

**PHASE II ENVIRONMENTAL SITE INVESTIGATION
OF**

**PUBLIC SCHOOL 131Q ADDITION
BLOCK 9875, PART OF LOT 1
170-45 84th AVENUE
QUEENS, NEW YORK 11432**

**SCA LLW NO. 104515
SCA CONTRACT NO. C000013007
SERVICE ID NO. 63885**

D&B PROJECT NO. 3415-AL2

JUNE 17, 2016

Prepared by:



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NOTICE OF REMEDIATION REQUIRED

Environmental contamination at the project site must be remediated prior to, or during, site development. Remedial design documents must be included within bid specifications for the construction contract. Contact IEH Department for additional information or assistance.

Site Name Public School 131Q Addition	LLW No. 104515
Description 170-45 84th Avenue, Queens New York 11432	IEH Service ID Number 63885
District 29	Consultant Vendor D&B Engineers and Architects, P.C.
Borough Queens	Phase I Delivery Date 3/18/2016
Block/ Lot Block 9875, Part of Lot 1	Phase II Delivery Date 6/17/2016

Identified Contamination

MEDIA	CONTAMINANT	CONCENTRATION RANGE	UNITS
Soil Vapor	1,2,4-Trimethylbenzene	23 to 31	ug/m3
Soil Vapor	1,3,5-Trimethylbenzene	5.6 to 11	ug/m3
Soil Vapor	Chlorobenzene	<0.16 to 2	ug/m3
Soil Vapor	m,p-Xylenes	15 to 27	ug/m3
Soil Vapor	o-Xylene	5.3 to 11	ug/m3
Soil Vapor	Toluene	65 to 180	ug/m3
Soil Vapor	Trichloroethene	3.1 to 3.4	ug/m3
Soil	Benzo(b)fluoranthene	<0.18 to 1.1	mg/kg
Soil	Indeno(1,2,3-cd)pyrene	<0.18 to 0.56	mg/kg
Soil	Mercury	<0.028 to 0.38	mg/kg
Perched Groundwater	Manganese	660 to 700	ug/l

Required Remediation

MEASURE (list recommended remediation measures)	METHOD (e.g., Contractor HASP, soil excavation, removed soil characterization, sub-slab vapor membrane, etc.)	COST ESTIMATE
Soil Vapor Barrier and Active Sub-Slab Depressurization System	N/A	\$384,000

Comments

D&B Engineers and Architects, P.C. (D&B) conducted a Phase II Environmental Site Investigation (ESI) for the Public School 131Q Addition located at 170-45 84th Avenue, Queens, New York (hereafter referred to as the "Site"). The Site consists of an approximate 12,000-square-foot area to the west of the existing P.S. 131Q school building where three transportable classroom units and the western playground are located. The Phase II ESI field activities were performed on April 7 and 9, 2016, and consisted of a geophysical survey, the advancement of soil borings, and the collection and analysis of soil, soil vapor and perched groundwater samples.

The analytical results of the soil samples detected two semivolatile organic compounds and the metal mercury at concentrations exceeding soil cleanup criteria, which were attributed to the characteristics of the on site fill material. Trichloroethene and several petroleum-related volatile organic compounds were detected in soil vapor above the New York State Department of Health Air Guideline Values (AGVs) and/or anticipated background levels, and can be attributed to off site sources. The perched groundwater sample contained concentrations of manganese above groundwater standards that were attributed to natural background conditions.

Based on the results of the Phase II ESI, D&B recommends that a soil vapor barrier and active sub-slab depressurization system be integrated into the new building addition design. D&B also recommends the proper characterization, handling and disposal of soil excavated during school construction with a minimum of two feet of environmentally clean fill placed over existing soil in all landscaped areas. Any dewatering necessary during the construction activities must be performed in accordance with applicable local, state and federal regulations, and minimized to mitigate potential influx of contaminated water from off-site sources toward the Site. Finally, suspect asbestos-containing materials, lead-based paint, and/or polychlorinated-biphenyl-containing materials should be properly identified and managed during demolition and construction activities in accordance with applicable regulations and NYCSCA policies and procedures.

