, state, and local regulations and requirements;
- Verifying that data are properly recorded, validated, reduced, summarized, and inspected;
- Evaluating sampling and monitoring activities;
- Educating the field staff on construction QC requirements and procedures; and
- Scheduling and coordinating inspections.

2.3 Field Team Leader (Consultant)

The field team leader will be an employee of AKRF, Inc. (AKRF) and will be on-site during construction activities. He/she will have authority to take any action necessary to maintain compliance with the RAWP and approved submittals and to maintain construction quality. The Field Team Leader will also manage the field staff discussed in this CQAP.

Specific responsibilities of the field team leader include:

- Reviewing the RAWP for clarity and completeness so that the construction activities can be effectively implemented;
- Verifying that the contractor's work is in accordance with the RAWP, approved submittals, and this CQAP;
- Performing on-site inspection of the work in progress to assess compliance with the RAWP, approved submittals, and this CQAP;
- Scheduling and coordinating inspections;
- Reporting the results of all observations and tests as the work progresses and modifying materials and work to comply with the RAWP and approved submittals as noted below:
    1. Providing daily reports on field construction, material shipments, and inspection results.
    2. Review and interpretation of all data, drawings, and reports.
    3. Identification of all work that should be accepted, rejected, or uncovered for observation, or that may require special testing, inspection, or approval.
    4. Rejection of defective work and verification that corrective measures are implemented.
    5. Making observations and records that will aid in the preparation of a report on remedial activities.
- Inspecting each delivery of materials and/or equipment;
- Reporting to the Construction QA Officer the results of all inspections, including work that is not of acceptable quality or that fails to meet the requirements of the RAWP, approved submittals, and this CQAP;
- Verifying that testing equipment meets established requirements that the tests are conducted according to the proper standardized procedures;

- Confirming that testing equipment, personnel, and procedures do not change over time, or making sure that any changes do not adversely impact the inspection process;
- Confirming that regular calibration of testing equipment occurs and is properly recorded; and
- Confirming that waste treatment or disposal is performed in accordance with applicable federal, state, and local laws and regulations.

2.4 Site Technician (Consultant)

A qualified scientist, geologist, or engineer (supplemented by additional personnel, if necessary) from AKRF will be on-site during remedial construction documenting site personnel, equipment, samples collected, contamination observations, and any other observations of field activities. Specific responsibilities include:

- Calibration, operation, and maintenance of air monitoring instrumentation in accordance with the RAWP and approved submittals.
- Collecting, packaging, and shipping of environmental samples in accordance with the RAWP and QAPP.
- Documenting sample collection in a field notebook and identifying all sample locations in a field notebook or site drawing.
- Preparing and logging manifests for transportation of any non-hazardous and hazardous materials.
- Informing the Site Project Coordinator when (if) the concentrations of air contaminants exceed action levels specified in the RAWP.
- Maintaining and organizing the field equipment and supply storage area.

3.0 FIELD QUALITY CONTROL INSPECTIONS, TESTING, AND SAMPLING

The definable features of work are described in Section 4 of the RAWP. This section describes the anticipated inspection, testing, and sampling requirements associated with these definable features of work.

3.1 Mobilization

Inspections will be performed to assure that site laydown areas, support facilities, surface water controls, and air monitoring systems are established in accordance with the RAWP and approved submittals. In addition, the stakeout of existing utilities in work areas and the maintenance of site security will be verified. There are no testing and sampling requirements associated with mobilization of the contractor(s).

Each delivery of materials and/or equipment will be inspected relative to approved submittals. Approved materials and/or equipment will be stored at a designated area of the Site.

Equipment will be set-up and tested in accordance with the RAWP and approved submittals.

3.2 Soil Excavation

The Soil/Materials Management Plan (SMMP), Section 7.4 of the RAWP, outlines the procedures to be performed during the handling of soil/fill materials on-site during all intrusive work. Inspections will be performed during soil excavation activities including concrete removal, soil excavation, stockpiling, and load out, shoring, and re-use and backfilling (if any). Any impacts to building structural elements will be documented and assessed immediately. AKRF will confirm that all soil excavation related work will be conducted as specified in the RAWP, or are equivalent. Air monitoring will be conducted as outlined in the HASP, provided as Appendix G to the RAWP. Soil screening will be conducted as outlined in Section 7.4.1 of the RAWP. Any corrective actions will be summarized in the Daily Reports.

3.3 Soil Sampling

Soil sampling activities at the Site include endpoint and reuse sampling, and sampling of clean backfill from off-site sources. Proposed endpoint sample locations are shown on Figure 8 of the RAWP. All soil sampling activities will be conducted in accordance with the Quality Assurance Project Plan (QAPP) and Sections 3.1 and 7.4 of the RAWP.

The applicable Soil Cleanup Objectives (SCOs) for this Site are the Track 4 Restricted Residential SCOs (RRSCOs) and Protection of Groundwater SCOs (PGWSCOs). Soil and materials management on-site and off-site will be conducted in accordance with the SMMP (Section 7.4.1 of the RAWP).

3.4 Groundwater Sampling

Groundwater sampling activities at the Site include baseline groundwater sampling and may also include additional long-term monitoring, if required. All groundwater sampling activities will be conducted in accordance with the Quality Assurance Project Plan (QAPP) and Section 6.0 of the RAWP.

3.5 Soil Vapor Sampling

Soil vapor sampling may be required as part of operations associated with the proposed SVE system and/or contingency SSDS. All soil vapor sampling activities will be conducted in accordance with the Quality Assurance Project Plan (QAPP).

3.6 Loading of Waste Material for Transportation

Inspections will be conducted to verify that material removed from the Site is properly loaded for transfer to a permitted treatment/disposal facility. Manifests and bills of lading will be maintained and will be included as an Appendix in the FER.

3.7 Site Restoration

Site restoration will be observed and recorded to verify compliance with the RAWP and approved submittals. The surface will be restored to match the surrounding ground surface.

4.0 MEETINGS

A pre-construction meeting will be held with representatives of the NYSDEC, the consultants, and the contractor(s) performing the work prior to the start of major construction activities. Additional meetings will be called as necessary if work conditions change or deviations are necessary.

Project personnel and visitors will be given health and safety briefings periodically by the Site Technician or field team leader to assist Site personnel in safely conducting their work activities. The safety briefings will include information on new operations to be conducted, changes in work practices or changes in the Site's environmental conditions, as well as periodic reinforcement of previously discussed topics.

5.0 DOCUMENTATION AND REPORTING REQUIREMENTS

The value of the CQAP will be assured by proper documentation. The inspectors will use data sheets, field reports, log forms, schedules, and checklists to document Site work and verify compliance with the RAWP and approved submittals. Documentation will include, at a minimum, the following reports and information:

- Daily field construction reports
- Photographs
- Sampling chains of custody
- Material disposition logs
- Variances to the RAWP and approved submittals

5.1 Daily Report

The Site technician or field team leader will prepare a daily report that identifies the following:

- Work force and visitors to the Site;
- 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 grid map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including excursions;
- Apparent deviations from the RAWP;
- Weather conditions;
- Photographs of the Site and pertinent work; and
- An explanation of notable Site conditions.

5.2 Photographic Log

The photographic log will be kept to document construction activities by still photographs. The photographic log may also be used to record activities recorded in the daily report. All photographs will be taken with a camera capable of producing date and timestamps.

5.3 Sampling Documentation

The project field book will be used to document all sampling activities and how they correspond to the RAWP. All observations and field and/or laboratory tests will be recorded in the project field book or on separate logs. Recorded field observations may take the form of notes, charts, sketches, or photographs.

5.4 Material Disposition Tracking

All materials that are taken off-site for disposal will be tracked and final disposition confirmed. Copies of all waste manifests and bills of lading will be maintained by the Project Manager.

5.5 Variances to Work Plan

Required changes to the RAWP will be documented as construction proceeds. Any material deviations from the NYSDEC-approved RAWP will be communicated to the NYSDEC project manager. NYSDEC approval will be sought prior to proceeding with work deviating materially from the RAWP. In the event of an emergency change to the work plan, the NYSDEC project manager will be consulted immediately.

5.6 Final Engineering Report (FER)

At the completion of the project the consultant/construction manager will prepare an FER. This report will describe the implementation of the RAWP and will include a summary of the field work, as-built drawings for constructed elements, manifests, bills of lading, test results demonstrating that all mitigation and remedial systems are functioning properly, and photographic documentation. The FER will also include a description of the changes in the Remedial Action from the elements provided in the RAWP.

