REMEDIAL ACTION WORK PLAN
for
168 8TH STREET
KINGS COUNTY, NEW YORK

PROPOSED PUBLIC SCHOOL FACILITY K710
168 8TH STREET
BROOKLYN, NEW YORK 11215
BLOCK 1003, LOT 11

NYSDEC BROWNFIELD CLEANUP PROGRAM SITE NO. C224266

SCA PROJECT ID NO. 099267
SCA CONTRACT NO. C000014345
SCA SERVICE ID NO. 68550

TRC PROJECT NO. 315824

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EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

The property is located at 168 8th Street, Brooklyn, New York 11215 (referred to as the "Site") and encompasses approximately 0.31 acre (13,500 square feet). The legal description of the Site is Block 1003, Lot 11. The New York City School Construction Authority (NYCSCA), a New York State Public Benefit Corporation, purchased the Site for construction of a public school facility in May 2017. The Site was accepted into the Brownfield Cleanup Program (BCP) and the NYCSCA was designated a Volunteer in April 2018. The BCP Site name is "168 8th Street" and the Site number is C224266.

The Site is bordered to the north by 8th Street followed by a two-story commercial building and three-story residential buildings; to the east by three- and four-story residential buildings; to the west by a one-story institutional building ("American Legion Hall") with a parking lot followed by a one-story commercial building with a parking lot ("Enterprise Rent-A-Car") and four-story residential buildings with one first-floor commercial tenant; and, to the south by 9th Street followed by a one-story commercial building ("Top Notch Auto Repair") and three-story residential buildings.

The regional topography slopes downward to the northwest toward the Gowanus Canal. The northern portion of the Site is approximately one to two feet lower in elevation in comparison to the southern portion of the lot, and a concrete ramp on the east-central portion of the lot connects these two areas for vehicle access. In addition, there is an access ramp at the 8th Street entrance of the Site.

According to the New York City Department of City Planning (NYCDCP) Zoning Map 16C, the Site is zoned for residential use (R6A for the southern portion of the Site and R6B for the northern portion of the Site). Residential districts permit community facilities such as schools. Properties in the area of the Site are zoned for residential, commercial, and manufacturing use.

Historic records indicate that the Site was first developed as farmland. A residential building, which was demolished in the late 1800s, was present on the southern portion of the Site. From the late 1800s to the early 1900s, the Site was occupied by an ink manufacturer (1888 to 1906), a storage facility (1906 to 1926) with a gauge manufacturer (circa 1917), a chemical laboratory (in 1926), and a machine works facility (1928 to 1934). In the mid- to late-1900s the Site was occupied by a garage and a gasoline station (from approximately 1926 to at least 1951), a plumbing supply/metal products manufacturer (1945 to 1965), and a textile factory (1976 to 1992). A fire

occurred on the Site in the early 1990s and the lot has been vacant since approximately 1992. The Site is currently unoccupied and consists of a concrete and gravel covered lot.

Summary of the Remedial Investigation

The 168 8th Street Remedial Investigation Report (RI Report) dated October 2018 describes the results of remedial investigation activities that were performed on the Site between late April and May 2018. The findings of the RI indicate the following:

- The primary contaminants of concern in soil are limited to the northern part of the Site and include metals (trivalent chromium and copper) in shallow soil.
- Groundwater contaminants of concern in the northern portion of the Site include volatile organic compounds (VOCs) (trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and naphthalene), per- and polyfluoroalkyl substances (PFAS), and the metal chromium (in filtered samples). In the southern portion of the Site, only naphthalene was detected slightly above the Class GA Value in one groundwater monitoring well adjacent to the southern-most underground storage tank (UST) area.
- Soil vapor contaminants of concern include chlorinated VOCs (TCE and cis-1,2-DCE).

Qualitative Human Health Exposure Assessment

Based on the findings of the RI, the principal contaminants of concern at the Site have been identified as chlorinated VOCs in soil vapor, chlorinated VOCs and PFAS in groundwater, one petroleum-related VOC in groundwater (naphthalene), and metals in subsurface soil and groundwater. A qualitative exposure assessment was prepared to evaluate the potential for exposure to these parameters. The evaluation addressed both potential on-Site and off-Site health impacts associated with the Site.

Dermal contact and ingestion of soil or groundwater, or inhalation of vapors or dust represent the potential routes of exposure. Potential receptors include construction workers during demolition and redevelopment, future on-Site occupants and visitors, future on-Site maintenance workers, and off-Site residents.

Considering the future remediation and redevelopment activities and institutional and engineering controls that will restrict future use, the following exposure pathways are considered incomplete:

- **Groundwater ingestion:** Use of groundwater in this area of Brooklyn is prohibited as a source of potable water; therefore, this exposure pathway is not complete for on-Site and off-Site occupants/residents. Also, an environmental easement will apply to groundwater, prohibiting its use.
- **Soil dermal contact by future on-Site occupants:** After completion of redevelopment activities, the remaining soil/fill material at the Site will be covered by new building(s), pavement, or clean cover material and landscaping, thereby preventing future exposure of occupants to the soil. The cover system is considered an engineering control and future inspections and maintenance activities will be performed in accordance with the Site Management Plan.
- **Inhalation of vapors by on-Site occupants:** It is anticipated that future redevelopment of the Site will include the construction of a vapor barrier and active sub-slab depressurization system below the proposed building that will minimize the potential for intrusion of VOCs into future building spaces and mitigate this exposure pathway.

The following exposure pathways are considered potentially complete:

- **Groundwater dermal contact by construction workers and future maintenance workers:** During the RI, groundwater was encountered between approximately 16 feet and 18.5 feet below ground surface. There is a potential for exposure to contaminated groundwater during redevelopment if a basement is incorporated into the new building design and dewatering is required; however, the frequency and duration of exposure is expected to be low.
- **Soil dermal contact by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in contact with on-Site contaminated soil.
- **Inhalation of vapors and dust by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in the generation of and exposure to on-Site contaminated vapors and dust.

- **Inhalation of vapors and dust by off-site residents:** Remedial alternatives and future construction activities (e.g., utility repairs) could result in the generation of contaminated vapors and dust that have the potential to migrate off-Site during construction. Off-Site vapor intrusion assessments may be performed at nearby properties by the NYSDEC and NYSDOH to evaluate the potential for exposure of off-Site residents.

A site-specific Health and Safety Plan (HASP), Soil/Material Management Plan (SoMP), and Community Air Monitoring Plan (CAMP) will be implemented during development and future maintenance activities when on-Site workers could become exposed to soil, soil vapor, or groundwater. The HASP and CAMP will establish procedures for the protection of on-Site workers and off-Site residents and will address community air monitoring and dust suppression measures. A Site Management Plan (SMP) will be implemented after the completion of the Remedial Action to protect against potential exposures during post-remediation soil and groundwater disturbances.

Summary of the Remedy

Remedial action objectives are presented in Section 2.8 and the Summary of Selected Remedial Actions are presented in Section 3.3 of this work plan. The following activities will be performed to achieve the remedial objectives:

1. Prepare and implement a site-specific HASP, SoMP, and CAMP for the remedial activities.
2. Decommission all existing groundwater monitoring wells with the exception of TRC-MW-101 (proposed for post-remediation monitoring) prior to remedial construction in accordance with NYSDEC CP-43.
3. Remove underground storage tank systems.
4. Removal of approximately 354 tons of impacted soil and crushed scrap metal/subsurface piping (the source of chlorinated VOCs) in the northern portion of the Site for off-Site disposal as part of an IRM.
5. A minimum of the upper two feet of soil (approximately 1,200 tons) across the Site will be excavated and transported off-site for disposal. In addition, removal and disposal off-site of approximately 500 tons of soil (hot spot removal) that exhibits trivalent chromium and copper above the Restricted-Residential Use Soil Cleanup Objectives (SCOs), extending to approximately 5 feet in depth, in the northeast part of the Site to the extent feasible based on structural considerations.

6. Remove and dispose off-Site soil excavated as part of the remedy. Approximately 4,500 tons of additional soil will be removed from the Site, if the building will be constructed with a basement.
7. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work.
8. Post-excavation end-point documentation/confirmatory soil sampling across the entire site, in the hotspot area that exhibits elevated concentrations of trivalent chromium and copper and in the area of the USTs to evaluate the performance of the remedy with respect to attainment Track 4: RRSCOs.
9. On-site soil which does not exceed Protection of Groundwater SCOs and Restricted-Residential SCOs criteria may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the Site. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) may be imported to the Site as necessary for backfilling. It is anticipated that approximately 600 tons of clean fill material will be imported to the Site for use as backfill. Approximately 250 tons of clean fill material were previously imported to the Site to backfill the IRM excavation area.
10. Appropriate offsite disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.
11. Groundwater contamination (remaining after active remediation) will be addressed with monitored natural attenuation (MNA). Groundwater will be monitored for chlorinated VOCs. Two quarterly sampling events will be completed prior to construction activities, and subsequent reports of the attenuation will be provided at a frequency determined in the SMP.
12. As part of construction of the new building, install a gas vapor barrier beneath the lowest level floor slab and install and operate a sub-slab depressurization system (SSDS).
13. Construct a composite cover system consisting of impervious surfaces (e.g., building, paved surfaces, etc.) across the majority of the Site and cover remaining landscaped areas with a minimum 2-foot thick imported clean soil layer. Install a demarcation layer on top of native site soils to remain and below the building, playground area, and clean cover layer in landscaped areas.
14. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.
15. Prepare and implement a SMP for long term maintenance of the Site.
16. Record an Environmental Easement to ensure proper use of the Site.
17. Submission of a Final Engineering Report (FER) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries,

and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER. By implementing a New York State Department of Environmental Conservation (NYSDEC) approved-RAWP and SMP, the proposed future redevelopment and use will be protective of human health and the environment.

1.0 INTRODUCTION

The New York City School Construction Authority (NYCSCA) has executed a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC), to remediate a 0.31-acre property located at 168 8th Street, Brooklyn, Kings County, New York (referred to as the "Site"). The Site was accepted into the Brownfield Cleanup Program (BCP) and the NYCSCA was designated a Volunteer in April 2018. Restricted-Residential use is proposed for the property. The BCP Site name is "168 8th Street" and the Site number is C224266. When redevelopment is completed, the Site will contain a public school facility.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between April and May 2018. This RAWP provides an evaluation of Track 1 and Track 4 remedial action alternatives, associated costs, and the recommended and preferred remedy. The remedy selection approach presented in this work plan is consistent with the procedures in DER-10 and complies with applicable standards, criteria, and guidance. The remedy described in this document also complies with applicable federal, state, and local laws, regulations and requirements. Following review of the draft RI Work Plan and BCP Application package, the NYSDOH determined that the Site represents a significant threat to public health based on the potential for exposure to site-related contaminants. The significant threat determination letter from the NYSDOH to the NYSDEC, dated March 8, 2018, is provided in Appendix A of this RAWP. The RI for this Site did not identify fish and wildlife resources.

The Site is located in an urban area and is not located in close proximity to a surface water body, wetland, or other ecologically significant area. Redevelopment plans for the Site include construction of a Pre-Kindergarten Facility, and there will be no ecological resources on the Site following the redevelopment. Therefore, in accordance with DER-10 Section 3.10.1(b), further evaluation related to the Fish and Wildlife Resources Impact Analysis is not warranted.

1.1 SITE LOCATION AND DESCRIPTION

The approximately 0.31-acre Site is located at 168 8th Street in the County of Kings, Brooklyn, New York and is identified as Block 1003, Lot 11. A United States Geological Survey (USGS) topographical quadrangle map (*Figure 1*) shows the Site location. The Site is bordered by 8th Street followed by a two-story commercial building and three-story residential buildings to the north; by three- and four-story residential buildings to the east; by a one-story institutional building ("American Legion Hall") with a parking lot followed by a one-story commercial building with a parking lot ("Enterprise Rent-A-Car") and four-story residential buildings with one first-floor commercial tenant to the west; and, by 9th Street followed by a one-story commercial building ("Top Notch Auto Repair") and three-story residential buildings to the south (see *Figures 2 and 3*). A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419.

1.2 CONTEMPLATED REDEVELOPMENT PLAN

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

The proposed future use of the Site is a Pre-Kindergarten Facility. The proposed redevelopment, based on the current conceptual design, includes a three-story building with a basement on the southern portion of the Site and a playground encompassing approximately 2,800 square-feet on the northern portion of the Site. The plan for construction of a basement and depth of the building basement have not yet been confirmed and will be established during the design phase. The entire Site will be covered by the school building and paved surfaces, or landscaping. *Figure 4* presents a conceptual design for the school facility. The conceptual design for the school facility is subject to change during the design process.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is bordered to the north by 8th Street followed by a two-story commercial building and three-story residential buildings; to the east by three- and four-story residential buildings; to the west by a one-story institutional building ("American Legion Hall") with a parking lot followed by a one-story commercial building with a parking lot ("Enterprise Rent-A-Car") and four-story

residential buildings with one first-floor commercial tenant; and, to the south by 9th Street followed by a one-story commercial building ("Top Notch Auto Repair") and three-story residential buildings. The existing buildings that abut the Site will be evaluated to determine the appropriate excavation and constructions methods for the Site, and feasible limits of earthwork.

According to the New York City Department of City Planning (NYCDCP) Zoning Map 16C, the Site is zoned for residential use (R6A for the southern portion of the Site and R6B for the northern portion of the Site). Residential districts permit community facilities such as schools. Properties in the area of the Site are zoned for residential, commercial, and manufacturing use. Construction of a new school building and play area (including a playground area) will improve the community by providing employment opportunities, a local public school, and park-like facilities on a property that has been vacant since the early 1990s. *Figure 3* presents the surrounding land use and potential sensitive environmental receptors.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with DER-10. The investigation was conducted between late April and May 2018. The October 2018 RI Report was approved by the NYSDEC in November 2018. *Figure 6* depicts the sample locations.

2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED

2.1.1 Samples Collected

The RI included the following:

1. Advancement of eight soil vapor sampling points and collection of eight soil vapor samples for laboratory analysis;
2. Advancement of 14 soil borings with continuous sampling to a maximum of 30 feet bgs and laboratory analysis of 22 soil samples; and,
3. Installation, development, and survey of seven (7) permanent monitoring wells and collection and laboratory analysis of one groundwater sample from each permanent well.

2.1.2 Chemical Analytical Work Performed

2.1.2.1 Soil Vapor

The soil vapor samples were analyzed for a list of 26 petroleum- and chlorinated solvent-related VOCs by United States Environmental Protection Agency (USEPA) Method TO-15.

2.1.2.2 Soil Borings and Subsurface Soil

The soil samples selected for laboratory analyses and the analyses performed are summarized in the following table.

Boring Depths and Soil Sample Analytical Plan

Soil Boring ID	Boring Depth (feet bgs)	Maximum PID Reading (parts per million)	Depth of Sample Intervals Selected for Analysis (feet bgs)	TCL/CP-51 VOCs+TICs	TCL/CP-51 SVOCs+TICs	TAL Metals + Cyanide*	TCL PCBs	TCL Pesticides/ Herbicides[4]	TCLP Lead	TCLP Chromium
TRC-SB-101	30	0	1-4			X				
			16-18	X	X	X	X	X		
TRC-SB-102	30	0	1-4			X			X	
			15-17	X	X	X	X	X		
TRC-SB-103	30	0	15-17	X	X	X	X	X		
TRC-SB-104	30	0	1-4			X				
			15-17	X	X	X	X	X		
TRC-SB-105	30	0	1-4			X				X
			15-17	X	X	X	X	X		
TRC-SB-106	30	0	16-18[1]	X	X	X	X	X		
TRC-UST-1	30	0	11-13	X	X	X	X	X		
TRC-UST-2	30	0	11-13	X	X	X	X	X		
TRC-UST-3	30	0	11-13	X	X	X	X	X		
TRC-UST-4	30	0	11-13	X	X	X	X	X		
TRC-UST-5	30	0	9-11	X	X	X	X	X		
TRC-UST-6	30	291	20-22	X	X	X	X	X		
			23-25	X	X	X	X	X		
TRC-UST-7	30	126	20-22	X	X	X	X	X		
			25-27	X	X	X	X	X		
TRC-UST-8	30	780	17-19	X	X	X	X	X		
			20-22	X	X	X	X	X		
			28-30	X	X	X	X	X		

Notes:
TAL: Target Analyte List
TCL: Target Compound List
TICs: Tentatively identified compounds
X: Analysis performed
[1] One duplicate soil sample TRC-DUP-1 [duplicate of TRC-SB-106(16-18')] was submitted for laboratory analysis.
* Note: Shallow soil samples collected from TRC-SB-101, TRC-SB-102, TRC-SB-104 and TRC-SB-105 were not analyzed for cyanide. Soil sample TRC-SB-105-(1-4) was additionally analyzed for hexavalent chromium.

2.1.2.3 Groundwater

The groundwater samples selected for laboratory analyses and the analyses performed are summarized in the following table.

Groundwater Sample Analytical Plan

Sample ID/ Well Number	Sample Date	Laboratory Sample ID	Depth to Water (feet bgs)[1]	Screened Interval (feet bgs)	TCL/CP-51 VOCs + TICs	TCL/CP-51 SVOCs + TICs	TAL Metals[2] + Cyanide	TCL PCBs	TCL Pesticides/ Herbicides	Natural Attenuation Parameters[3]	PFAS	1,4-Dioxane
TRC-MW-101	5/17/18	460-156444-2 320-39544-2	17.23	13 to 28	X	X	X	X	X	X	X	X
TRC-MW-102[4]	5/17/18	460-156444-3 320-39544-3	16.4	12 to 27	X	X	X	X	X	X	X	X
TRC-MW-103	5/17/18	460-156444-4 320-39544-4	16.74	12 to 27	X	X	X	X	X	X	X	X
TRC-MW-104	5/17/18	460-156444-5 320-39544-5	16.64	12 to 27	X	X	X	X	X	X	X	X
TRC-MW-105	5/17/18	460-156444-6 320-39544-6	15.97	12 to 27	X	X	X	X	X	X	X	X
TRC-MW-106	5/17/18	460-156444-7	18.47	13 to 28	X	X	X	X	X	X		
TRC-MW-107	5/17/18	460-156444-8	18.51	15 to 30	X	X	X	X	X	X		

Notes:
X - Sample analysis performed
TAL: Target Analyte List
TCL: Target Compound List
TICs: Tentatively identified compounds
PFAS: Per- and polyfluoroalkyl substances
[1] Measured from the top of PVC casing
[2] Filtered and unfiltered
[3] Natural attenuation parameters include alkalinity, sulfate, total organic carbon and total kjeldahl nitrogen (TKN)
[4] One duplicate groundwater sample, TRC-DUP1(WG), was collected on May 17, 2018 from TRC-MW-102.

2.1.3 Geophysical Survey

A geophysical survey was performed on June 30, 2011 to verify that the proposed boring locations were clear of subsurface utilities and structures, and to identify potential buried structures in accessible areas of the Site. The results of the geophysical surveys did not reveal evidence of utilities or buried structures in the vicinity of the soil borings. Although there were no underground storage tanks identified during the geophysical surveys due to a reinforced concrete slab covering

the Site, trenches were subsequently excavated during implementation of an archeological investigation and three USTs were identified. Utility clearance consisting of required New York One Call notifications and the mark outs of locations of underground utility lines in public roads and rights-of-way was also performed prior to sampling. Sampling locations were established in areas that did not conflict with subsurface structures or utilities.

2.1.4 Summary of Remedial Investigation Findings

Below is a summary of the RI findings.

VOCs in Soil Vapor

Eight soil vapor samples were collected at the Site and analyzed for VOCs. The results of the analyses of the soil vapor samples were compared to NYSDOH Vapor Intrusion Matrices A, B, and C. Of the eight soil vapor samples collected, seven soil vapor samples contained one or more VOCs at a concentration potentially above a recommended action limit (i.e., mitigation or monitoring) which would apply to sub-slab vapor.

There are four recommendations within the NYSDOH Vapor Intrusion Matrices: no further action, identify sources(s) and resample or mitigate, monitor, and mitigate. A comparison of the concentrations of compounds detected in the soil vapor samples to the NYSDOH Vapor Intrusion Matrices indicates the following:

- Comparison of the concentrations of cis-1,2-DCE detected in soil vapor sample TRC-SV-104 and TCE detected in soil vapor sample TRC-SV-105 to the NYSDOH Vapor Intrusion Matrices indicates no further action, monitoring, or mitigation would be the recommended action, depending on the corresponding indoor air concentrations, if the results are representative of sub-slab vapor concentrations.
- Comparison of the concentrations of cis-1,2-DCE and/or TCE detected in soil vapor samples TRC-SV-101, TRC-SV-102, TRC-SV-103, TRC-SV-104, TRC-SV-109 and TRC-SV-110 to the NYSDOH Vapor Intrusion Matrices indicates mitigation would be the recommended action, regardless of indoor air concentrations, if the results are representative of sub-slab vapor concentrations.

Cis-1,2-DCE was detected in five soil vapor samples at concentrations ranging between 0.49 and 350 $\mu g/m^3$. TCE was detected in seven soil vapor samples at concentrations ranging between 10 and 12,000 $\mu g/m^3$.

The complete results of the analyses of the soil vapor samples for VOCs are presented in *Table 1*.

Volatile Organic Compounds (VOCs) in Soil

A total of 18 soil samples and one duplicate soil sample were analyzed for Target Compound List (TCL) VOCs +10 tentatively identified compounds (TICs). There were no VOCs detected at concentrations exceeding the Restricted-Residential Use SCOs. Note that TCE was detected in subsurface soil samples selected for analysis from borings TRC-SB-101 through TRC-SB-106 at concentrations ranging from 0.0016 mg/kg to 0.016 mg/kg, which is below the Unrestricted Use SCO and Restricted-Residential Use SCOs.

The complete results of the analyses of the soil samples for VOCs are presented in *Table 2*.

Semivolatile Organic Compounds (SVOCs) in Soil

A total of 18 soil samples and one duplicate soil sample were analyzed for TCL semivolatile organic compounds (SVOCs) +20 TICs. There were no SVOCs detected at concentrations exceeding the Restricted-Residential Use SCOs.

The complete results of the analyses of the soil samples for SVOCs are presented in *Table 3*.

Metals and Cyanide in Soil

A total of 22 soil samples and one duplicate soil sample were analyzed for Target Analyte List (TAL) metals, eighteen (18) soil samples were analyzed for cyanide, and one sample was additionally analyzed for hexavalent chromium. The analytical data is summarized in *Table 4*. Trivalent chromium and copper were detected at concentrations exceeding the Restricted-Residential Use SCOs as shown in the table below.

Metals Detected in Soil at Concentrations Above Restricted-Residential Use SCOs and Results of Analysis for Hexavalent Chromium

Sample ID Sample Depth (ft) Units	TRC-SB-102(SO)-1-4 1'-4' (mg/kg)	TRC-SB-105(SO)-1-4 1'-4' (mg/kg)	RRUSCO mg/kg
Trivalent Chromium[1]	19.1	**1,710**	180
Hexavalent Chromium	NA	0.99 J	110
Copper	**344**	**321**	270

Notes:
NA – Not Analyzed
J – Estimated value
RRUSCO: Restricted-Residential Use SCO
Bold and shaded values exceed RRUSCO
mg/kg: Milligrams per kilogram
(1) Results are compared to RRUSCO for trivalent chromium.

TRC-SB-105(SO)-1-4 was analyzed for hexavalent chromium based on the elevated concentration of chromium detected in the sample. Hexavalent chromium was detected in the soil sample at an estimated concentration of 0.99 mg/kg which is well below the Restricted-Residential Use SCO of 110 mg/kg. Additionally, soil samples which exhibited elevated concentrations of total lead and total chromium over 100 mg/kg were analyzed by the TCLP as described below.

Hazardous Waste Characteristics in Soil

One (1) soil sample (TRC-SB-102(SO)-1-4) was analyzed for TCLP lead and one (1) soil sample (TRC-SB-105(SO)-1-4) was analyzed for TCLP chromium. The leachable concentration of lead in TRC-SB-102(SO)-1-4 did not exceed the regulatory limit of 5 mg/L and the leachable concentration of chromium in TRC-SB-105(SO)-1-4 also did not exceed the regulatory limit of 5 mg/L.

A summary of the analytical results for the TCLP lead and chromium testing is presented in *Table 5.*

Polychlorinated Biphenyls (PCBs) in Soil

Eighteen soil samples and one duplicate soil samples were analyzed for PCBs. PCBs were not detected in any of the soil samples. The analytical data is summarized in *Table 6.*

Pesticides and Herbicides in Soil

Eighteen soil samples were analyzed for TCL pesticides and herbicides. There were no pesticides or herbicides detected at concentrations greater than the Restricted-Residential Use SCOs. The analytical data is summarized in *Table 7.*

VOCs in Groundwater

Seven groundwater samples and one duplicate groundwater sample collected from the permanent monitoring wells were analyzed for TCL VOCs +10 TICs. Groundwater samples collected from TRC-MW-101 through TRC-MW-105 were additionally analyzed for 1,4-dioxane via USEPA Method 8270 plus selective ion monitoring at the request of the NYSDEC. Three VOCs were detected at concentrations above Class GA Values in the groundwater samples. The analytical data is summarized in *Table 8.* A summary of the VOCs detected above Class GA Values in the groundwater samples is presented in the following table.

VOCs Detected in Groundwater at Concentrations Greater than Class GA Values

Sample ID Units	TRC-MW-101(WG) (µg/L)	TRC-MW-103(WG) (µg/L)	TRC-MW-104(WG) (µg/L)	TRC-MW-107(WG) (µg/L)	Class GA Value (µg/L)
Cis-1,2-dichloroethene (cis-1,2-DCE)	2.6	**13**	1.7	<1.0	5
Naphthalene	<1.0	<1.0	<1.0	**26**	10
Trichloroethene (TCE)	**10**	**39**	**8.3**	<1.0	5

Notes:
Bold and shaded values exceed Class GA Values
µg/L: Micrograms per liter
<: The compound was not detected above the reporting limit.

As shown in the table above, cis-1,2-DCE, naphthalene, and TCE were detected in the groundwater samples at concentrations exceeding Class GA Values. Additional discussion regarding these three compounds is provided below:

- TCE was detected in groundwater in six on-Site monitoring wells (TRC-MW-101 through TRC-MW-106) at a maximum concentration of 39 µg/L (in TRC-MW-103), which is above the Class GA Value of 5 µg/L. Based on the locations of elevated concentrations of TCE detected in on-Site groundwater and in on-Site soil vapor, and that TCE was detected in Site soil during the RI and previous investigations, TCE in groundwater at the Site may be attributed to an on-Site source[1].
- Cis-1,2-DCE, a breakdown product of TCE, was detected in groundwater in four on-Site monitoring wells (TRC-MW-101, TRC-MW-103, TRC-MW-104, and TRC-MW-105), at a maximum concentration of 13 µg/L (in TRC-MW-103), which is above the Class GA Value of 5 µg/L. Based on the locations of cis-1,2-DCE detected in on-Site groundwater and in on-Site soil vapor, cis-1,2-DCE in groundwater at the Site may be attributed to an on-Site source.

[1] Note that all material in the northern portion of the Site identified as a potential source of VOCs during implementation of the IRM (including subsurface piping, a drainage feature, and impacted soil) was removed in October and November 2017.

- Naphthalene was detected in one on-Site monitoring well (TRC-MW-107) at a concentration of 26 µg/L, which is above the Class GA Value of 10 µg/L. The naphthalene detected in TRC-MW-107 may be attributed to heavily weathered gasoline, since evidence of limited impacts was observed in soil samples collected below the water table in the immediate vicinity of the southern-most UST area.

SVOCs in Groundwater

Seven groundwater samples and one duplicate groundwater sample collected from the permanent monitoring wells were analyzed for TCL SVOCs +20 TICs. There were no SVOCs detected at concentrations greater than the Class GA Values in the groundwater samples. The analytical data is summarized in *Table 9.*

Metals in Groundwater

Seven groundwater samples and one duplicate groundwater sample were collected from the permanent monitoring wells and analyzed for metals (unfiltered and filtered). The analytical data is summarized in *Table 10.* Four metals were detected in the filtered groundwater samples at concentrations above the Class GA Values. A summary of the metals detected at concentrations greater than the Class GA Values in the filtered groundwater samples is provided in the following table.

Metals Detected in Filtered Groundwater at Concentrations above Class GA Values

Sample ID Filtered/Unfiltered Units	TRC-MW-101(WG) Filtered µg/L	TRC-MW-102(WG) Filtered µg/L	TRC-MW-103(WG) Filtered µg/L	TRC-MW-104(WG) Filtered µg/L	Class GA Value µg/L
Chromium	49.1	2.3 J	262	89.1	50
Sodium	28,700	109,000	90,300	67,200	20,000

Sample ID Filtered/Unfiltered Units	TRC-MW-105(WG) Filtered µg/L	TRC-MW-106(WG) Filtered µg/L	TRC-MW-107(WG) Filtered µg/L	TRC-MW-DUP1(WG) Filtered µg/L	Class GA Value µg/L
Iron	<120	<120	**1,570**	<120	300
Manganese	56.5	21.1	**5,580**	68.4	500
Sodium	**23,200**	**83,200**	**78,900**	**110,000**	20,000

Notes:
Bold and shaded values exceed Class GA Values
<: The compound was not detected above the reporting limit.
J: Estimated value
µg/L: Micrograms per liter
TRC-MW-DUP1(WG) is a duplicate of TRC-MW-102(WG)

Chromium, iron, manganese, and sodium were detected in filtered groundwater samples at concentrations exceeding Class GA Values. The metals detected in groundwater are likely attributable to local groundwater characteristics and/or the characteristics of the fill material at the Site.

PCBs in Groundwater

Seven groundwater samples and one duplicate groundwater sample collected from the permanent monitoring wells were analyzed for PCBs. There were no PCBs detected in the groundwater samples. The analytical data is summarized in *Table 11.*

Pesticides and Herbicides in Groundwater

Seven groundwater samples and one duplicate groundwater sample collected from the permanent monitoring wells were analyzed for TCL pesticides and TCL herbicides. There were no pesticides or herbicides detected at concentrations greater than the Class GA Values in the groundwater samples. The analytical data is summarized in *Table 12.*

Natural Attenuation Parameters in Groundwater

Seven groundwater samples and one duplicate groundwater sample collected from the permanent monitoring wells were analyzed for natural attenuation parameters, including alkalinity, sulfate, total kjeldahl nitrogen (TKN), and total organic carbon (TOC). The range of results for the natural attenuation parameters are as follows: alkalinity: 47.2 mg/L to 200 mg/L; sulfate: 14.8 mg/L to 116 mg/L; and, total organic carbon: 0.81 to 3.9 mg/L. TKN was detected only in the groundwater sample collected from monitoring well TRC-MW-107, at a concentration of 0.25 mg/L. The analytical data is summarized in *Table 13.*

Per- and Polyfluoroalkyl Substances in Groundwater

Five groundwater samples and one duplicate groundwater sample collected from the permanent monitoring wells were analyzed for per- and polyfluoroalkyl substances (PFAS) as required by the NYSDEC. PFAS were detected in groundwater, including perfluorooctanesulfonic acid (PFOS), at concentrations ranging between 3.3 nanograms per liter (ng/L) and 10 ng/L, and perfluorooctanoic acid (PFOA) at concentrations ranging between 28 ng/L and 590 ng/L. The highest concentrations of PFOS and PFOA were detected in TRC-MW-105, which is located on the northeast portion of the Site. There are no Class GA Values or other New York State SCGs for PFAS in groundwater. However, 70 nanograms per liter (ng/L) for individual or combined concentrations of PFOA and PFOS [the USEPA lifetime health advisory level (HA[2])] is utilized by the Department as a screening level above which additional evaluation is warranted. The analytical data is summarized in *Table 14*.

2.2 SIGNIFICANT THREAT

Following review of the draft RI Work Plan and BCP Application package, the NYSDOH determined that the Site represents a significant threat to public health based on the potential for exposure to site-related contaminants. The significant threat determination letter from the NYSDOH to the NYSDEC, dated March 8, 2018, is provided in Appendix A of the RI Report. A copy of the notice is included in *Appendix A*.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

Historic records indicate that the Site was first developed as farmland. A residential building, which was demolished in the late 1800s, was present on the southern portion of the Site. From the late 1800s to the early 1900s, the Site was occupied by an ink manufacturer (1888 to 1906), a storage facility (1906 to 1926) with a gauge manufacturer (circa 1917), a chemical laboratory (in 1926), and a machine works facility (1928 to 1934). In the mid- to late-1900s the Site was occupied by a garage and a gasoline station (from approximately 1926 to at least 1951), a plumbing

[2] HAs serve as informal technical guidance to assist federal, state and local officials, as well as managers of public or community water systems in protecting public health. They are not regulations and should not be construed as legally enforceable federal standards. (Federal Register/Vol. 81, No.101/Wednesday, May 25, 2016/Notices)

supply/metal products manufacturer (1945 to 1965), and a textile factory (1976 to 1992). A fire occurred on the Site in the early 1990s and the lot has been vacant since approximately 1992.