Attachments

The following environmental reports are attached to this document:

REPORT	PREPARE FIRM	DATE
Phase II Environmental Site Investigation	D&B Engineers and Architects, P.C.	6/17/2016

Signature

Emily Hepding	D&B Engineers and Architects, P.C.	6/17/2016
Preparer	Firm	Date

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EXECUTIVE SUMMARY

At the request of the New York City School Construction Authority (NYCSCA), D&B Engineers and Architects, P.C. (D&B) conducted a Phase II Environmental Site Investigation (ESI) of the Public School 131Q Addition located at 170-45 84th Avenue, Queens, New York (hereafter referred to as the "Site"). The legal description of the Site is Block 9875, Part of Lot 1. The Site is being considered by the NYCSCA for the construction of an addition to the existing, adjoining school building. The Site is located in an area that is primarily characterized by residential and institutional use.

The Site lot consists of an irregularly-shaped 74,000-square-foot lot improved with a building that is currently used as a primary school with a playground, basketball courts, track and field, and three Transportable Classroom Units (TCUs). The existing school building is a 28,320-square-foot irregularly-shaped three-story building originally constructed in 1925, with additions constructed in 1946, 1949 and 1994. For the purposes of this Phase II ESI, the existing school building, playground north of the building, basketball courts and track and field are not considered part of the Site. The Site is defined as the approximate 12,000-square-foot area to the west of the existing school building where the three TCUs and western playground are located. The three TCUs are rectangular-shaped one-story metal-framed buildings that were installed approximately 20 years ago. Historically, the Site has been utilized as P.S. 131Q since 1925 when the existing school building was constructed. Prior to construction of the building, the Site was vacant. Adjoining properties have historically been residential and institutional.

The Site is bounded to the north by the P.S. 131Q school yard followed by 83rd Avenue; to the east by the P.S. 131Q school building and yard followed by 172nd Street; to the west by residential properties followed by 170th Street; and, to the south by 84th Avenue followed by residential properties.

D&B previously performed a Phase I Environmental Site Assessment (ESA) of the Site for the NYCSCA. The Phase I ESA Report dated March 18, 2016 identified Recognized Environmental Conditions (RECs) and/or Vapor Encroachment Conditions (VECs) associated with historic fill of unknown origin. The Phase I ESA also identified off-site RECs associated with dry wells located on the adjoining school property playground and a historical upgradient automobile repair facility. Additionally, the evaluation revealed the presence of environmental concerns associated with the potential presence of asbestos-containing materials (ACM), lead-based paint (LBP) and polychlorinated biphenyl (PCB)-containing material.

The purpose of the Phase II ESI was twofold: 1) determine if the RECs, VECs, and environmental concerns identified in the Phase I ESA Report require special consideration and/or affect the suitability of the Site for use as a public school facility, and 2) preliminarily characterize the environmental condition of the soil anticipated to be excavated for construction of the new school facility. The Phase II ESI field activities were performed on April 7 and 9, 2016 and consisted of a geophysical survey, the advancement of three soil borings, and the collection of three soil samples, three soil vapor samples, and one perched groundwater sample from the borings.

Based on the Phase II ESI results, the following can be concluded:

- The RECs/VECs identified in the Phase I ESA were adequately investigated.
- Trichloroethene was detected at concentrations exceeding its New York State Department of Health (NYSDOH) Air Guideline Value (AGV) in all three soil vapor samples. Petroleum and

chlorinated solvent-related VOCs were detected in soil vapor at concentrations exceeding published background concentrations. These detections are likely attributable to off-site sources.

- Benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and mercury were detected in one soil sample at concentrations exceeding the Unrestricted Use SCOs. These detected concentrations exceeding the regulatory criteria are likely attributable to the characteristics of the fill material present at the Site; visual evidence of contamination was not observed in the soil samples. VOCs, pesticides, herbicides and PCBs were not detected in the soil samples at concentrations exceeding the Unrestricted Use SCOs.
- VOCs, SVOCs and PCBs were either not detected or were detected in the perched groundwater sample at concentrations below the Class GA Groundwater Standards/Guidance Values. The perched groundwater sample analyses exhibited manganese at concentrations exceeding its NYSDEC Class GA Groundwater Standards in the both the unfiltered (total) and filtered (dissolved) samples, at similar concentrations. Manganese was detected in all three soil samples but at concentrations below its Unrestricted Use SCO. Manganese is typically detected at elevated concentrations in regional groundwater. As a result, the presence of manganese in the perched groundwater is likely attributable to natural conditions rather than on-site or off-site sources.
- Due to concentrations of select SVOCs and metals exceeding the Unrestricted Use SCOs, the soil encountered at the Site should be classified as nonhazardous excavated material.

Based on the results of the Phase II ESI, the following remedial actions and/or engineering controls are required to render the Site suitable for use as a public school facility:

- As a safeguard to prevent potential volatile organic compounds in soil vapor from entering the new school building addition in the future, an active sub-slab depressurization system (SSDS) and a soil vapor barrier should be integrated into the new building addition design including integration with any proposed damp-proofing or waterproofing components of the new building addition design. The design of the system should take into account the shallow perched groundwater elevation at the Site and consideration should be given toward designing a system capable of handling high moisture air with minimal system maintenance and downtime.

In addition, D&B recommends the following as part of the NYCSCA standard construction requirements:

- All material excavated during construction activities should be properly characterized and disposed, including collection and analysis of additional samples if required by the contractor-selected solid waste management facilities.
- Any dewatering necessary during school construction activities must be performed in accordance with applicable local, state and federal regulations. Dewatering required during construction should be minimized to mitigate potential influx of contaminated water from off-site sources toward the Site.
- Any exposed soil (landscaped areas) must be covered with at least two feet of environmentally clean fill.

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- Suspect ACM, LBP, and/or PCB-containing materials should be properly managed during construction or demolition activities.

Based on the Phase II ESI results, additional investigation is not recommended for the Site. A description of the remedial engineering controls and associated cost estimates is included in *Appendix G*.

1.0 INTRODUCTION

1.1 Purpose

At the request of New York City School Construction Authority (NYCSCA), D&B Engineers and Architects, P.C. (D&B) conducted a Phase II Environmental Site Investigation (ESI) of the Public School 131Q Addition located at 170-45 84th Avenue, Queens, New York (hereafter referred to as the "Site"). The legal description of the Site is Block 9875, Part of Lot 1. The Site is located in an area that is primarily characterized by residential and institutional use.

The Site lot consists of an irregularly-shaped 74,000-square-foot lot improved with a building that is currently used as a primary school with a playground, basketball courts, track and field, and three Transportable Classroom Units (TCUs). The existing school building is a 28,320-square-foot irregularly-shaped three-story building originally constructed in 1925, with additions constructed in 1946, 1949 and 1994. For the purposes of this Phase II ESI, the existing school building, playground north of the building, basketball courts and track and field are not considered part of the Site. The Site is defined as the approximate 12,000-square-foot area to the west of the existing school building where the three TCUs and western playground are located. The three TCUs are rectangular-shaped one-story metal-framed buildings that were installed approximately 20 years ago. Historically, the Site has been utilized as P.S. 131Q since 1925 when the existing school building was constructed. Prior to construction of the building, the Site was vacant. Adjoining properties have historically been residential and institutional.

The Site is bounded to the north by the P.S. 131Q school yard followed by 83rd Avenue; to the east by the P.S. 131Q school building and yard followed by 172nd Street; to the west by residential properties followed by 170th Street; and, to the south by 84th Avenue followed by residential properties. *Figure 1* presents a Site Location Map.

A Test Fit/Sketch Study dated March 15, 2016 was prepared by the NYCSCA for the Site. The Test Fit/Sketch Study envisions a new three-story school building addition encompassing 52,000 square feet of gross floor area. A copy of the March 15, 2016 Test Fit/Sketch Study is provided in *Appendix F*.