5.7 Document Storage

The field team leader will maintain the current field book and all original field paperwork during the performance of work. The project manager will maintain the field paperwork after completion and will maintain all submittal document files.

APPENDIX L
VAPOR BARRIER SPECIFICATIONS

STEGO® WRAP
SAFETY DATA SHEET

Revision Date: August 18, 2017 | Date of Issue: February 23, 2017 | Version Number: 3.0

SECTION 1: IDENTIFICATION

Product Identifier
Product Name: Stego Wrap

Intended Use of the Product
Under-slab and below-grade water vapor barrier

Company Name, Address, and Telephone of the Responsible Party
Stego Industries, LLC
216 Avenida Fabricante #101
San Clemente, CA 92672 USA

Emergency Telephone Number
Emergency Number: 1 (800) 424-9300 (24 Hrs.) CHEMTREC
Main Contact Number: (877) 464-7834

SECTION 2: HAZARDS IDENTIFICATION

Potential Health Effects:
Hazard Information: None as defined under OSHA Hazard Communication Standard: 29 CFR Part 1910.1200.
GHS Classification: Not classified/not a dangerous substance per Globally Harmonized System of Classification and Labeling of Chemicals (GHS).
GHS Labeling: No Label elements required/not a dangerous substance per Globally Harmonized System of Classification and Labeling of chemicals (GHS).
Inhalation: Inhalation of this product is not a likely route of exposure at room temperature. In the case of critical situations (i.e. fire, overheating, or combustion) excessive inhalation of fumes may result in respiratory irritation.
Skin: This product is not likely to be hazardous by skin contact under recommended conditions of use. Molten product may cause thermal burns.
Eyes: This product is not likely to be an eye irritant under recommended conditions of use. Mechanical irritation is possible, but unlikely under recommended conditions of use. Molten product may cause thermal burns.
Ingestion: Ingestion of this product is not a likely route of exposure.
Carcinogenicity: These components are not considered to be hazardous chemicals per OSHA Hazard Communication Standard: 29 CFR Part 1910.1200. No Ingredient of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC. No ingredient of this product present at levels greater than or equal 0.1% is identified as a known or anticipated carcinogen by NTP. No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Characterization: Polyolefins and additives. *
Description: Film made of polyolefins. **

Mixture:
Chemical Characters: Polyolefin and additives.
Hazard Information: The material is not expected to be classified as hazardous.

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SECTION 4: FIRST AID MEASURES

The following first aid recommendations assume that appropriate personal and industrial hygiene practices are followed.

If Inhaled: This material is not likely to be hazardous by inhalation. At room temperature, the material is neither an irritant nor gives off hazardous vapor. In case of excessive inhalation of fumes due to critical situations (fire, etc.) move the person to fresh air. If symptoms persist, contact a physician.
In Case of Skin Contact: This material is not likely to be hazardous by skin contact. If molten material contacts skin, quickly cool in water, seek immediate medical attention. Do not try to peel solidified material from the skin or use solvents or thinners to dissolve it.
In Case of Eye Contact: Not likely to be an eye hazard in present form. In the case of physical contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of exposure to excessive fumes due to critical situations (fire, etc.) move the person to fresh air. If symptoms persist, contact a physician.
If Wwallowed: This material is not likely to be ingested in present form. Do not induce vomiting. Seek medical advice.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Water, Water Mist, Dry Chemical, Carbon Dioxide, and Foam. If possible water should be applied as a spray from a fogging nozzle since this is a surface burning material. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Specific Hazards During Fire Fighting: In its normal form, this product offers no unusual explosion hazards. See Hazardous Decomposition Products below.
Special Protective Equipment and Precaution for Fire Fighters: Use personal protective equipment. Wear self-contained breathing apparatus and chemical protective clothing for firefighting, if necessary.
Hazardous Decomposition Products: Normal combustion forms carbon dioxide, water vapor and may produce carbon monoxide, incomplete combustion products, other hydrocarbons, and hydrocarbon oxidation products depending on temperature and air availability.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Collect spilled material. Danger of slipping on spilled product.
Environmental Precautions: No special measures required. Prevent product from entering drains.
Methods and Materials for Containment and Cleaning Up: Clean up promptly by physical collection, sweeping or vacuum. Recycle product or dispose of properly.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling: Good personal hygiene practices and employ good housekeeping. Always wash hands after handling the product. When handled in bulk quantities, this product and its associated packaging may present a crushing hazard due to the large masses involved, possibly resulting in severe injury or death. Take precautionary measures against static electricity. Minimize dust generation.
Precautions for Safe Storage: Keep in a cool, dry, well ventilated environment. Product should not be stored in excessive cold, direct sunlight or temperatures exceeding 90°F. Compliance of this policy should ensure optimum performance of this product. Store in accordance with local regulations. Materials should be stored away from heat, sources of ignition, direct sunlight, oxidizing agents and other incompatible materials. Treat as a solid that can burn.

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SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Ventilate area to prevent accumulation of dust and fumes. Use local exhaust ventilation when routinely heat sealing this product. Ensure good ventilation at the workplace.
Exposure Limits: No applicable exposure limits available for product or components.
Personal Protection: Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material is offered only based on our understanding of normal usage. User's selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use.
Respiratory Protection: With proper Engineering Controls in place, no respiratory protection should be required.
Eye Protection: Use of safety glasses with side shields is good industrial practice. If contact is likely, safety glasses with side shields are recommended.
Skin Protection: Risk of skin irritation is not likely. If irritation occurs or is of concern wear disposable, protective gloves while handling this material.
Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, using tobacco products, or using toilet facilities. Routinely wash work clothing and protective equipment to remove contaminates. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping. Materials spilled on hard surface can be a serious slipping/falling hazard. Use care in walking on spilled material.
Environmental Controls: Comply with applicable environment regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.
Occupational Exposure Limits: Consult local authorities for acceptable exposure limits.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

General Physical Form: Solid plastic film.

Information on Basic Physical and Chemical Properties

Appearance	Film
Physical State	Solid
Odor	Mild to no odor
Odor Threshold	No data available
pH-value	Not applicable
Melting Point (C)	90-140 degrees
Freezing Point (C)	No data available
Flash Point	No data available
Flammability (solid, gas)	Not classified. Polymer will burn but does not easily ignite.
Solubility in Water	Insoluble
Auto-ignition Temp	No data available
Density	1.00-0.91 g/cc
Lower Explosion Limit	Not applicable
Upper Explosion Limit	Not applicable
Explosive Properties	No data available

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SECTION 10: STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions.
Conditions to Avoid: Avoid elevated temperatures for prolonged periods of time, contact with strong oxidizers, sparks or open flame. Minimize dust generation and accumulation.
Materials to Avoid: Avoid contacts with strong oxidizing agents. Material product performance and/or service life may be adversely affected by some aromatic hydrocarbons or other known polymer pro-degradants.
Hazardous Decomposition Products: Material does not decompose at ambient temperature.
Hazardous Polymerization: Under normal conditions of storage and use, hazardous polymerization will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute Toxicity:
Oral Toxicity: Health injuries are not known or expected under normal use. Presumed not toxic.
Inhalation Toxicity, Vapor: Health injuries are not known or expected under normal use. Presumed not toxic.
Dermal Toxicity: Health injuries are not known or expected under normal use. Presumed not toxic.
Skin Irritation: No data available. No adverse effects expected.
Eye Irritation: No data available. No adverse effects expected.
Sensitization: No data available. No adverse effects expected.
Carcinogenicity: See section 2.
Additional Toxicological Information: Contains additives that are encapsulated in the film. Under the normal conditions for use of this film the encapsulated additives are not expected to pose any health hazards per our experience and the information provided to us.

SECTION 12: ECOLOGICAL INFORMATION

Persistence and Degradability: This material is persistent in the environment. Not readily biodegradable.
Bioaccumulation: No data available. No bioaccumulation expected.
Mobility: Product is insoluble and floats on water.
Ecotoxicity (Aquatic and Terrestrial): Not expected to be harmful to aquatic or terrestrial organisms.
Biodegradability: The material is not expected to be readily biodegradable.
Other Information: Recycle material or dispose of properly.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal (recommendations based on product as supplied): Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal. It is recommended that all waste be analyzed for compliance to applicable laws and regulations governing proper recycling and/or disposal methods and reporting requirements. Consult your local or regional authorities.