The current owner of the Site is the NYCSCA. Previous property owners are listed below:

- Derby Textile Corporation (from 1971 to 2017)
- Alpha Knitting Mills (1971)
- Irene Friedman (1970)
- 197 Realty Corp (1969)

2.3.2 Prior Reports

Presented in this section are summaries of reports regarding previous investigations conducted at the Site which include a Phase I Environmental Site Assessment (ESA) Report prepared by TRC in May 2011, a Phase II Environmental Site Investigation (ESI) Report prepared by TRC in May 2013, and a Letter Report prepared by TRC in July 2017 which describes the inspection services performed during a Phase IB Archeological Investigation.

2.3.2.1 Phase I Environmental Site Assessment (ESA), May 2011

A Phase I ESA for Block 1003, Lot 11 (the Site) and the adjacent lot (Block 1003, Lot 59) was completed by TRC in 2011 on behalf of the NYCSCA. The Phase I ESA identified the following on-Site recognized environmental conditions (RECs) for Block 1003, Lot 11: the potential presence of buried structures from former on-site structures and fill material from unknown sources; and the historic use of the Site as an ink manufacturer, a storage facility with a gauge manufacturer, a machine works facility, a plumbing supply/metal products manufacturer, a garage with a gasoline station, a chemical laboratory, and a textile factory[3]. Off-site RECs identified included the historic and current use of nearby properties for manufacturing, factories, a printing facility, automobile repair facilities, garages with gasoline tanks, a fuel oil company, an undertaker, dry cleaning/laundry facilities, a tire shop, and a filling station. Additionally, nearby sites with the potential to impact the Site are listed in environmental regulatory agency databases for generation of hazardous waste and petroleum bulk storage. The Phase I ESA additionally identified environmental concerns including potential asbestos-containing material (ACM), lead-

[3] Note that certain information regarding the Site history was determined after completion of the Phase I ESA and has been incorporated into the description of on-Site RECs.

based paint (LBP), and PCB-containing materials in buried structures and debris associated with former structures on the Site.

Based on the results of the Phase I ESA, TRC recommended performing a Phase II ESI to determine whether the identified RECs affected the suitability of the Site for the construction of a Pre-Kindergarten Facility. Environmental sampling was subsequently completed by TRC and is described below.

2.3.2.2 Phase II Environmental Site Investigation (ESI), March 2013

A Phase II ESI Report for Block 1003, Lot 11 was prepared by TRC in March 2013 on behalf of the NYCSCA to assess the RECs identified in the Phase I ESA. The following field activities were completed as part of the Phase II ESI:

- Geophysical surveys to verify that the proposed boring locations were clear of subsurface utilities and structures, and to identify potential buried structures in accessible areas of the Site;
- Advancement of twelve (12) soil borings; continuous soil sampling to a maximum depth of 20 feet bgs; and, laboratory analysis of discrete soil and groundwater samples.
- Installation of seven (7) soil vapor probes, and collection and laboratory analysis of a soil vapor sample from each vapor probe; and,
- Collection and analysis of one (1) ambient air sample.

Since the Site was rumored to be a potential burial ground for Revolutionary War soldiers, an archeologist from AKRF Engineering, PC (AKRF) was on-Site to screen the soils recovered from the soil borings. A Phase IB Archeological Investigation was subsequently completed in June 2017 (refer to Section 3.3).

The results of the geophysical surveys did not reveal evidence of utilities or buried structures in the vicinity of the soil borings. Although there were no underground storage tanks identified during the geophysical surveys due to a reinforced concrete slab covering the Site, subsequent trenches were advanced during implementation of the archeological investigation and three USTs were identified (refer to Section 3.3). During the Phase II ESI, fill material was identified to a

depth of approximately 10 feet bgs[4] and native material was observed below the fill material. Additionally during the Phase II ESI, groundwater was encountered at the Site at depths ranging from approximately 13 to 19 feet bgs[5].

The seven soil vapor samples collected at the Site were analyzed for VOCs. The laboratory results identified the presence of several petroleum and chlorinated-solvent related VOCs at elevated concentrations (compared to typical background concentrations) in soil vapor, most notably at soil vapor sample locations TRC-SG1, TRC-SG2, and TRC-SG9 collected in the northern portion of the Site. Specifically, TCE was detected at a maximum concentration of 16,000 micrograms per cubic meter ($\mu g/m^3$) in TRC-SG1, cis-1,2-DCE was detected at a maximum concentration of 110 $\mu g/m^3$ in TRC-SG9, and tetrachloroethene (PCE) was detected at a maximum concentration of 940 $\mu g/m^3$ in TRC-SG1. Additionally, petroleum-related compounds including toluene, ethylbenzene, and xylenes were detected in soil vapor sample TRC-SG1 each at a concentration over 1,000 $\mu g/m^3$. Based on the concentrations of chlorinated volatile organic compounds (CVOCs) detected, mitigation would be the recommended action based on comparison of the soil vapor sampling results to the NYSDOH Vapor Intrusion Matrices, if the results are considered representative of sub-slab vapor concentrations which would exist after construction of a building. VOCs were not detected in the ambient air sample at concentrations exceeding the NYSDOH Air Guideline Values (AGVs) or published background levels. *Figure 5A* shows a comparison of the soil vapor sampling results to the NYSDOH Vapor Intrusion Matrices.

Visual and olfactory indications of contamination were observed in one soil boring (TRC-SB6) from 19 to 20 feet bgs, which is below the depth at which groundwater was encountered (i.e., in a saturated soil sample). The VOCs naphthalene and 1,2,4-trimethylbenzene were detected in the soil sample selected for laboratory analysis from this interval (TRC-SB6 (19-20)) at concentrations slightly above the 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use Soil Cleanup Objectives (SCOs) and Protection of Groundwater SCOs. The VOCs detected in the soil sample at concentrations slightly exceeding regulatory criteria were attributed to a discrete area of potential petroleum contamination identified in this soil interval. Naphthalene and 1,2,4-trimethylbenzene were not detected in the groundwater sample collected at this location (TRC-GW6). Evidence of contamination was not identified in any other recovered soil samples.

[4] Note that during the RI, fill material was identified to a depth of approximately 8 feet bgs.
[5] Note that during the RI, depth to water measurements in permanent monitoring wells across the Site ranged from approximately 16 feet bgs in TRC-MW-105 to 18.5 feet bgs in TRC-MW-107.

Mercury and nickel were detected in one soil sample (TRC-SB1 (1-4)) at concentrations above the Restricted-Residential Use SCOs and chromium was detected in one soil sample (TRC-SB9 (1-4)) at a concentration above the Restricted-Residential Use SCO. The detected metal concentrations in soil were attributed to the characteristics of fill material at the Site. A summary of the results of the analyses of the soil samples which exceed Unrestricted Use SCOs and Restricted-Residential Use SCOs is shown on *Figure 5B.*

Two (2) VOCs were detected at concentrations exceeding the New York State Class GA Groundwater Standards (Class GA Values). TCE was detected above the Class GA Value of 5 micrograms per liter (µg/L) in TRC-MW12 (at 99 µg/L), TRC-MW13 (at 34 µg/L) and TRC-GW1 (at 9.3 µg/L), and cis-1,2-DCE was detected above the Class GA Value of 5 µg/L in TRC-MW12 (at 11 µg/L) and TRC-MW13 (at 18 µg/L). TRC-MW13 and TRC-GW1 were collected in the northern part of the Site. TRC-MW12 was collected below the 8th Street sidewalk immediately north of the Site. The VOCs detected in groundwater were attributed to former on-site activities or to a historic release from a former dry cleaner northwest of the Site at the southeast corner of 8th Street and 3rd Avenue. Naturally occurring metals (magnesium, manganese, and sodium) were also detected in filtered groundwater samples at concentrations exceeding the groundwater quality standards. The elevated concentrations of metals in filtered groundwater samples were attributed to the characteristics of Site soils. *Figure 5C* shows the Phase II ESI groundwater sampling results greater than Class GA Values.

2.3.2.3 Letter Report for Inspection Services during Phase IB Archeological Investigation, July 2017 and Supplemental Phase IB Archeological Investigation

In July 2017, TRC prepared a letter report titled "Inspection Services during Phase IB Archeological Investigation" for NYCSCA. The letter report summarizes the results of periodic inspection services completed by TRC in June 2017 on behalf of NYCSCA's Industrial and Environmental Hygiene Division during the implementation of a Phase IB Archeological Investigation implemented at the Site by AKRF. An environmental contractor, Brookside Environmental, Inc. (Brookside), was retained as a subcontractor by AKRF for excavation services in support of the archeological investigation. An excavator was utilized to complete eight (8) trenches to a maximum depth of 10 feet bgs. TRC was on-Site to screen soils for evidence of contamination. The approximate locations of the eight (8) trenches excavated during the Phase IB Archeological Investigation are shown on *Figure 6.*

The subsurface excavations confirmed the presence of at least three USTs at the Site; one concrete encased UST on the southeastern portion of the Site and two steel USTs on the southern portion

of the Site. The three USTs are each approximately 550-gallons in capacity, formerly contained gasoline, and are inactive. The three USTs were registered under PBS Facility ID No. 2-612781 following NYCSCA acquisition of the Site.

The inspections performed by TRC during the archaeological investigation additionally revealed elevated photoionization detector (PID) readings and visual and olfactory indications of potential contamination in soil excavated from 7.5 to 8 feet bgs in the vicinity of a drainage feature and subsurface piping identified in Trench 2, located in the northern part of the Site. In addition, elevated PID readings were observed in soil excavated from Trench 2 from approximately 3.5 to 4 feet bgs; however, visual and olfactory indications of potential contamination were not identified at this depth interval. No other visual or olfactory indications of potential contamination or elevated PID readings were observed in the excavated soil from the remaining trenches. However, piping was identified in Trench 1 and Trench 3 during the investigation. AKRF identified items of potential archeological significance (i.e., cistern and hand-dug well) in Trench 5.

Three samples of soil excavated from Trench 2 were submitted for laboratory analysis for United States Environmental Protection Agency (USEPA) Target Compound List (TCL)/NYSDEC Commissioner Policy 51 Tables 2 and 3 (CP-51) VOCs. The locations of the three samples of soil excavated from Trench 2 are shown on *Figure 5B*. TCE was detected in one soil sample (TRC-TR-2 [3.5-4]) at a concentration above the Unrestricted Use SCO and the Protection of Groundwater SCO (refer to *Figure 5B)*. The concentration of TCE detected in the soil excavated from Trench 2 is attributable to former Site uses and is suspected to be associated with the former drainage system identified in Trench 2. Additional investigation of the drainage system and associated piping in Trench 2 and piping in Trenches 1 and 3 identified during the archeological investigation was recommend by TRC.

A Supplemental Phase 1B Archaeological Investigation was completed by AKRF in September 2017 to further investigate the items of potential archeological significance, including the cistern and hand-dug well in Trench 5. TRC was on-Site during the Supplemental Phase 1B Archaeological Investigation to screen soils for evidence of contamination; however, impacted soils were not identified, and therefore no soil samples were submitted for laboratory analysis. Based on the findings of the Supplemental Phase 1B Archaeological Investigation, it was determined that further archeological investigation was not required.

2.3.3 Sanborn Maps

Sanborn Maps available for this Site were reviewed prior to preparation of the RAWP. Copies of the Sanborn Maps are in *Appendix F*. The following summary of the history and uses of the Site is based on a review of available Sanborn Fire Insurance Maps and the Phase I ESA Report prepared by TRC in 2011.

The Sanborn Map for 1888 shows three low-rise structures and an ink manufacturer on the northern portion of the Site and a residential building on the southern portion of the Site. The 1906 Sanborn Map shows three two-story buildings, which were utilized as a storage facility, on the northern portion of the Site along 8th Street, two structures on the central portion of the Site, and the residential building on the southern portion of the Site. The 1926 Sanborn Map shows a two-story garage with a gasoline tank which encompasses the entire Site, with the exception of the northeast corner, which is the location of a two-story chemical laboratory. The 1951 Sanborn Map indicates that the former garage is now utilized as a plumbing supply manufacturer and the former chemical laboratory building is utilized for storage. The 1965 Sanborn Map shows no significant changes from the previous Sanborn Map. The 1978 Sanborn Map shows one one-story building and two two-story buildings which are connected and utilized as a knitting mill. Sanborn Maps from 1979 through 1992 show no significant changes from the previous 1978 Sanborn Map. The 1993 Sanborn Map shows the buildings formerly located on the Site have been demolished and the area is now undeveloped. Sanborn Maps for subsequent years show no significant change in Site use.

2.4 GEOLOGICAL CONDITIONS

2.4.1 Geology

Geologic cross-sections are presented on Figures 7 and 8. Brooklyn is located within the Atlantic Coastal lowlands physiographic province of New York State. The geology of Kings County consists of unconsolidated glacial deposits overlying crystalline bedrock. Based upon available literature (Buxton, Soren, Posner, and Shernoff, 1981), the subsurface geology for the Site property likely includes the following formations: Pleistocene upper glacial deposits, Gardiners Clay, Jameco Gravel, Cretaceous Raritan Formation consisting of sands and clays, and crystalline bedrock. The depth to crystalline bedrock for the area is estimated to be 200 feet bgs.

The topography of the Site slopes downward toward the north. There is a concrete ramp located on the east-central portion of the lot that connects the northern and southern portion of the Site for vehicle access.

The nearest major surface water body is the Gowanus Canal, located approximately 0.4 miles to the west and 0.3 miles to the north.

2.4.2 Hydrogeology

Based on topography in the area, the predominant regional groundwater flow direction is expected to be towards the northwest. Based on information gathered during the Phase II ESI, the depth to groundwater at the Site ranges from approximately 13 to 19 feet bgs. One round of synoptic water level measurements was collected from seven surveyed permanent monitoring wells (TRC-MW-101 through TRC-MW-107) as part of the RI. Groundwater surface elevations[6] in the monitoring wells ranged from approximately 6.72 feet in monitoring well TRC-MW-101 (located in the northwest portion of the Site) to 7.03 feet in monitoring well TRC-MW-107 located in the southern portion of the Site. Based on the one round of groundwater surface elevation measurements, the apparent predominant direction of groundwater flow is towards the north in the southern part of the Site and towards the north-northwest in the northern part of the Site.

Figure 9 presents the groundwater surface elevation measurements and inferred groundwater surface elevation contours.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

The following conceptual site model explains the nature and extent of the contaminants known to be present at the Site, the dominant fate and transport characteristics, potential exposure pathways, and potential impacts to receptors. The conceptual site model was developed based on current conditions and following the implementation of the IRM in October and November 2017, which consisted of soil excavation in the northern portion of the Site (over an approximately 48 feet long by 44 feet wide area to a maximum depth of 19 feet bgs) and removal of subsurface structures (including cast-iron and lead piping, brick walls, and drains). Approximately 354 tons of impacted soil and crushed scrap metal (subsurface piping) were removed for off-Site disposal and backfilling. The excavation was backfilled with clean fill material (sand) which met the Restricted-Residential Use requirements for imported fill material found in Appendix 5 of DER-

[6] Groundwater surface elevation datum is NAVD88.

10. The excavation was limited due to structural concerns associated with the east-adjacent building (constructed circa 1899).

Based on the RI results, the primary contaminants of concern in soil include metals (trivalent chromium and copper); in groundwater the primary contaminants of concern are VOCs (TCE, cis-1,2-DCE and naphthalene), PFAS, and the metal chromium (in filtered samples); and in soil vapor the primary contaminants of concern are chlorinated VOCs.

Metals in soil are attributed to the characteristics of fill material and the historic use of the Site for industrial purposes. During the RI, fill material was encountered from directly below ground surface coverings to depths ranging up to approximately 8 feet bgs. Hazardous levels of leachable chromium were not detected in soil. Soil impacted with metals is localized on the northern/northeastern portion of the Site, and the Site is fenced and covered with gravel and concrete; therefore, under current conditions exposure to metals in subsurface soil is not likely. Potential exposure could occur during soil disturbing activities (e.g., utility maintenance, or future redevelopment); however, the frequency and duration of exposure is expected to be low, and would be mitigated by implementation of a Community Air Monitoring Plan (CAMP) and appropriate health and safety procedures.

The nature and extent of groundwater contamination and the limited potential for exposure to groundwater are discussed below.

Chlorinated VOCs (TCE and cis-1,2-DCE) were detected in groundwater at concentrations above Class GA Values. However, there does not appear to be a remaining on-Site source that would warrant active remediation based on the detected maximum concentrations and considering that: 1) the source of chlorinated VOCs identified during the archeological investigation was removed as part of the IRM, 2) chlorinated VOCs were not detected in the IRM confirmatory soil samples at concentrations above the Unrestricted Use SCOs, and 3) chlorinated VOCs were not detected at concentrations above the Unrestricted Use SCOs in soil samples collected during the RI. Additionally of note is that in the northern-most well (most downgradient location), TCE was the only VOC detected (marginally) above the Class GA Value. Therefore, the potential for migration of VOCs in groundwater is considered low, and, further, the residual TCE and cis-1,2-DCE in groundwater are expected to naturally attenuate.

Filtered metals (chromium, iron, manganese and sodium) were detected in groundwater above Class GA Values. Chromium was detected in two filtered groundwater samples at concentrations above the Class GA Value; however, in the northern-most well (most downgradient location), the

concentration of chromium detected was below the Class GA Value. Therefore, there is no evidence that chromium-impacted groundwater above the Class GA Value is migrating off-Site. Note that chromium was not detected in filtered groundwater samples collected as part of the 2013 Phase II ESI at concentrations above the Class GA Value.

Naphthalene was detected in one groundwater sample collected from the southern-most monitoring well, TRC-MW-107, immediately south and upgradient of the southern UST area, at a concentration above the Class GA Value. The naphthalene detected may be attributed to heavily weathered gasoline, based on the presence of petroleum-related hydrocarbons in saturated soil and evidence of contamination in soil below the water table in the immediate area of the USTs. Note that evidence of contamination was not identified in unsaturated soil during well installation at TRC-MW-107, and an automobile repair facility is located upgradient of the Site across 9th Street. The concentrations of sulfate and dissolved oxygen in groundwater, although relatively low, should not limit natural attenuation, and the concentration of naphthalene is expected to decrease over time.

During the RI, groundwater was encountered at depths ranging from approximately 16 feet to 18.5 feet below ground surface, minimizing the potential for exposure to groundwater at the Site. Groundwater at the Site is not utilized for potable or non-potable purposes. Therefore, under current conditions, ingestion and absorption of contaminated groundwater do not represent significant potential exposure pathways, and for this reason, the potential for exposure to contaminated groundwater by potential receptors is low. There is a short-term potential for exposure to contaminated groundwater during redevelopment and associated dewatering activities if a basement is incorporated into the new building design; however, the frequency and duration of potential exposure to contaminated groundwater is expected to be low, and would be mitigated by appropriate health and safety procedures.

The chlorinated VOCs detected in on-Site soil vapor could potentially result in vapor intrusion and impact the occupants of the proposed Pre-Kindergarten Facility; therefore, the proposed building will be constructed with a vapor intrusion mitigation system (i.e., a gas vapor barrier and sub-slab depressurization system). Since the Site was determined to pose a significant threat to public health, it is anticipated that an off-Site vapor intrusion assessment will be performed by the NYSDEC and NYSDOH to evaluate the potential for exposure of off-Site residents.

The following part of the conceptual site model discussion is specific to PFAS:

Although there are currently no SCGs for PFOA and PFOS in groundwater, at the direction of the Department, 70 nanograms per liter (ng/L) for individual or combined concentrations of PFOA and PFOS [the USEPA lifetime health advisory level (HA)] is utilized in this Remedial Action Work Plan as a screening level. Above the screening level of 70 ng/L, the Department has indicated evaluation is warranted. The highest combined concentration of PFOA and PFOS (600 ng/L) in groundwater was detected in TRC-MW-105 located on the northeast portion of the Site. The combined concentrations of PFOS and PFOA; however, decrease rapidly in the wells downgradient of TRC-MW-105 over a short distance, as shown in the table below, to concentrations below or within an order of magnitude of the advisory level, indicating a discrete and discontinuous source (i.e., secondary source).

Percent Reduction of Combined Concentration of PFOA and PFOS			
Monitoring Well ID	**Distance from TRC-MW-105 (feet)**	**Concentration of PFOA + PFOS (ng/L)**	**Percent Reduction from TRC-MW-105 (600 ng/L)**
TRC-MW-101	65	67.3	89%
TRC-MW-102	40	35.9	94%
TRC-MW-103	50	164.1	73%
TRC-MW-104	30	233.8	61%

The concentrations of PFAS measured in the most downgradient wells (i.e., in TRC-MW101 and TR-MW102), at the property boundaries, are below the health advisory level.

Potential secondary sources of PFAS that may have contributed to elevated PFOA and PFOS in groundwater would likely have been removed to a large degree during the implementation of the Interim Remedial Measure.

Additionally, groundwater at and in the vicinity of the Site is not used for potable water supply and is unlikely to be a viable source of potable water in the future due to other reasons unrelated to the presence of PFOA and PFOS. Additionally, an Environmental Easement will be placed on the property that will restrict the use of groundwater at the Site. Considering this, and the conditions described above, there is no evidence to suggest that PFAS in on-Site groundwater could pose a risk to off-Site receptors.

Furthermore, the proposed remedy for the Site (described below) to address the conventional contaminants of concern (chlorinated VOCs and metals), is protective for PFAS as well. The remedy includes removal of metals contaminated soil and likely removal of additional soil as part of site development (which would include removal of residual PFAS remaining in soil, if any),

and covering of the majority of the Site with impervious surfaces (i.e., the new building and pavement). As a result, the remedy will further minimize the potential for exposure, and will minimize the potential for contaminant migration, by removing residual contamination in soil (if any) and minimizing groundwater infiltration.

Based on the information presented above, specific analysis of alternatives with respect to PFAS in groundwater is not necessary, and, therefore, the remedial action alternatives discussed in Section 3.0 below, do not include discussion related specifically to PFAS in groundwater. However, the evaluation criteria do also apply to PFAS in groundwater, thereby resulting in appropriate remedy selection for all contaminant of concern at the Site.

2.5.2 Description of Contaminants of Concern

The following is description of contaminants of concern:

- The primary contaminants of concern in soil are in the northern part of the Site and include metals (trivalent chromium and copper) in shallow soil. There are two UST areas, containing a total of three USTS, located in the southern portion of the Site.
- Groundwater contaminants of concern include VOCs (TCE, cis-1,2-DCE, and naphthalene), PFAS, and the metal chromium (in filtered samples), also limited to the northern portion of the Site with the exception of naphthalene which was detected slightly above the Class GA Value in one well adjacent to the southern-most UST area.
- Soil vapor contaminants of concern include chlorinated VOCs (TCE and cis-1,2-DCE).

2.5.3 Identification of Standards, Criteria and Guidance

A criterion for remedy selection is evaluation for conformance with SCGs that are applicable, relevant, and appropriate. Principal SCGs that are applicable, relevant, and appropriate for evaluating the alternatives for remediation of the Site include the following:

- New York State Environmental Conservation Law (ECL) Article 27, Title 14, Brownfield Cleanup Program (ECL §27-14);
- 6 NYCRR Subpart 375-1, General Remedial Program Requirements; 6 NYCRR Subpart 375-3, Brownfield Cleanup Program; and 6 NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives;
- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation;

- NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Groundwater Effluent Limitations;
- NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York;
- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Draft Brownfield Cleanup Program Guide;
- NYSDOH Generic Community Air Monitoring Plan;
- NYSDEC CP-51 Soil Cleanup Guidance;
- USEPA Lifetime Health Advisories and Health Effects Support Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Federal Register/Vol. 81, No.101/Wednesday, May 25, 2016/Notices[7].

Additional regulations and guidance are applicable, relevant, and appropriate to the remedial alternatives (such as 6 NYCRR Part 360, Solid Waste Management Requirements; 6 NYCRR Part 364, Waste Transporter Permits; 6 NYCRR Part 613, Handling and Storage of Petroleum, etc.), and will be complied with; however, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the Site.

Conformance with the appropriate standards for remediation of contaminated soil is an important criteria in evaluating the remedial alternatives for the Site. Presently, in New York State 6 NYCRR Part 375 establishes the primary SCGs associated with remediation of contaminated soil at sites in the BCP. If proposing remediation pursuant to a Track other than Track 1 (Unrestricted Use), 6 NYCRR Part 375 requires evaluation of at least one remedial alternative pursuant to Track 1 (Unrestricted Use) and one other alternative developed by the Applicants for the proposed use of the Site[8]. The remedial alternatives analysis presented in Section 3.1 of this RAWP has been prepared in conformance with this requirement.

The preferred alternative, identified in Section 3.2 as Remedial Alternative 2: Remediate to Achieve Restricted-Residential Use, is an alternative which will satisfy the requirements of Track 4 cleanup with Engineering Controls and Institutional Controls. The elements of the Remedial

[7] Note that this lifetime health advisory is applicable to drinking water. The health advisory as a screening level for groundwater, above which additional evaluation is warranted, has been included at the direction of the NYSDEC.
[8] Exceptions apply to this and can be found at 6 NYCRR 375-3.8(f)(3).

Action are described in detail in Section 3.3. As part of the remedy, the Volunteer is proposing to excavate soil which exhibits elevated concentrations of trivalent chromium and copper in the northeast part of the Site to the extent practical and additional soil would be removed as part of Site development in support of excavation for the proposed Site building and basement. The NYCSCA's standard specifications for the clean cover layer (i.e., top two feet of exposed soil) require the use of soil in which VOCs are not detected and the remaining parameters are below the more stringent Unrestricted Use SCOs as further described in Section 5.4.9.

2.5.4 Soil/Fill Contamination

Investigations conducted at the Site have determined that the primary contaminants of concern in soil are limited to the northern part of the Site and include metals (trivalent chromium and copper) in shallow soil.

2.5.4.1 Summary of Soil/Fill Data

Summaries of the results of the analyses of the soil samples collected during the RI are presented in *Tables* 2 through 7. In the tables, analytical results are compared to the Unrestricted Use SCOs, Restricted-Residential Use SCOs, and Protection of Groundwater SCOs. The complete laboratory analytical data reports are presented in *Appendix H* of the RI Report.

A review of the results of the analyses of the soil samples is presented in Section 2.1.4.

2.5.4.2 Comparison of Soil/Fill with SCGs

Tables 2 through 7 show exceedances of Track 1 Unrestricted SCOs for soil samples collected at the Site during the RI. *Figure 5B* shows the locations and summarizes the exceedances of Track 1 Unrestricted Use SCOs for soil/fill (prior to completion of the IRM) and *Figure 11* shows the locations and summarizes exceedances of Track 1 Unrestricted SCOs for soil/fill (following removal and off-Site disposal of soil as part of the IRM). *Figure 12* is a map from the RI Report that shows the locations and summarizes exceedances of the Restricted-Residential Use SCOs.

2.5.5 On-Site and Off-Site Groundwater Contamination

Groundwater at the Site is impacted primarily by VOCs (TCE, cis-1,2-DCE, and naphthalene), PFAS, and the metal chromium (in filtered samples).

2.5.5.1 Summary of Groundwater Data

Summaries of the results of the analyses of the groundwater samples collected at the Site during the RI are presented in *Tables 8* through *14*. The complete laboratory analytical data reports are

presented in *Appendix H* of the RI Report. A review of the results of the analyses of the groundwater samples is presented in Section 2.1.4.

2.5.5.2 Comparison of Groundwater with SCGs

Tables 8 through *14* show exceedances of Class GA Values in groundwater samples prior to the remedy. Maps that indicate the locations of and summarizes exceedances of Class GA Values in groundwater samples are presented as *Figure 5C* (prior to the completion of the IRM) and as *Figure 13* (following the completion of soil removal as part of the IRM and prior to implementation of the RAWP).

2.5.6 On-Site Soil Vapor Contamination

Summaries of the results of the analyses of the soil vapor samples are presented in *Table 1*. The complete laboratory analytical data reports are presented in *Appendix H* of the RI Report. *Figures 5A and 10* shows a comparison of soil vapor sampling results to the NYSDOH Vapor Intrusion Matrices. A review of the results of the analyses of the soil vapor samples is presented in Section 2.1.4

2.5.6.1 Comparison of Soil Vapor with SCGs

A table of soil vapor data collected prior to the remedy is shown in *Table 1*. A map that indicates the locations of and summarizes soil vapor data prior to the remedy is shown in *Figures 5A and 10.*

2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.6.1 Qualitative Human Health Exposure Assessment

An evaluation of potential exposure pathways and potentially exposed human populations is presented in the RI Report. The evaluation addresses both potential on-site and off-site health impacts associated with the Site.

An exposure pathway consists of five elements: (1) a contaminant source, (2) a contaminant release, and transport mechanism, (3) a point of exposure, (4) a route of exposure, and (5) a receptor population. An exposure pathway is complete when all five elements of an exposure pathway are complete.

Based on the findings of the RI, the principal contaminants of concern at the Site have been identified as chlorinated VOCs and PFAS in groundwater, one petroleum-related VOC in groundwater (naphthalene), metals in subsurface soil and groundwater, and chlorinated VOCs

in soil vapor. A qualitative exposure assessment was prepared to evaluate the potential for exposure to these parameters. The evaluation addresses both potential on-Site and off-Site health impacts associated with the Site.

Dermal contact and ingestion of soil or groundwater, or inhalation of vapors or dust represent the potential routes of exposure. Potential receptors include construction workers during demolition and redevelopment, future on-Site occupants and visitors, future on-Site maintenance workers, and off-Site residents.

Considering the future remediation and redevelopment activities and institutional and engineering controls that will restrict future use, the following exposure pathways are considered incomplete:

- **Groundwater ingestion:** Use of groundwater in this area of Brooklyn is prohibited as a source of potable water; therefore, this exposure pathway is not complete for on-Site and off-Site occupants/residents. Reservoirs in upstate New York (i.e., Croton, Catskill and Delaware Watersheds) supply Brooklyn with potable water. Also, an environmental easement will apply to groundwater, prohibiting its use.
- **Soil dermal contact by future on-Site occupants:** After completion of redevelopment activities, the remaining soil/fill material at the Site will be covered by new building(s), pavement, or clean cover material and landscaping, thereby preventing future exposure of occupants to the soil. The cover system is considered an engineering control and future inspections and maintenance activities will be performed in accordance with the Site Management Plan.
- **Inhalation of vapors by on-Site occupants:** It is anticipated that future redevelopment of the Site will include the construction of a vapor barrier and sub-slab depressurization system below the proposed building that will minimize the potential for intrusion of VOCs into future building spaces and mitigate this exposure pathway.

The following exposure pathways are considered potentially complete:

- **Groundwater dermal contact by construction workers and future maintenance workers:** During the RI, groundwater was encountered between approximately 16 feet and 18.5 feet below ground surface. There is a potential for exposure to contaminated groundwater during redevelopment if a basement is incorporated into the new building design and dewatering is required; however, the frequency and duration of exposure is expected to be low.

- **Soil dermal contact by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in contact with on-Site contaminated soil.
- **Inhalation of vapors and dust by construction workers and future maintenance workers:** Potential future construction and maintenance activities (e.g., utility repairs) could result in the generation of and exposure to on-Site contaminated vapors and dust.
- **Inhalation of vapors and dust by off-site residents:** Remedial alternatives and future construction activities (e.g., utility repairs) could result in the generation of contaminated vapors and dust that have the potential to migrate off-Site during construction. Off-Site vapor intrusion assessment may be performed at nearby properties by the NYSDEC and NYSDOH to evaluate the potential for exposure of off-Site residents.

A site-specific HASP, SoMP, and CAMP will be implemented during development and future maintenance activities when on-Site workers could become exposed to soil, soil vapor, or groundwater. The HASP and CAMP will establish procedures for the protection of on-Site workers and off-Site residents and will address community air monitoring and dust suppression measures. A SMP will be implemented after the completion of the Remedial Action to protect against potential exposures during post-remediation soil and groundwater disturbances.

2.6.2 Fish & Wildlife Resources Impact Analysis

A fish and wildlife resources impact analysis was completed in general conformance with the framework of Appendix 3C of the Draft DER–10 technical guidance. Significant findings of the analysis are presented below.

The Site has been developed since the late-1800s, with little or no vegetated area. Thus, no terrestrial wildlife resources exist on the Site itself. Further, PCBs and pesticides, bioaccumulable substances, were not found in on-site soil during the RI at concentrations that exceed the Protection of Ecological Resources SCOs.