This Phase II ESI was performed based on the recommendations of the Phase I Environmental Site Assessment (ESA), prepared by D&B, dated March 18, 2016. Its purpose is to determine if there are any Recognized Environmental Conditions (RECs), Vapor Encroachment Conditions (VECs) or environmental concerns identified on the property or adjacent areas that require special considerations and/or may have affected the suitability of the Site for use as a public school facility (see Section 1.2). The analytical data collected during this study will also assist in preliminarily characterizing the soil anticipated to be excavated for construction of the school addition. To accomplish these objectives, the following media were investigated: soil, soil vapor, and perched groundwater water.

1.2 Recognized Environmental Conditions (RECs), Vapor Encroachment Conditions (VECs) and Environmental Concerns

The Phase I ESA of the Site identified several on-site and off-site RECs, VECs and environmental concerns, as listed below:

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On-Site RECs/VECs:

- Historic fill of unknown origin.

Off-Site RECs/VECs:

- Dry wells located on the adjoining school property.
- 84-26 Homelawn Street due to its listing in the EDR US Hist Auto Stations database, its upgradient location and its close proximity to the Site.

The Phase I ESA also revealed the following environmental concerns associated with the Site:

- Suspect ACM based on the age of the structures.
- Suspect LBP identified on interior and exterior painted surfaces of the structures.
- Suspect PCB-containing equipment and materials based on the age of the structures.

2.0 DESCRIPTION OF PHASE II ESI FIELD ACTIVITIES

The Phase II ESI field activities were performed on April 7 and 9, 2016 and included the following:

- A pre-probe ACM survey prior to the ESI boring activities (performed by NYCSCA asbestos contractor/consultant);
- A geophysical survey to clear boring locations of utilities;
- Installation of three soil vapor probes and collection of soil vapor samples for laboratory analysis;
- Advancement of three soil borings with continuous sampling to a maximum of 35 feet below grade;
- Collection of soil samples from each boring for laboratory analysis; and
- Collection of a perched groundwater sample from one boring location.

A Site Plan showing all the sampling locations, Site features, tax block and lot numbers, identified RECs/VECs and anticipated groundwater flow direction is provided as *Figure 3*. Representative photographs of the field investigation activities including the condition of the Site prior to and following the investigation are included in *Appendix A*.

The Phase II ESI was conducted in general accordance with D&B's Phase II ESI Scope of Work (SOW) dated March 18, 2016, with the following exceptions:

- The original scope of work indicated that the soil borings would be advanced to approximately 35 feet below grade. However, since perched groundwater was encountered in Location 3 at a depth of approximately 9.5 feet below grade, soil sampling for this boring was terminated at a depth of approximately 20 feet below grade. In addition, since apparent perched groundwater was encountered in Location 2 at approximately 25 feet below grade, soil sampling for this boring was terminated at a depth of approximately 30 feet below grade.
- The original scope of work indicated that, if perched groundwater was encountered, then perched groundwater samples would be collected at Locations 2 and 3. During the field activities, perched groundwater was encountered at Locations 2 and 3. The boring at Location 1 was advanced to approximately 35 feet below grade (as outlined in the scope of work) but perched groundwater was not encountered. In addition, although perched groundwater was apparent at Location 2 at approximately 25 feet below grade, the water did not recharge into the well and a sample was not collected. As a result, only one perched groundwater sample was collected.

The scope of the field activities and methods are described below.

2.1 Geophysical Survey

A geophysical survey was performed on April 7, 2016 by Diversified Geophysics, Inc. of Mineola, New York to verify that the proposed sample locations were clear of subsurface structures and utilities. The

sample locations were established in areas that did not conflict with any subsurface structures or utilities. A copy of the geophysical survey report is attached as *Appendix B*.