SECTION 14: TRANSPORT INFORMATION

US DOT Hazard Class: Not regulated

SECTION 15: REGULATORY INFORMATION

US Regulations:
TSCA: All components of this product are on the TSCA inventory or are exempt from listing.
California Proposition 65: This product contains no known chemicals regulated by California Proposition 65.

Continued...
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SECTION 16: OTHER INFORMATION

MEDICAL APPLICATION CAUTION: Do not use this material in medical applications involving permanent implantation in the human body or permanent contact with internal body fluids or tissues.

* Article; product meets definition of an article as defined by official OSHA interpretations.

** As per paragraph (i) of OSHA Hazard Communication Standard 29 CFR Part 1910.1200, formulation is considered a trade secret and specific chemical identify and exact percentage of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designation representatives in accordance with applicable provisions of paragraph (i).

Disclaimer: The information contained herein only applies to the noted product. To the best of our knowledge, having been obtained through our suppliers or third parties, this information is accurate. We make no warranties, express or implied, concerning this information or the safe use of the noted product, and we disclaim liability from loss, damage, or other from the product's use, handling, or storage. Users are responsible for verifying the fitness/suitable of the product for any purposes/applications and for confirming compliance with any/all relevant codes or regulations.

Please read the Product Statements for all Stego® products by navigating here:
http://www.stegoindustries.com/legal

STEGO® WRAP 20-MIL VAPOR BARRIER

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGO WRAP 20-MIL VAPOR BARRIER

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672 USA
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Wrap 20-Mil Vapor Barrier is used as a below-slab vapor barrier.

COMPOSITION: Stego Wrap 20-Mil Vapor Barrier is a multi-layer plastic extrusion manufactured with only the highest grade of prime, virgin, polyolefin resins.

ENVIRONMENTAL FACTORS: Stego Wrap 20-Mil Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO WRAP 20-MIL VAPOR BARRIER

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0071 perms
Permeance After Conditioning (ASTM E1745 Sections 7.1.2 - 7.1.5)	ASTM E154 Section 8, F1249 – Permeance after wetting, drying, and soaking ASTM E154 Section 11, F1249 – Permeance after heat conditioning ASTM E154 Section 12, F1249 – Permeance after low temperature conditioning ASTM E154 Section 13, F1249 – Permeance after soil organism exposure	0.0088 perms 0.0081 perms 0.0084 perms 0.0077 perms
Methane Transmission Rate	ASTM D1434 - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting	152.2 GTR* (mL(STP)/m^2*day)
Radon Diffusion Coefficient	K124/02/95	9.9 x 10^{-12} m^2/second
Puncture Resistance	ASTM D1709 – Test Method for Impact Resistance of Plastic Film by Free-Falling Dart Method	3500+ grams**
Tensile Strength	ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting	97.7 lbf/in
Thickness		20 mil
Roll Dimensions	width x length: area:	14' x 105' 1470 ft^2
Roll Weight		140 lb

Note: perm unit = grains/(ft^2*hr*in-Hg)
*GTR = Gas Transmission Rate
**The material maxed out the testing equipment and did not fail at 3746 grams.

Continued...

STEGO® WRAP 20-MIL VAPOR WRAP BARRIER

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

5. INSTALLATION

UNDER SLAB: Unroll Stego Wrap 20-Mil Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of 6 inches and tape using Stego® Tape or Stego® Crete Claw® Tape. All penetrations must be sealed using a combination of Stego Wrap and Stego Accessories.

For additional information, please refer to Stego's complete installation instructions.

6. AVAILABILITY & COST

Stego Wrap 20-Mil Vapor Barrier is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

None required.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

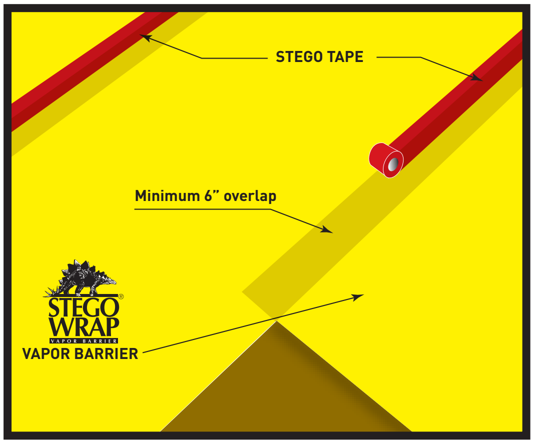
- www.stegoindustries.com

STEGO® WRAP VAPOR BARRIER/RETARDER INSTALLATION INSTRUCTIONS

IMPORTANT: Please read these installation instructions completely, prior to beginning any Stego Wrap installation. The following installation instructions are based on ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs. If project specifications call for compliance with ASTM E1643, then be sure to review the specific installation sections outlined in the standard along with the techniques referenced in these instructions.

UNDER-SLAB INSTRUCTIONS:

FIGURE 1: UNDER-SLAB INSTALLATION



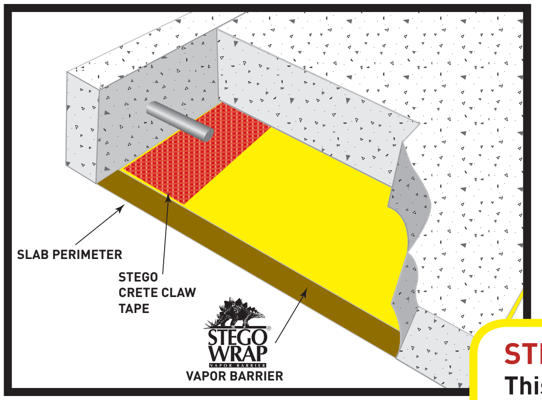
1. Stego Wrap can be installed over an aggregate, sand, or tamped earth base. It is not necessary to have a cushion layer or sand base, as Stego Wrap is tough enough to withstand rugged construction environments.

2. Unroll Stego Wrap over the area where the slab is to be placed. Stego Wrap should completely cover the concrete placement area. All joints/seams both lateral and butt should be overlapped a minimum of 6" and taped using Stego® Tape.

NOTE: The area of adhesion should be free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive tape.

3. ASTM E1643 requires sealing the perimeter of the slab. *Extend vapor retarder over footings and seal to foundation wall, grade beam, or slab at an elevation consistent with the top of the slab or terminate at impediments such as waterstops or dowels.* Consult the structural engineer of record before proceeding.

FIGURE 2a: SEAL TO SLAB AT PERIMETER



SEAL TO SLAB AT PERIMETER:*

NOTE: Clean the surface of Stego Wrap to ensure that the area of adhesion is free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive adhesive.

a. Install Stego® Crete Claw® Tape on the entire perimeter edge of Stego Wrap.

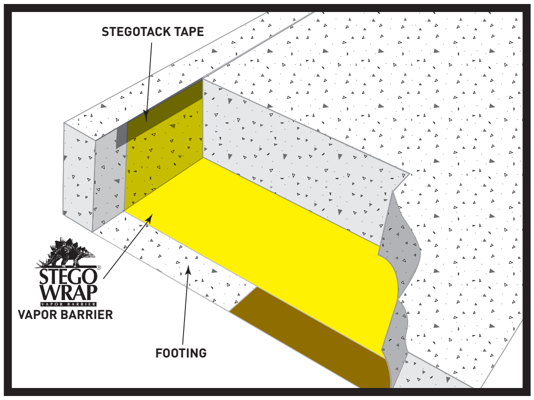
b. Prior to the placement of concrete, ensure that the top of Stego Crete Claw Tape is free of dirt, debris, or mud to maximize the bond to the concrete.

STEGO LABOR SAVER!

This method not only complies with ASTM E1643, but it also:

- **reduces labor compared to other perimeter sealing techniques.**
- **can be used even without an existing wall or footing, unlike alternatives.**

FIGURE 2b: SEAL TO PERIMETER WALL



OR **SEAL TO PERIMETER WALL WITH STEGOTACK® TAPE:***

a. Make sure area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion.

b. Remove release liner on one side and stick to desired surface.