The urban Site is not located in close proximity to a surface water body, wetland, or other ecologically significant area. Redevelopment plans for the Site include construction of a Pre-Kindergarten Facility, and there will be no ecological resources on the Site following the redevelopment. Therefore, in accordance with DER-10 Section 3.10.1(b), further evaluation related to the Fish and Wildlife Resources Impact Analysis is not warranted.

2.7 INTERIM REMEDIAL ACTION

IRM field activities were performed between October 30, 2017 and November 6, 2017 in accordance with the IRM Work Plan dated September 2017. TheNYSDEC had no objection to the submitted Work Plan; however, NYSDEC indicated that the IRM would be completed outside of the Brownfield Cleanup Program (BCP) . The IRM consisted of soil excavation in the northern portion of the Site (over an approximately 48 feet long by 44 feet wide area to a maximum depth of 19 feet bgs) and removal of subsurface structures (including cast-iron and lead piping, brick walls, and drains). Excavation began in the vicinity of the observed drainage feature identified during the June 2017 Archeological Investigation (in Trench 2). The limits of the excavation were advanced based on field observations to the south, west, and northwest (toward Trench 1). Since the apparent source area was identified and evidence of contamination was not identified on the southern sidewall of the excavation, additional excavation in the vicinity of Trench 3 was not warranted. The approximate area of the IRM excavation is shown on Figure 6.

Additionally, the IRM field activities included collection of eight (8) post-excavation soil samples and three (3) documentation soil samples[9] for analysis for VOCs; off-Site transportation of approximately 354 tons of impacted soil and crushed scrap metal (subsurface piping) for disposal; and backfilling of the excavation with excavated soil which was free of evidence of impacts and clean fill material (sand) which met the Restricted-Residential Use requirements for imported fill material found in Appendix 5 of DER-10. A demarcation layer (i.e., plastic orange fencing) was placed between Site soil and imported material, and the ground surface was restored with two feet of virgin bluestone.

The most impacted interval of soil (exhibiting odors, and a maximum PID reading of 608.5 ppm) was encountered in the southeastern portion of the excavation from approximately 6 to 7 feet bgs, approximately 3 feet below the nearest subsurface piping. The soil inside the piping and in the immediate vicinity of the nearest subsurface piping did not exhibit evidence of contamination, and an exact point of a release could not be determined. Free product was not observed in the excavation. Soil at the deepest part of the excavation was saturated; however, groundwater did not accumulate in the excavation. There were no VOCs detected at concentrations above the

[9] The documentation soil samples were samples of soil that were later removed.

Restricted-Residential Use or Protection of Groundwater SCOs in the post-excavation and documentation soil samples.

Based on the results of the IRM, subsurface material that was likely the primary source of CVOCs in soil, groundwater, and soil vapor in the northern portion of the Site was substantially removed and disposed of off-Site. Soil which previously contained chlorinated VOCs above the Protection of Groundwater SCOs was excavated and, as noted above, the results of all documentation samples collected during the IRM were below the comparison criteria. Concentrations of CVOCs in soil vapor and groundwater following the IRM generally decreased or were consistent to prior sampling results. Specifically, TCE was detected at a maximum concentration of 16,000 $\mu g/m^3$ in 2012 (during the Phase II ESI) and at a maximum concentration of 12,000 $\mu g/m^3$ in 2018 (during the RI) and cis-1,2-DCE was detected at maximum concentrations of 110 $\mu g/m^3$ in 2012 and 350 $\mu g/m^3$ in 2018. The highest concentration of TCE in groundwater was detected at 99 ug/L in 2013 in comparison to 39 µg/L in 2018, following the IRM.

2.8 REMEDIAL ACTION OBJECTIVES

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

1. Reduce the contaminant mass by removing contaminated soil.
2. Protect on-Site workers and the surrounding community from exposure to site-related contaminants during remedial construction and development.
3. Establish engineering and institutional controls for the Site to protect future occupants, maintenance personnel, and the surrounding community from potential exposure to site-related contaminants remaining after Site redevelopment.

The RAOs for specific media consist of the following:

2.8.1 Soil Vapor

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

2.8.2 Soil

<u>RAOs for Public Health Protection</u>

- 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.

2.8.3 Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Remove the source of groundwater contamination.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 EVALUATION OF REMEDIAL ALTERNATIVES

The purpose of this section is to present descriptions of and an evaluation of the remedial alternatives selected for analysis for the Site. The primary goal of this analysis is to demonstrate how the selected remedy will comply with the following nine remedy selection factors in accordance with the NYSDEC BCP regulations found at 6 NYCRR 375-1.8(f):

1. Protection of human health and the environment;
2. Compliance with standards, criteria, and guidance (SCGs);
3. Short-term effectiveness and impacts;
4. Long-term effectiveness and permanence;
5. Reduction of toxicity, mobility, or volume of contaminated material;
6. Implementability;
7. Cost effectiveness;
8. Community Acceptance; and
9. Land use.

Two remedial alternatives, consistent with the 6 NYCRR Subpart 375-3 Brownfield Cleanup Program requirements, have been developed for analysis. Descriptions of the alternatives are presented below.

Remedial Alternative 1: Remediate to Achieve Unrestricted Use

Alternative 1 consists of the excavation and removal of all soil which exceeds NYSDEC BCP Track 1 Unrestricted Use Soil Clean-up Objectives. Based on the data presented in the RI Report, the estimated volume of soil requiring removal for Alternative 1 is approximately 10,500 tons[10].

Three USTs (in two separate UST areas), piping, and appurtenances at the Site would be removed under this alternative. Sheeting would be installed, as necessary, to stabilize the excavation.

[10] This estimated soil volume excludes the removal of soil required for development. All of the quantities are intended solely to be estimates. The quantity estimates presented in this document are subject to change based on the final design for Site development.

During remedial construction, controls would be in place to minimize the potential for exposure of workers and the surrounding community to contaminants. Controls would be implemented in accordance with a site-specific HASP, SoMP, and CAMP. Following remedial activities, the Site would be backfilled to development grade using imported environmentally clean material that meets the protection of public health soil cleanup objectives for Unrestricted Use as described in 6 NYCRR Part 375-6.7(d)(1)(ii)(a) or otherwise approved by NYSDEC.

In-situ groundwater treatment would be performed prior to construction of the school building to treat on-Site impacted groundwater. On-Site impacted groundwater would be monitored for progress with respect to remedial objectives.

Additionally, short-term (i.e., in operation for less than five years) engineering controls are included in this alternative and would consist of the following:

1. The school building would be constructed with sub-slab vapor barriers and SSDS designed to minimize the potential for vapor intrusion into buildings. Physical performance testing (pressure field extension) would be required to confirm the system is working as designed. Additionally, modifications to the SSDS would not be made without agency approval. Sub-slab vapor and indoor air sampling in the future would be required in order to evaluate whether SSDS deactivation was acceptable.

Consideration of this Alternative 1 satisfies the 6 NYCRR Part 375 requirement of evaluating at least one remedial alternative which would achieve Track 1 (Unrestricted Use).

Remedial Alternative 2: Remediate to Achieve Restricted-Residential Use Including the Use of Permanent Engineering Controls

Alternative 2 includes the excavation and removal of soil that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs in one area delineated to an approximately 22-foot by 74-foot area, extending to approximately 5 feet in depth, in the northeast part of the Site (soil in the vicinity of groundwater monitoring well TRC-MW-105 which exhibited PFAS in groundwater at elevated concentrations would be removed for off-Site disposal). The three on-Site USTs would be closed and removed. Petroleum impacted soil (if encountered) would be excavated for off-Site disposal. A minimum of the upper two feet of soil across the Site would be excavated for off-Site disposal. Additional soil would likely be removed as part of Site development in support of excavation for the proposed Site building and basement. Excavation of soil required for development is not included in the remedial cost estimate. The site development depth is expected to be approximately 12 feet bgs beneath the footprint of the proposed building, and approximately 4 feet bgs at the playground area located on the northern portion of the Site. Soil

excavation would be performed over the entire limits of the Site and there would be no unexcavated surface soil areas as part of the Site development. Based on the data presented in the RI Report, the estimated volume of soil requiring removal that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs for Alternative 2 is approximately 1,700 tons, which includes 500 tons of soil in the northeast portion of the Site (soil that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs) and the upper two feet of soil across the remaining area of the Site (approximately 1,200 tons of soil). Approximately 4,500 tons of additional soil would be removed as part of Site development, if the new building includes a basement. Additionally, this alternative includes post-remedial groundwater monitoring for chlorinated VOCs in two downgradient monitoring wells, K710-MW-1 and K710-MW-2. *Figure 15* shows the estimated extent of excavation required for removal of the trivalent chromium and copper impacted area and the extent of excavation across the entire limits of the Site, UST areas, and proposed post-excavation sample location plan. *Figure 16* shows the proposed post-excavation monitoring well locations.

As described above, three USTs, piping, and appurtenances at the Site would be removed under this alternative. Sheeting would be installed, as necessary, to stabilize excavations.

During remedial construction, controls would be in place to minimize the potential for exposure of workers and the surrounding community to contaminants. Controls would be implemented in accordance with a site-specific HASP, SoMP, and CAMP.

Engineering and institutional controls are included in this alternative and would consist of the following:

1. The final cover will consist of impervious surfaces (i.e, a building and paved surfaces) and in other areas (i.e., landscaped areas) at least two feet of clean cover layer that will meet the protection of public health Soil Cleanup Objectives for Unrestricted Use as described in 6 NYCRR Part 375-6.7(d)(1)(ii)(a) or otherwise approved by the NYSDEC. However, the NYCSCA standard specifications for cover material (i.e., the upper two feet of soil in landscaped areas) require the use of soil in which VOCs are not detected and the remaining parameters are below the more stringent Unrestricted Use SCOs further described in Section 5.4.9;
2. The Site building would be constructed with a gas vapor barrier and SSDS designed to minimize the potential for vapor intrusion into the building;
3. A demarcation layer would be installed beneath the building gas vapor barrier and SSDS, the playground area, and the clean cover layer in landscaped areas; and

4. Preparation and implementation of a post-remediation SMP describing the requirements for engineering and institutional controls; monitoring; operation and maintenance of engineering controls; and, a reporting plan for submittal of data, information, recommendations, and certifications to the NYSDEC. A soil vapor mitigation system consisting of a continuous vapor barrier and an active sub-slab depressurization system constructed under all building structures must be inspected, certified, operated and maintained as required by the SMP. An environmental easement would be established to restrict use of groundwater prior to treatment. Site management is the last phase of remediation, which begins with the approval of the Final Engineering Report (FER).

3.1.1 Protection of Human Health and the Environment

The implementation of Alternative 1 – Remediate to Achieve Unrestricted Use would be protective of public health and the environment through the removal of all contaminated soil and removal of three USTs, piping, and appurtenances. In-situ groundwater treatment would remediate on-Site impacted groundwater and installation of a gas vapor barrier and SSDS would minimize the potential for vapor intrusion into the proposed school building.

During remedial construction, on-site workers and the surrounding community would be protected from exposure to site-related contaminants through the implementation of health and safety protocols, a SoMP, and adherence to a CAMP.

Alternative 2 – Remediate to Achieve Restricted-Residential Use would be protective of public health and the environment through the removal of approximately 1,700 tons of soil, including 500 tons of soil that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs and 1,200 tons of soil consisting of the upper two feet of soil across the remainder of the Site, removal of three USTs, piping, and appurtenances, and the implementation of engineering and institutional controls including ground surface covers, a vapor barrier, an SSDS, and an environmental easement. Approximately 4,500 additional tons of non-hazardous soil would be removed as part of Site development, if the new building includes a basement. In support of Site development, soil would be excavated across the entire limits of the Site (up to the Site boundary) to a minimum depth of approximately four feet bgs, to the extent feasible based on structural considerations. There will be no unexcavated areas of the Site as part of the site development. Groundwater at the downgradient edge of the Site would be monitored to evaluate the effectiveness of the remedy.

Also, under Alternative 2, during construction, on-site workers and the surrounding community would be protected from exposure to site-related contaminants through the implementation of health and safety protocols, a SoMP, and adherence to a CAMP.

Although impacted soil would remain in place beneath the composite cover system under Alternative 2, the use of engineering and institutional controls would minimize the potential for exposure to soil and soil vapor contamination. Groundwater contamination beneath the Site would be addressed by institutional controls under Alternative 2. Therefore, both alternatives would be protective of human health and the environment.

3.1.2 Compliance with Standards, Criteria, and Guidelines (SCGs)

Alternative 1 – Remediate to Achieve Unrestricted Use would satisfy the SCGs (described in Section 2.5.3) and the RAOs (described in Section 2.8) developed for the Site. Soil which exceeds Track 1 SCOs and the suspect UST, piping, and appurtenances would be removed. In-situ groundwater treatment would satisfy the SCGs and RAOs for groundwater.

Alternative 2 – Remediate to Achieve Restricted-Residential Use would satisfy the SCGs and RAOs for soil and soil vapor identified for the Site. Soil that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs would be excavated and the upper two feet of soil across the remainder of the Site would be excavated. In addition, the three USTs, piping, and appurtenances would be removed. Engineering and institutional controls included as a part of Alternative 2 would protect future Site users from soil and soil vapor contamination. Groundwater contamination beneath the Site would be monitored and addressed by institutional controls under Alternative 2.

Under both alternatives, applicable environmental and health and safety laws and regulations would be followed, and waste would be managed and disposed in accordance with applicable laws and regulations. In summary, both alternatives proposed would conform to the SCGs and RAOs applicable to soil and soil vapor for remediation of the Site, however, groundwater contamination would not be actively remediated under Alternative 2 and chlorinated VOCs in groundwater would be monitored.

3.1.3 Short-Term Effectiveness and Impacts

Potential short-term impacts to the community associated with implementation of Alternative 1 – Remediate to Achieve Unrestricted Use include increased construction noise, increased truck traffic, and the potential creation of objectionable odors, vapors, and/or dust. Specialized excavation and construction techniques may be required for sheeting and excavating soils along the perimeter of the Site. Potential short-term impacts to on-site workers associated with

Alternative 1 include exposure to site-related contaminants and physical hazards associated with working around heavy equipment and large excavations.

During the construction phase for Alternative 1, short-term impacts to the community would be minimized through remediation phase controls such as implementation of a SoMP and CAMP, use of soil erosion controls, and adherence to pre-approved truck routes. Decontamination of vehicles and equipment prior to leaving the Site would minimize the potential for off-site soil migration during remediation. Short-term exposures to on-site workers would be minimized through implementation of and adherence to a site-specific HASP, which would establish procedures and personal protective equipment requirements for site work.

The implementation of Alternative 2 – Remediate to Achieve Restricted-Residential Use represents the potential for similar short-term impacts and would include the same impact mitigation strategies as those described for Alternative 1. The smaller volume of soil requiring removal for Alternative 2, compared to Alternative 1, represents corresponding decreases in the impacts to the surrounding community, including a shorter period of construction noise, decreased truck traffic, and lower potential for creation of objectionable odors, vapors, and/or dust.

In summary, both alternatives would be effective in the short term, through the removal of contaminated soil, and additionally through the implementation of engineering and institutional controls under Alternative 2. Adherence to appropriate controls would minimize potential short-term impacts to the surrounding community and on-site workers. However, the potential for short-term impacts to the community and on-site workers during construction activities associated with Alternative 1 is greater than with Alternative 2, due to the volume of soil requiring removal.

3.1.4 Long-term Effectiveness and Permanence

Alternative 1 – Remediate to Achieve Unrestricted Use would be a long-term effective and permanent alternative since all contaminated soil above Track 1 SCOs would be removed and the suspect UST, piping, and appurtenances would be removed. Removal of all contaminated soil with contaminant concentrations exceeding Track 1 SCOs would require excavations up to 30 feet deep; therefore, specialized excavators (e.g., with extension arms) and additional specialized sheeting (for support of deep excavation sidewalls) would be required for Alternative 1. Further, extensive dewatering would be required in order to remove soil approximately 12 to 14 feet below the water table, and the source of contamination identified on the upgradient side of the Site (south of the southern UST area) has not been confirmed; therefore, off-Site contaminants may be pulled into the Site during dewatering operations. In-situ groundwater treatment would be performed prior to construction of the school building to treat on-Site impacted groundwater. On-Site

impacted groundwater would be monitored for progress with respect to remedial objectives; and, a vapor barrier and SSDS would be installed beneath the building.

Alternative 2 – Remediate to Achieve Restricted-Residential Use would be an effective and permanent alternative for the Site. The removal of approximately 1,700 tons of soil, including 500 tons of soil that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs and 1,200 tons of soil consisting of the upper two feet of soil across the remainder of the Site, and removal of three USTs, piping, and appurtenances represents an effective and permanent remedy. Approximately 4,500 additional tons of non-hazardous soil would be removed as part of Site development, if the new building includes a basement. In support of Site development, soil would be excavated across the entire limits of the Site (up to the Site boundary) to a minimum depth of four feet bgs. It is anticipated that there will be no unexcavated areas of the Site as part of the site development. The remaining soil would be covered with a building and/or paved surfaces and clean cover layer in landscaped areas (with a demarcation layer installed below the building, playground area, and clean cover layer in landscaped areas). Groundwater at the downgradient edge of the Site would be monitored to evaluate the effectiveness of the remedy. A vapor barrier and SSDS would be installed beneath the building. Therefore, potential for exposure to remaining soil would be minimized by long-term engineering controls. The use of institutional controls would serve to further minimize potential future exposure pathways over the long term.

Even though impacted soil would remain in place beneath the cover system under Alternative 2, the use of engineering and institutional controls would minimize the potential for exposure to Site-related contaminants. Therefore, both alternatives represent long-term effective and permanent remedies for the Site that are protective of human health and the environment.

3.1.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

The implementation of Alternative 1 – Remediate to Achieve Unrestricted Use would reduce the toxicity, mobility, and volume of contamination by removing soil with contaminant concentrations above Track 1 SCOs and removing the three USTs, piping, and appurtenances. In-situ groundwater treatment would remediate on-Site impacted groundwater, reducing the toxicity of groundwater and the volume of impacted groundwater. The toxicity, mobility and volume of contaminated soil at the Site would be reduced by removal and disposing of the soil at appropriate permitted off-site disposal facilities.

The implementation of Alternative 2 – Remediate to Achieve Restricted-Residential Use would reduce the toxicity, mobility, and volume of contamination by removing an estimated 1,700 tons of soil, including 500 tons of soil that exhibits trivalent chromium and copper above the Restricted-

Residential Use SCOs and 1,200 tons of soil consisting of the upper two feet of soil across the remainder of the Site, and the three USTs, piping, and appurtenances. Approximately 4,500 tons of soil would be removed for off-Site disposal across the remainder of the Site as part of Site development, if the new building includes a basement. In support of Site development, soil will be excavated across the entire limits of the Site to a minimum depth of four feet bgs. There will be no unexcavated areas of the Site as part of the site development. The toxicity of soil and volume and mobility of contaminated soil at the Site would be reduced by removal and management at permitted off-site treatment and/or disposal facilities.

Although both alternatives would serve to reduce the toxicity, mobility, and volume of contamination, Alternative 1 would be more effective since the volume of impacted soil removed would be larger as a result of the additional excavation.

3.1.6 Implementability

Alternative 1 – Remediate to Achieve Unrestricted Use can be implemented with standard construction techniques, using widely available construction equipment and materials. However, removal of all contaminated soil with contaminant concentrations exceeding Track 1 SCOs would require excavations up to 30 feet deep in the central portion of the Site; therefore, specialized excavators (e.g., with extension arms) and additional specialized sheeting (for support of deep excavation sidewalls) would be required for Alternative 1. Further, extensive dewatering would be required in order to remove soil approximately 12 to 14 feet below the water table, and the source of contamination identified on the upgradient side of the Site (south of the southern UST area) has not been confirmed; therefore, off-Site contaminants may be pulled into the Site during dewatering operations. It is expected that required permits, such as from New York City Department of Buildings for excavation could be obtained in acceptable time frames; however, procurement of dewatering permits from applicable regulatory agencies has the potential to delay the start of the remedy. In-situ groundwater treatment can be performed prior to construction of the school building to treat on-Site impacted groundwater. The gas vapor barrier and SSDS can be constructed via standard techniques during construction of the school building and operated by available trained staff.

Alternative 2 – Remediate to Achieve Restricted-Residential Use can be implemented with standard construction techniques, using widely available equipment and materials. The gas vapor barrier and SSDS can be implemented during construction of the school building. Additional specialized equipment and materials would not be required and it is expected permits would be obtained in an appropriate time frame.

Therefore, due to the need for specialized equipment and the complications of performing excavations up to 30 feet in depth including extensive dewatering required, Alternative 1 would be more difficult to implement than Alternative 2.

3.1.7 Cost Effectiveness

Cost estimates were prepared for both alternatives based on recent bids for remediation projects and communications with remedial contractors, material suppliers, waste transporters, and disposal facilities. Alternative 1 – Remediate to Achieve Unrestricted Use is estimated to cost $8,500,000. Alternative 2 – Remediate to Achieve Restricted-Residential Use is estimated to cost $900,000. The cost estimates are intended only for the purpose of determining relative cost in comparison to other alternatives.

The cost of Alternative 1 is significantly higher than Alternative 2 due to the larger volume of soil removal and disposal and extensive dewatering operations required under Alternative 1.

3.1.8 Community Acceptance

Both alternatives would entail excavation of contaminated soil and include the implementation of a SoMP and CAMP to minimize the potential for off-site migration of dust, which would promote community acceptance. However, the larger volume of soil requiring removal under Alternative 1 – Remediate to Achieve Unrestricted Use increases the potential for impacts to the community from increased truck traffic and fugitive dust, odors and vapors. Additionally, since Alternative 1 includes extensive dewatering during construction, there is an increased potential for impacts to the community to impacted groundwater and related odors. Since Alternative 2 – Remediate to Achieve Restricted-Residential Use has a shorter remedial timeframe, it is likely that this alternative would be more acceptable to the community.

Public comments that are provided during the public comment period on this RAWP will be evaluated, and this RAWP may be modified as appropriate in response to comments.

3.1.9 Land Use

The proposed future use of the Site is a Pre-Kindergarten Facility. The proposed redevelopment includes a three-story building with a basement on the southern portion of the Site and a playground encompassing approximately 2,800 square-feet on the northern portion of the Site. The conceptual building design is preliminary and is subject to change during the design process. Both remedial alternatives allow for this future planned development by removal of contaminated soil, and under Alternative 2 implementation of engineering and institutional controls to minimize the potential for impacts from the Site to future users.

Citizens participation in connection with the RAWP and planned future use of the Site is described in the CPP attached as *Appendix E*.

3.2 SELECTION OF THE PREFERRED REMEDY

Both of the remedial alternatives evaluated would be protective of human health and the environment, provide a long term and effective remedy for the Site, and allow for future development. However, Alternative 1 – Remediate to Achieve Unrestricted Use would result in greater potential short-term impacts to the community due to the longer remedial time frame, and larger volume of soil removed, would be more difficult to implement due to the greater excavation depths and necessity for extensive dewatering. Further, Alternative 1 is less cost effective when compared to Alternative 2. Although Alternative 1 would be more effective in reducing the volume of contaminants at the Site and achieving the SCGs, it would not provide significant additional protection of human health or the environment.

Therefore, based on the evaluation of the remedial alternatives against the nine remedy selection factors in accordance with the requirements of 6 NYCRR 375-1.8(f), Alternative 2 – Remediate to Achieve Track 4: Restricted-Residential Use is the selected remedy for the Site. Alternative 2 satisfies the soil and soil vapor remedial action objectives for the Site and will be protective of human health and the environment.

The land use factor evaluation below examines the selected alternative in comparison to the criteria required by Article 27, Title 14 of the Environmental Conservation Law 27-1415.

3.2.1 Zoning

According to the New York City Department of City Planning (NYCDCP) Zoning Map 16C, the Site is zoned for residential use (R6A for the southern portion of the Site and R6B for the northern portion of the Site). Residential districts permit community facilities such as schools. Properties in the area of the Site are zoned for residential, commercial, and manufacturing use. *Figure 3* presents the surrounding land use and potential sensitive environmental receptors.

3.2.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The proposed use of the Site is consistent with the allowed land use in this portion of Brooklyn. There are no available Community Master Plans or Land Use Plans for the Site.

3.2.3 Surrounding Property Uses

The surrounding property uses are commercial, residential, and institutional. The Site is located in a highly developed urban area with commercial and residential buildings to the north, residential

buildings to the east, a one-story institutional building ("American Legion Hall") with a parking lot and commercial and residential buildings to the west, and residential and commercial buildings to the south. The proposed use of the Site as a public school facility is consistent with the surrounding property uses. *Figure 3* presents the surrounding land use and potential sensitive environmental receptors.

3.2.4 Citizen Participation

Refer to Section 4.1.8 for information on the Citizen Participation Plan. The NYSDEC-approved CPP is provided in *Appendix E.*

3.2.5 Environmental Justice Concerns

The Site is located in an Environmental Justice Area with a large Hispanic-American population. Therefore, Fact Sheets issued for this Site will be translated into Spanish. Additional details regarding community outreach and environmental justice are included in the Citizen Participation Plan.

3.2.6 Land Use Designations

The proposed use of the Site is consistent with the land use designation in this portion of Brooklyn.

3.2.7 Population Growth Patterns

The proposed public school facility is intended to address the need for Pre-Kindergarten facilities within this portion of Brooklyn.

3.2.8 Accessibility to Existing Infrastructure

The proposed Pre-Kindergarten Facility Site is accessible to the required infrastructure (e.g., utilities, transportation, etc.).

3.2.9 Proximity to Cultural Resources

There are no cultural resources within immediate proximity of the Site identified as part of this RAWP.

3.2.10 Proximity to Natural Resources

The nearest water bodies to the Site include: the Gowanus Canal, located approximately 0.4 miles to the west and 0.3 miles to the north. On-Site groundwater is not used as a source of potable water. The selected remedial alternative would not impact natural resources.

3.2.11 Off-Site Groundwater Impacts

The Site is predominantly capped with an impervious cover, minimizing potential off-site impacts to groundwater.

3.2.12 Proximity to Floodplains

The Site is not located in a flood zone.

3.2.13 Geography and Geology of the Site

The proposed use of the Site would alter the geology of the Site by removal of fill material and underlying native sand and silt.

3.2.14 Current Institutional Controls

Currently there are no institutional controls for the Site. Following the completion of the remediation, an environmental easement will be in place as described in Section 10.1.

3.3 SUMMARY OF SELECTED REMEDIAL ACTIONS

Remedial activities will be performed in accordance with this RAWP. The following activities will be performed to achieve the remedial objectives:

1. Prepare and implement a site-specific HASP, SoMP, and CAMP for the remedial activities.
2. Decommission all existing groundwater monitoring wells with the exception of TRC-MW-101 (proposed for post-remediation monitoring) prior to remedial construction in accordance with NYSDEC CP-43.
3. Remove underground storage tank systems.
4. Removal of approximately 354 tons of impacted soil and crushed scrap metal/subsurface piping (the source of chlorinated VOCs) in the northern portion of the Site for off-Site disposal as part of an IRM.
5. A minimum of the upper two feet of soil (approximately 1,200 tons) across the Site will be excavated and transported off-site for disposal. In addition, removal and disposal off-site of approximately 500 tons of soil (hot spot removal) that exhibits trivalent chromium and copper above the Restricted-Residential Use Soil Cleanup Objectives (SCOs), extending to approximately 5 feet in depth, in the northeast part of the Site to the extent feasible based on structural considerations.
6. Remove and dispose off-Site soil excavated as part of the remedy. Approximately 4,500 tons of additional soil will be removed from the Site, if the building will be constructed with a basement.
7. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work.

8. Post-excavation end-point documentation/confirmatory soil sampling across the entire site, in the hotspot area that exhibits elevated concentrations of trivalent chromium and copper and in the area of the USTs to evaluate the performance of the remedy with respect to attainment Track 4: RRSCOs.
9. On-site soil which does not exceed Protection of Groundwater SCOs and Restricted-Residential SCOs criteria may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the Site. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) may imported to the Site as necessary for backfilling. It is anticipated that approximately 600 tons of clean fill material will be imported to the Site for use as backfill. Approximately 250 tons of clean fill material were previously imported to the Site to backfill the IRM excavation area.
10. Appropriate offsite disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.
11. Groundwater contamination (remaining after active remediation) will be addressed with monitored natural attenuation (MNA). Groundwater will be monitored for chlorinated VOCs. Two quarterly sampling events will be completed prior to construction activities, and subsequent reports of the attenuation will be provided at a frequency determined in the SMP.
12. As part of construction of the new building, install a gas vapor barrier beneath the lowest level floor slab and install and operate a sub-slab depressurization system (SSDS).
13. Construct a composite cover system consisting of impervious surfaces (e.g., building, paved surfaces, etc.) across the majority of the Site and cover remaining landscaped areas with a minimum 2-foot thick imported clean soil layer. Install a demarcation layer on top of unexcavated native soils and below the building, playground area, and clean cover layer in landscaped areas.
14. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.
15. Prepare and implement a SMP for long term maintenance of the Site.
16. Record an Environmental Easement to ensure proper use of the Site.
17. Submission of a Final Engineering Report (FER) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

The objective of this section of the RAWP is to present a scope of work which will be approved by NYSDEC and when completely implemented will ready the Site for development for the Contemplated Use, which is Restricted-Residential Use, consistent with the requirements of the Brownfield Cleanup Program.

The following activities will be performed to achieve the remedial objectives:

1. Prepare and implement a site-specific HASP, SoMP, and CAMP for the remedial activities.
2. Decommission all existing groundwater monitoring wells with the exception of TRC-MW-101 (proposed for post-remediation monitoring) prior to remedial construction in accordance with NYSDEC CP-43.
3. Remove underground storage tank systems.
4. Removal of approximately 354 tons of impacted soil and crushed scrap metal/subsurface piping (the source of chlorinated VOCs) in the northern portion of the Site for off-Site disposal as part of an IRM.
5. A minimum of the upper two feet of soil (approximately 1,200 tons) across the Site will be excavated and transported off-site for disposal. In addition, removal and disposal off-site of approximately 500 tons of soil (hot spot removal) that exhibits trivalent chromium and copper above the Restricted-Residential Use Soil Cleanup Objectives (SCOs), extending to approximately 5 feet in depth, in the northeast part of the Site to the extent feasible based on structural considerations.
6. Remove and dispose off-Site soil excavated as part of the remedy. Approximately 4,500 tons of additional soil will be removed from the Site, if the building will be constructed with a basement.
7. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work.
8. Post-excavation end-point documentation/confirmatory soil sampling across the entire site, in the hotspot area that exhibits elevated concentrations of trivalent chromium and copper and in the area of the USTs to evaluate the performance of the remedy with respect to attainment Track 4: RRSCOs.
9. On-site soil which does not exceed Protection of Groundwater SCOs and Restricted-Residential SCOs criteria may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the Site. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) may imported to the Site as necessary for backfilling. It is anticipated that approximately 600 tons of clean fill material will be imported to the Site for use as backfill. Approximately 250 tons of clean fill material were previously imported to the Site to backfill the IRM excavation area.

10. Appropriate offsite disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.
11. Groundwater contamination (remaining after active remediation) will be addressed with monitored natural attenuation (MNA). Groundwater will be monitored for chlorinated VOCs. Two quarterly sampling events will be completed prior to construction activities, and subsequent reports of the attenuation will be provided at a frequency determined in the SMP.
12. As part of construction of the new building, install a gas vapor barrier beneath the lowest level floor slab and install and operate a sub-slab depressurization system (SSDS).
13. Construct a composite cover system consisting of impervious surfaces (e.g., building, paved surfaces, etc.) across the majority of the Site and cover remaining landscaped areas with a minimum 2-foot thick imported clean soil layer. Install a demarcation layer on top of unexcavated native soils and below the building, playground area, and clean cover layer in landscaped areas.
14. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.
15. Prepare and implement a SMP for long term maintenance of the Site.
16. Record an Environmental Easement to ensure proper use of the Site.
17. Submission of a Final Engineering Report (FER) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.

4.1 GOVERNING DOCUMENTS

4.1.1 Site Specific Health & Safety Plan (HASP)

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

The NYCSCA (Volunteer) and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

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

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

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

Activities performed on-site by TRC will be conducted in accordance with TRC's HASP. Refer to *Appendix B* for the TRC HASP. Construction activities performed on-site will be conducted in accordance with the Contractor's Site-Specific HASP. Updates or additions to the HASP, if necessary, will be provided to NYSDEC.