2.2 Asbestos Clearance

D&B marked the proposed boring locations on a map to allow for subsequent completion of a pre-probe survey for asbestos clearance. Louis Berger performed the asbestos testing and sample collection on April 5, 2016. Based on the results of the pre-probe survey, clearance was provided to proceed with the Phase II drilling program. A copy of the pre-probe survey report is provided in *Appendix E*.

2.3 Soil Vapor Survey

A soil vapor survey was conducted as part of the Phase II ESI to evaluate the potential for vapor intrusion at the Site. *Figure 3* shows the locations of the soil vapor survey points advanced at the Site as part of the Phase II ESI.

A total of three soil vapor samples were collected for laboratory analysis.

2.3.1 Soil Vapor Sampling

The soil vapor sampling program was completed on April 9, 2016 in conformance with the applicable procedures described in ASTM E 2600-10 “Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions” and the October 2006 NYSDOH Soil Vapor Intrusion Guidance Document protocols. Aquifer Drilling and Testing, Inc. (ADT) of Mineola, New York was retained for drilling services. *Figure 3* presents the soil vapor sampling locations.

The rationale for each soil vapor sample location is as follows: Locations 1 through 3 provide spatial coverage across the Site and investigate potential impacts from historic fill and off-site RECs.

The soil vapor samples were collected using a direct-drive system (i.e., Geoprobe). Soil vapor points were installed by advancing a 0.75-inch diameter hollow probe rod fitted with an expendable 6-inch diameter stainless steel screened drive point to a depth of 5 feet below ground surface (bgs). Dedicated Teflon tubing with threaded fittings was then connected to the probe. The hollow probe rod was then removed and an air tight seal was created at the surface using hydrated bentonite.

The adequacy of each seal was tested using a 5-gallon bucket placed over the borehole and sealed from the ambient air using modeling clay. Helium tracer gas was then pumped into the bucket. The above grade end of the tubing, which is the sample collection point, was then attached to a helium gas detector. The adequacy of the seal was verified by direct helium readings of less than 10 percent. Each of the temporary soil vapor probes was then purged using a photoionization detector (PID) to evacuate three volumes of soil vapor. PID readings during purging ranged from 0 to 2.1 ppm. After purging, each probe was connected by means of Teflon tubing to a laboratory-supplied individually certified-clean, 6-liter SUMMA canister equipped with a 0.2 liter per minute (L/min) flow regulator. Soil vapor samples were collected in SUMMA canisters for an approximately 30-minute sampling period. Upon completion, each soil vapor point was backfilled to near grade surface with the drill cuttings and then the ground surface was restored to its original condition by capping with asphalt.

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The three soil vapor samples were analyzed for VOCs by USEPA Method TO-15 (low level sensitivity). Method TO-15 provides detection limits of 0.25 micrograms per cubic meter for vinyl chloride, trichloroethene (TCE), and carbon tetrachloride, allowing for comparison with the lowest action levels for these compounds in the NYSDOH “Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York”, dated October 2006. All other compounds have a detection limit of 1 microgram per cubic meter.

The compounds of concern are listed in the following table. These compounds were selected based on D&B’s case-specific review of the information provided in the Phase I ESA and identification of potential VECs.