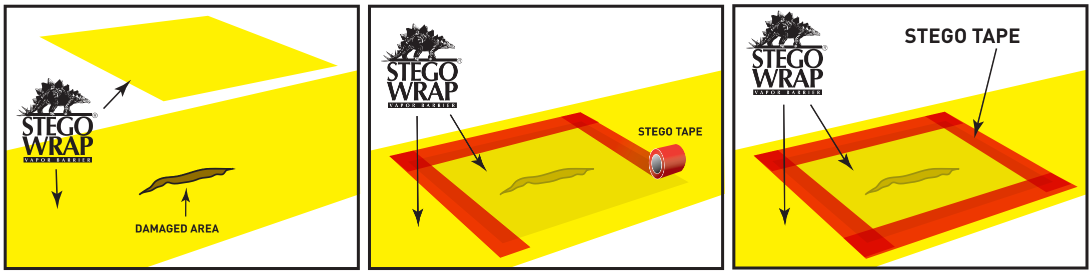
c. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

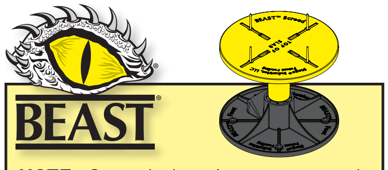
* If ASTM E1643 is specified, consult with project architect and structural engineer to determine which perimeter seal technique should be employed for the project.

Continued...

4. In the event that Stego Wrap is damaged during or after installation, repairs must be made. For holes, cut a piece of Stego Wrap to a size and shape that covers any damage by a minimum overlap of 6" in all directions. Clean all adhesion areas of dust, dirt, moisture, and frost. Tape down all edges using Stego Tape **(See Figure 3)**.

FIGURE 3: SEALING DAMAGED AREAS

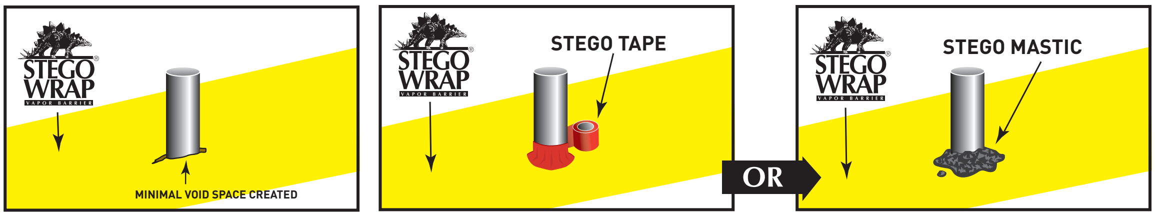




NOTE: Stego Industries recommends the use of vapor barrier-safe concrete accessories, like Beast® Screed, to help minimize the amount of penetrations in a Stego Wrap Installation.

5. **IMPORTANT: ALL PENETRATIONS MUST BE SEALED.** All pipe, ducting, rebar, wire penetrations and block outs should be sealed using Stego Wrap, Stego Tape and/or Stego Mastic **(See Figure 4a)**. If penetrations are encased in other materials, such as expansive materials like foam, unless otherwise specified, Stego Wrap should be sealed to the underlying penetration directly.

FIGURE 4a: PIPE PENETRATION SEALING



STEGO WRAP PIPE PENETRATION REPAIR DETAIL:

1: Install Stego Wrap around pipe penetrations by slitting/cutting material as needed. Try to minimize the void space created.

2: If Stego Wrap is close to pipe and void space is minimized then seal around pipe penetration with Stego Tape and/or Stego Mastic. **(See Figure 4a)**

3: If detail patch is needed to minimize void space around penetration, then cut a detail patch to a size and shape that creates a 6" overlap on all edges around the void space at the base of the pipe. Stego Pre-Cut Pipe Boots are also available to speed up the installation.

4: Cut an "X" the size of the pipe diameter in the center of the pipe boot and slide tightly over pipe.

5: Tape down all sides of the pipe boot with Stego Tape.

6: Seal around the base of the pipe using Stego Tape and/or Stego Mastic. **(See Figure 4b)**

FIGURE 4b: DETAIL PATCH FOR PIPE PENETRATION SEALING

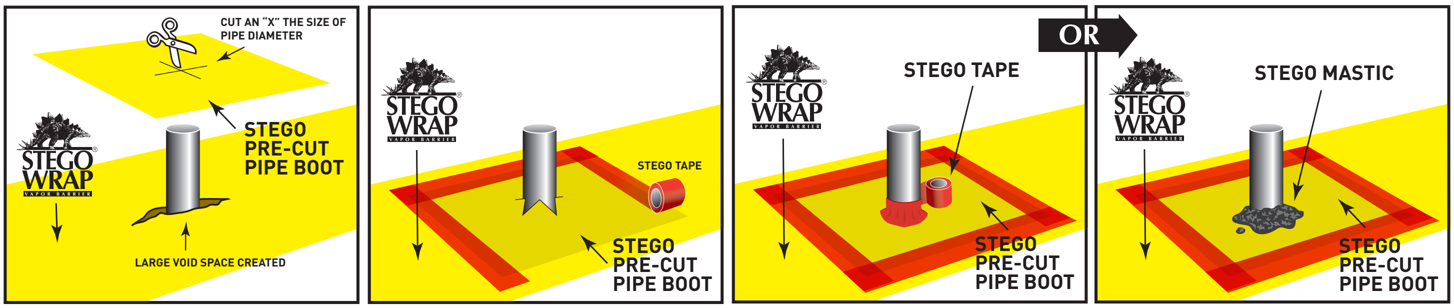
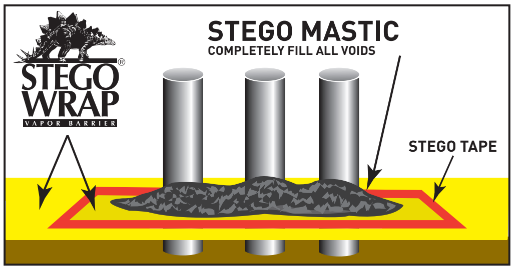


FIGURE 5: MULTIPLE PIPE PENETRATION SEALING



MULTIPLE PIPE PENETRATION SEALING:
Multiple pipe penetrations in close proximity and very small pipes may be sealed using Stego Wrap and Stego Mastic for ease of installation **(See Figure 5)**.

NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

STEGO® WRAP 20-MIL VAPOR BARRIER

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGO WRAP 20-MIL VAPOR BARRIER

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672 USA
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Wrap 20-Mil Vapor Barrier is used as a below-slab vapor barrier.

COMPOSITION: Stego Wrap 20-Mil Vapor Barrier is a multi-layer plastic extrusion manufactured with only the highest grade of prime, virgin, polyolefin resins.

ENVIRONMENTAL FACTORS: Stego Wrap 20-Mil Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO WRAP 20-MIL VAPOR BARRIER

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0071 perms
Permeance After Conditioning (ASTM E1745 Sections 7.1.2 - 7.1.5)	ASTM E154 Section 8, F1249 – Permeance after wetting, drying, and soaking ASTM E154 Section 11, F1249 – Permeance after heat conditioning ASTM E154 Section 12, F1249 – Permeance after low temperature conditioning ASTM E154 Section 13, F1249 – Permeance after soil organism exposure	0.0088 perms 0.0081 perms 0.0084 perms 0.0077 perms
Methane Transmission Rate	ASTM D1434 - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting	152.2 GTR* (mL(STP)/m²*day)
Radon Diffusion Coefficient	K124/02/95	9.9×10^{-12} m²/second
Puncture Resistance	ASTM D1709 – Test Method for Impact Resistance of Plastic Film by Free-Falling Dart Method	3500+ grams**
Tensile Strength	ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting	97.7 lbf/in
Thickness		20 mil
Roll Dimensions	width x length: area:	14' x 105' 1470 ft²
Roll Weight		140 lb

Note: perm unit = grains/(ft²*hr*in-Hg)

*GTR = Gas Transmission Rate

**The material maxed out the testing equipment and did not fail at 3746 grams.

Continued...
Note – legal notice on page 2.

STEGO® WRAP 20-MIL VAPOR WRAP BARRIER

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

5. INSTALLATION

UNDER SLAB: Unroll Stego Wrap 20-Mil Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of 6 inches and tape using Stego® Tape or Stego® Crete Claw® Tape. All penetrations must be sealed using a combination of Stego Wrap and Stego Accessories.

For additional information, please refer to Stego's complete installation instructions.

6. AVAILABILITY & COST

Stego Wrap 20-Mil Vapor Barrier is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

None required.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

- www.stegoindustries.com

STEGO® MASTIC

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGO MASTIC

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Mastic is designed to be used as a vapor retardant membrane for use in conjunction with Stego® Wrap Vapor Barrier/Retarder. Stego Mastic can be used for sealing utility and pipe penetrations in Stego Wrap.