4.1.2 Quality Assurance Project Plan (QAPP)

Post-excavation confirmatory sampling will be performed in the area that exhibits elevated concentrations of trivalent chromium and copper and in the area of the three USTs. Laboratory analysis will be performed in accordance with the Quality Assurance Project Plan (QAPP) presented in *Appendix C*. The QAPP presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with field activities. The QAPP also describes specific protocols for field sampling, sampling handling and storage, and laboratory analysis.

4.1.3 Construction Quality Assurance Plan (CQAP)

The Construction Quality Assurance Plan (CQAP) will be submitted to the NYSDEC for approval prior to the start of work. The CQAP provides a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedy construction is in conformance with the remediation objectives and specifications prepared for the environmental remediation components of the project. The CQAP includes the following:

- Responsibilities and authorities of the organizations and key personnel involved in the design and construction of the remedy.
- Qualifications of the quality assurance personnel that demonstrate that they possess the proper training and experience necessary to fulfill project-specific responsibilities.
- The observations and tests that will be used to monitor construction and the frequency of performance of such activities.
- The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures.

- Requirements for project coordination meetings between the Volunteer and its representatives, the Construction Manager, Excavation Contractor, remedial or environmental subcontractors, and other involved parties.
- Description of the final documentation retention provisions.

4.1.4 Soil/Material Management Plan (SoMP)

The SoMP is described in Section 5.4.

4.1.5 Soil Erosion and Sediment Control Plan

The erosion and sediment controls will be in conformance with requirements presented in the New York State Standards and Specifications for Erosion and Sediment Control. A Soil Erosion and Sediment Control Plan and Details will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work.

Soil erosion and sediment control procedures will be in place and functional prior to beginning any ground intrusive work. These procedures include installation and maintenance of silt fencing, vehicle-tracking pads at egress points, storm drain inlet protection, sediment traps, and soil stockpile protection. Additional requirements regarding Soil erosion and sediment control procedures are listed below:

- Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs will be made immediately.
- Accumulated sediment will be removed as required to keep the barrier and hay bale check functional.
- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.
- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.
- Erosion and sediment control measures identified in the RAWP will be observed to confirm that they are operating correctly. Where discharge locations or points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

- Silt fencing or hay bales will be installed around the entire perimeter of the excavation area.

4.1.6 Community Air Monitoring Plan (CAMP)

During ground-intrusive work activities the requirements of the CAMP presented in *Appendix D* will be implemented. The CAMP requires real-time monitoring for VOCs and particulates (i.e., dust) at the downwind and upwind perimeter of the Site. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the remediation work activities) from potential airborne contaminant releases as a direct result of remedial work activities. The action levels specified in the CAMP require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP documents that work activities did not spread contamination off-Site through the air.

4.1.7 Contractor's Site Operations Plan (SOP)

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

Detailed remedial construction design documents will be submitted to NYSDEC for approval prior to the start of work.

4.1.8 Citizen Participation Plan

The NYSDEC determined the BCP Application was complete, therefore the BCP Application was placed into the document repository and the Public Notice was published in the Environmental Notice Bulletin (ENB) and local newspaper. The Public Notice and Fact Sheet that describes the draft RI Work Plan and announces the 45-day comment period was mailed to the site contact list.

A certification of mailing was sent by the NYCSCA (Volunteer) to the NYSDEC project manager following the distribution of all Fact Sheets and notices that included: (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 the applicable project documents.

No changes were made to the approved Fact Sheets authorized for release by NYSDEC. No other information, such as brochures and flyers, were included with the Fact Sheet mailing. All future Fact Sheets will be translated into Spanish due to the large Hispanic-American population surrounding the Site.

A draft Citizen Participation Plan (CPP) was submitted to the NYSDEC in February 2018 prior to execution of the BCA. The CPP was revised based on NYSDEC comments and the final CPP was submitted to NYSDEC on March 21, 2018. The CPP was approved by NYSDEC on April 18, 2018.

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

1. Brooklyn Public Library
   Pacific Library
   25 4th Avenue
   Brooklyn, NY 11217
   Telephone: (718) 638-1531
   Hours: Mon – Tues: 10 AM to 6 PM, Wed: 1 PM to 8 PM, Thu: 10 AM to 8 PM, Fri: 10 AM to 6 PM, Sat: 10 AM to 5 PM, Sun: Closed

2. Brooklyn Community Board 6
   250 Baltic Street
   Brooklyn, NY 11201
   Attn: Sayar Lonial
   Phone: (718) 643-3027
   Hours: Mon to Fri: 9AM to 5 PM
   (call for appointment)

3. Brooklyn Public Library – Central Library
   Society, Sciences, and Technology Division
   10 Grand Army Plaza
   Brooklyn, NY 11238
   Attn: Ian Mazour
   Phone: (718) 230 - 2100
   Hours: Mon-Thurs: 9AM-9PM; Fri & Sat: 9AM-6PM
   Sunday: 1PM to 5 PM

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

The NYCSCA has contracted TRC to prepare the BCP Application, RI Report, and RAWP, and provide remedial action design services associated with the RAWP. Site monitoring will be completed by the NYCSCA and the TRC Remedial Engineer (refer to Section 4.2.2). The Contractor, who will be selected prior to construction, will implement the Remedial Action during construction of the proposed school facility. An organization chart of key TRC personnel involved in the Remedial Action is provided in Section 3 of the HASP in *Appendix B*. Resumes of key personnel involved in the Remedial Action are included in Appendix I.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Kevin Boger. The Remedial Engineer is a registered professional engineer licensed by the State of New York. TRC is assigned as the Remedial Engineer responsible for overseeing the Remedial Action. The Remedial Engineer for this project will be a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the Site (NYSDEC BCA Index No. C224266-01-18 Site No. C224266). The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his/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 that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

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

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

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

4.2.3 Remedial Action Construction Schedule

The NYCSCA will issue a design package for demolition of current site features and construction of the proposed school, which will include the proposed Remedial Actions. The remedy is anticipated to be completed and the Certificate of Completion to be obtained by August 2022 to allow for the start of use of the school in September 2022.

A construction schedule prepared by the contractor will be submitted to the NYSDEC prior to the start of work.

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. The anticipated work hours for the remedial activities will be from 7:00 AM to 3:30 PM, Monday through Friday. NYSDEC will be notified by the NYCSCA (Volunteer) of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

A fence will be constructed along the perimeter of the Site. Access to the Site will be through controlled locations that are staffed 24-hours per day. Visitors to the Site will be required to sign-in and will be escorted while on-Site.

4.2.6 Traffic Control

A traffic control plan will be developed by the Contractor and submitted to the NYSDEC prior to the start of work.

4.2.7 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during the remedial excavation or development related construction, sampling will be performed on product and environmental media as appropriate. Chemical analyses will be for appropriate parameters (TAL metals, TCL volatiles and semivolatiles, TCL pesticides, and/or PCBs). 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 work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic reports.

4.2.8 Worker Training and Monitoring

Any individual working on the Site which could potentially be exposed to site soil must have current certifications documenting OSHA 40-hour and 8-hour refresher HAZWOPER training and medical monitoring in accordance with 29 CFR 1910.120 (for work on hazardous waste sites). Contractors that may be exposed to site soil during intrusive work will maintain a medical monitoring and respiratory protection program and documentation for individuals who will perform ground intrusive-related work at the Site have appropriate training and that medical monitoring is being performed in accordance with the requirements of OSHA will be included as part of the Site-Specific HASP. Additionally, the Contractor's Site-Specific HASP will include a description and documentation of training, respirator fit testing, and medical monitoring for each individual proposed for Remedial Action work.

4.2.9 Agency Approvals

The NYCSCA (Volunteer) has addressed or will address all State Environmental Quality Review Act (SEQRA) requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

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 developed and submitted to the NYSDEC prior to the start of work. This list will include a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the Final Engineering Report.

4.2.10 Pre-Construction Meeting with NYSDEC

A Pre-Construction meeting between the NYSDEC and NYCSCA will be scheduled prior to the start of construction activities. The purpose of the meeting will be to review the environmental conditions present at the Site and review the scope of the RAWP and design documents with involved parties. No additional meetings will be scheduled prior to implementation of the RAWP, unless specifically requested by the NYSDEC.

4.2.11 Emergency Contact Information

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

4.2.12 Remedial Action Costs

The total estimated cost of the Remedial Action is $900,000. An itemized and detailed summary of estimated costs for all remedial activity is attached as *Appendix G*. This will be revised based on actual costs and submitted as an Appendix to the Final Engineering Report.

4.3 SITE PREPARATION

4.3.1 Mobilization

The first step in site preparation is mobilization. Mobilization will be conducted in stages as necessary for each phase of work. Demobilization is discussed below.

4.3.2 Monitoring Well Decommissioning

Existing groundwater monitoring wells will be properly decommissioned prior to remedial construction in accordance with NYSDEC CP-43. The only exception to this is if the full length of the well is to be excavated during remediation and development.

4.3.3 Erosion and Sedimentation Controls

The erosion and sediment controls will be in conformance with requirements presented in the New York State Standards and Specifications for Erosion and Sediment Control. Details regarding soil erosion and sediment control are presented in Section 4.1.5.

4.3.4 Stabilized Construction Entrance(s)

A stabilized gravel construction entrance will be located near the Site exit to provide a clean and dust-free road surface prior to departure from the Site.

4.3.5 Utility Marker and Easements Layout

The NYCSCA (Volunteer) and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The NYCSCA and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The NYCSCA 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.

4.3.6 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 NYCSCA (Volunteer) and its contractors. The NYCSCA and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The NYCSCA and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the NYCSCA and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

Sheeting will be designed by a licensed New York State Professional Engineer and will conform to applicable building codes.

4.3.7 Equipment and Material Staging

Equipment and material will be stored and staged in a manner that is consistent with local, State, and Federal regulations, as well as in accordance with the requirements of the New York State Standards and Specifications for Erosion and Sediment Control.

4.3.8 Decontamination Area

Equipment will be delivered to the work site free of contamination. The NYCSCA's on-site representative will prohibit any equipment from the Site that in his/her opinion has not been thoroughly decontaminated prior to arrival. The Contractor is prohibited from decontaminating equipment on-Site that is not thoroughly decontaminated prior to arrival.

Decontamination of equipment associated with ground-intrusive work will be conducted at an area within the work site that has been approved by the NYCSCA's on-site representative for such use. Frequency of decontamination will be determined by the NYCSCA's on-site representative and will be required prior to equipment and supplies leaving the Site between stages of the work. Decontamination materials will be collected, containerized, tested, labeled, and disposed in accordance with applicable laws and regulations. Transportation vehicles will be inspected, prior to leaving the Site, to ensure that no material adheres to the wheels, undercarriage, tailgates, covers or other areas of transport vehicles. Vehicles potentially in contact with contaminated material will be cleaned including tires, undercarriage, and any other contaminated parts, prior to leaving the Site.

4.3.9 Site Fencing

Site fencing will be installed around the perimeter of the Site to control Site access as indicated in Section 4.2.5 above. The fencing will be maintained throughout the construction phase and removed following completion of Site development.

4.3.10 Demobilization

Demobilization will include:

- Restoration of areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary wastewater management area[s], and access area);
- Removal of temporary access areas (whether on-Site or off-Site) and restoration of disturbed access areas to pre-remediation conditions;
- Removal of sediment and erosion control measures and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination or disposal, as appropriate; and
- General refuse disposal.

4.4 REPORTING

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

4.4.1 Daily Reports

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

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to the Site Plan 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 (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 a map for the Site that identifies work areas. These reports will include a summary of air monitoring results generated from the performance of the CAMP, odor and dust problems and corrective actions, and all complaints received from the public.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

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

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

4.4.3 Other Reporting

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

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

4.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other conditions will be addressed promptly. Complaints and the response to those complaints will be recorded in the daily reports. NYSDEC and NYSDOH will be notified of all odor events and of other complaints about the project.

4.4.5 Deviations from the Remedial Action Work Plan

The process to be followed if there are any deviations from the RAWP, at a minimum, will include a written submission to the NYSDEC with the following information:

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

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

This section introduces plans for removal of contaminated media (soil, structures, etc.), and includes a description and identification of: the locations of planned remedial activities; the estimated volume of each environmental medium to be remediated; the location, depth, and concentration of contaminants in excess of remediation standards; and planned sample locations, depths, and parameters for post-excavation documentation soil samples and post-excavation confirmatory samples in the area of the three USTs. The RAWP Quality Assurance Project Plan, describing the proposed sampling and analytical methods, is provided in *Appendix C*. A complete list of all local, regional and national governmental permits required to perform the work will be developed and submitted to the NYSDEC prior to the start of work.

5.1 SOIL CLEANUP OBJECTIVES

The Soil Cleanup Objectives for this Site are listed in Table 375-6.8(b) of 6 NYCRR Part 375.

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

Figures that show all soil samples that exceed the RRUSCOs are shown on *Figures 5B and 12*.

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

5.2 REMEDIAL PERFORMANCE EVALUATION (POST-EXCAVATION DOCUMENTATION SAMPLING)

5.2.1 Post-Remediation Sampling Frequency

Post-excavation documentation/confirmatory sampling will include the collection of soil and groundwater samples, as discussed below.

Post-Remediation Soil Sampling

Soil samples will be collected across the entire site, in the area that exhibits elevated concentrations of trivalent chromium and copper and in the areas of the three USTs. Soil samples will be collected in accordance with DER-10 requirements. Collection of post-excavation soil samples will be performed at a frequency of one (1) bottom sample every 900 square feet across the entire Site and one (1) sidewall sample every 30 linear feet at the perimeter of the excavation in the area that exhibits elevated concentrations of trivalent chromium and copper (refer to *Figure 15)*. Additionally, one bottom soil sample and four sidewall samples will be collected in the area of the

three USTs. Soil sampling methods, analysis, and QA/QC requirements are presented in the QAPP in *Appendix C*.

Post-Remediation Groundwater Sampling

Groundwater samples will be collected from two downgradient monitoring wells, K710-MW-1 and K710-MW-2 for analysis for chlorinated VOCs (refer to *Figure 16* for the proposed monitoring well locations). An existing monitoring well, TRC-MW-101, may be used in lieu of installing monitoring well K710-MW-1. Required New York One Call notifications will be made at least three days prior to intrusive work and the locations of underground utility lines in public roads and rights-of-way will be marked out prior to well installation. A geophysical survey will be completed prior to installation of the sidewalk monitoring well, K710-MW-2.

Groundwater monitoring well installation and sampling will include the following:

- Monitoring wells will be installed to approximately 10 feet below the observed water table. Soil samples will not be collected during well installation activities. Each monitoring well will be constructed using 4-inch diameter polyvinyl chloride (PVC) monitoring well riser and screen. Each well will be screened from approximately 5 feet above the observed water table to 10 feet below the observed water table.
- Clean silica sand, Morie No. 1, or similar, will be placed in the annular space around each groundwater monitoring well to a minimum of one foot above the top of the well screen, two feet being optimal. A two-foot bentonite seal will be placed above the sand pack. The monitoring wells will be completed with a flush-mounted outer protective casing.
- Well construction diagrams will be prepared for each well.
- Following installation, the groundwater monitoring wells will be developed using backwashing or mechanical surging methods until five well volumes are removed and the water is reasonably free of turbidity and field parameter readings (temperature, conductivity, oxidation reduction potential (ORP), pH, and dissolved oxygen [DO]) sufficiently stabilize. During well development, TRC will actively monitor and track the volume of water purged and the field parameter readings. Field measurements will be recorded in a field logbook. Fifty nephelometric turbidity units (NTUs) or less will be the turbidity goal, but not an absolute value. The groundwater monitoring wells will be allowed to equilibrate for one week prior to sampling.

Groundwater samples will be collected over two quarterly sampling events (anticipated to be completed in the first and second quarters of 2019) and the results will be presented in the FER.

The results of the groundwater sampling events will be evaluated to determine if additional monitoring is warranted as part of site management. Groundwater sampling methods, analysis, and QA/QC requirements are presented in the QAPP in *Appendix C*.

5.2.2 Methodology

Post-excavation documentation soil samples across the entire Site and in the area that exhibits elevated concentrations of trivalent chromium and copper will be collected from each sidewall and the excavation bottom and will be analyzed for trivalent chromium and copper. Additionally, following removal of the UST system, post-excavation confirmatory samples will be collected in accordance with DER-10 and analyzed for CP-51 Tables 2 and 3 VOCs and SVOCs. Proposed post-excavation soil sampling locations are shown on *Figure 15*. Post-remediation groundwater samples will be collected over two quarterly sampling events (anticipated to be completed in the first and second quarters of 2019).

5.2.3 Reporting of Results

The FER will provide a tabular and map summary of post-excavation soil sample results and exceedances of RRUSCOs, if any. Additionally, the FER will include the results of the quarterly groundwater sampling event.

5.2.4 Quality Assurance/ Quality Control (QA/QC)

A QA/QC program for the RAWP will be instituted to verify that the project analytical data objectives are met. The QA/QC program will be implemented consistent with the QAPP, which specifies the data quality objectives (DQOs) for each analytical parameter for the entire Remedial Action. During the program, the collection of QC samples will be monitored to verify that the field QC samples are collected at the proper frequency. Finally, the QA/QC program will include data validation of the analytical data, as specified in the QAPP.

5.2.5 Data Usability Summary Reports (DUSRs)

Data validation will be performed for the post-excavation documentation/confirmatory soil sample analytical data and groundwater sample analytical data. The results of the data validation will be summarized in Data Usability Summary Reports (DUSRs).

5.2.6 Reporting of End-Point Data in FER

Chemical laboratories used for all end-point sample analyses and contingency sampling will be NYSDOH Environmental Laboratory Approval Program (ELAP) certified.

Bottom and side-wall sampling will be performed in accordance with DER-10 sample frequency requirements. The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs, if any.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

The estimated quantity of soil to be removed from the Site is approximately 1,700 tons of soil, including 500 tons of soil that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs and 1,200 tons of soil consisting of the upper two feet of soil across the remainder of the Site. Approximately 4,500 additional tons of soil would be removed as part of Site development, if the new building includes a basement. The conceptual building design is preliminary and is subject to change during the design process. Based on the current concept, the site development depth is approximately 12 feet bgs beneath the footprint of the proposed building and cellar-level playground area, and approximately 4 feet bgs at the ground level playground area on the northern portion of the Site. In support of Site development, soil will be excavated across the entire limits of the Site to a minimum depth of four feet bgs. There will be no unexcavated areas of the Site as part of the site development.

5.4 SOIL/MATERIAL MANAGEMENT PLAN

5.4.1 Soil Screening Methods

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

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

Screening will be performed by qualified environmental professionals. If requested by NYSDEC, resumes will be provided for all personnel responsible for field screening (i.e., those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

5.4.2 Stockpile Methods

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, except when materials are being removed or added and during stockpile sampling. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

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

Water will be available on-site at suitable supply and pressure for use in dust control.

5.4.3 Materials Excavation and Load Out

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

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

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

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

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

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

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

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

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

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

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

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

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

5.4.4 Materials Transport Off-Site

All transport of excavated 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 for subsurface soil removed from the Site are provided in *Appendix H*. All trucks loaded with Site remediation materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work. The proposed truck routes will take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; (f) overall safety in transport; and (g) community input.

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

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

Queuing of trucks will be performed on-Site in order 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 potentially in contact with contaminated material will be washed prior to leaving the Site.

5.4.5 Materials Disposal Off-Site

Proposed disposal locations will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work. Disposal locations established at a later date will be reported to the NYSDEC Project Manager.

The total quantity of material that exhibits trivalent chromium and copper above the Restricted-Residential Use SCOs is approximately 500 tons. Approximately 1,200 tons of soil consisting of the upper two feet of soil across the remainder of the Site will be excavated. Approximately 4,500 additional tons of non-hazardous soil would be removed as part of Site development, if the new building includes a basement. Disposal facilities will be selected following completion of waste characterization sampling and analysis.

Soil/fill/solid waste excavated and removed from the Site will be managed in accordance with 6NYCRR Part 360 and federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 361-5 Registration Facility).

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

1. A letter from the Remedial Engineer, contractor, or NYCSCA (Volunteer) to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material

generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and

2. A letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed 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 Regulated Waste 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 361-5 Registered Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

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

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

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

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

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

5.4.6 Materials Reuse On-Site

It is anticipated that soil will not be re-used on-Site; however, if necessary, soil with contaminant concentrations that meets the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use as described in 6 NYCRR Part 375-6.7(d)(1)(ii)(b) will be reused to backfill excavations below the building and paved surfaces and up to 2 feet below the clean cover layer in landscaped areas. A demarcation layer would be installed above existing soil throughout the Site, beneath the building, playground area, and a minimum 2-foot thick imported clean cover layer in landscaped areas. Stockpiled backfill material will be maintained on-site separate from the areas of active remediation work.

Material proposed for reuse must be sampled in accordance with the requirements in DER-10 and meet the criteria listed in Appendix 5 of DER-10. The potential excavation areas for material reuse and associated soil quantities have not been established as of the date of this RAWP. However, the Remedial Engineer will coordinate with the NYSDEC for approval of reuse material during construction activities, as applicable. Samples will be collected in accordance with the frequency and analyses listed in the table below and submitted to a NYSDOH ELAP-certified laboratory.

Table 5.4(e)10
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site

Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➢ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Additional requirements regarding material reuse on-site include:

- The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.
- Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos.
- 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, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final Site Management Plan.

5.4.7 Fluids Management

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

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

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

5.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the Site Management Plan. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals

Management Zone' in the Site Management Plan. A map showing the survey results will be included in the Final Engineering Report and the Site Management Plan.

5.4.9 Backfill from Off-Site Sources

This section presents the requirements for imported fill materials to be used as backfill and clean cover layer. Backfill material will be comprised of soil or other unregulated material. Use of recycled concrete aggregate as backfill is prohibited. Imported material used to backfill below the building and paved surfaces and up to 2 feet below the clean cover layer in landscaped areas, if any, will meet the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use. The NYCSCA's standard specifications for the clean cover layer (i.e., top two feet of exposed soil) require the use of soil in which VOCs are not detected and the remaining parameters are below the more stringent 6 NYCRR Part 375-6 Unrestricted Use SCOs.

Details regarding imported material include:

- Soil proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site.
- Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.
- The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan."
- All imported soil will meet NYSDEC approved backfill or cover soil quality objectives for this Site. The NYSDEC approved backfill quality objective is the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use as set forth in Table 375-6.8(b) of 6 NYCRR Part 375. The NYSDEC approved cover soil quality objective is the protection of public health soil cleanup objectives for Unrestricted Use as set forth in Table 375-6.8(a) of 6 NYCRR Part 375. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.
- Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without

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

- Solid waste will not be imported onto the Site.
- Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

5.4.10 Soil Erosion and Sediment Control

A Soil Erosion and Sediment Control Plan and Details will be submitted to the NYSDEC for approval prior to the start of work. The erosion and sediment controls will be in conformance with requirements in the New York State Standards and Specifications for Erosion and Sediment Control. Soil erosion and sediment control procedures will be in place and functional prior to and during any ground-intrusive work. Additional requirements regarding stormwater pollution prevention are listed below:

- Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.
- Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.
- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.
- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.
- Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters
- Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area, wherever there is potential for sediment transport.

5.4.11 Contingency Plan

If additional underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to 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 NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

5.4.12 Community Air Monitoring Plan

Site investigations have indicated the presence of petroleum and chlorinated VOCs in groundwater and soil vapor and metals in subsurface soils. The CAMP has been designed to monitor for the target contaminants (refer to *Appendix D*). Real-time air monitoring will be performed at the perimeter of remedial construction zones. The goal of the CAMP is to recognize and aggressively respond to exceedances of pre-determined action levels for contaminants of concern. Corrective actions, which may include dust and vapor suppression techniques, alteration of certain work activities, or stopping work, will be taken if exceedance of pre-determined action levels are detected.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

5.4.13 Odor, Dust and Nuisance Control Plan

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

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include limiting the area of open excavations. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the

project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteer's Remedial Engineer, who is responsible for certifying the Final Engineering Report.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; and (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.

5.4.13.2 Dust Control Plan

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

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

5.4.13.3 Other Nuisances

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

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

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

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

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have two (2) primary EC systems. These are: (1) an impermeable cover system consisting of concrete building slabs, paved surfaces and a minimum two-foot thick clean cover layer and (2) a vapor barrier and SSDS below the building floor slab.

The FER will report residual contamination on the Site in tabular and map form. This will include presentation of exceedances of both Track 1 and Track 4 standards.

7.0 ENGINEERING CONTROLS: COVER SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered cover system that will be built on the Site. This impermeable cover system will be comprised of concrete building slabs and/or paved surfaces, and a minimum 2-foot thick imported clean cover layer in landscaped areas, if any.

An engineered cover system will be built on the Site consisting of impervious surfaces (e.g., building, paved surfaces, etc.) and in all other areas (e.g., landscaped areas) at least two feet of clean cover material meeting the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted-Residential Use as described in 6 NYCRR 375-6.7(d)(1)(ii)(b) or otherwise approved by NYSDEC. The NYCSCA standard specifications for the clean cover layer require the use of soil in which VOCs are not detected and the remaining parameters meet the more stringent Unrestricted Use SCOs further described in Section 5.4.9.

A diagram showing the design detail for each cover type is shown in *Figure 16*. A map showing the aerial distribution of each of the cover types to be built at the Site is included in *Figure 16*. The proposed playground includes installation of a rubber safety surface, which would not act as an engineering control for the Site cover. As noted previously, the final cover system will consist of impervious surfaces (e.g., a building and/or paved surfaces, etc.) and in all other areas (i.e., landscaped areas) at least two feet of clean cover layer that will meet the soil cleanup objectives for Unrestricted Use.

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

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

8.0 ENGINEERING CONTROLS: SSDS

To prevent sub-slab vapor from entering the new building, engineering controls consisting of a gas vapor barrier and SSDS will be installed. The gas vapor barrier is a continuous synthetic membrane installed below the building which is impermeable to vapors. An active SSDS will be designed and installed to minimize the potential for vapor intrusion. The proposed building footprint and area to be depressurized with an active SSDS is shown on *Figure 17*. The principal components of the SSDS will include:

- Vapor barrier (described above);
- Suction pits beneath the lowest floor slab;
- Pipe running horizontally beneath the slab from each suction pit to a common header or headers;
- A vertical riser or risers, at least six inches in diameter, from the common header(s) connecting to a suction fan or fans above the building roof;
- An exterior suction fan(s);
- An alarm system which will be activated on low vacuum conditions; and,
- Monitoring points at selected locations in the building floor slab.

The Operation and Maintenance (O&M) requirements for the SSDS will consist of initial start-up testing, routine maintenance and monitoring activities, and non-routine maintenance activities to be described in the SMP.

Design plans and specifications will be submitted to NYSDEC under the SMP.

All as-built drawings or signed and sealed construction drawings reviewed by the Remedial Engineer, diagrams, and post-installation pressure field extensions testing results will be presented in the FER.

9.0 CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS

9.1 COVER SYSTEM

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

9.2 SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

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

10.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (ECs) for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan.

All as-built drawings or signed and sealed construction drawings reviewed by the Remedial Engineer, and diagrams will be presented in the FER. A Site-specific Environmental Easement will be recorded with Kings County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

10.1 ENVIRONMENTAL EASEMENT

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

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

Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- An impermeable cover system consisting of concrete building slabs and paved surfaces must be inspected, certified, and maintained as required in the SMP;
- The minimum 2-foot thick clean cover layer in landscaped areas must be inspected, certified, and maintained as required in the SMP;
- A soil vapor mitigation system consisting of a continuous vapor barrier and an active sub-slab depressurization system under all building structures must be inspected, certified, operated and maintained as required by the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- 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;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

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

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;

- The Controlled Property may be used for Educational or Restricted-Residential use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as Unrestricted use without an amendment or extinguishment of this Environmental Easement;
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

10.2 SITE MANAGEMENT PLAN

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

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

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

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period. The annual reports will document the annual inspections of the SSDS and cover system. The annual reports will be prepared and filed until the NYSDEC issues notification in writing that an annual report is no longer required. Each annual report will be signed by a New York State licensed Professional Engineer and will contain a certification confirming that the engineering and institutional controls at the Site have been maintained in accordance with the SMP to protect public health and the environment.

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.

11.0 FINAL ENGINEERING REPORT

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

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

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

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

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

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

The 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).

11.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer 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, _____, 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 168 8th Street Site (NYSDEC BCA Index No. C224266-01-18, Site No. C224266).

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 168 8th Street 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 NYCSCA for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, and that such plan has been approved by the NYSDEC.

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

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

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

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as a 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 a New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

12.0 SCHEDULE

The Remedial Action will be implemented during construction of the new school (scheduled to open in September 2022). *Table 15* presents a schedule for proposed remediation. As the schedule for remediation and redevelopment activities become more defined, the schedule will be updated and provided to the NYSDEC.

Table 15
Remediation Schedule

Schedule Milestone	Estimated Completion Date
NYSDEC Approval of RAWP	April 2019
Pre-Construction Kickoff Meeting	August 2019
Excavate and Remove Chromium and Copper Area and USTs	September 2019
Excavate a Minimum of Two Feet of Soil across the Site	December 2021
Complete Remedial Action Activities (Up to Start-up Testing for SSDS)	July 2022
Submit Final Engineering Report/ Site Management Plan	August 2022
Certificate of Completion	August 2022
School Opening	September 2022



LEGEND (SYMBOLS NOT TO SCALE)

- SITE BOUNDARY
- APPROXIMATE AREA OF UST(s)

0 30'

SCALE: 1" = 30'
SHEET SIZE: 11" BY 17"

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHO
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C
PROPOSED PRE-KINDERGARTEN FACILITY K
168 8TH STREET - BLOCK: 1003, LOT: 11
BROOKLYN, NY 11215

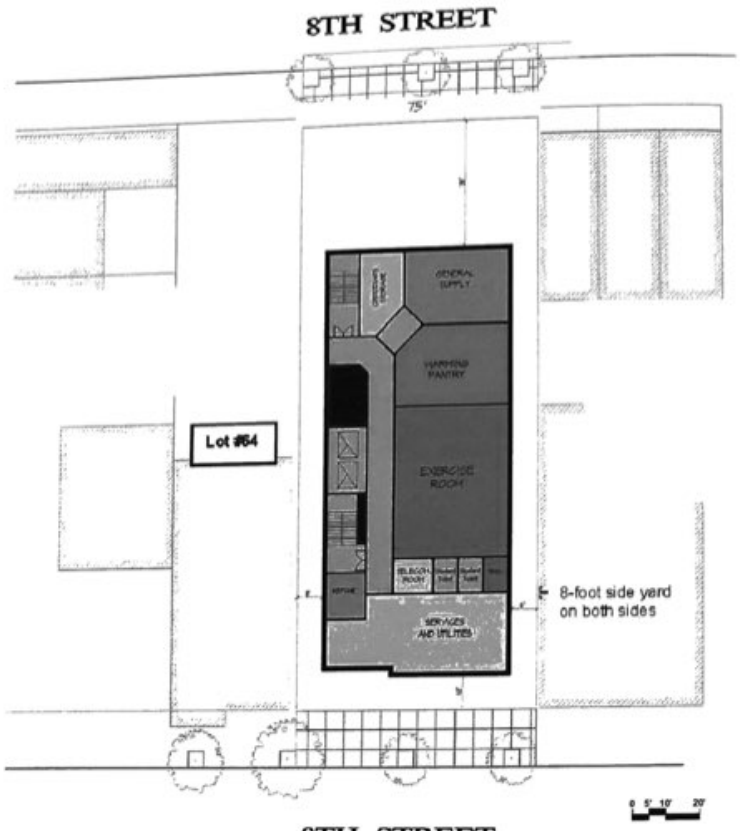
TITLE: SITE PLAN

DRAWN BY	H. DELGADO	PROJ NO.
CHECKED BY	L. O'HARA	
APPROVED BY	D. SCHMIDT	FIGURE
DATE	MARCH 2019	

TRC

FILE NO.