Table 1
Summary of Compounds of Concern

	Compound	Rationale for Including in Parameter Suite
1	Benzene	Petroleum constituent
2	Carbon Tetrachloride	Historically used at dry cleaners
3	Chlorobenzene	Petroleum constituent
4	Chloroethane	Breakdown product of 1,1,1-TCA
5	Chloromethane	Breakdown product of carbon tetrachloride
6	1,2-Dichlorobenzene	Petroleum constituent
7	1,3-Dichlorobenzene	Petroleum constituent
8	1,1-Dichloroethane	Breakdown product of 1,1,1-TCA
9	1,2-Dichloroethane	Plastic and rubber constituent. Used as a solvent and fumigant
10	1,1-Dichloroethene	Breakdown product of PCE and TCE
11	cis-1,2-Dichloroethene	Breakdown product of PCE and TCE
12	trans-1,2-Dichloroethene	Breakdown product of PCE and TCE
13	1,2-Dichloropropane	Unleaded gasoline additive
14	Ethylbenzene	Petroleum constituent
15	Methyl tert-Butyl Ether	Gasoline additive
16	Methylene Chloride	Breakdown product of carbon tetrachloride, paint stripper and cleaning component
17	Naphthalene	Petroleum constituent
18	Tetrachloroethene (PCE)	Dry cleaning solvent
19	Toluene	Petroleum constituent
20	1,1,1-Trichloroethane	Common degreasing solvent
21	Trichloroethene (TCE)	Solvent, breakdown product of PCE
22	1,2,4-Trimethylbenzene	Petroleum constituent
23	1,3,5-Trimethylbenzene	Petroleum constituent
24	Vinyl Chloride	Breakdown product of PCE, TCE, and DCE (1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE), used in PVC
25	m,p-Xylenes	Petroleum constituent
26	o-Xylene	Petroleum constituent

The canisters were properly labeled and transported via courier to Con-Test Analytical Laboratory of East Longmeadow, Massachusetts utilizing standard chain-of-custody procedures. Con-Test Analytical

Laboratory is a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory, whose current certification has been verified by D&B. A summary of the analytical results is provided in *Table 9* and a copy of the analytical laboratory results is attached in *Appendix E*.

2.4 Soil Investigation

A soil sampling program was conducted as part of the Phase II ESI. Soil samples were collected to assess current environmental conditions and to characterize subsurface soil at the Site. *Figure 3* shows the locations of the soil borings advanced at the Site as part of the Phase II ESI.

All soil sampling was conducted in accordance with the procedures set forth in the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010.

The subsurface soil sampling program was performed on April 9, 2016. Aquifer Drilling and Testing, Inc. (ADT) of Mineola, New York was retained for drilling services. Direct push drilling methods, utilizing a track-mounted direct drive rig, were used to retrieve soil samples. Soil samples were collected and screened continuously for evidence of field contamination from the ground surface to a maximum depth of 35 feet below ground surface in 5-foot long, 2-inch diameter macro-core samplers lined with acetate sleeves. A description of the soils retained in each Geoprobe sample core was logged by D&B's on-site environmental scientist and the soils were screened in the field for the presence of VOCs with a PID. Soil encountered at the Site was described as fine to medium sand with some rock and gravel. Evidence of contamination was not encountered. Upon completion, each boring was backfilled to near grade surface with the drill cuttings and then the ground surface was restored to its original condition with asphalt patch. Soil boring logs, including the PID responses for each sample, are provided in *Appendix B*.

A description of each boring location is presented below. Locations 1 through 3 were used to determine impacts from historic fill of unknown origin.

The following criteria were applied in selecting soil samples for laboratory analysis:

- Soil sampling was conducted in accordance with the NYCSCA-approved scope of work dated March 18, 2016, amended as indicated in Section 2.0.
- Soil samples were collected continuously from grade to 35 feet below grade at Location 1, to 30 feet below grade at Location 2, and to 5 feet below grade at Location 3.
- Soil samples collected from each boring were screened with a PID and inspected for indications of contamination (e.g., staining, odors, etc.). Geologic descriptions of the soil and field screening results were recorded in field logs.
- One soil sample was collected from each boring from 0 to 5 feet below ground surface.

The subsurface soil samples submitted to the laboratory were analyzed for Target Compound List (TCL) and CP-51 listed VOCs plus TICs, TCL and CP-51 listed SVOCs plus TICs, PCBs, TAL metals (less Al, Ca, Fe, K, Mg and Na), TCL pesticides/herbicides, cyanide and hexavalent chromium. The samples were also analyzed for TPH DRO/GRO and RCRA characteristics for pre-design waste characterization. In addition, portions of the samples were sent to the laboratory for analysis for TCLP and placed on-hold, pending the results of the previously mentioned analyses; based on the sample results, none of the samples were subsequently analyzed for TCLP. The following table summarizes the soil analytical plan.