COMPOSITION: Stego Mastic is a medium viscosity, water-based, polymer-modified anionic bituminous/asphalt emulsion.

SIZE: Stego Mastic comes in 2-gallon and 5-gallon buckets.

4. TECHNICAL DATA

TABLE 1: PHYSICAL PROPERTIES OF STEGO MASTIC

PROPERTY	TEST	RESULTS
Tensile	ASTM D412	32 psi
Elongation	ASTM D412	3860%
Resistance to Decay	ASTM E154	10% perm loss
Accelerated Aging	ASTM G23	No Effect
Permeance	ASTM E96	0.17 perms
Hydrostatic Water Pressure	ASTM D751	28 psi
Methane Transmission Rate	ASTM D1434	0
Adhesion to Concrete & Masonry	ASTM C836	7 lbf/in
Hardness	ASTM C836	75
Crack Bridging	ASTM C836	No Cracking
Low Temp Flexibility	ASTM C836	No Cracking

Note: perm unit = grains/(ft^2*hr*in-Hg)

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Note – legal notice on page 2.

STEGO® MASTIC

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

5. INSTALLATION

PREPARATION:

- A test application simulating the project environment should always be done prior to final usage of Stego Mastic.
- All surfaces should be dry and free of loose materials, oils and other contaminants. The surfaces should be cleaned in the same fashion as the test surface in order to ensure proper results.
- Store above 40°F, and apply above 40°F and below 100°F.

PENETRATIONS:
To repair penetrations in Stego Wrap, cut Stego Wrap just big enough to fit over and around the penetration so as to minimize void space. Liberally apply Stego Mastic around the penetration to keep the integrity of the membrane intact. Stego Mastic can be applied by brush, roller, or trowel.

NOTES: 1) If needed to minimize void space around penetrations, utilize a detail patch of Stego Wrap or Stego® Pre-Cut Pipe Boot to fit over the penetration and seal the patch/boot with Stego® Tape prior to applying Stego Mastic. 2) Solvent-based products should not be applied over this product. 3) Clean all tools with kerosene and/or oil-based cleaners.

For additional information, please refer to Stego's complete installation instructions.

6. AVAILABILITY & COST

Stego Mastic is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

None required.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com
Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

- www.stegoindustries.com

STEGO DATA

STEGO® TAPE

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGO TAPE

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Tape is a low-permeance tape designed for protective sealing, hanging, seaming, splicing, and patching applications where a highly conformable material is required. It has been engineered to bond specifically to Stego® Wrap, making it ideal for sealing Stego Wrap seams and penetrations.

COMPOSITION: Stego Tape is composed of polyethylene film and an acrylic, pressure-sensitive adhesive.

SIZE: Stego Tape is 3.75" x 180'. Stego Tape ships 12 rolls in a case.

4. TECHNICAL DATA

APPLICABLE STANDARDS:
Pressure Sensitive Tape Council (PSTC)

- PSTC 101 – International Standard for Peel Adhesion of Pressure-Sensitive Tape

American Society for Testing & Materials (ASTM)

- ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO TAPE

PROPERTY	RESULTS
Dimensions	3.75" x 180'
Total Thickness	6 mil
Permeance	0.03 perms
Tensile Strength	17 lb/in
Elongation (at break) MD	1060%
Adhesion (20 min dwell ss, PSTC 101)	84 oz/in
Ultraviolet Resistance	Excellent

Note: perm unit = grains/(ft^2*hr*in-Hg)

Continued...
Note – legal notice on page 2.

STEGO® TAPE

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

5. INSTALLATION

SEAMS: Overlap Stego Wrap 6 inches and seal with Stego Tape. Make sure the area of adhesion is free from dust, dirt, moisture and frost to allow maximum adhesion of the pressure sensitive tape.

PIPE PENETRATION SEALING
1) Install Stego Wrap around pipe by slitting/cutting material
2) If void space around pipe is minimal, seal around base of pipe with Stego Tape (Stego® Mastic can be used for additional coverage)

DETAIL PATCH FOR PIPE PENETRATION SEALING
1) Cut a piece of Stego Wrap that creates a 6 inch overlap around all edges of the void space
2) Cut an "X" in the center of the detail patch
3) Slide detail patch over pipe, secure tightly
4) Tape down all sides of detail patch with Stego Tape
5) Seal around base of pipe with Stego Tape (Stego Mastic can be used for additional coverage)

Stego Tape should be installed above 40°F. In temperatures below 40°F take extra care to remove moisture or frost from the area of adhesion.

For additional information, please refer to Stego's complete installation instructions.

6. AVAILABILITY & COST

Stego Tape is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

None required.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com
Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

- www.stegoindustries.com

STEGO® CRETE CLAW® TAPE (3" wide)

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGO CRETE CLAW TAPE (3" wide)

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Crete Claw Tape is a multi-layered tape that is used to seal Stego® Wrap Vapor Barrier to the perimeter of the slab while the concrete is placed. Stego Crete Claw Tape allows wet concrete to cast into the textured top surface to form a mechanical bond/seal.

COMPOSITION: Stego Crete Claw Tape is composed of polyethylene film, aperture film, and an acrylic, pressure-sensitive adhesive.

SIZE: Stego Crete Claw Tape is 3" x 180'. Stego Crete Claw Tape (3" wide) ships 16 rolls in a case.

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO CRETE CLAW TAPE (3" wide)

PROPERTY	RESULTS
Dimensions	3" x 180'
Total Thickness	26 mil
Permeance: ASTM F1249	0.03 perms
D903	17.6 lbf/in
Sheer Adhesion Strength: 1 in^2 shear test using an Instron 3345 Machine	>49 lbf/in^2*

* Specimens failed by stretching vapor barrier to failure before pulling Stego Crete Claw Tape from concrete.
Note: perm unit = grains/(ft^2*hr*in-Hg)

5. INSTALLATION

SECURING STEGO WRAP TO SLAB: Clean surface of Stego Wrap to ensure that it is free of moisture, frost, dirt, and debris prior to the installation of Stego Crete Claw Tape. When ready to apply Stego Crete Claw Tape, peel back the release liner and apply to Stego Wrap. Stego Crete Claw Tape should be completely on Stego Wrap.

To detail, cut Stego Crete Claw Tape with a box knife or scissors. Stego Crete Claw Tape should be installed above 40°F for maximum adhesion. For additional information please refer to Stego's complete installation instructions.

TIP: Wrap the release liner back over the entire roll while unrolling Stego Crete Claw Tape. This technique will allow the release liner to pull off easily and keep it out of the way.

STEGO® CRETE CLAW® TAPE (3" wide)

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

6. AVAILABILITY & COST

Stego Crete Claw Tape is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

Store Stego Crete Claw Tape in a dry and temperate area.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com
Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

- www.stegoindustries.com

STEGO® CRETE CLAW® TAPE (6" wide)

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGO CRETE CLAW TAPE (6" wide)

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Crete Claw Tape is a multi-layered tape that is used to seal Stego® Wrap Vapor Barrier to the perimeter of the slab while the concrete is placed. Stego Crete Claw Tape allows wet concrete to cast into the textured top surface to form a mechanical bond/seal.

COMPOSITION: Stego Crete Claw Tape is composed of polyethylene film, aperture film, and an acrylic, pressure-sensitive adhesive.

SIZE: Stego Crete Claw Tape is 6" x 180'. Stego Crete Claw Tape (6" wide) ships 8 rolls in a case.

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO CRETE CLAW TAPE (6" wide)

PROPERTY	RESULTS
Dimensions	6" x 180'
Total Thickness	26 mil
Permeance: ASTM F1249	0.03 perms
180° Adhesion Peel Strength: ASTM D903	17.6 lbf/in
Sheer Adhesion Strength: 1 in^2 shear test using an Instron 3345 Machine	>49 lbf/in^2*

* Specimens failed by stretching vapor barrier to failure before pulling Stego Crete Claw Tape from concrete.
Note: perm unit = grains/(ft^2*hr*in-Hg)

5. INSTALLATION

SECURING STEGO WRAP TO SLAB: Clean surface of Stego Wrap to ensure that it is free of moisture, frost, dirt, and debris prior to the installation of Stego Crete Claw Tape. When ready to apply Stego Crete Claw Tape, peel back the release liner and apply to Stego Wrap. Stego Crete Claw Tape should be completely on Stego Wrap.