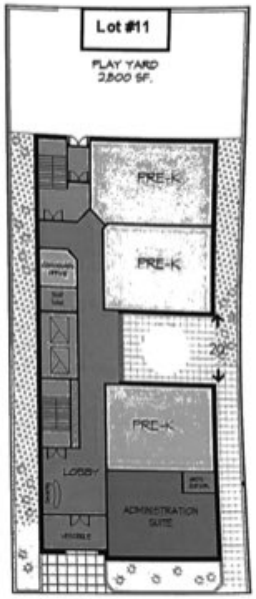
Figure 2



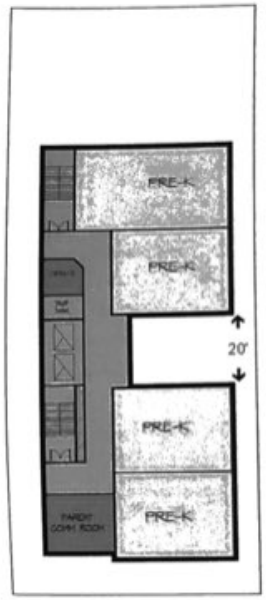
LEGEND:

- GROUP 1 – INSTRUCTIONAL
- GROUP CW – CITY WIDE SP. ED – D75
- GROUP 2 – SPECIALIZED INSTRUCTION
- GROUP 3 – SCIENCE
- GROUP 4 – PHYSICAL EDUCATATION
- GROUP 5 – ASSEMBLY
- GROUP 6 – LIBRARY
- GROUP 7 – LOBBY
- GROUP 8 – STUDENT SUPPORT
- GROUP 9 – STORAGE
- GROUP 10 – ADMINISTRATION
- GROUP 11 – CAFETERIA, STAFF LUNCH
- GROUP K – KITCHEN/FOOD SERVICES
- GROUP 12 – CUSTODIAL
- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS
- UNASSIGNED SPACE

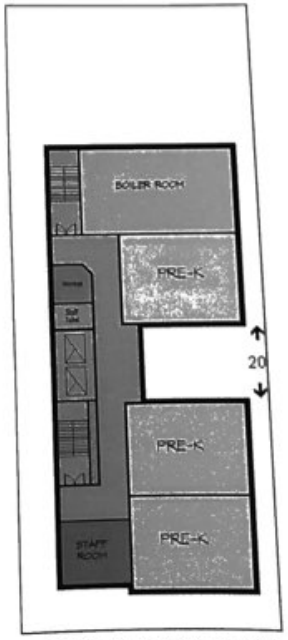
SITE / CELLAR FLOOR PLAN [168 8th Street]



FIRST FLOOR PLAN



SECOND FLOOR PLAN



THIRD FLOOR PLAN

SOURCE:
NYCSCA CONCEPTUAL PLAN FOR PUBLIC SCHOOL PS710K, MARCH 23, 2015.

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C224266
PROPOSED PRE-KINDERGARTEN FACILITY K710
168 8TH STREET - BLOCK: 1003, LOT: 11
BROOKLYN, NY 11215

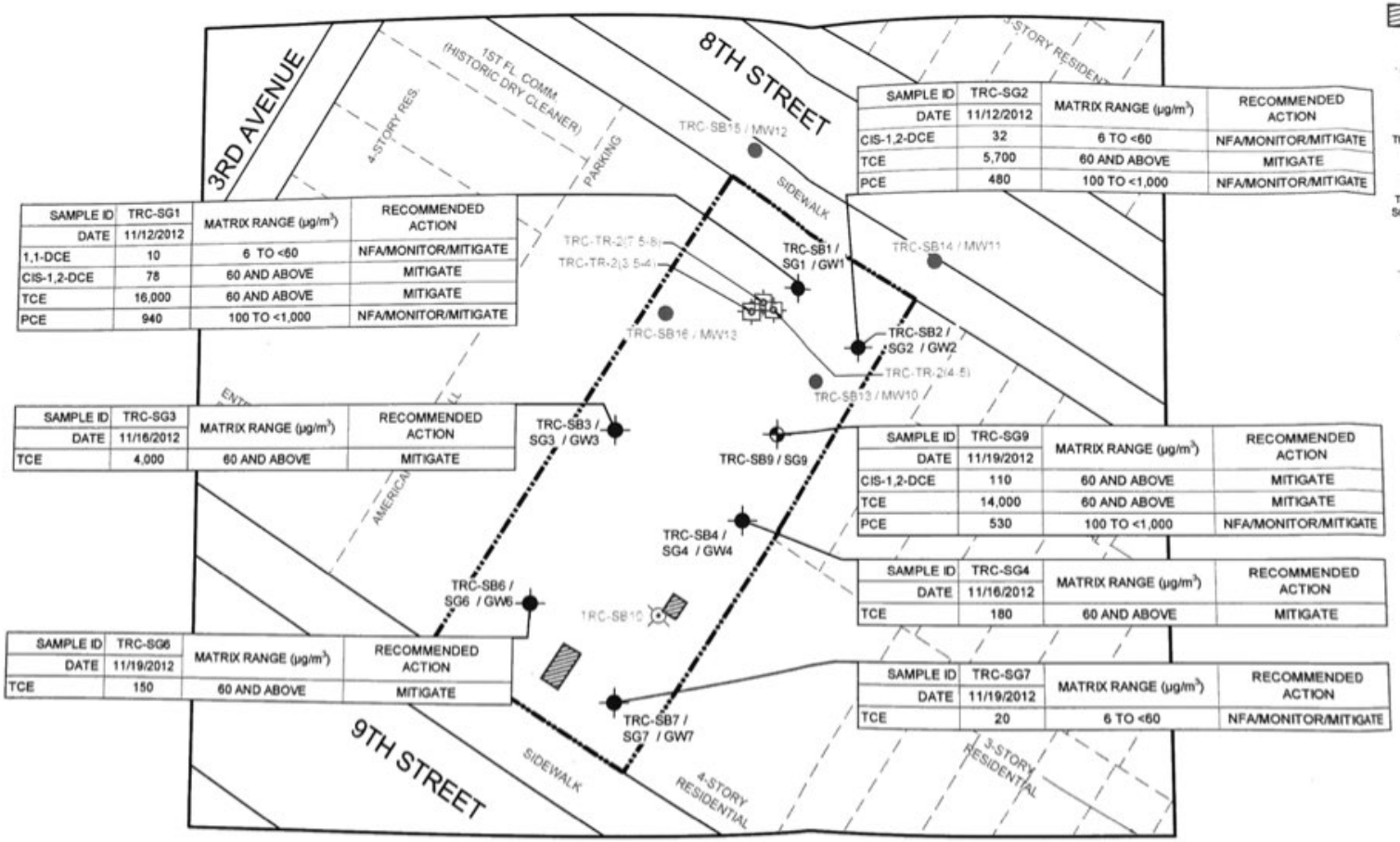
TITLE: **SITE DEVELOPMENT PLAN**

DRAWN BY	H. DELGADO	PROJ NO.	315824
CHECKED BY	L. O'HARA		
APPROVED BY	D. SCHMIDT		**FIGURE 4**
DATE	MARCH 2019		

TRC

1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO. Figure 4 - Site Development Plan.dwg



SAMPLE ID	TRC-SG1	MATRIX RANGE (µg/m³)	RECOMMENDED ACTION
DATE	11/12/2012		
1,1-DCE	10	6 TO <60	NFA/MONITOR/MITIGATE
CIS-1,2-DCE	78	60 AND ABOVE	MITIGATE
TCE	16,000	60 AND ABOVE	MITIGATE
PCE	940	100 TO <1,000	NFA/MONITOR/MITIGATE

SAMPLE ID	TRC-SG2	MATRIX RANGE (µg/m³)	RECOMMENDED ACTION
DATE	11/12/2012		
CIS-1,2-DCE	32	6 TO <60	NFA/MONITOR/MITIGATE
TCE	5,700	60 AND ABOVE	MITIGATE
PCE	480	100 TO <1,000	NFA/MONITOR/MITIGATE

SAMPLE ID	TRC-SG3	MATRIX RANGE (µg/m³)	RECOMMENDED ACTION
DATE	11/16/2012		
TCE	4,000	60 AND ABOVE	MITIGATE

SAMPLE ID	TRC-SG4	MATRIX RANGE (µg/m³)	RECOMMENDED ACTION
DATE	11/16/2012		
TCE	180	60 AND ABOVE	MITIGATE

SAMPLE ID	TRC-SG6	MATRIX RANGE (µg/m³)	RECOMMENDED ACTION
DATE	11/19/2012		
TCE	150	60 AND ABOVE	MITIGATE

SAMPLE ID	TRC-SG7	MATRIX RANGE (µg/m³)	RECOMMENDED ACTION
DATE	11/19/2012		
TCE	20	6 TO <60	NFA/MONITOR/MITIGATE

SAMPLE ID	TRC-SG9	MATRIX RANGE (µg/m³)	RECOMMENDED ACTION
DATE	11/19/2012		
CIS-1,2-DCE	110	60 AND ABOVE	MITIGATE
TCE	14,000	60 AND ABOVE	MITIGATE
PCE	530	100 TO <1,000	NFA/MONITOR/MITIGATE

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- APPROXIMATE AREA OF UST(s)
- SOIL SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SBX / SGX — SOIL AND SOIL VAPOR SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SBX / SGX / GWX — SOIL, SOIL VAPOR, AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- SOIL AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (JANUARY 2013)
- SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER FROM TRENCH EXCAVATION DURING ARCHEOLOGICAL ASSESSMENT (JUNE 2017) (DEPTH IN FEET)

W N E

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. DATA SHOWN IN µg/m³ - MICROGRAMS PER CUBIC METER
3. MATRIX RANGE IS APPLICABLE SUB-SLAB VAPOR CONCENTRATION RANGE IN NYSDOH VAPOR INTRUSION MATRICES.
4. RECOMMENDED ACTIONS BASED ON NYSDOH VAPOR INTRUSION MATRICES.
5. INDOOR AIR DATA NOT AVAILABLE. INDOOR AIR DATA WOULD BE REQUIRED TO DETERMINE FINAL RECOMMENDED ACTIONS.
6. RECOMMENDED ACTIONS BASED ON SOIL VAPOR RESULTS BEING REPRESENTATIVE OF SUB-SLAB CONDITIONS IF A BUILDING WAS CONSTRUCTED AT THE SAMPLING LOCATION.
7. ONLY RESULTS THAT COULD POTENTIALLY REQUIRE RECOMMENDED ACTION ARE SHOWN.
8. 1,1-DCE - 1,1-DICHLOROETHENE
9. CIS-1,2-DCE - CIS-1,2-DICHLOROETHENE
10. TCE - TRICHLOROETHENE
11. PCE - TETRACHLOROETHENE
12. UST - UNDERGROUND STORAGE TANK
13. NFA - NO FURTHER ACTION
14. NYSDOH - NEW YORK STATE DEPARTMENT OF HEALTH

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C224266
PROPOSED PRE-KINDERGARTEN FACILITY K710
168 8TH STREET - BLOCK: 1003, LOT: 11
BROOKLYN, NY 11215

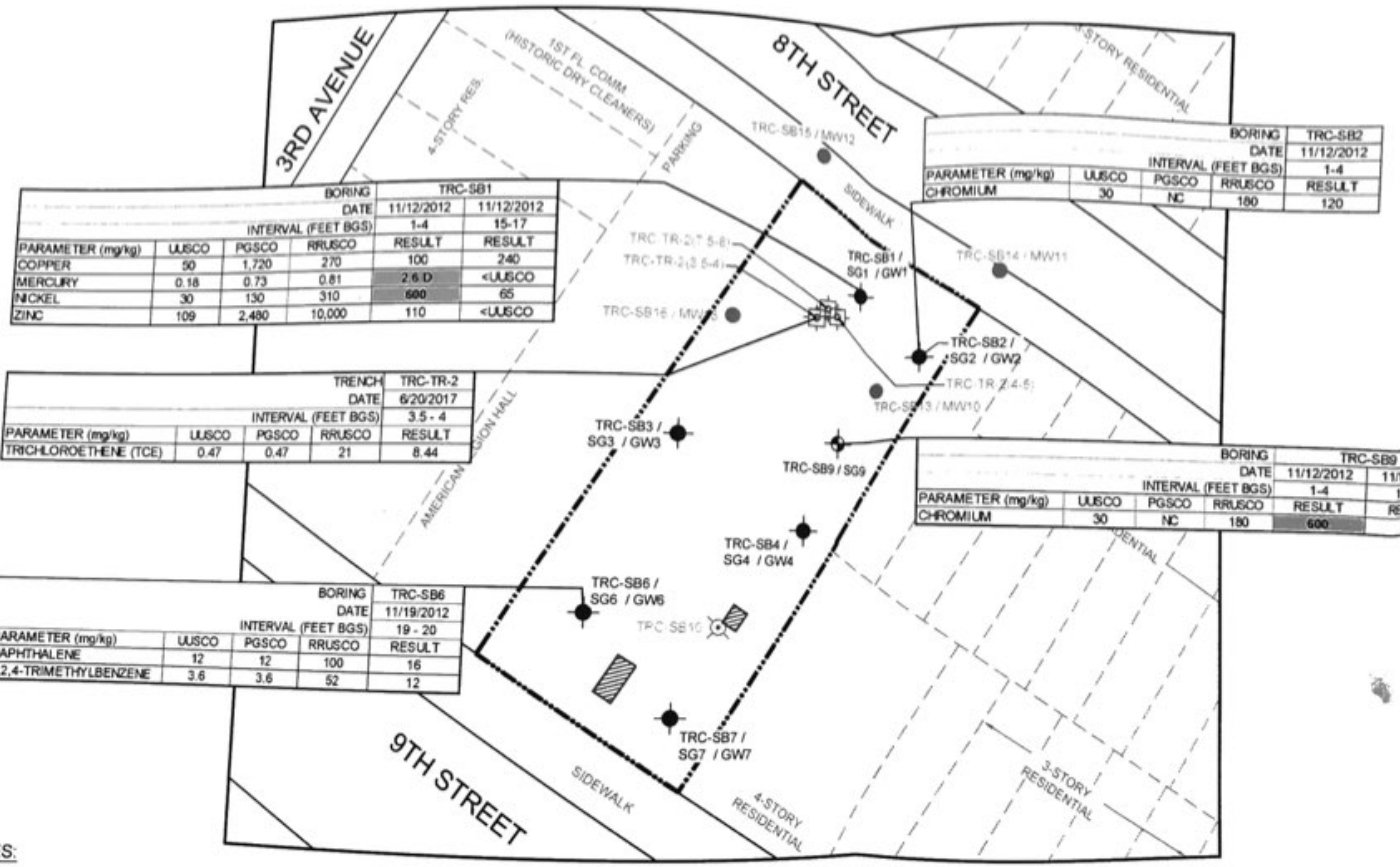
TITLE:
HISTORIC SOIL VAPOR SAMPLING RESULTS

DRAWN BY	H. DELGADO	PROJ NO.	315824
CHECKED BY	L. O'HARA		
APPROVED BY	D. SCHMIDT		FIGURE 5A
DATE	MARCH 2019		

TRC

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New York, NY 10018
Phone: 212 221 7832

FILE NO. Figure 5A - Historic SV Samp. Res. dwg



	BORING	TRC-SB1	
	DATE	11/12/2012	11/12/2012
	INTERVAL (FEET BGS)	1-4	15-17
PARAMETER (mg/kg)	UUSCO / PGSCO / RRUSCO	RESULT	RESULT
COPPER	50 / 1,720 / 270	100	240
MERCURY	0.18 / 0.73 / 0.81	2.6 D	<UUSCO
NICKEL	30 / 130 / 310	600	65
ZINC	109 / 2,480 / 10,000	110	<UUSCO

	BORING	TRC-SB2
	DATE	11/12/2012
	INTERVAL (FEET BGS)	1-4
PARAMETER (mg/kg)	UUSCO / PGSCO / RRUSCO	RESULT
CHROMIUM	30 / NC / 180	120

	TRENCH	TRC-TR-2
	DATE	6/20/2017
	INTERVAL (FEET BGS)	3.5 - 4
PARAMETER (mg/kg)	UUSCO / PGSCO / RRUSCO	RESULT
TRICHLOROETHENE (TCE)	0.47 / 0.47 / 21	8.44

	BORING	TRC-SB9	
	DATE	11/12/2012	11/12/2012
	INTERVAL (FEET BGS)	1-4	15-16
PARAMETER (mg/kg)	UUSCO / PGSCO / RRUSCO	RESULT	RESULT
CHROMIUM	30 / NC / 180	600	34

	BORING	TRC-SB6
	DATE	11/19/2012
	INTERVAL (FEET BGS)	19 - 20
PARAMETER (mg/kg)	UUSCO / PGSCO / RRUSCO	RESULT
NAPHTHALENE	12 / 12 / 100	16
1,2,4-TRIMETHYLBENZENE	3.6 / 3.6 / 52	12

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- APPROXIMATE AREA OF UST(s)
- SOIL SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SBX / SGX — SOIL AND SOIL VAPOR SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SBX / SGX / GWX — SOIL, SOIL VAPOR, AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- SOIL AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (JANUARY 2013)
- SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER FROM TRENCH EXCAVATION DURING ARCHEOLOGICAL ASSESSMENT (JUNE 2017) (DEPTH IN FEET)

W N E

0 40' 80'

SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. BOLD TEXT WITH GRAY SHADE EXCEEDS RESTRICTED-RESIDENTIAL USE SCO.
3. SOIL SAMPLE SB-6 (19-20') WAS COLLECTED BELOW THE WATER TABLE.
4. THERE IS NO SCO FOR TOTAL CHROMIUM. THE SCO FOR TRIVALENT CHROMIUM IS USED.
5. BGS - BELOW GROUND SURFACE
6. D - DILUTED
7. UST - UNDERGROUND STORAGE TANK
8. mg/kg - MILLIGRAMS PER KILOGRAM
9. NC - NO CRITERIA
10. ONLY RESULTS ABOVE SCREENING CRITERIA ARE SHOWN.
11. PGSCO - 6 NYCRR PART 375 PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVE
12. RRUSCO - 6 NYCRR PART 375 RESTRICTED-RESIDENTIAL USE SOIL CLEANUP OBJECTIVE
13. UUSCO - 6 NYCRR PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVE

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C224266
PROPOSED PRE-KINDERGARTEN FACILITY K716
168 8TH STREET - BLOCK: 1003, LOT: 11
BROOKLYN, NY 11215

TITLE: HISTORIC SOIL SAMPLING RESULTS

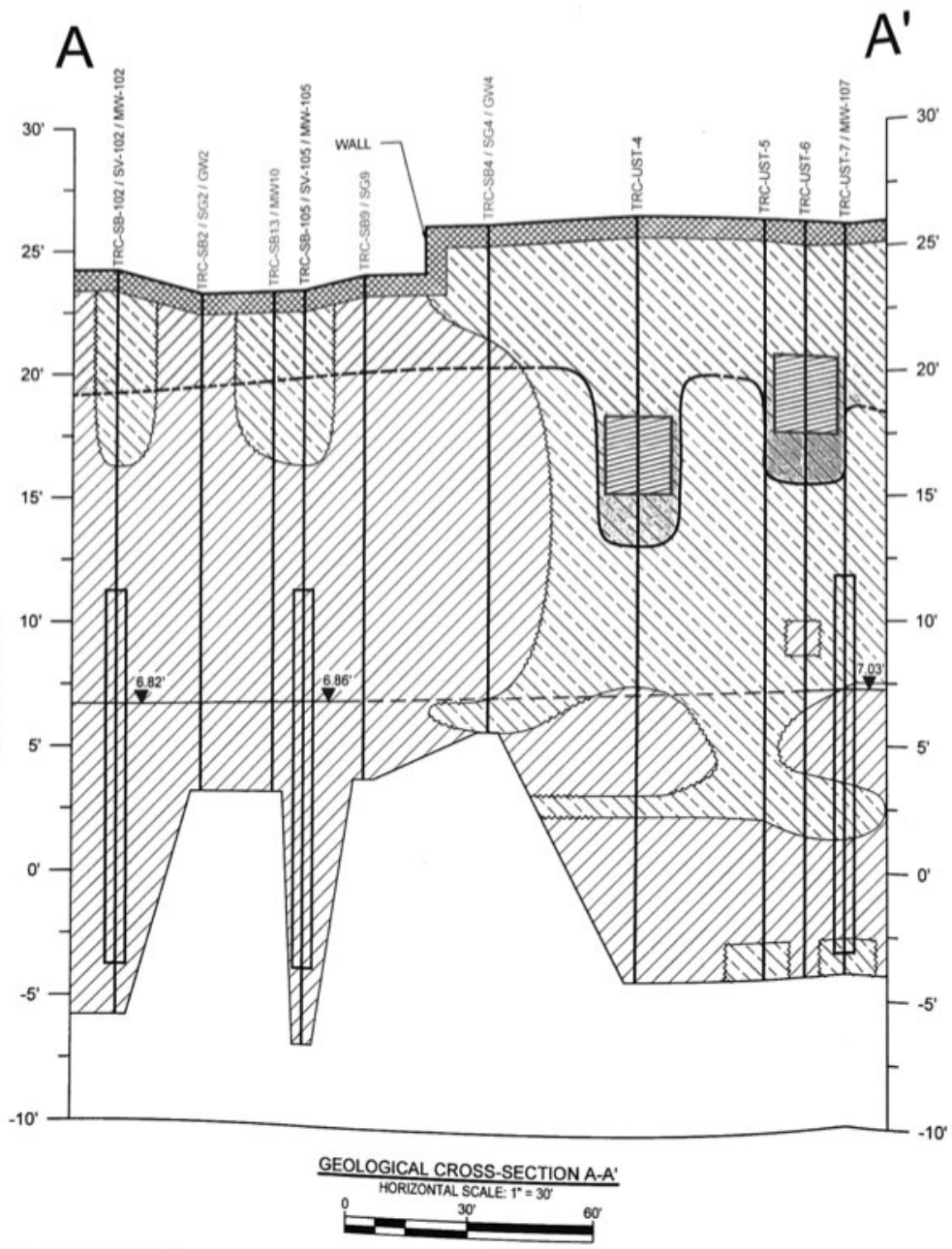
DRAWN BY	H. DELGADO	PROJ NO	3155824
CHECKED BY	L. O'HARA		
APPROVED BY	D. SCHMIDT		FIGURE 5B
DATE	MARCH 2019		

TRC

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10th Floor
Suite 1401, NY 10018
Phone: 212 221 1922

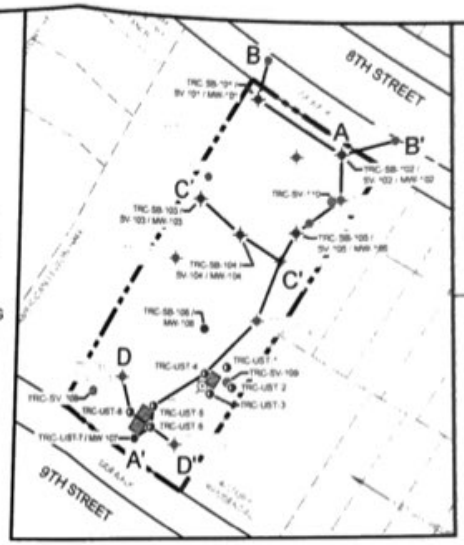
FILE NO: Figure 5B - Historic Soil Samp. Res. dwg

DWG = ATTACHED DEBTS — ATTACHED REFS: 5B-SB, 167 8th Street.dwg, 2019 Digital Map, 4710
DRAWING NAME: I:\Projects\NYCSCA Contract\D000014\341168 8th Street - K716\3155824 - K716 RAWP 168 8th St, Brooklyn\RAWP\Figures\TRC Working Drawings\Figure 5B - Historic Soil Samp. Res. dwg — PLOT DATE: March 19, 2019 - 3:48PM — LAYOUT: 11x17L



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- APPROXIMATE AREA OF UST(s)
- TRC-SB-X: SOIL SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SB-X SOV: SOIL AND SOIL VAPOR SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SB-X SOV GWX: SOIL, SOIL VAPOR, AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SB-X MWX: SOIL SAMPLING AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (JANUARY 2013)
- TRC-SB-X / SV-X / MW-X: SOIL, SOIL VAPOR SAMPLING, AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- TRC-SB-X / MW-X OR TRC-UST-X / MW-X: SOIL SAMPLING AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (MAY 2018)
- TRC-SV-X: SOIL VAPOR SAMPLING LOCATION AND IDENTIFICATION NUMBER (APRIL / MAY 2018)
- TRC-UST-X: SOIL SAMPLING LOCATION AND IDENTIFICATION NUMBER (MAY 2018)
- GEOLOGIC CROSS-SECTION TRANSECT
- 6.91': GROUNDWATER SURFACE ELEVATION ON MAY 17, 2018 (DASHED WHERE INFERRED)
- ABRUPT LITHOLOGIC CHANGE, BOUNDARY INFERRED
- GRADATIONAL LITHOLOGIC BLENDING, BOUNDARY INFERRED
- MONITORING WELL SCREEN
- CONCRETE OR GRAVEL
- INTERPRETED DEPTH OF FILL MATERIAL
- MOSTLY SILT
- MOSTLY SAND



TRANSECT LOCATION MAP

0 60' 120'

SCALE: 1" = 60'

NOTES:

1. WITH THE EXCEPTION OF TRC-UST-1 THROUGH TRC-UST-8, SAMPLING LOCATIONS INCLUDING MONITORING WELLS AND SOIL BORING AND SOIL VAPOR SAMPLING LOCATIONS, WERE SURVEYED BY PERFECT POINT LAND SURVEYING ON MAY 29, 2018 AND JUNE 6, 2018.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
3. GROUNDWATER SURFACE ELEVATION DATUM IS NAVD88. HORIZONTAL DATUM IS STATE PLANE COORDINATE SYSTEM, NAD83.

SHEET SIZE: 11" BY 17"

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - SCP SITE NO. C224266
PROPOSED PRE-KINDERGARTEN FACILITY K710
168 8TH STREET - BLOCK: 1083, LOT: 11
BROOKLYN, NY 11215

TITLE: GEOLOGICAL CROSS-SECTION A-A'

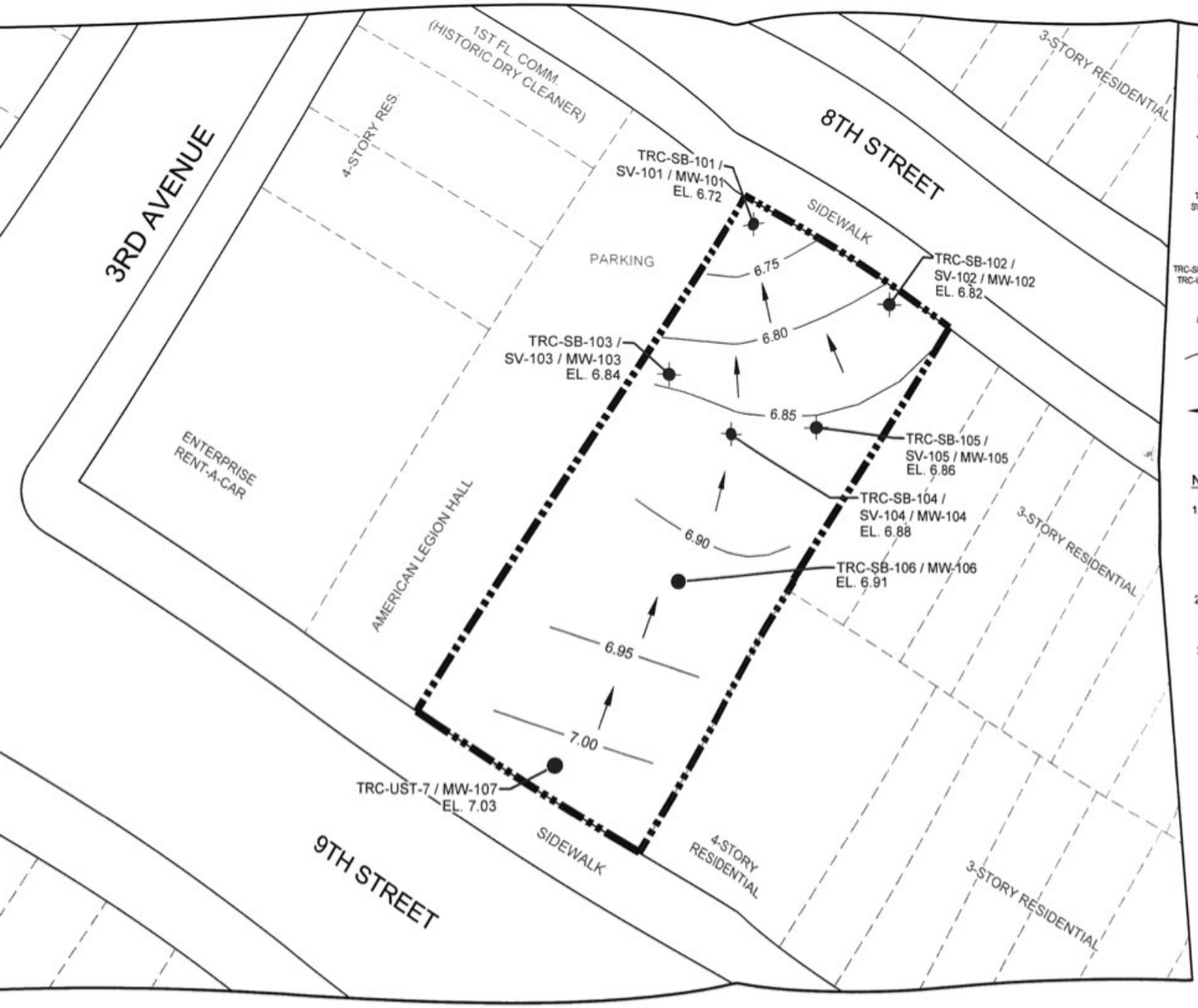
DRAWN BY	M. DELGADO	PROJ. NO.	315824
CHECKED BY	L. O'HARA		
APPROVED BY	D. SCHMIDT		FIGURE 7
DATE	MARCH 2019		

TRC

1430 Broadway
10th Floor
New York, NY 10018
Phone: 212.221.9822

FILE NO. Figure 7-8 - Geo. Cross-Sections A-A' dwg

DRAWING NAME: I:\Projects\NYCSCA Certified C000014345\184 6th Street - K710\315824 - K710 RAWP-168 8th St, Brooklyn\RAWP\Figures\TRC Working Drawings\Figure 7-8 - Geo. Cross-Sections A-A'.dwg — PLOT DATE: March 18, 2019 - 3:39PM — LAYOUT: 11X17L (Fig 7)



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- TRC-SB-X / SV-X / MW-X — SOIL AND SOIL VAPOR SAMPLING AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (MAY 2018)
- TRC-SB-X / MW-X OR TRC-UST-X / MW-X — SOIL SAMPLING AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (APRIL / MAY 2018)
- EL. 6.82 — GROUNDWATER SURFACE ELEVATION (IN FEET)
- 6.8 — INFERRED GROUNDWATER SURFACE ELEVATION CONTOUR (IN FEET)
- INFERRED GROUNDWATER FLOW DIRECTION

W N E

NOTES:

1. WITH THE EXCEPTION OF TRC-UST-1 THROUGH TRC-UST-8, SAMPLING LOCATIONS INCLUDING MONITORING WELLS AND SOIL BORING AND SOIL VAPOR SAMPLING LOCATIONS, WERE SURVEYED BY PERFECT POINT LAND SURVEYING ON MAY 29, 2018 AND JUNE 6, 2018.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
3. GROUNDWATER SURFACE ELEVATION DATUM IS NAVD88.