To detail, cut Stego Crete Claw Tape with a box knife or scissors. Stego Crete Claw Tape should be installed above 40°F for maximum adhesion. For additional information please refer to Stego's complete installation instructions.

TIP: Wrap the release liner back over the entire roll while unrolling Stego Crete Claw Tape. This technique will allow the release liner to pull off easily and keep it out of the way.

Continued...
Note – legal notice on page 2.

STEGO® CRETE CLAW® TAPE (6" wide)

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

6. AVAILABILITY & COST

Stego Crete Claw Tape is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

Store Stego Crete Claw Tape in a dry and temperate area.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com
Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

- www.stegoindustries.com

STEGOTACK® TAPE

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGOTACK TAPE

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: StegoTack Tape is a double-sided adhesive strip used to bond and seal Stego® Wrap Vapor Barrier to concrete, masonry, wood, metal, and other surfaces. StegoTack Tape is a flexible and moldable material to allow for a variety of applications and installations.

COMPOSITION: StegoTack Tape is made from a blend of synthetic rubber and resins.

SIZE: StegoTack Tape is 2" x 50'. StegoTack Tape ships 12 rolls in a case.

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGOTACK TAPE

PROPERTY	RESULTS
Dimensions	2" x 50'
Total Thickness	30 mil
Permeance (30 mil)	0.03 perms
Color	Grey
Material	Synthetic rubber blend
Adhesion to Steel	12.5 lb/in width ASTM D1000
Installation Temperature	40°F/110°F
In Service Temperature Range	-20°F/+140°F
VOC Content	No VOCs, 100% solids

Note: perm unit = grains/(ft^2*hr*in-Hg)

5. INSTALLATION

TO WALLS: Make sure the area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion. Remove release liner on one side and stick to desired surface. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

Cut StegoTack Tape using a utility knife or scissors. Cut StegoTack Tape before removing the release liner for easier cutting. Install StegoTack Tape between 40°F and 110°F. For additional information please refer to Stego's complete installation instructions.

Continued...
Note – legal notice on page 2.

STEGOTACK® TAPE

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

6. AVAILABILITY & COST

StegoTack Tape is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

For longer adhesive life, store in dry, temperate area.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com
Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

- www.stegoindustries.com

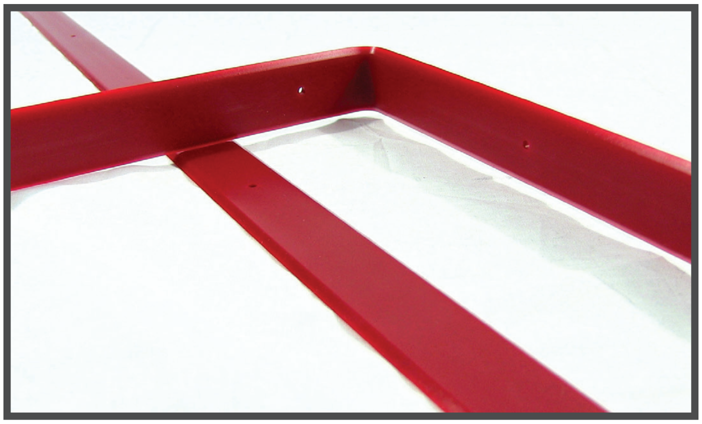
STEGO DATA

STEGO® TERM BAR

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

1. PRODUCT NAME

STEGO TERM BAR



2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Term Bar is a semi-flexible plastic termination bar used for mechanically securing Stego® Wrap or other materials to concrete, masonry, or wood.

COMPOSITION: Stego Term Bar is made from post-industrial recycled PVC.

SIZE: Stego Term Bar is 4' x 1.125".

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO TERM BAR

PROPERTY	RESULTS
Dimensions	4' x 1.125"
Color	Red
Material	Recycled PVC
Weight	4.7 oz

5. INSTALLATION

UNDER SLAB: Nail through Stego Term Bar and Stego Wrap to secure material as needed. If the beveled edge is facing the wall, a pocket/lip is created for mastic/sealant to be used if required. Pre-drilled nail holes are provided every 6" for ease of installation.

To cut Stego Term Bar, score with a utility knife or wire snips. Stego Term Bar can be bent back and forth and then broken at desired locations as well.

Stego Term Bar is flexible enough to bend around corners and contours in the wall for easy installation.

For additional information, please refer to Stego's complete installation instructions.

Continued...
Note – legal notice on page 2.

STEGO® TERM BAR

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

6. AVAILABILITY & COST

Stego Term Bar is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

Store above 60°F. Term Bar will become less flexible at lower temperatures.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com
Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

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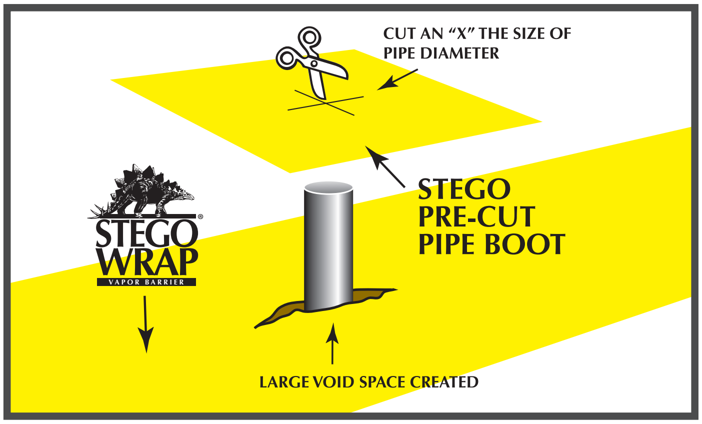
STEGO® PRE-CUT PIPE BOOTS

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018



1. PRODUCT NAME

STEGO PRE-CUT PIPE BOOTS

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Pre-Cut Pipe Boots are used to seal around permanent penetrations in Stego® Wrap.

COMPOSITION: Stego Pre-Cut Pipe Boots are made from Stego Wrap Vapor Barrier (15-mil), and therefore are manufactured from only high grade prime, virgin, polyolefin resins.

SIZE: Stego Pre-Cut Pipe Boots are 18" x 18" and 15 mil thick. Stego Pre-Cut Pipe Boots ship 10 packs of 25 in a case (250 boots per case).

4. TECHNICAL DATA

TABLE 1: PHYSICAL PROPERTIES OF STEGO PRE-CUT PIPE BOOTS

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E1745 Class A, B & C– Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0086 perms
Permeance After Conditioning (ASTM E1745 Sections 7.1.2 - 7.1.5)	ASTM E154 Section 8, F1249 – Permeance after wetting, drying, and soaking ASTM E154 Section 11, F1249 – Permeance after heat conditioning ASTM E154 Section 12, F1249 – Permeance after low temperature conditioning ASTM E154 Section 13, F1249 – Permeance after soil organism exposure	0.0098 perms 0.0091 perms 0.0097 perms 0.0095 perms
Puncture Resistance	ASTM D1709 – Test Method for Impact Resistance of Plastic Film by Free-Falling Dart Method	2,266 grams
Tensile Strength	ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting	70.6 lbf/in
Thickness		15 mil
Pipe Boot Dimensions	width x length:	18" x 18"

Note: perm unit = grains/(ft^2*hr*in-Hg)

5. INSTALLATION

UNDER SLAB: Cut an "X" the size of the pipe diameter in the center of the Pre-Cut Pipe Boot and slide tightly over pipe. Tape all sides of the pipe boot with Stego® Tape. Seal around the base of the pipe using Stego Tape and/or Stego® Mastic.

For additional information, please refer to Stego's complete installation instructions.

Continued...
Note – legal notice on page 2.

STEGO® PRE-CUT PIPE BOOTS

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: JAN 5, 2018

6. AVAILABILITY & COST

Stego Pre-Cut Pipe Boots are available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

None required.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com
Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

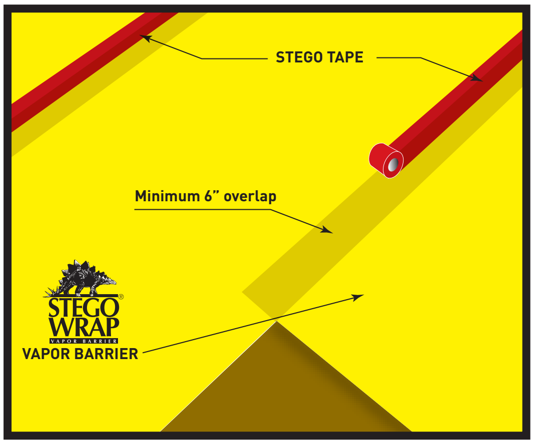
- www.stegoindustries.com

STEGO® WRAP VAPOR BARRIER/RETARDER INSTALLATION INSTRUCTIONS

IMPORTANT: Please read these installation instructions completely, prior to beginning any Stego Wrap installation. The following installation instructions are based on ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs. If project specifications call for compliance with ASTM E1643, then be sure to review the specific installation sections outlined in the standard along with the techniques referenced in these instructions.

UNDER-SLAB INSTRUCTIONS:

FIGURE 1: UNDER-SLAB INSTALLATION



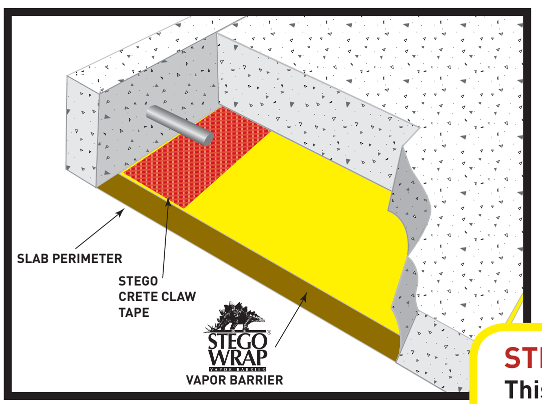
1. Stego Wrap can be installed over an aggregate, sand, or tamped earth base. It is not necessary to have a cushion layer or sand base, as Stego Wrap is tough enough to withstand rugged construction environments.

2. Unroll Stego Wrap over the area where the slab is to be placed. Stego Wrap should completely cover the concrete placement area. All joints/seams both lateral and butt should be overlapped a minimum of 6" and taped using Stego® Tape.

   NOTE: The area of adhesion should be free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive tape.

3. ASTM E1643 requires sealing the perimeter of the slab. *Extend vapor retarder over footings and seal to foundation wall, grade beam, or slab at an elevation consistent with the top of the slab or terminate at impediments such as waterstops or dowels.* Consult the structural engineer of record before proceeding.

FIGURE 2a: SEAL TO SLAB AT PERIMETER



SEAL TO SLAB AT PERIMETER:*

NOTE: Clean the surface of Stego Wrap to ensure that the area of adhesion is free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive adhesive.

a. Install Stego® Crete Claw® Tape on the entire perimeter edge of Stego Wrap.

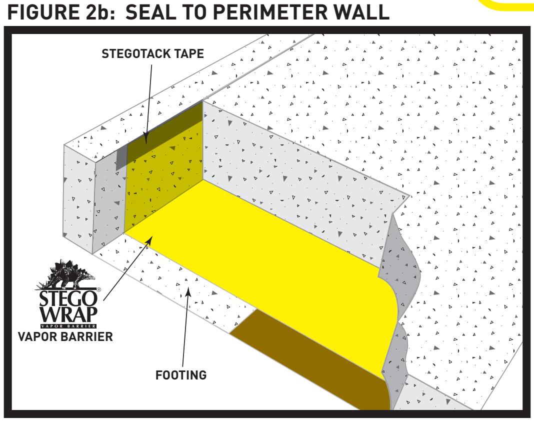
b. Prior to the placement of concrete, ensure that the top of Stego Crete Claw Tape is free of dirt, debris, or mud to maximize the bond to the concrete.

STEGO LABOR SAVER!

This method not only complies with ASTM E1643, but it also:

- **reduces labor compared to other perimeter sealing techniques.**
- **can be used even without an existing wall or footing, unlike alternatives.**

FIGURE 2b: SEAL TO PERIMETER WALL



OR **SEAL TO PERIMETER WALL WITH STEGOTACK® TAPE:***

a. Make sure area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion.

b. Remove release liner on one side and stick to desired surface.

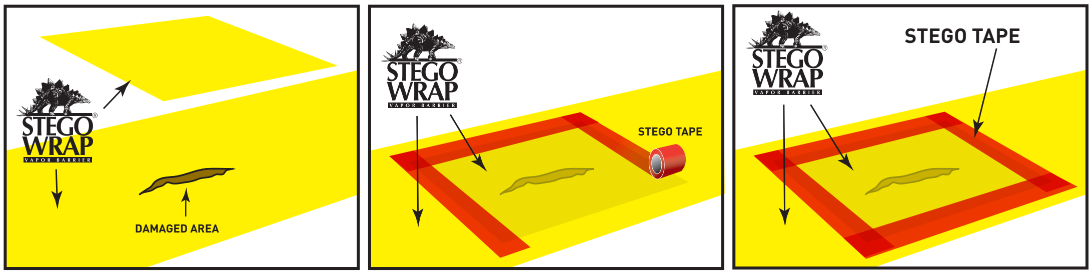
c. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

* If ASTM E1643 is specified, consult with project architect and structural engineer to determine which perimeter seal technique should be employed for the project.

Continued...

4. In the event that Stego Wrap is damaged during or after installation, repairs must be made. For holes, cut a piece of Stego Wrap to a size and shape that covers any damage by a minimum overlap of 6” in all directions. Clean all adhesion areas of dust, dirt, moisture, and frost. Tape down all edges using Stego Tape **(See Figure 3)**.

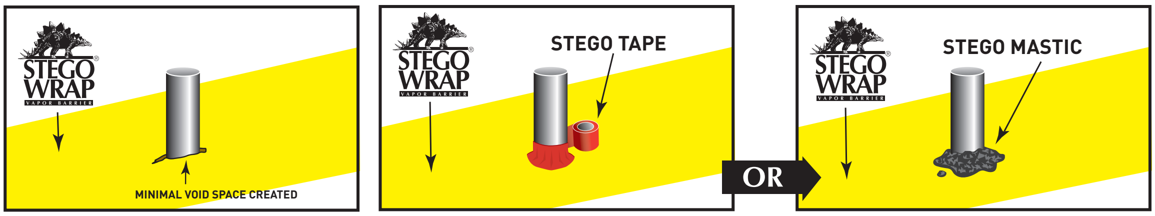
FIGURE 3: SEALING DAMAGED AREAS



NOTE: Stego Industries recommends the use of vapor barrier-safe concrete accessories, like Beast® Screed, to help minimize the amount of penetrations in a Stego Wrap Installation.

5. **IMPORTANT: ALL PENETRATIONS MUST BE SEALED.** All pipe, ducting, rebar, wire penetrations and block outs should be sealed using Stego Wrap, Stego Tape and/or Stego Mastic **(See Figure 4a)**. If penetrations are encased in other materials, such as expansive materials like foam, unless otherwise specified, Stego Wrap should be sealed to the underlying penetration directly.

FIGURE 4a: PIPE PENETRATION SEALING



STEGO WRAP PIPE PENETRATION REPAIR DETAIL:

1: Install Stego Wrap around pipe penetrations by slitting/cutting material as needed. Try to minimize the void space created.

2: If Stego Wrap is close to pipe and void space is minimized then seal around pipe penetration with Stego Tape and/or Stego Mastic. **(See Figure 4a)**

3: If detail patch is needed to minimize void space around penetration, then cut a detail patch to a size and shape that creates a 6” overlap on all edges around the void space at the base of the pipe. Stego Pre-Cut Pipe Boots are also available to speed up the installation.
4: Cut an “X” the size of the pipe diameter in the center of the pipe boot and slide tightly over pipe.
5: Tape down all sides of the pipe boot with Stego Tape.
6: Seal around the base of the pipe using Stego Tape and/or Stego Mastic. **(See Figure 4b)**