0 30' 60'

SCALE: 1" = 30'
SHEET SIZE: 11" BY 17"

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C224266
PROPOSED PRE-KINDERGARTEN FACILITY K710
168 8TH STREET - BLOCK: 1003, LOT: 11
BROOKLYN, NY 11215

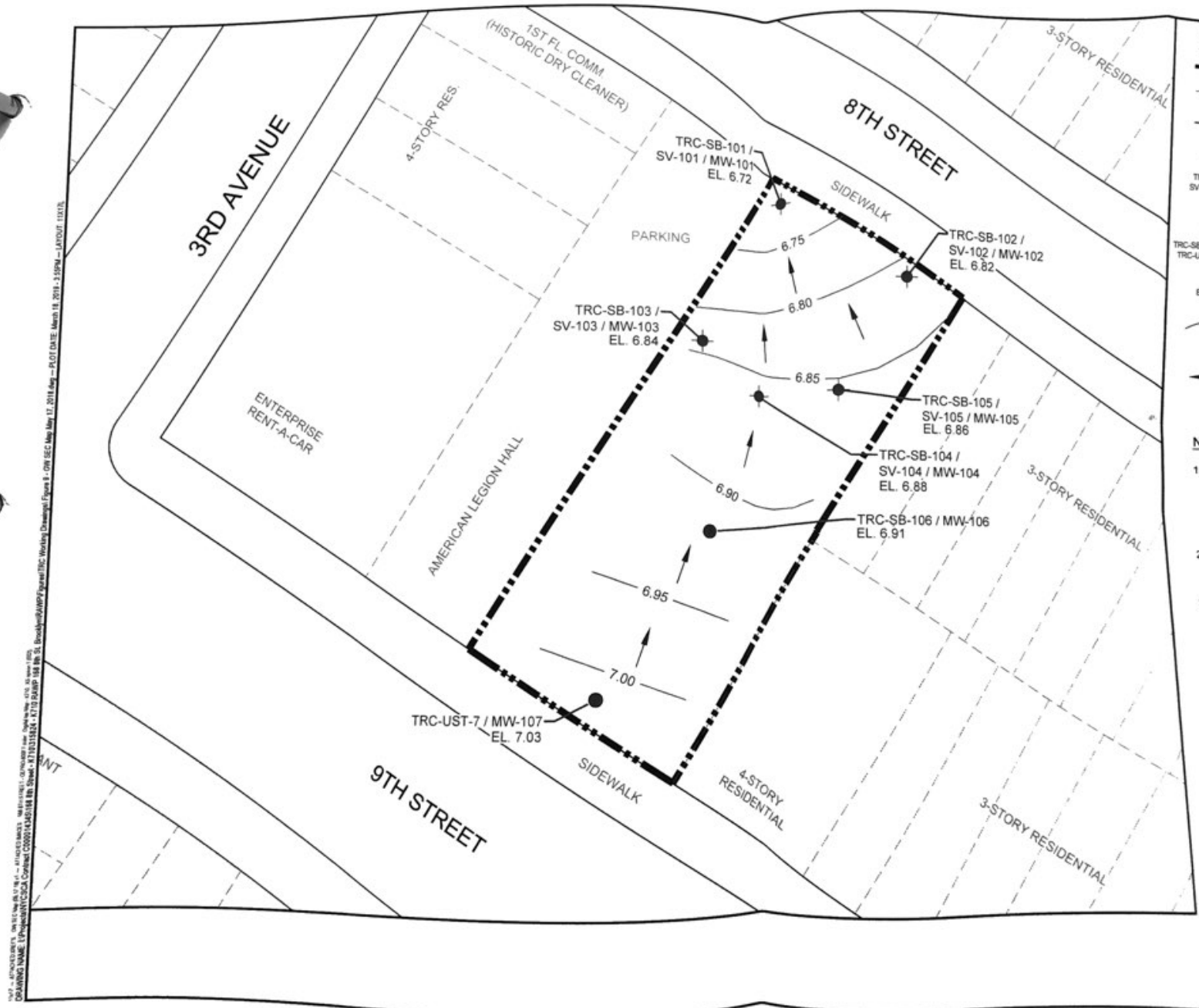
TITLE: **GROUNDWATER SURFACE ELEVATION CONTOUR MAP MAY 17, 2018**

DRAWN BY	H. DELGADO	PROJ NO.	315824
CHECKED BY	L. O'HARA		
APPROVED BY	D. SCHMIDT		**FIGURE 9**
DATE	MARCH 2019		

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10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO. Figure 9 - GW SEC Map May 17, 2018.dwg



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- TRC-SB-X / SV-X / MW-X: SOIL AND SOIL VAPOR SAMPLING AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (MAY 2018)
- TRC-SB-X / MW-X OR TRC-UST-X / MW-X: SOIL SAMPLING AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (APRIL / MAY 2018)
- EL. 6.82: GROUNDWATER SURFACE ELEVATION (IN FEET)
- 6.8: INFERRED GROUNDWATER SURFACE ELEVATION CONTOUR (IN FEET)
- INFERRED GROUNDWATER FLOW DIRECTION

W N E

NOTES:

1. WITH THE EXCEPTION OF TRC-UST-1 THROUGH TRC-UST-8, SAMPLING LOCATIONS INCLUDING MONITORING WELLS AND SOIL BORING AND SOIL VAPOR SAMPLING LOCATIONS, WERE SURVEYED BY PERFECT POINT LAND SURVEYING ON MAY 29, 2018 AND JUNE 6, 2018.
2. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
3. GROUNDWATER SURFACE ELEVATION DATUM IS NAVD88.

0 30' 60'

SCALE: 1" = 30'
SHEET SIZE: 11" BY 17"

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C224296
PROPOSED PRE-KINDERGARTEN FACILITY K710
168 8TH STREET - BLOCK: 1003, LOT: 11
BROOKLYN, NY 11215

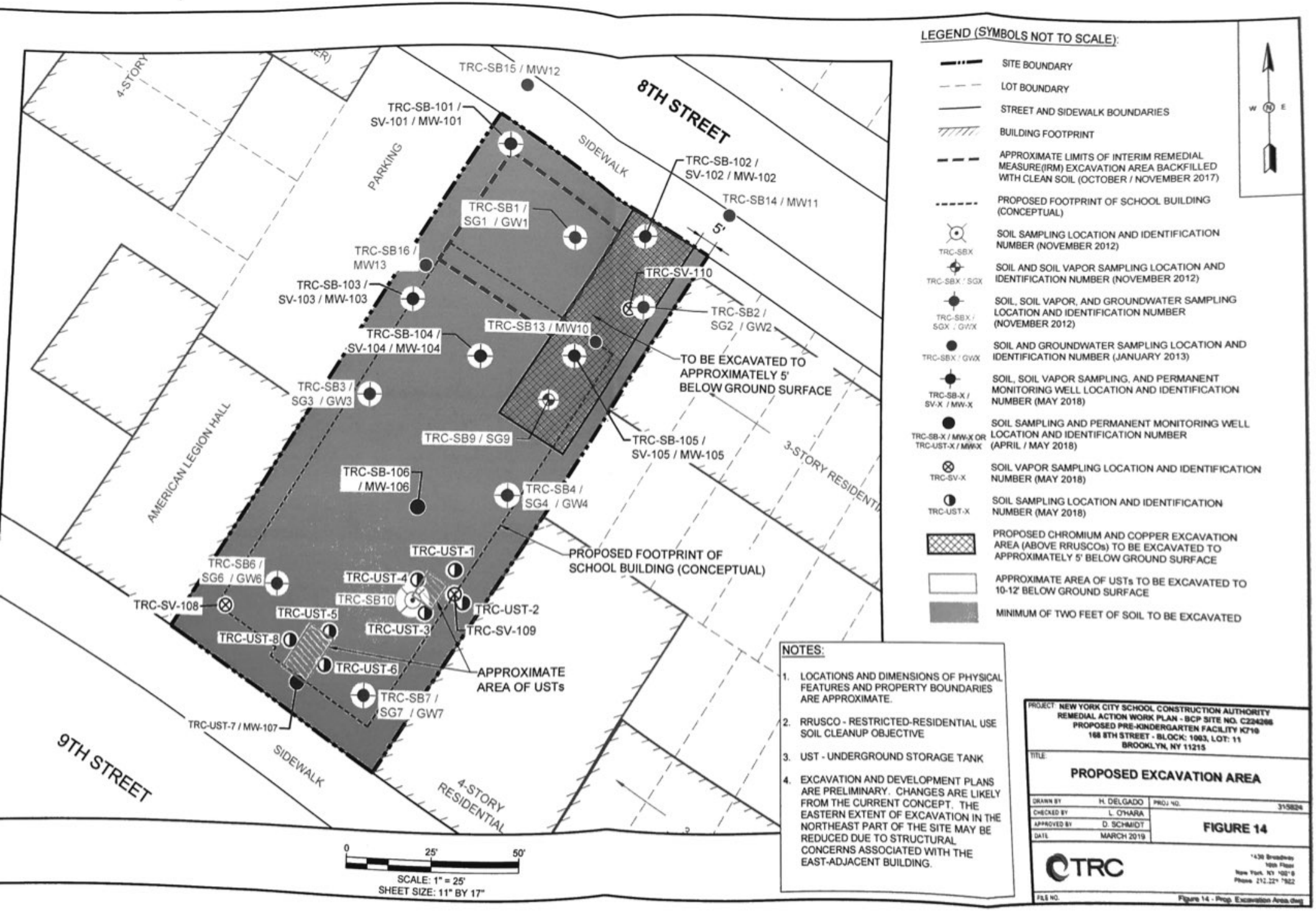
TITLE: GROUNDWATER SURFACE ELEVATION CONTOUR MAP MAY 17, 2018

DRAWN BY	N. DELGADO	PROJ. NO.	315824
CHECKED BY	L. O'HARA		
APPROVED BY	D. SCHMIDT		FIGURE 9
DATE	MARCH 2019		

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10th Floor
New York, NY 10018
Phone: 212.221.7822

FILE NO. Figure 9 - GW SEC May 17, 2018.dwg



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- BUILDING FOOTPRINT
- APPROXIMATE LIMITS OF INTERIM REMEDIAL MEASURE(IRM) EXCAVATION AREA BACKFILLED WITH CLEAN SOIL (OCTOBER / NOVEMBER 2017)
- PROPOSED FOOTPRINT OF SCHOOL BUILDING (CONCEPTUAL)
- TRC-SBX — SOIL SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SBX / SGX — SOIL AND SOIL VAPOR SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SBX / SGX / GWX — SOIL, SOIL VAPOR, AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (NOVEMBER 2012)
- TRC-SBX / GWX — SOIL AND GROUNDWATER SAMPLING LOCATION AND IDENTIFICATION NUMBER (JANUARY 2013)
- TRC-SB-X / SV-X / MW-X — SOIL, SOIL VAPOR SAMPLING, AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (MAY 2018)
- TRC-SB-X / MW-X OR TRC-UST-X / MW-X — SOIL SAMPLING AND PERMANENT MONITORING WELL LOCATION AND IDENTIFICATION NUMBER (APRIL / MAY 2018)
- TRC-SV-X — SOIL VAPOR SAMPLING LOCATION AND IDENTIFICATION NUMBER (MAY 2018)
- TRC-UST-X — SOIL SAMPLING LOCATION AND IDENTIFICATION NUMBER (MAY 2018)
- PROPOSED CHROMIUM AND COPPER EXCAVATION AREA (ABOVE RRUSCOs) TO BE EXCAVATED TO APPROXIMATELY 5' BELOW GROUND SURFACE
- APPROXIMATE AREA OF USTs TO BE EXCAVATED TO 10-12' BELOW GROUND SURFACE
- MINIMUM OF TWO FEET OF SOIL TO BE EXCAVATED

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.
2. RRUSCO - RESTRICTED-RESIDENTIAL USE SOIL CLEANUP OBJECTIVE
3. UST - UNDERGROUND STORAGE TANK
4. EXCAVATION AND DEVELOPMENT PLANS ARE PRELIMINARY. CHANGES ARE LIKELY FROM THE CURRENT CONCEPT. THE EASTERN EXTENT OF EXCAVATION IN THE NORTHEAST PART OF THE SITE MAY BE REDUCED DUE TO STRUCTURAL CONCERNS ASSOCIATED WITH THE EAST-ADJACENT BUILDING.

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C224208
PROPOSED PRE-KINDERGARTEN FACILITY K710
168 8TH STREET - BLOCK: 1093, LOT: 11
BROOKLYN, NY 11215

TITLE:

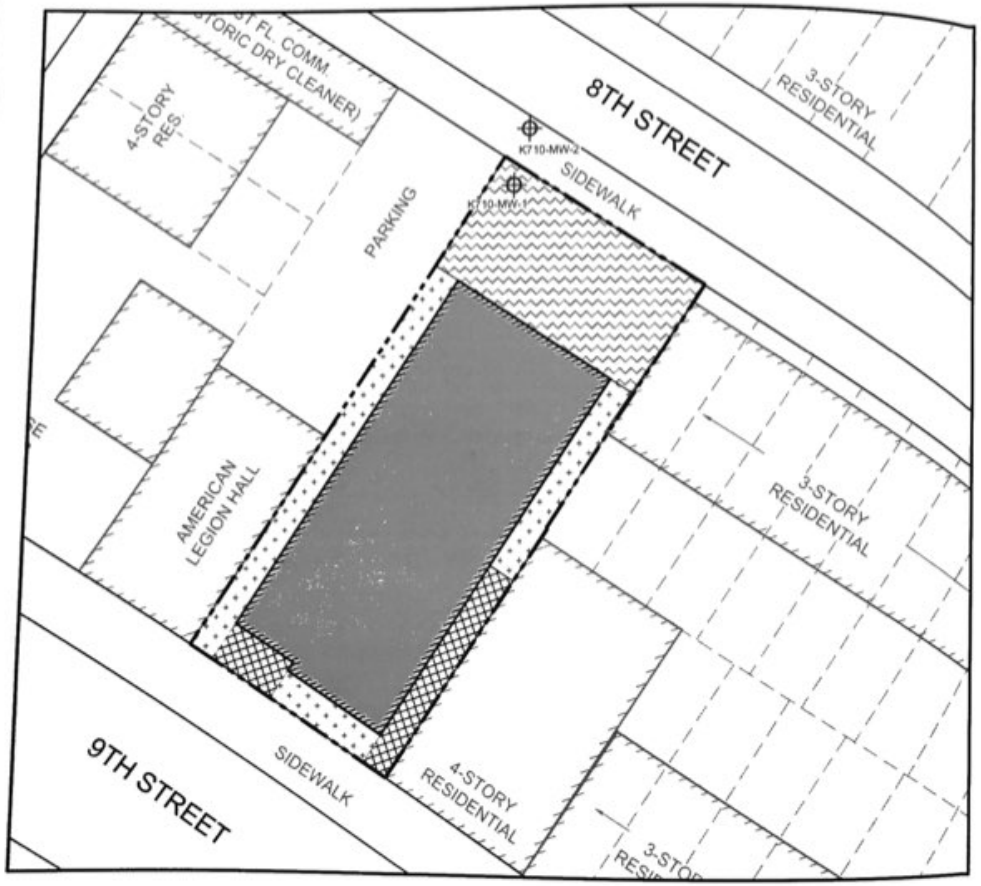
PROPOSED EXCAVATION AREA

DRAWN BY	H. DELGADO	PROJ NO.	315824
CHECKED BY	L. O'HARA		
APPROVED BY	D. SCHMIDT		FIGURE 14
DATE	MARCH 2019		

TRC

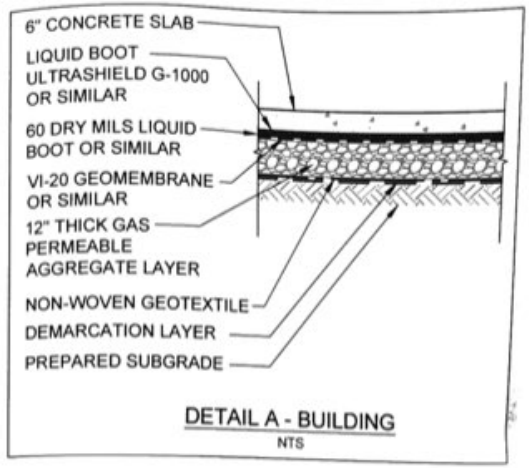
1430 Broadway
10th Floor
New York, NY 10018
Phone 212.221.7922

FILE NO. Figure 14 - Prop. Excavation Area.dwg

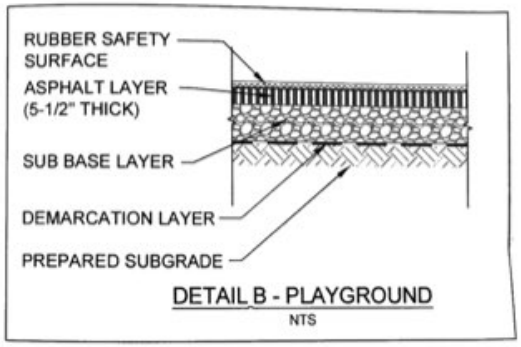


0 40' 80'

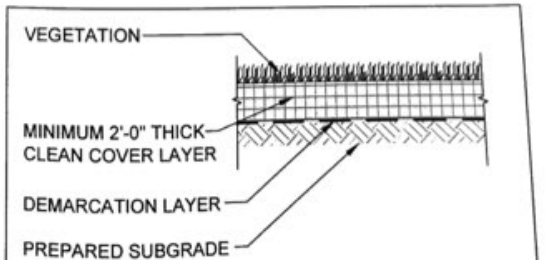
SCALE: 1" = 40'
SHEET SIZE: 11" BY 17"



DETAIL A - BUILDING
NTS



DETAIL B - PLAYGROUND
NTS



DETAIL C - LANDSCAPED AREAS
NTS

LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY
- PROPOSED BUILDING FOOTPRINT (CONCEPTUAL)
- LOT BOUNDARY
- STREET AND SIDEWALK BOUNDARIES
- CONCRETE BUILDING SLAB (REFER TO DETAIL A)
- RUBBER SAFETY SURFACE OVER ASPHALT (REFER TO DETAIL B)
- LANDSCAPING (REFER TO DETAIL C)
- CONCRETE COVER
- K710-MW-X — PROPOSED PERMANENT GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

W N E

NOTES:

1. DIMENSIONS AND LOCATIONS OF PHYSICAL FEATURES ARE APPROXIMATE.
2. DEVELOPMENT PLANS ARE PRELIMINARY AND LIKELY TO CHANGE DURING SCHOOL DESIGN.
3. PROPOSED LOCATIONS OF PERMANENT GROUNDWATER MONITORING WELLS ARE APPROXIMATE. EXISTING MONITORING WELL TRC-MW-101 MAY BE USED IN LIEU OF INSTALLING NEW WELL AT THE LOCATION OF K710-MW-1. LOCATION MAY BE ADJUSTED IN THE FIELD.

SOURCE:
NYCSCA CONCEPTUAL PLAN FOR PUBLIC SCHOOL PS710K, MARCH 23, 2015.

PROJECT: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
REMEDIAL ACTION WORK PLAN - BCP SITE NO. C224266
PROPOSED PRE-KINDERGARTEN FACILITY K710
168 8TH STREET - BLOCK: 1003, LOT: 11
BROOKLYN, NY 11215

TITLE: **PROPOSED SITE COVERS**

DRAWN BY:	H. DELGADO	PROJ NO.	315824
CHECKED BY:	L. O'HARA		
APPROVED BY	D. SCHMIDT		**FIGURE 16**
DATE	MARCH 2019		

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1430 Broadway
10th Floor
New York, NY 10018
Phone 212.221.7622

FILE NO. Figure 16 - Proposed Site Covers.dwg

1.0 SITE INFORMATION

1.1 Introduction

The following is the Health and Safety Plan (HASP) for remediation activities at the proposed Pre-Kindergarten Facility K710 located at 168 8th Street, Brooklyn, New York 11215 (the "Site"). A detailed scope of work is described in the Remedial Action Work Plan (RAWP).

The site-specific HASP was developed from Site visits and investigations, as well as appropriate project documents. Revisions and/or alterations to this HASP may become necessary as more information becomes available. Any proposed changes to this HASP will be approved by the Health & Safety Coordinator prior to implementation. All on-site personnel are required to read, review, and strictly comply with the HASP as well as sign the Health and Safety Plan Acceptance in **Attachment A**. It is the responsibility of the Project Manager or designee to ensure that the HASP is implemented and enforced.

1.2 Purpose

The Site remediation tasks and objectives are the mitigation of human contact with soil vapor, groundwater, and soil impacted by volatile organic compounds (VOCs) and metals. Remedial measures described herein will be performed in accordance with this HASP and applicable federal, state, and local regulations.

1.3 Site Description and History

The Site encompasses approximately 13,500 square feet and is currently a concrete- and asphalt-paved vacant lot. Historically, the Site was occupied by an ink manufacturer from approximately 1888 to at least 1906, a storage facility from approximately 1906 to at least 1926, a chemical laboratory in 1926, a garage from approximately 1926 to at least 1951, a plumbing supply/metal products manufacturer from approximately 1945 to 1965, and a textile factory from approximately 1976 to at least 1992. The Site has been vacant since approximately 1992 and was acquired by NYCSCA in May 2017.

Previous investigations conducted at the Site include a Phase I Environmental Site Assessment (ESA) Report prepared by TRC in May 2011, a Phase II Environmental Site Investigation (ESI) Report prepared by TRC in May 2013, a Letter Report prepared by TRC in July 2017 which describes the inspection services performed during a Phase IB Archeological Investigation, and Interim Remedial Measure (IRM) Construction Completion Report completed in January 2018 and a Remedial Investigation Report completed in October 2018.

Based on the results of previously investigation, the primary contaminants of concern in soil include metals (chromium and copper); in groundwater the primary contaminants of concern are VOCs (TCE, cis-1,2-DCE and naphthalene) and PFAS, and the metal chromium (in filtered samples); and in soil vapor the primary contaminants of concern are chlorinated VOCs.

2.0 SCOPE OF WORK

Remedial activities to be implemented as part of the RAWP include:

- Decommission existing groundwater monitoring wells prior to remedial construction in accordance with NYSDEC CP-43.
- Remove underground storage tank systems.
- Remove and dispose off-Site soil that exhibits chromium and copper above the Restricted-Residential Use Soil Cleanup Objectives (SCOs), extending to approximately 5 feet in depth, in the northeast part of the Site.
- Remove and dispose off-Site soil excavated as part of the proposed redevelopment.
- Post-excavation documentation/confirmatory soil sampling in the area that exhibits elevated concentrations of copper and chromium and in the area of the USTs.
- As part of construction of the new building, install a gas vapor barrier beneath the lowest level floor slab and install and operate a sub-slab depressurization system (SSDS).
- Construct an impermeable cover system consisting of impervious surfaces (e.g., building, paved surfaces, etc.) across the majority of the Site and cover remaining landscaped areas with a minimum 2-foot thick imported clean soil layer. Install a demarcation layer below the clean soil cover.

3.0 EMERGENCY AND TRC CONTACT NUMBERS

Ambulance: **911** Fire Department: **911**

Police Department: **911 (78th Precinct (718) 636-6411)**

Hospital: **New York-Presbyterian Brooklyn Methodist Hospital**

Emergency Center No.: **(718) 780-3000**

Hospital Address: **506 6th Street, Brooklyn, NY 11215**

HOSPITAL DIRECTIONS

NOTE: FOR ANY TYPE OF SERIOUS MEDICAL EMERGENCY, CALL 911 AND REQUEST AN AMBULANCE. NEW YORK CITY STREETS ARE OFTEN CONGESTED DUE TO HEAVY TRAFFIC, CONSTRUCTION AND DOUBLE-PARKED VEHICLES AND IT MAY BE DIFFICULT TO DRIVE TO THE EMERGENCY ROOM.

Refer to **Attachment B** for Hospital Route Direction with maps.

- All field team members working near/with equipment with emergency shut-off switches should be aware of the locations and situations when these switches should be used.

5.9 Air Monitoring Requirements

Real-time air monitoring for VOCs and observations of particulate levels at the perimeter of the work areas will be completed during intrusive activities. Continuous monitoring and observations will be required for all intrusive work activity. A detailed description of the Community Air Monitoring Plan (CAMP) is provided as Appendix E to the Remedial Action Work Plan (RAWP).

OSHA Permissible Exposure Limit (PEL)

The OSHA PEL, for benzene, which will be used to determine the appropriate respiratory protection, is 1 part per million (ppm) over an 8-hour time-weighted average or 5 ppm over 15 minutes. This value is based upon the OSHA PEL for benzene, which, of the VOC constituents of petroleum compounds, has the lowest PEL.

Respiratory Protection

It is unlikely that respiratory protection will be required during implementation of the work plan. TRC's health and safety goal is to avoid using respiratory protection unless it is absolutely necessary or required. Administrative controls or engineering controls should always be considered as a means to reduce potential exposures before PPE is required. If air monitoring measurements indicate that levels of organic vapors have reached 5 ppm, workers will cease work in the area until levels of organic vapors have decreased. If necessary, modifications to work practices will be implemented to reduce or avoid generating elevated levels of organic vapors.

Respiratory protection for TRC's subcontractor may be required during tank cleaning activities. Any upgrade in respiratory protection will be coordinated with the Health & Safety Coordinator and the Industrial Hygienist. For operations that may require the use of a respirator, the TRC Project Manager (and Contractor equivalent) must verify that Field Personnel are medically approved to use respiratory equipment, fit tested, and trained in the proper use of respirators. Only respirators that are NIOSH/MSHA1 approved are to be used.

Exposure Limits: The following tables summarizes anticipated concentrations and accepted exposure limits of chemicals potentially present at the Site.

1 NIOSH – National Institute for Occupational Safety and Health; MSHA – Mine Safety and Health Administration

APPENDIX D
COMMUNITY AIR MONITORING PLAN

COMMUNITY AIR MONITORING PLAN

In accordance with the Remedial Action Work Plan (RAWP), this Community Air Monitoring Plan (CAMP) was developed to describe the procedures for real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area at the Site during ground intrusive work activities at 168 8th Street, Brooklyn, New York (referred to as the "Site"). The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities do not spread contamination off-site through the air.

Community Air Monitoring Plan

Real-time air monitoring for VOCs and observations of particulate levels at the perimeter of the work areas will be completed during intrusive activities. Continuous monitoring and observations will be required during soil excavation activities. The downwind location will be just inside the fence line at the edge of the property.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of each designated work area on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated daily. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring will continue. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring will continue. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the work area or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings will be recorded and will be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind locations of the borings at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work will be stopped and a re-evaluation of activities will be initiated. Work will be able to be resumed provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

3. All readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

ODOR MONITORING AND MITIGATION PLAN

The purpose of this Odor Monitoring and Mitigation Plan is to detail the monitoring and, if necessary, mitigation of odor potentially generated during implementation of the RAWP. However, work activities will be performed to minimize the potential for generation of odor.

Odor Monitoring

Odor will be monitored within the work area and at the perimeter CAMP stations. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Odor or dust complaints from any owner or occupant of an adjacent or nearby property will be immediately addressed and managed by the Environmental Monitor in a manner equivalent to an exceedance of an air monitoring action level.

Odor Mitigation

All necessary means will be employed to prevent on- and off-Site nuisances. These measures may include: containerizing drill cuttings immediately and using tarps to cover exposed odorous soil (if encountered). 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, except when materials are being removed or added, and during stockpile sampling. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

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

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: use of chemical odorants in spray or misting systems; and, use of staff to monitor odors in surrounding neighborhoods. It is anticipated that any nuisance odors developed during intrusive work can be corrected, without the use of a temporary containment structure equipped with appropriate air venting/filtering systems.

NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
168 8th Street

March 2018

Appendix C - Site Location Map 24

Appendix D - [illegible] 25

Brownfield Cleanup Program Site No. C224266
168 8th Street
Kings County, NY 11215

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 generally is made using information developed during the investigation of the Site, as described in Section 5.

If the Site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the Site and the development/ implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the Site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the Site.

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.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the Site. See http://www.dec.ny.gov/chemical/61092.html.

Subsequent fact sheets about the Site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

As of the date of issuance of this CP Plan, it has been determined that the site poses a significant threat.

To verify the significant threat status of the Site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period (Note that because the RI Work Plan was submitted with the application, this comment period was concurrent with the Application 30-day comment period indicated above)	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

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.

All investigation and remediation work will be performed in a manner that protects the public from adverse exposure to contaminants. Groundwater is not currently used for public water supply in Brooklyn, the Site is fenced to restrict access, and the ground surface is covered with concrete and gravel. A Community Air Monitoring Plan will be implemented to provide a measure of protection for the downwind community (i.e., off-Site receptors including businesses) from potential airborne contaminant releases as a direct result of investigative and remedial work activities.

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.

There are sizable African-American and Hispanic-American communities nearby. Therefore, all future fact sheets will be translated into Spanish.

4. Site Information

Site Description

The Site is located in Gowanus, a mixed-use urban area of Brooklyn, NY, which includes residential, commercial, and manufacturing areas. The Site consists of one lot (Block 1003, Lot 11) totaling approximately 13,500 square feet (sf) or 0.31 acre. The Site is a vacant concrete and gravel covered lot and is fenced. Appendix C contains a map identifying the location of the Site.

The Site is bordered to the north by 8th Street followed by a two-story commercial building and three-story residential buildings; to the east by three- and four-story residential buildings; to the west by a one-story institutional building ("American Legion Hall") with a parking lot followed by a one-story commercial building with a parking lot ("Enterprise Rent-A-Car") and four-story residential buildings with one first-floor commercial tenant; and, to the south by 9th Street followed by a one-story commercial building ("Top Notch

Auto Repair") and three-story residential buildings. Beyond the properties immediately adjacent to the Site, property uses are commercial, residential, institutional, and manufacturing.

History of Site Use, Investigation, and Cleanup

Historic records indicate that the Site was first developed as farmland. A residential building, which was demolished in the late 1800s, was present on the southern portion of the Site. The Site was occupied by an ink manufacturer, a storage facility with a gauge manufacturer, a chemical laboratory, a machine works facility a garage, and a gasoline station, a plumbing supply/metal products manufacturer, and a textile factory. A fire occurred on the Site in the early 1990s and the lot has been vacant since approximately 1992.