FIGURE 4b: DETAIL PATCH FOR PIPE PENETRATION SEALING

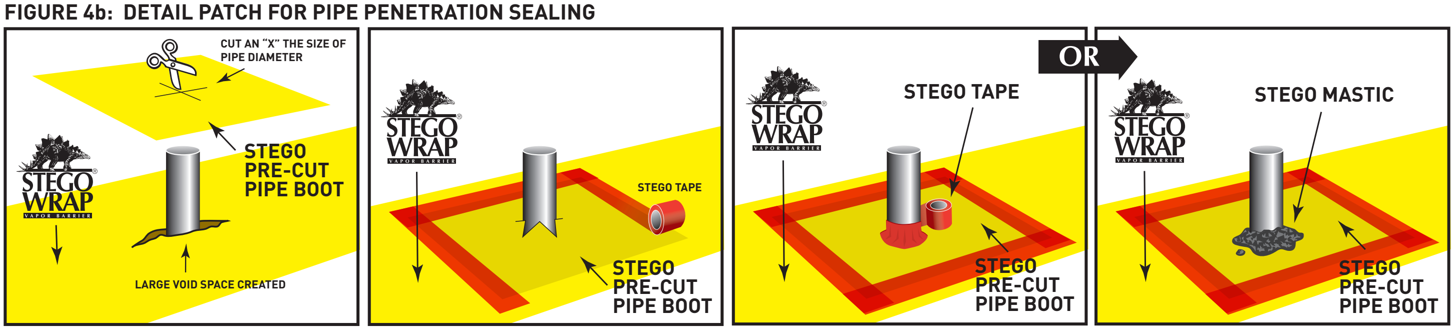
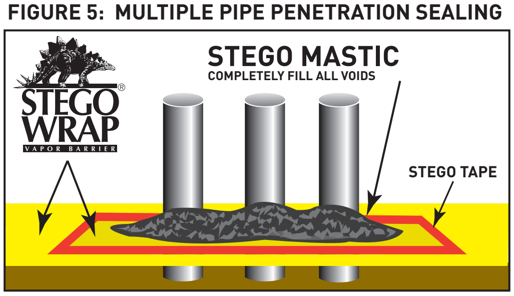


FIGURE 5: MULTIPLE PIPE PENETRATION SEALING



MULTIPLE PIPE PENETRATION SEALING:
Multiple pipe penetrations in close proximity and very small pipes may be sealed using Stego Wrap and Stego Mastic for ease of installation **(See Figure 5)**.

NOTE: Stego Industries, LLC’s (“Stego”) installation instructions are based on ASTM E1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner’s representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

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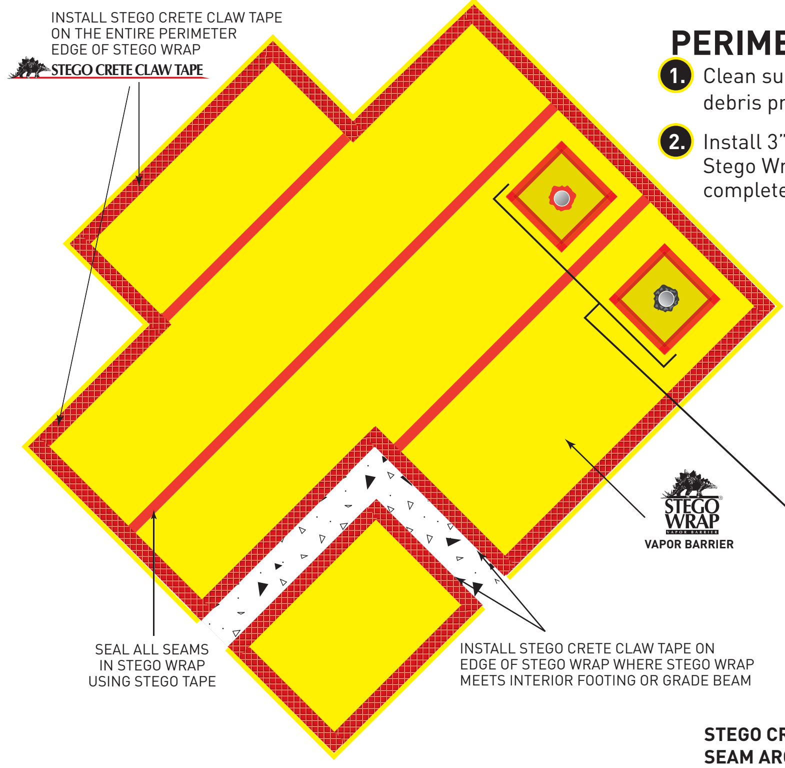
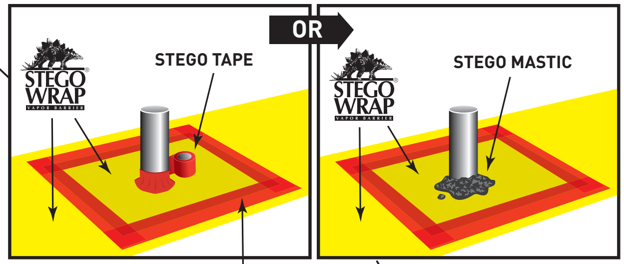
STEGO® CRETE CLAW® TAPE
INSTALLATION INSTRUCTIONS



PERIMETER SEAL TO SLAB

1. Clean surface of Stego Wrap to ensure that it is free of moisture and debris prior to the installation of Stego Crete Claw Tape.
2. Install 3" or 6" Stego Crete Claw Tape on the entire perimeter of the Stego Wrap installation. Stego Crete Claw Tape should be completely on Stego Wrap.

SEAL ALL PENETRATIONS WITH STEGO TAPE AND/OR STEGO MASTIC. STEGO CRETE CLAW TAPE IS NOT MEANT FOR REPAIRING PENETRATIONS.



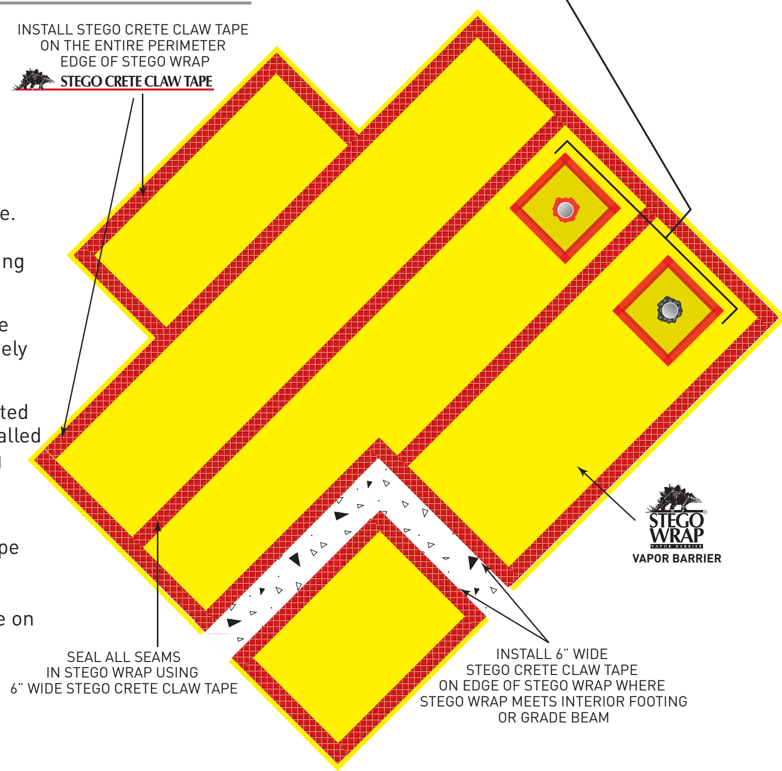
STEGO CRETE CLAW TAPE CAN BE USED TO SEAL SEAM AROUND DETAIL PATCH FOR ADDED PROTECTION.

SECURING STEGO WRAP TO THE BOTTOM OF THE SLAB

1. Clean surface of Stego Wrap to ensure that it is free of moisture and debris prior to the installation of 6" wide Stego Crete Claw Tape.
2. Overlap seams a minimum of 6". Seal all seams in Stego Wrap using Stego Crete Claw Tape.
3. Install 6" wide Stego Crete Claw Tape on the entire perimeter of the Stego Wrap Installation. Stego Crete Claw Tape should be completely on Stego Wrap.
4. Install additional Stego Crete Claw Tape if required. Lab and simulated field tests have shown that if 6" wide Stego Crete Claw Tape is installed on all seams and around the perimeter, then it is more than strong enough to support Stego Wrap. If determined by the architect or engineer, additional Stego Crete Claw Tape may be specified.
5. Prior to the placement of concrete, ensure that Stego Crete Claw Tape is free of dirt or debris to ensure maximum bond to the concrete.

These are general instructions. Installation requirements may change on a project-by-project basis.

IMPORTANT - For the application of securing Stego Wrap to the bottom of the slab, always use 6" wide Stego Crete Claw Tape.



NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

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www.stegoindustries.com