Between 2011 and 2013, environmental due diligence activities were completed at the Site. Additionally, since the Site had been identified by local community groups as a potential burial ground for Revolutionary War soldiers, archeological investigations were completed in June and September 2017. No evidence of human remains or grave shafts were observed during the archeological investigations. The results of prior investigations indicate that Chlorinated Volatile Organic Compounds (CVOCs) were present in soil, groundwater, and soil vapor at concentrations above regulatory criteria, which were attributed to former Site uses. Metals were identified in shallow soil at concentrations above regulatory criteria. Additionally, three Underground Storage Tanks (USTs), were identified on the Site during prior investigations and were registered with the NYSDEC. An Interim Remedial Measure (IRM) was completed in October/November 2017, which included investigation and removal of subsurface piping/structures, and contaminated soil in the northern portion of the Site.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and has 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 purposes. Specifically, the Site was purchased by the NYCSCA in May 2017 for the

Appendix B - Site Contact List

1. The Chief Executive Officer and Zoning Board Chairperson of Each County, City, Town, and Village in which the Site is Located:

The Honorable Bill de Blasio
Mayor, City of New York
City Hall
New York, NY 10007

Hon. Scott Stringer
NYC Comptroller
1 Centre Street
New York, NY 10007

Hon. Letitia James
Public Advocate
1 Centre Street
New York, NY 10007

Marisa Lago
Commissioner
New York City Department of City Planning
120 Broadway, 31st Floor
New York, NY 10271

Hon. Eric L. Adams
Brooklyn Borough President
Borough Hall
209 Joralemon Street
Brooklyn, NY 11201

Dan Walsh, Director
NYC Office of Environmental Remediation
100 Gold Street - 2nd Floor
New York, NY 10038

Julie Stein
Office of Environmental Assessment & Planning
NYC Dept. of Environmental Protection
96-05 Horace Harding Expressway
Flushing, NY 11373

2. Residents, Owners, and Occupants of the Site and Properties Adjoining and Adjacent to the Site

Site Property Address	Block, Lot	Owner
168 8th Street	Block 1003, Lot 11	New York City School Construction Authority c/o Lee Guterman 30-30 Thomson Avenue Long Island City, NY 11101
Adjoining Property Address	**Block, Lot**	**Owner/Occupant**
193 9th Street	Block 1003 Lot 64	American Legion Hall (Occupant) M A Rawley Jr. Memorial (Owner) 193 9th Street Brooklyn, NY 11207
Adjoining Property Address	**Block, Lot**	**Owner/Occupant**
174 8th Street	Block 1003, Lot 14	Timothy F. Sohn 168 Pacific Street, #2 Brooklyn, NY 11201
203 9th Street	Block 1003, Lot 59	203 Ninth Street, LLC 4400 Second Avenue Brooklyn, NY 11232
Adjacent Property Address	**Block, Lot**	**Owner/Occupant**
439 3rd Avenue	Block 997, Lot 1	Blue Corner, Inc. 437-439 Third Avenue Brooklyn, NY 11215
165 8th Street	Block 997, Lot 77	Michael J. Brennan and Francelle C. Lim 156 Bowery New York, NY 10012 Frieda Lim and Kevin P. McClurkan 224 West 13th Street New York, NY 10012

Adjacent Property Address	Block, Lot	Owner/Occupant
167 8th Street	Block 997, Lot 75	Elizabeth and Wayne Adams 167 8th Street Brooklyn, NY 11215
169 8th Street	Block 997, Lot 74	Albert D., Carole A., and Robert C. Angel 169 8th Street Brooklyn, NY 11215
171 8th Street	Block 997, Lot 73	171 8th Street, LLC 171 8th Street Brooklyn, NY 11215
173 8th Street	Block 997, Lot 72	Matilde Arroyo 173 8th Street Brooklyn, NY 11215
175 8th Street	Block 997, Lot 71	175 8th, LLC 6 Grove Street New York, NY 10014
177 8th Street	Block 997, Lot 70	177 8th St, LLC 890 Lakeside Drive Woodmere, NY 11598
179 8th Street	Block 997, Lot 69	Estate of Henry Lusik 179 8th Street Brooklyn, NY 11215
179A 8th Street	Block 997, Lot 68	179A JC Coin Realty 7326 Bergen Cove, Floor 2 Brooklyn, NY 11234
181 8th Street	Block 997, Lot 67	Ellen Foote and Stephen Hindy 181 8th Street Brooklyn, NY 11215
183 8th Street	Block 997, Lot 65	Richard and Anna Gatto 183 8th Street Brooklyn, NY 11215
185A 8th Street	Block 997, Lot 64	Laura Routgauzer 870 West 181st Street New York, NY 10033
222 9th Street	Block 1009, Lot 20	Donna and Eugene Kabacinski 222 9th Street Brooklyn, NY 11215
220 9th Street	Block 1009, Lot 19	Joseph Salemi 220 9th Street Brooklyn, NY 11215

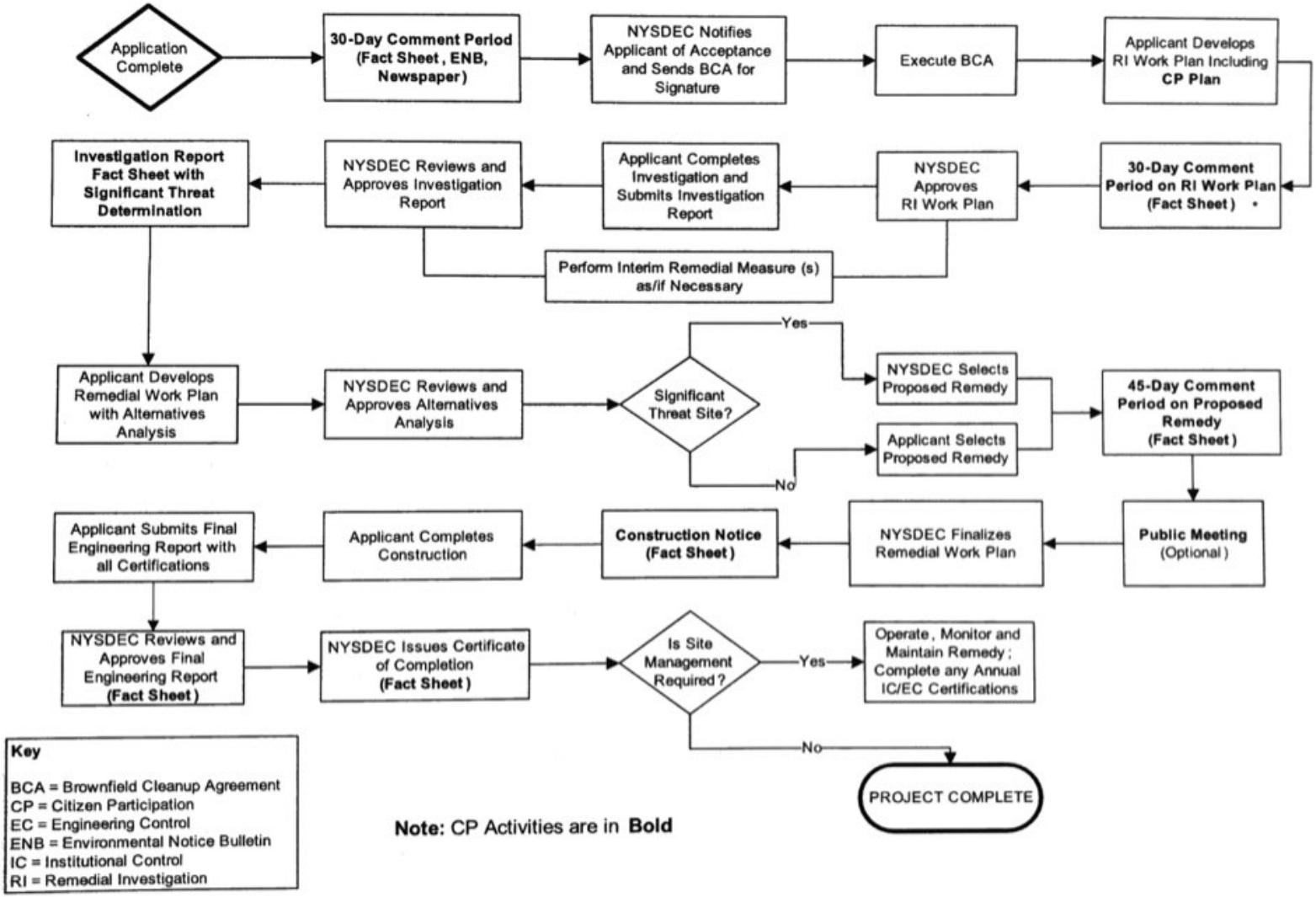
Adjacent Property Address	Block, Lot	Owner/Occupant
218 9th Street	Block 1009, Lot 18	Rosemarie Addusti 218 9th Street Brooklyn, NY 11215
216 9th Street	Block 1009, Lot 17	Wayne and Rose York 216 9th Street Brooklyn, NY 11215
224 9th Street	Block 1009, Lot 15	Sylvia and Anna Castro 147 17th Street Brooklyn, NY 11215
210 9th Street	Block 1009, Lot 14	Bogumila Pastwa 210 9th Street Brooklyn, NY 11215
208 9th Street	Block 1009, Lot 13	Elizabeth Rodriguez 647 Jerome Street Brooklyn, NY 11207
204 9th Street	Block 1009, Lot 11	204 Property Associates, LLC 100 Seventh Avenue Brooklyn, NY 11215
202 9th Street	Block 1009, Lot 10	138 15, LLC 241 Barton Avenue Melville, NY 11747
200 9th Street	Block 1009, Lot 9	Richard Ribellino 200 9th Street Brooklyn, NY 11215
455 3rd Avenue	Block 1009, Lot 8	Vincent Russo/Francis Izzo 455 3rd Avenue Brooklyn, NY 11215
457 3rd Avenue	Block 1009, Lot 107	John Rota 271 12th Street Brooklyn, NY 11215

3. Local News Media from which the Community Typically Obtains Information

New York Post
1211 Avenue of the Americas
New York, NY 10036-8790

New York Daily News
4 New York Plaza
New York, NY 10004

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**

* Note that because the RI Work Plan was submitted with the BCP application, this comment period was concurrent with the Application 30-day comment period

NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: *168 8th Street*

Site Number: *BCP Site No. C224266*

Site Address and County: *168 8th Street, Kings County*

Remedial Party(ies): *New York City School Construction Authority*

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**

Individuals, groups, organizations, businesses, and/or units of government have not requested environmental information pertaining to the Site as of the date of issuance of the CPP. As noted in the CPP, all environmental investigation and remediation work will be performed in a manner that protects the public from adverse exposure to contaminants.

How were these issues and/or information needs identified?

Not applicable

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.

Not applicable.

How were these information needs identified?

Not applicable.

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.

Not applicable.

How were these issues and/or information needs identified?

Not applicable.

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning at and around site:

☒ **Residential** ☐ **Agricultural** ☐ **Recreational** ☒ **Commercial** ☐ **Industrial**

b. Residential type around site:
☒ **Urban** ☐ **Suburban** ☐ **Rural**

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

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:

Not applicable.

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

Provide details if appropriate:

Not applicable.
g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☒ **Yes** ☐ **No**

The Site is located in a Potential Environmental Justice Area.

h. Special considerations:
☒ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**

The surrounding area has a large Hispanic-American population, therefore future fact sheets need to be translated into Spanish.

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2 of the Citizen Participation Plan under 'Site Contact List'. Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☒ **Non-Adjacent Residents/Property Owners:** *Refer to CPP.*

☒ **Local Officials:** *Refer to CPP.*

☒ **Media:** *Refer to CPP.*

☒ **Business/Commercial Interests:** *Refer to CPP.*

☐ **Labor Group(s)/Employees:** *Not applicable.*

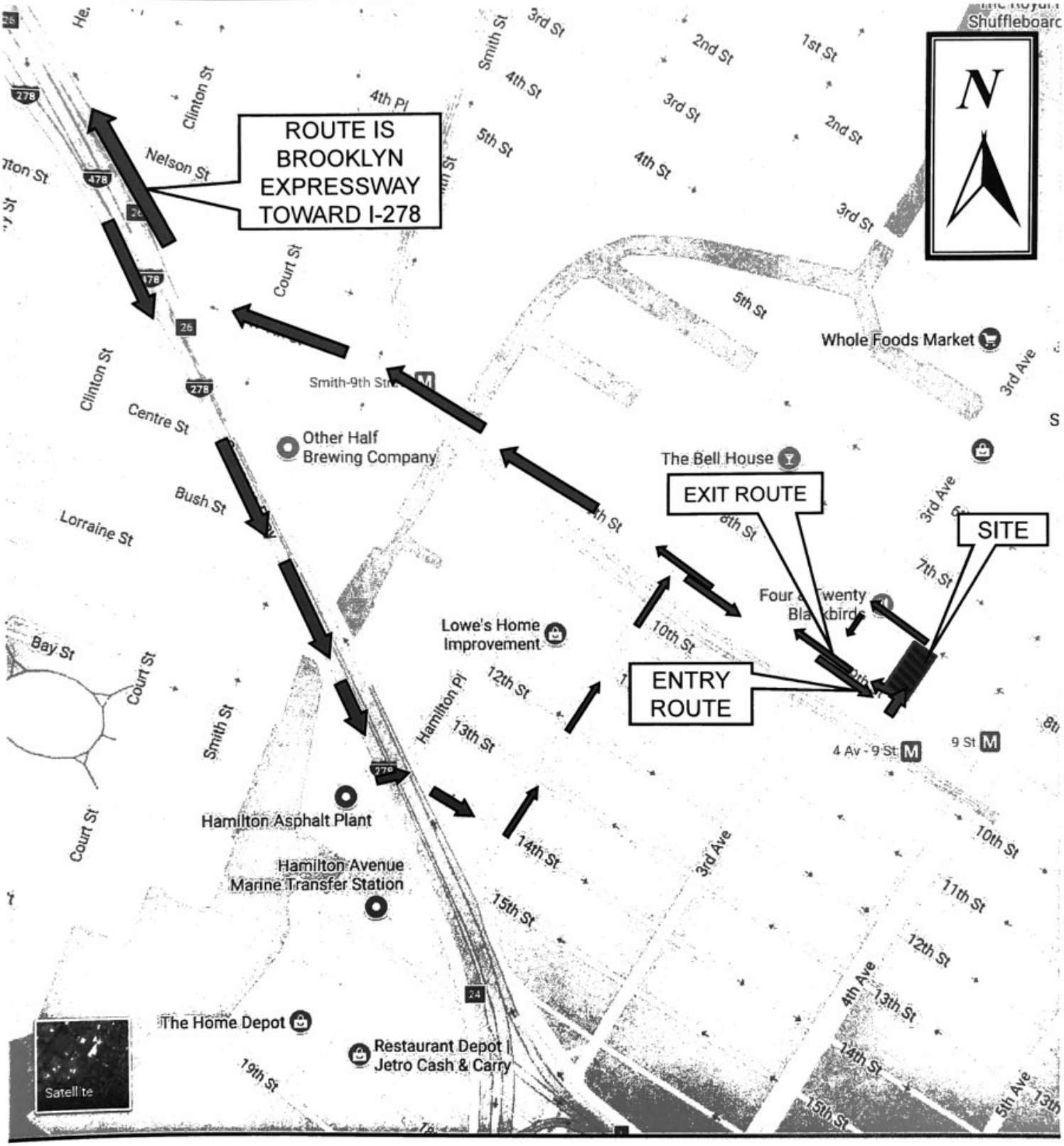
☐ **Indian Nation:** *Not applicable.*

☒ **Citizens/Community Group(s):** *Not applicable.*

☒ **Environmental Justice Group(s):** *The Site is located within a potential EJ area; however, specific EJ groups have not been identified.*

APPENDIX H
PROPOSED TRUCK ROUTE





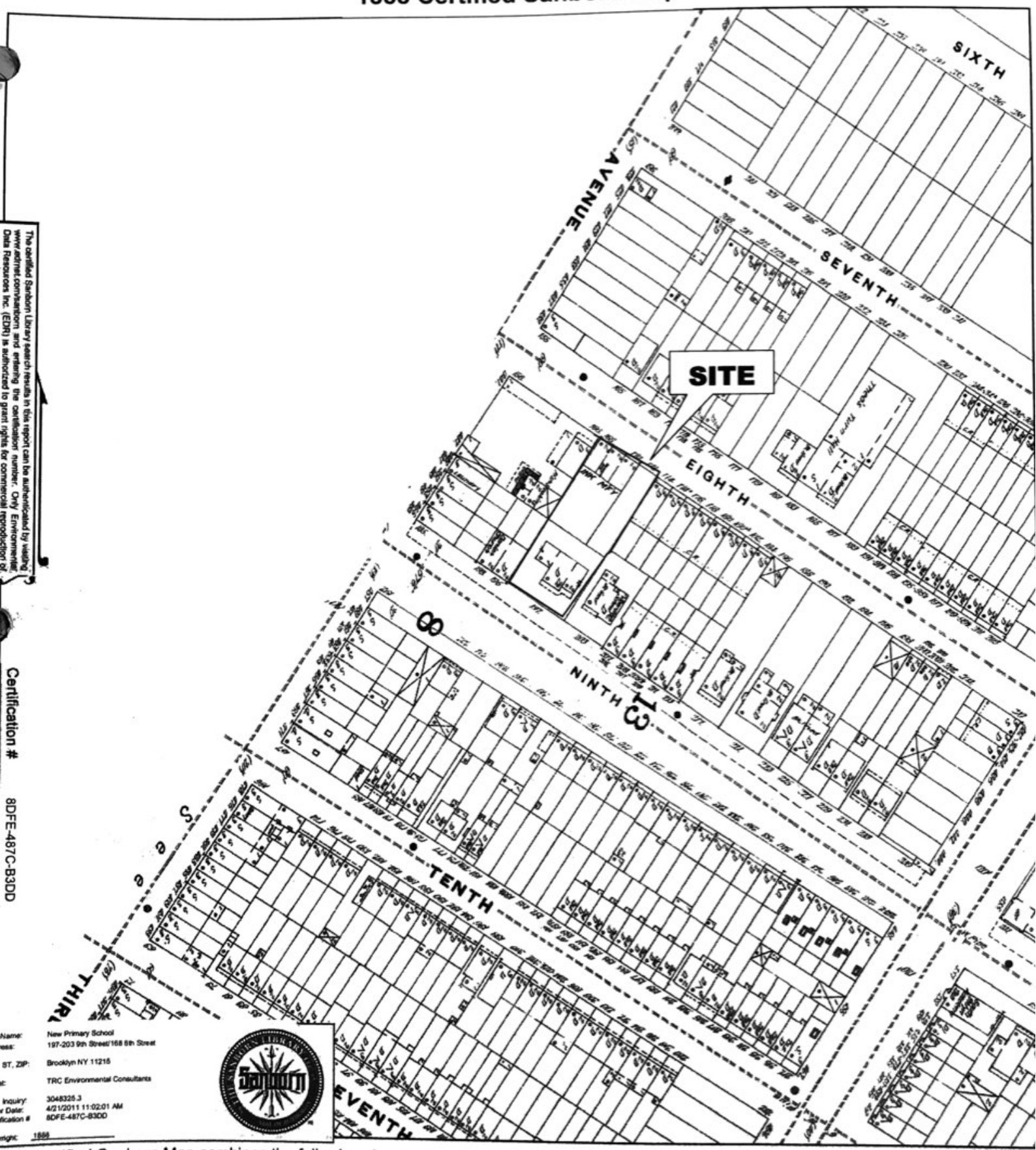
REMEDIAL ACTION WORK PLAN – SITE TRUCK ROUTE

168 8TH STREET
BROOKLYN, NEW YORK
NYSDEC BCP SITE NO. C224266

TRC
1430 BROADWAY, 10TH FLOOR
NEW YORK, NEW YORK 10018

DATE	MARCH 2019
DRAWING BY	LO
PROJECT No.	315824
FIGURE No.	1

1888 Certified Sanborn Map



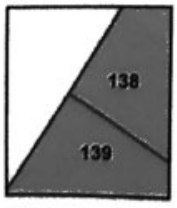
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ST, ZIP: Brooklyn NY 11215
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Inquiry: 3048325.3
r Date: 4/21/2011 11:02:01 AM
dication # 8DFE-487C-B3DD
ight: 1888

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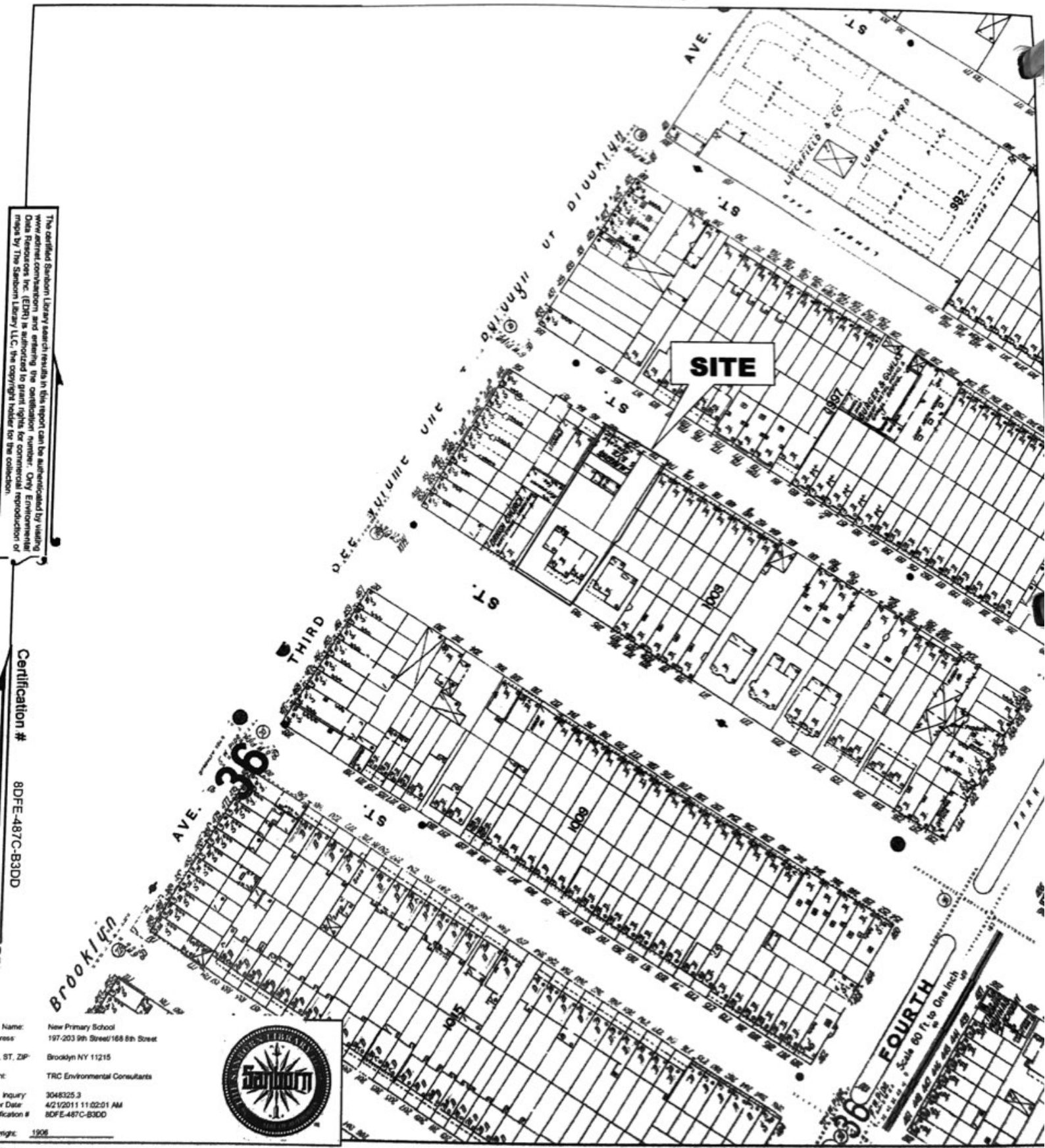


Volume 6, Sheet 138
Volume 6, Sheet 139

0 Feet 150 300 60

N

1906 Certified Sanborn Map



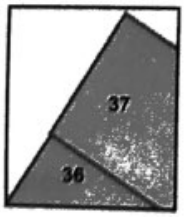
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nsgnc: 1906

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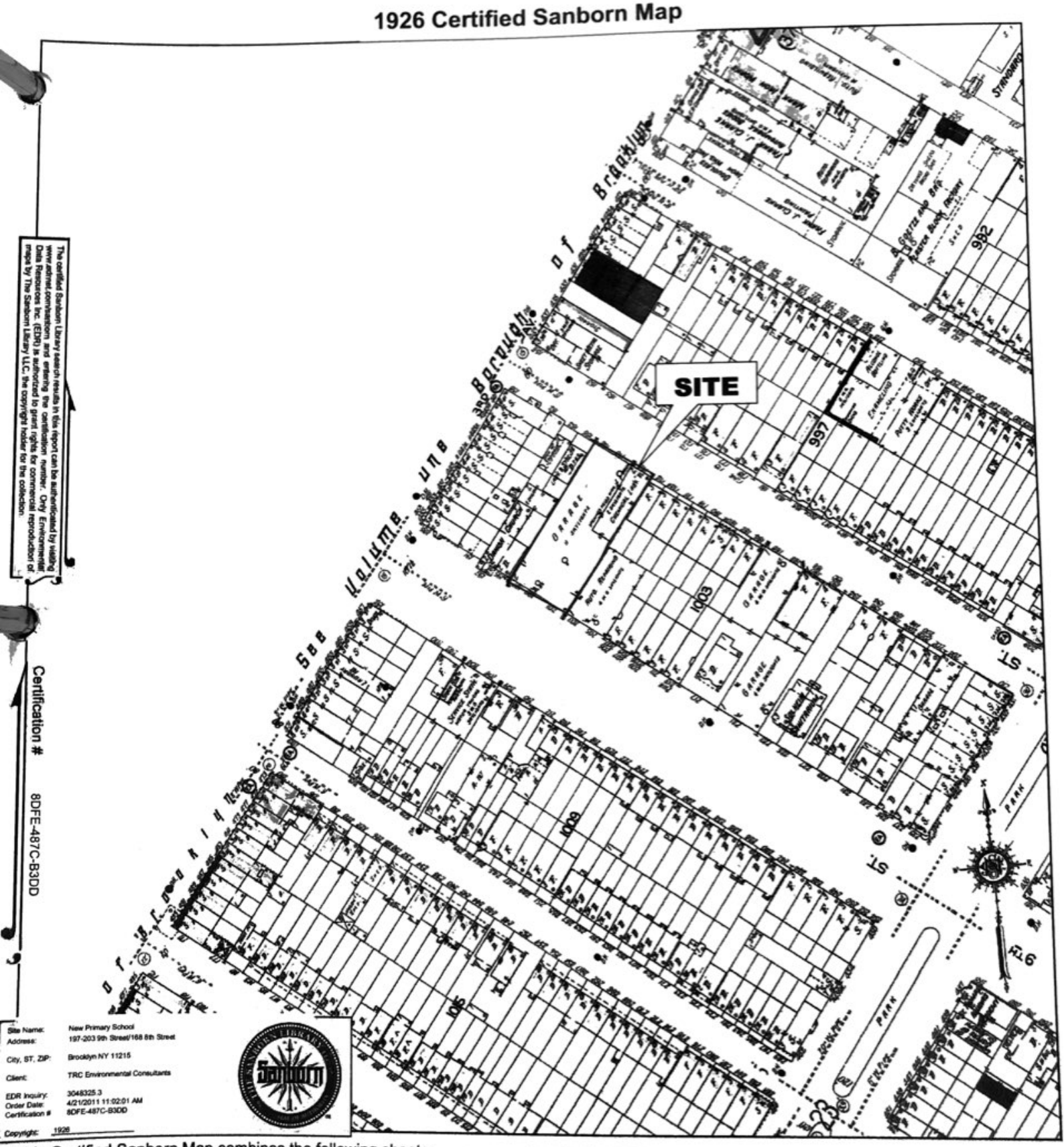




Volume 6, Sheet 36
Volume 6, Sheet 37

0 Feet 150 300

1926 Certified Sanborn Map

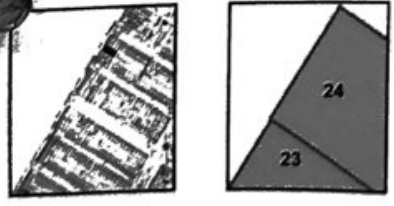


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City, ST, ZIP:	Brooklyn NY 11215
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Certification #	8DFE-487C-B3DD
Copyright:	1926

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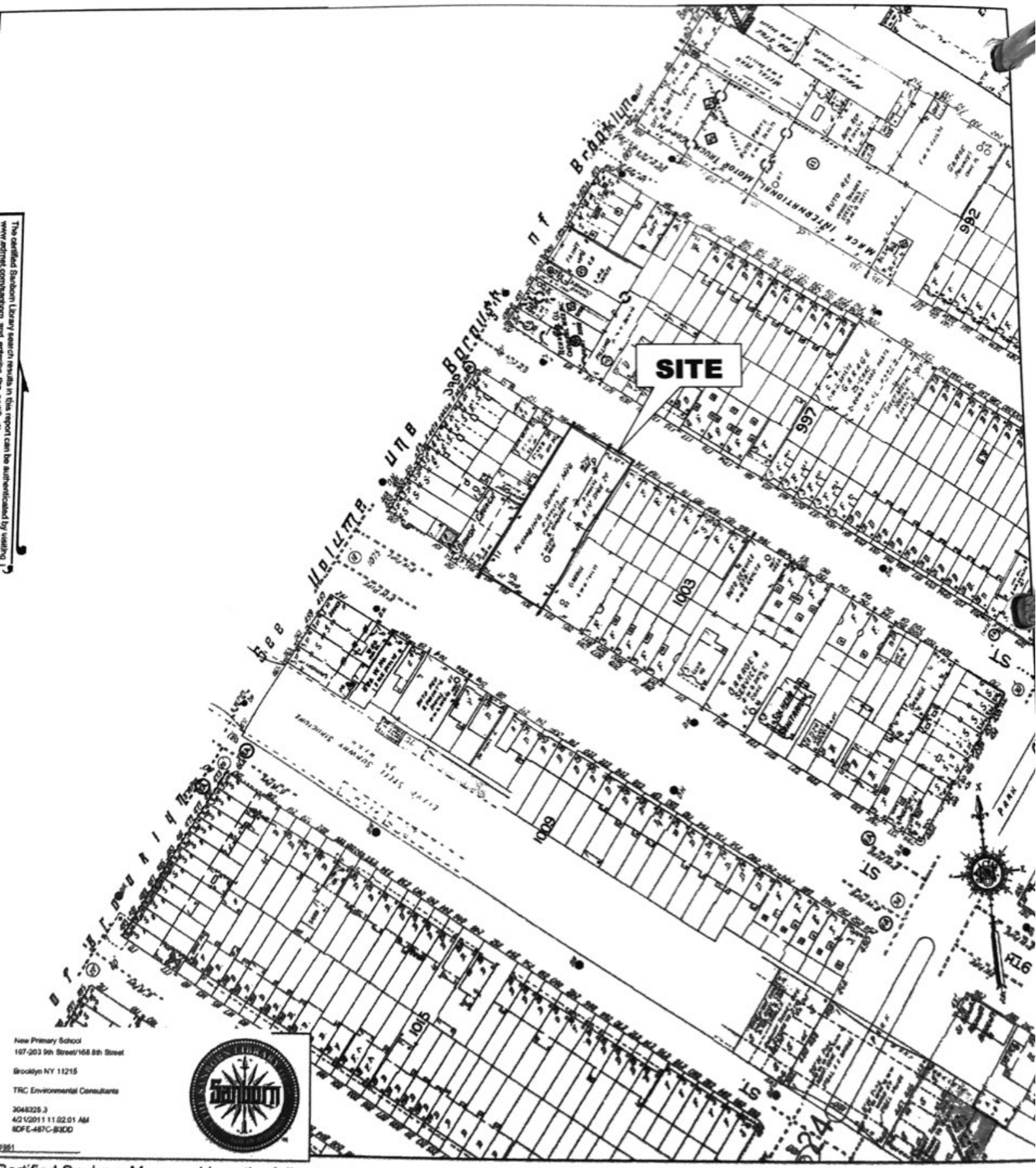


Volume 6, Sheet 23
Volume 6, Sheet 24

0 Feet 150 300 600

N

1951 Certified Sanborn Map



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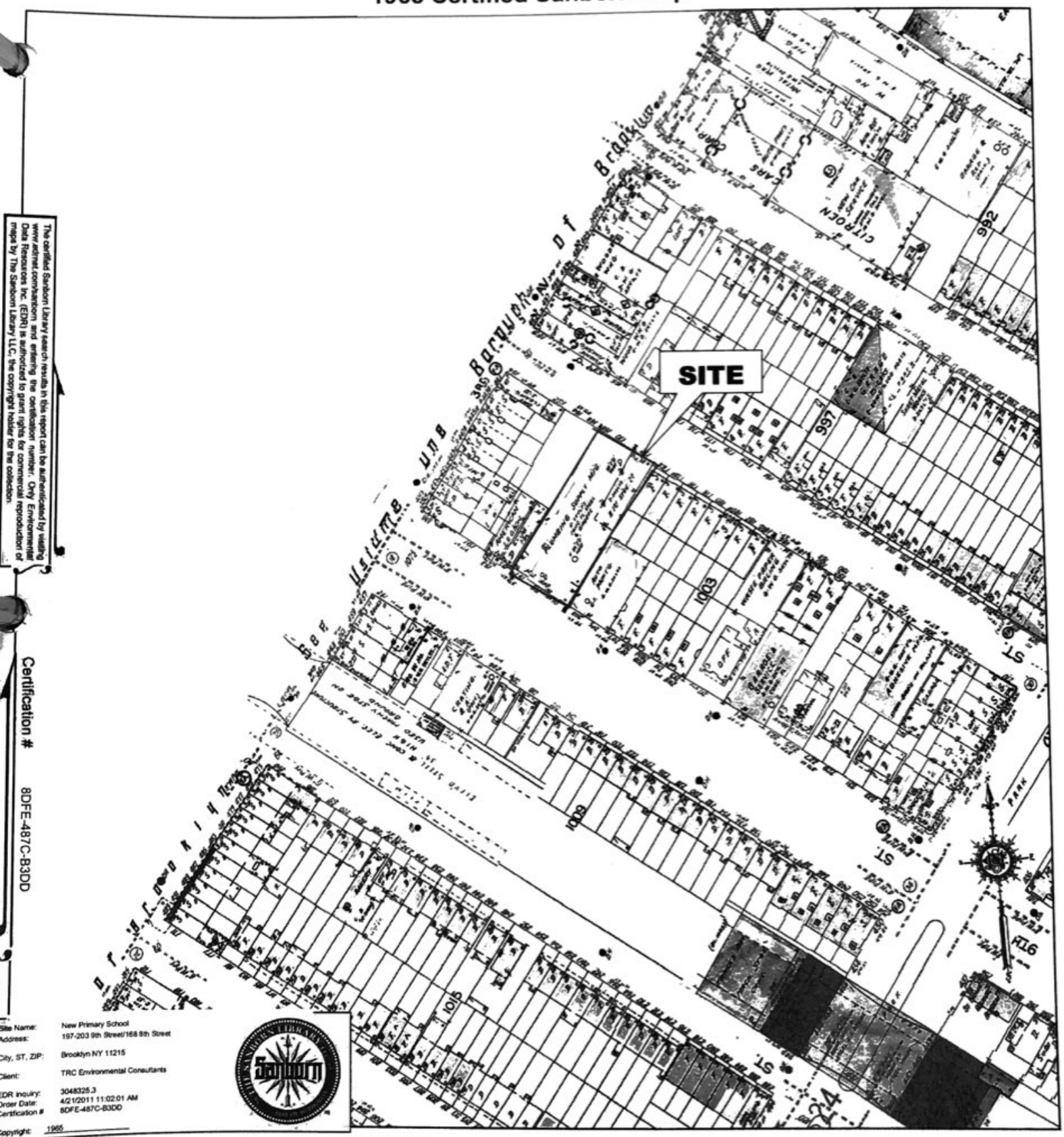
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ed areas indicate map sheets within the collection.

Volume 6, Sheet 23
Volume 6, Sheet 24

0 Feet 150 300

1965 Certified Sanborn Map



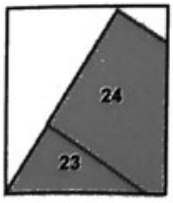
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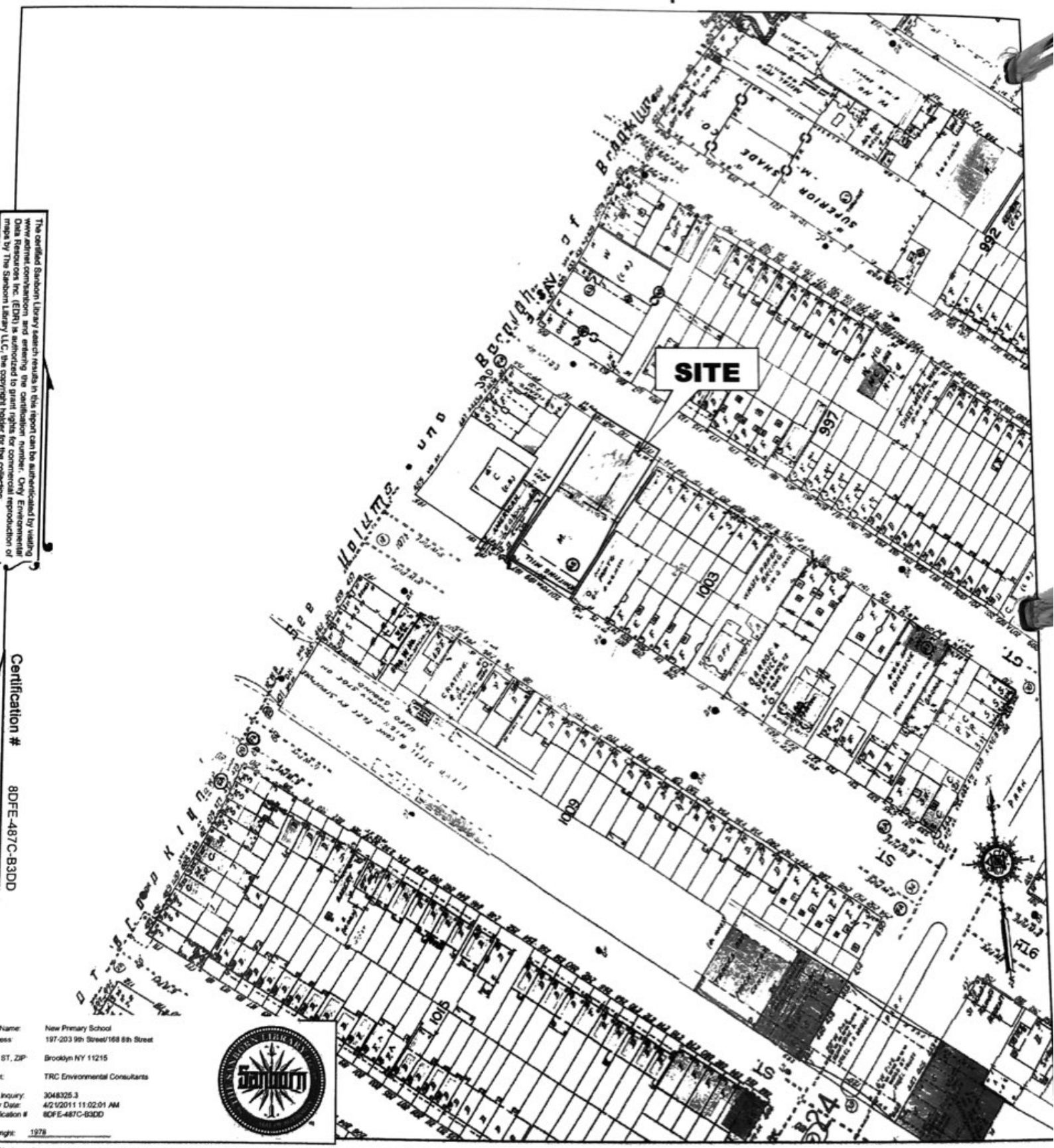


Volume 6, Sheet 23
Volume 6, Sheet 24

0 Feet 150 300 600

N

1978 Certified Sanborn Map



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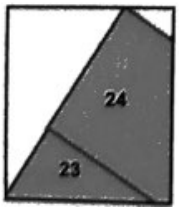
Certification # 8DFE-487C-B3DD

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ST, ZIP: Brooklyn NY 11215
: TRC Environmental Consultants
Inquiry: 3048325.3
Date: 4/21/2011 11:02:01 AM
ication # 8DFE-487C-B3DD
ght: 1978

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0 Feet 150 300

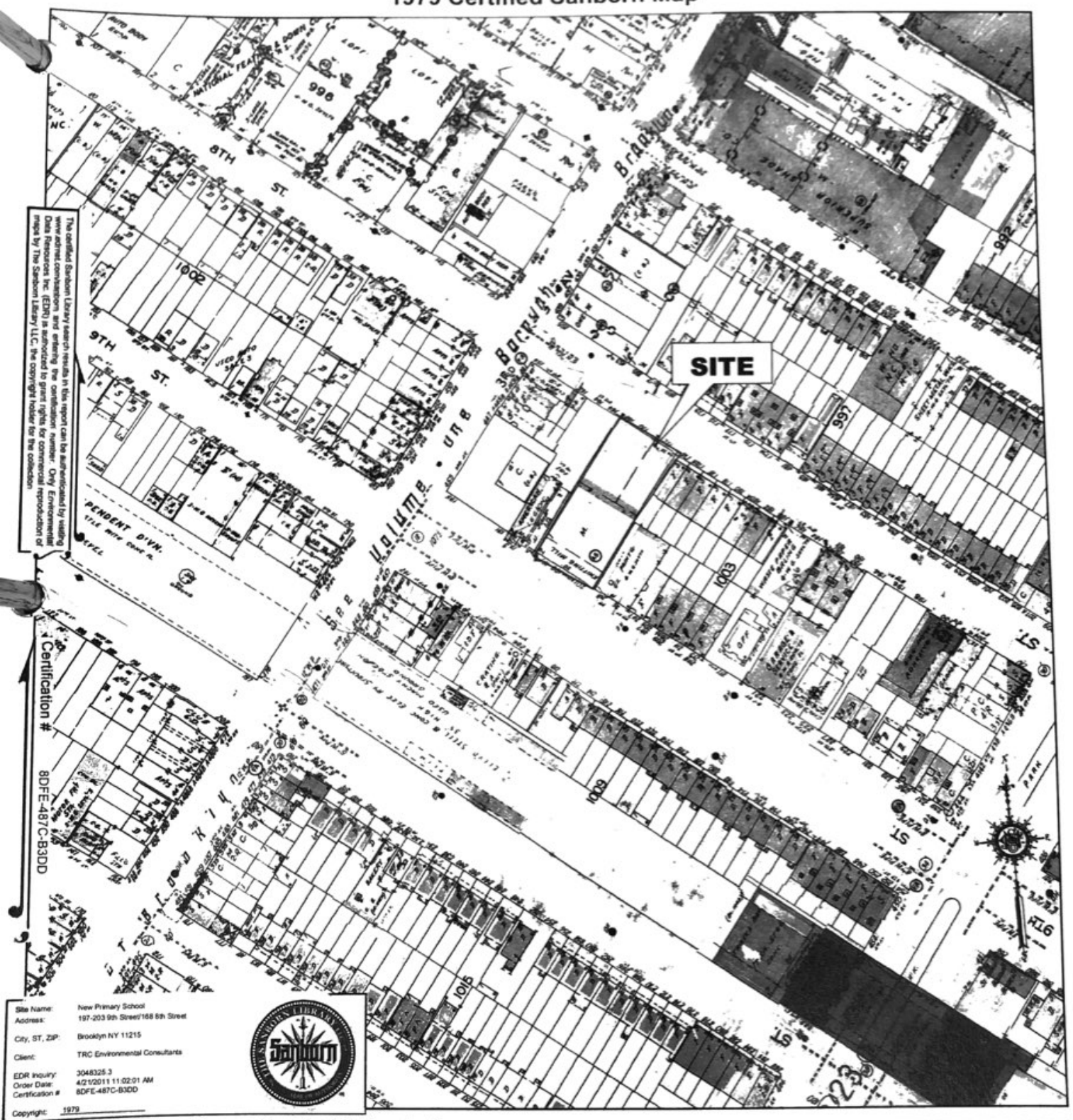




Volume 6, Sheet 23
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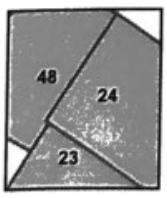
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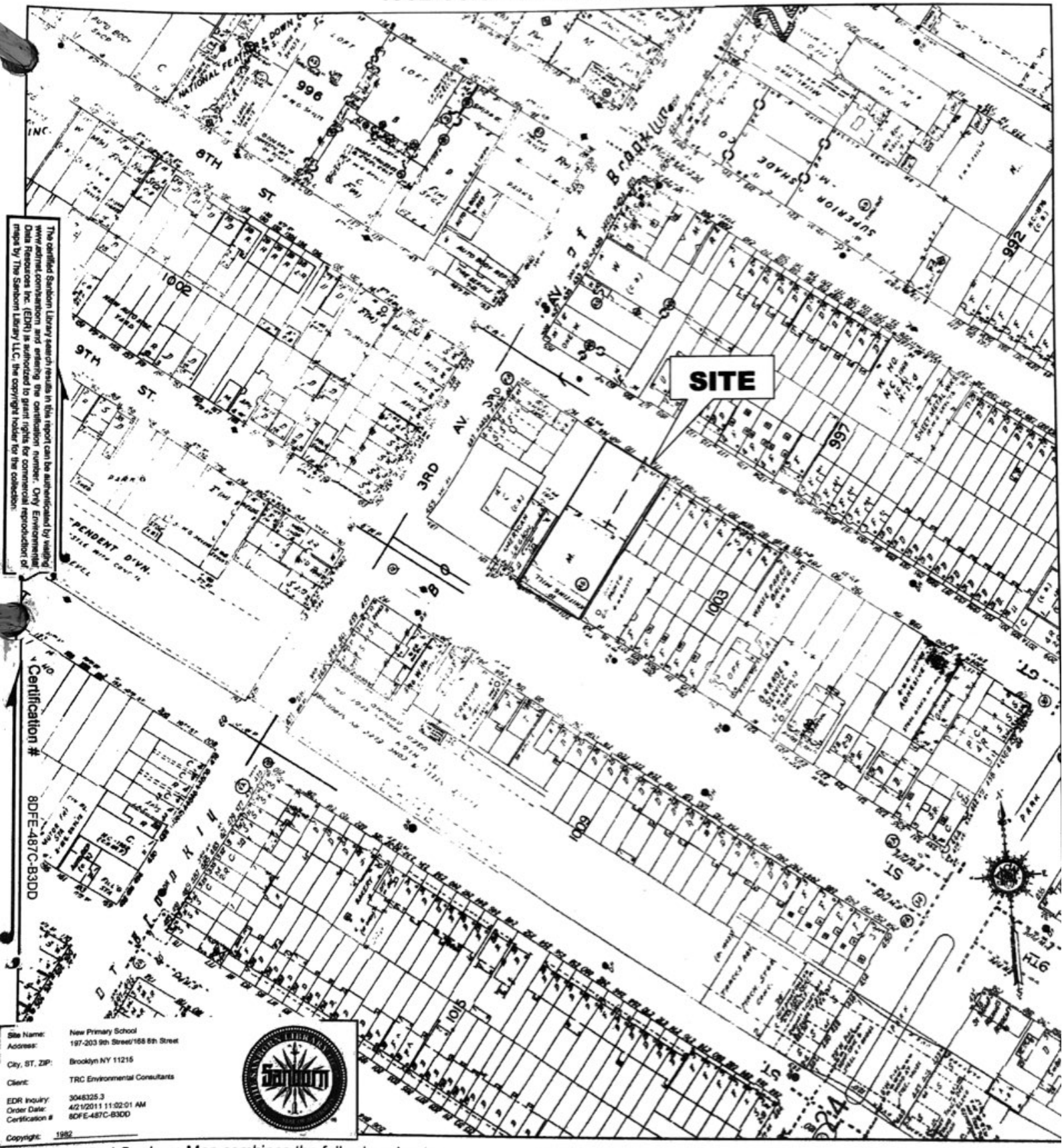


Volume 1, Sheet 48
Volume 6, Sheet 23
Volume 6, Sheet 24

0 Feet 150 300 600

N

1982 Certified Sanborn Map



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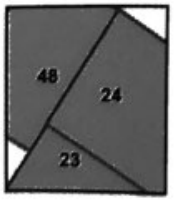
Certification # 8DFE-487C-B3DD

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Copyright: 1982

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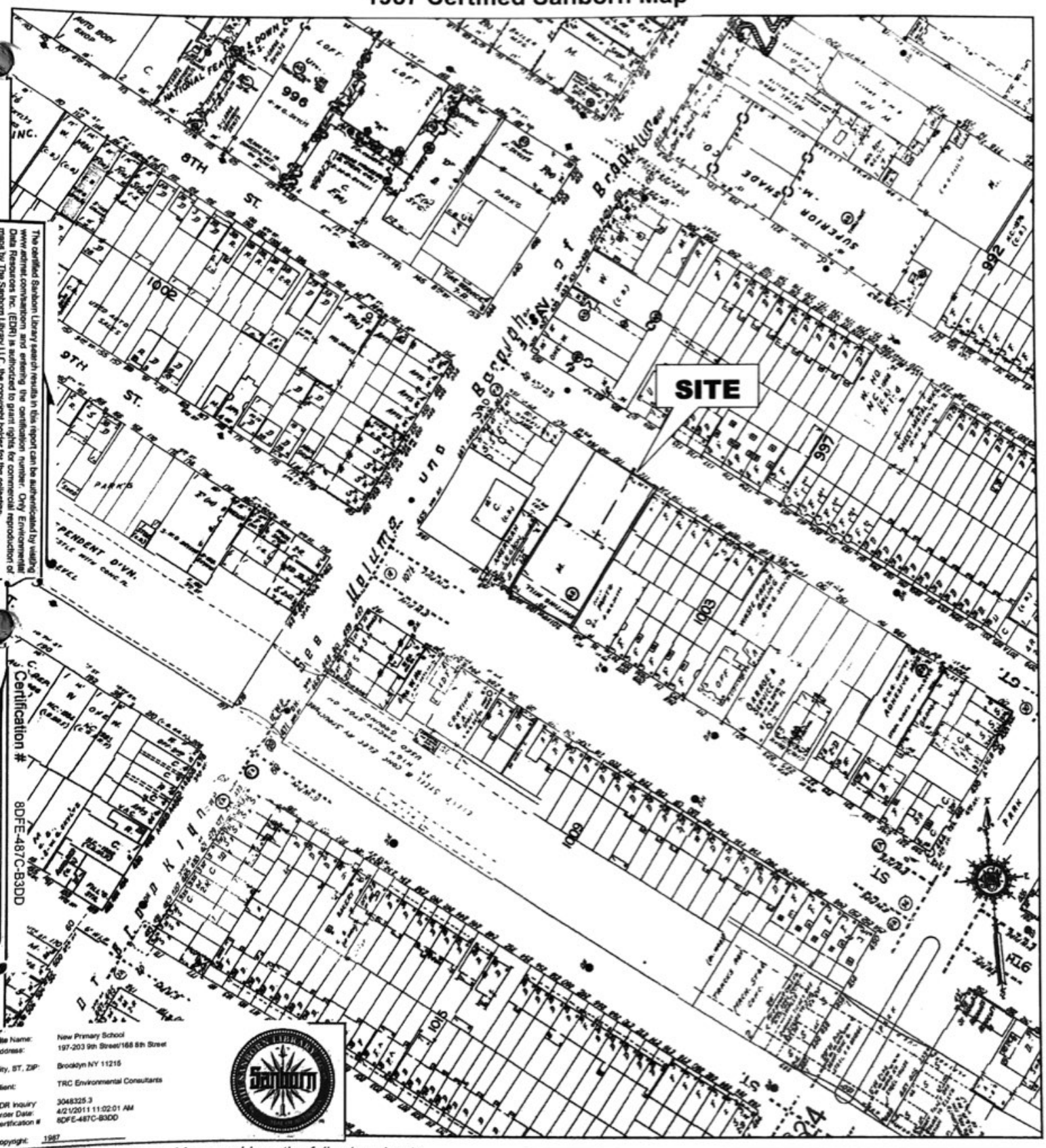


Volume 6, Sheet 23
Volume 6, Sheet 24
Volume 1, Sheet 48

0 Feet 150 300 600

N

1987 Certified Sanborn Map



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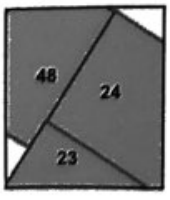
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Site Name:	New Primary School
Address:	197-203 9th Street/168 8th Street
City, ST, ZIP:	Brooklyn NY 11215
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Copyright: 1987

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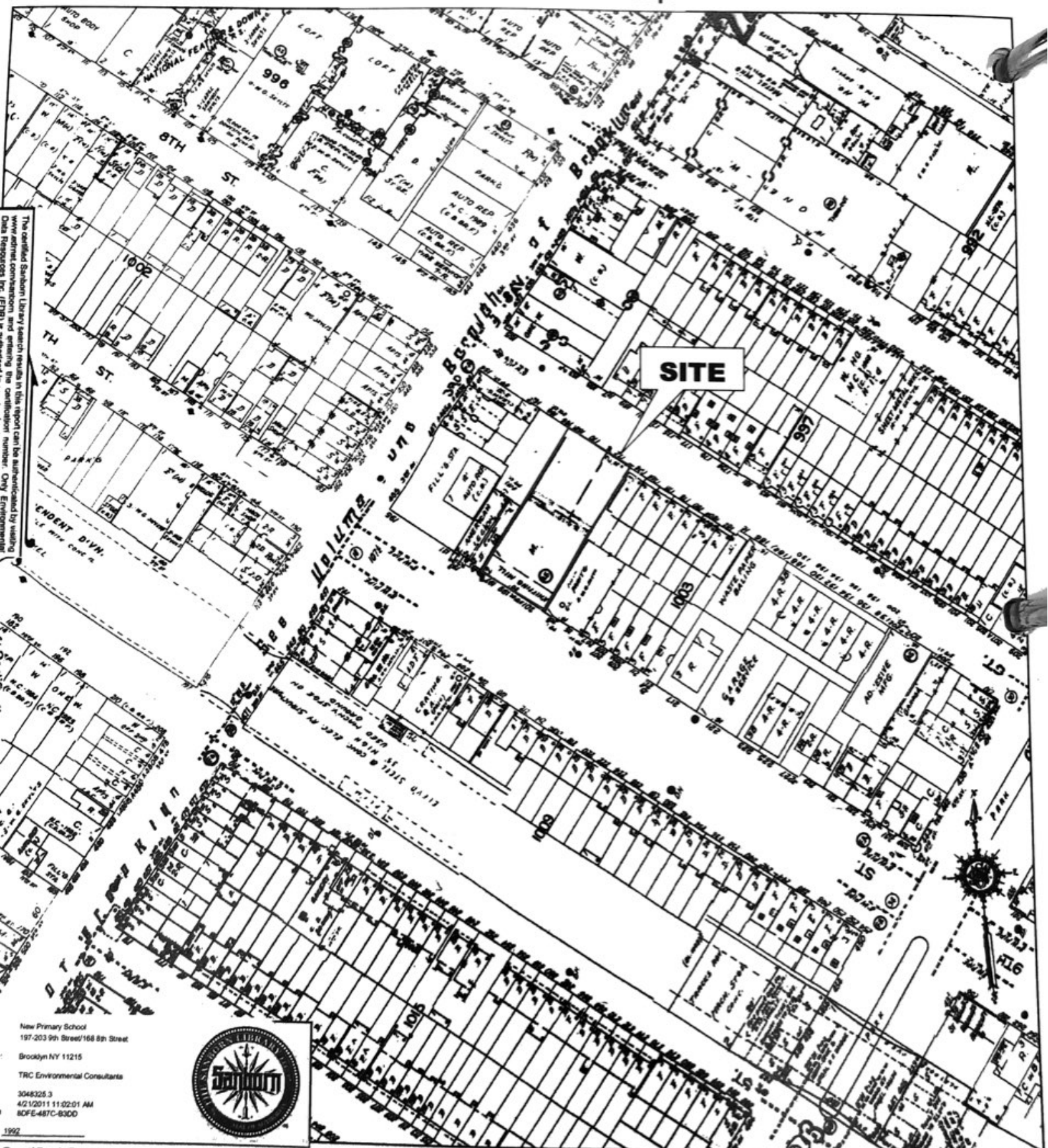


Volume 1, Sheet 48
Volume 6, Sheet 23
Volume 6, Sheet 24

0 Feet 150 300 600

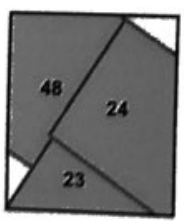
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1992 Certified Sanborn Map



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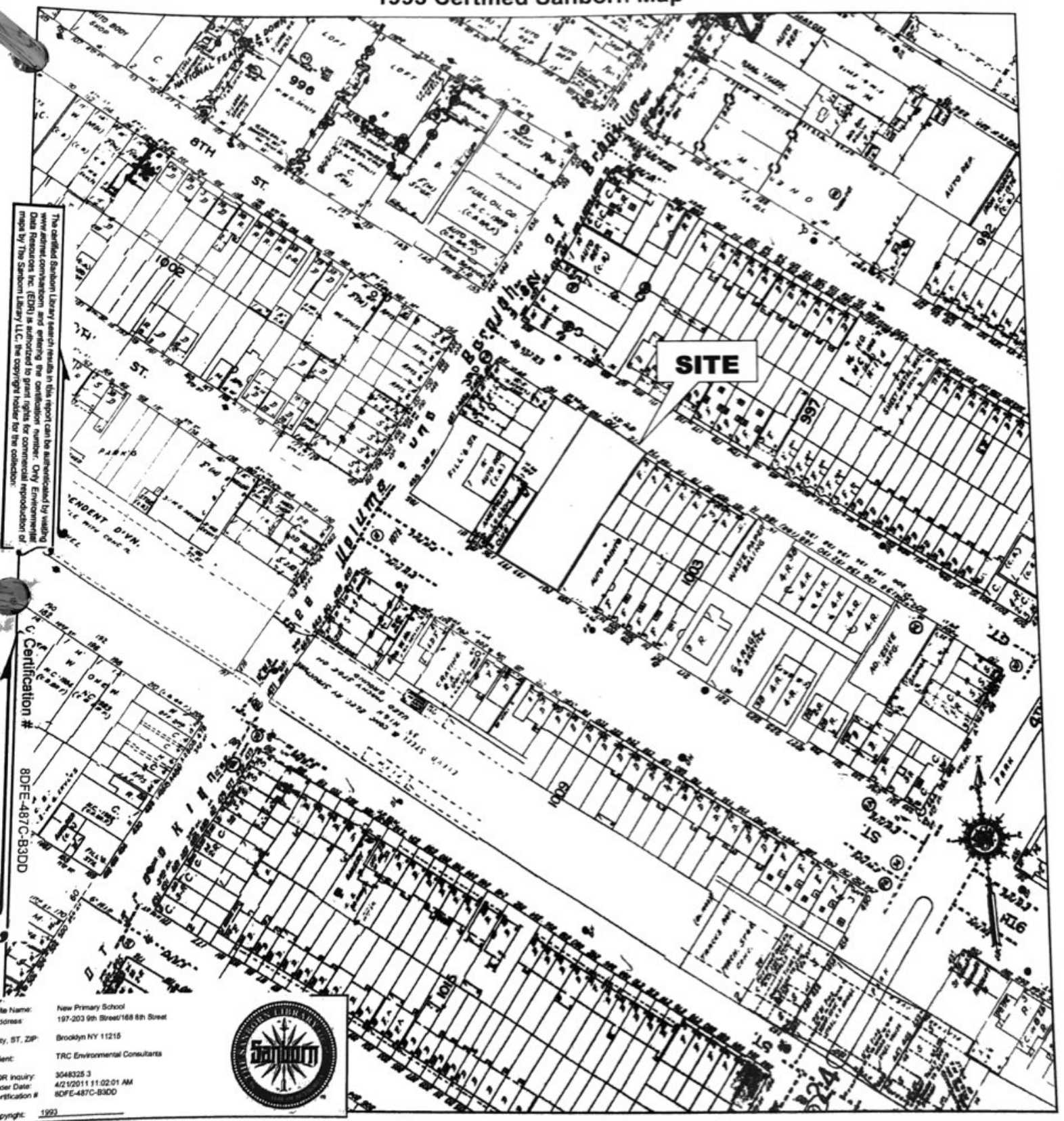




Volume 1, Sheet 48
Volume 6, Sheet 23
Volume 6, Sheet 24

0 Feet 150 300

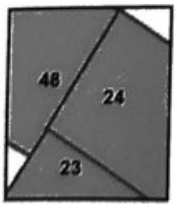
1993 Certified Sanborn Map



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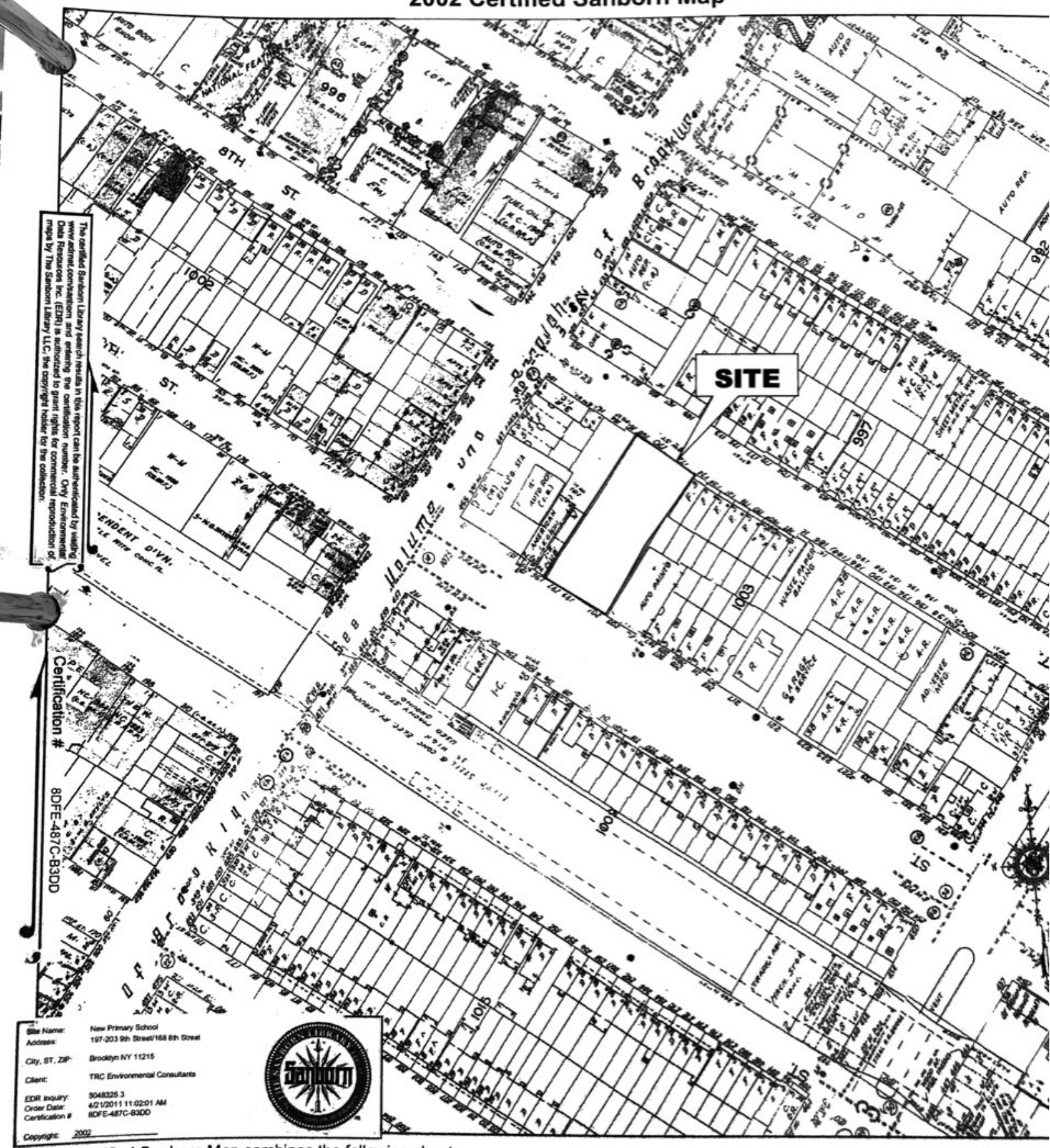


Volume 6, Sheet 23
Volume 6, Sheet 24
Volume 1, Sheet 48

0 Feet 150 300 600

N

2002 Certified Sanborn Map



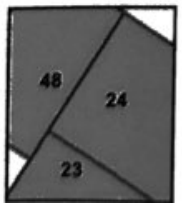
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Certification #:	8DFE-487C-B3DD

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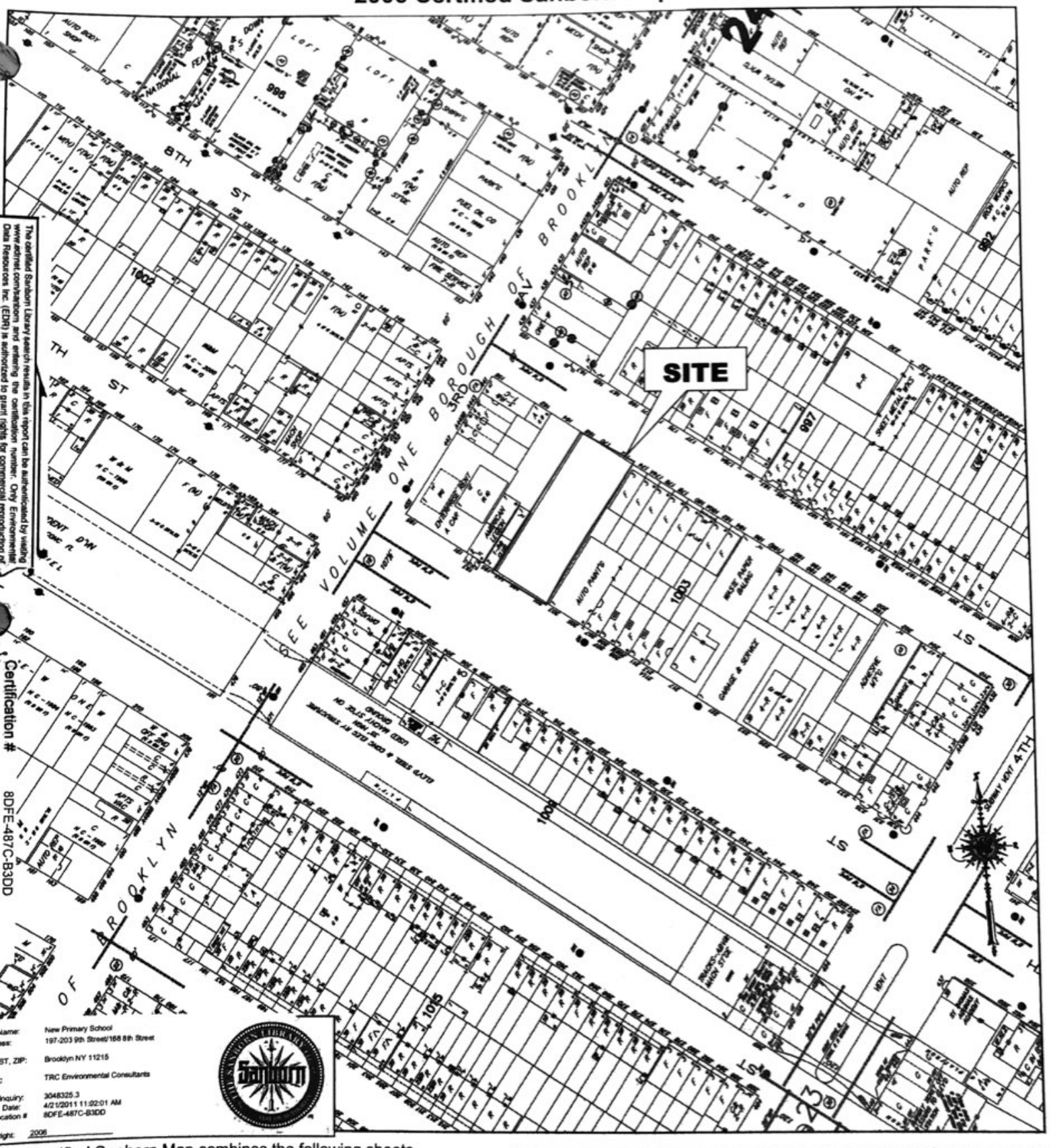




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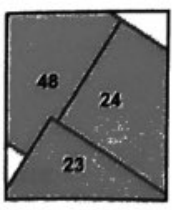
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2006 Certified Sanborn Map



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Volume 6, Sheet 23
Volume 6, Sheet 24
Volume 1, Sheet 48

0 Feet 150 300 600

N