Table 2
Summary of PID Screening and Soil Sample Analytical Plan

Sample ID/Soil Boring Number	Boring Depth (ft bgs)	Sample Interval Selected for Analysis (ft bgs)	PID Reading (ppb)	TCL/CP-51 VOCs	TCL/CP-51 SVOCs	TAL Metals	PCBs	TCL Pesticides/Herbicides	Hexavalent Chromium	Cyanide	TPH DRO/GRO	RCRA Characteristics	TCLP
GP-1	35'	0 - 5'	0.0	X	X	X	X	X	X	X	X	X	--
GP-2	30'	0 - 5'	0.0	X	X	X	X	X	X	X	X	X	--
GP-3	20'	0' - 5'	0.0	X	X	X	X	X	X	X	X	X	--

X - Sample analysis performed
-- - Not analyzed

Sampling was conducted in accordance with the NYCSCA-approved Scope of Work dated March 18, 2016, amended as discussed previously. Sampling parameters were based on the identified RECs/VECs which indicated potential petroleum and chlorinated solvent contamination on-site. Samples analyzed for TCL and CP-51 VOCs and SVOCs were also analyzed for TICs.

The samples were collected and containerized in accordance with NYSDEC/United States Environmental Protection Agency (USEPA) protocols. Each container was properly labeled, preserved, and placed in a cooler for transport via courier to Con-Test Analytical Laboratory of East Longmeadow, Massachusetts. Con-Test Analytical Laboratory is a NYSDOH ELAP-certified analytical laboratory, whose current certification has been verified by D&B. Standard chain-of-custody procedures were followed. A summary of the analytical results is provided in *Tables 10 through 13* and a copy of the analytical laboratory results is attached in *Appendix E*.

2.5 Perched Groundwater Investigation

A perched groundwater sampling program was conducted as part of the Phase II ESI. A perched groundwater sample was collected to assess the current environmental conditions of perched groundwater within the proposed Site. *Figure 3* shows the location of the perched groundwater sample collected at the Site as part of the Phase II ESI.

The perched groundwater sampling program was completed on April 9, 2016. Aquifer Drilling and Testing, Inc. (ADT) of Mineola, New York was retained for drilling services. All perched groundwater

sampling was conducted in accordance with the procedures set forth in the NYSDEC’s DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010.

Perched groundwater sampling was conducted in accordance with the NYCSCA approved scope of work dated March 18, 2016, amended as discussed in Section 2.0. A perched groundwater sample was collected from Location 3, as shown on *Figure 3*; perched groundwater was not encountered in Location 1 to a depth of approximately 35 feet below grade and, although apparent in Location 2 at a depth of 25 feet below grade, did not recharge into the well for sampling. A perched groundwater sample was collected by installing a temporary 1-inch PVC monitoring well below the encountered perched water table. Perched groundwater was encountered at a depth of approximately 9.5 feet bgs at Location 3. Prior to the collection of the perched groundwater sample, the sample location was purged until perched groundwater turbidity reached a minimum (i.e., less than 50 Nephelometric Turbidity Units [NTUs] was the goal) and the other water chemistry parameters stabilized. The perched groundwater sample was collected using a check valve and dedicated Teflon lined tubing inserted into the installed well screen. Conductivity, dissolved oxygen, pH, temperature and turbidity were monitored using a Horiba™ water quality meter during purging. Visual or olfactory indications of contamination were not observed in the perched groundwater sample collected and LNAPL or sheens were not encountered. During purging, D&B actively monitored and tracked the volume of water purged and the field parameter readings. Data was recorded in the field log book.

A summary of the perched groundwater field screening results and the perched groundwater sample analytical plan is presented in the table below.

**Table 3
Perched Groundwater Sample Analytical Plan**

Sample ID/ Well Number	Depth to Water (ft bgs)	Screened Interval (MWs) or Sample Interval (TWPs)	Field Observations (PID readings, sheen, odor, etc.)	TCL/CP-51 VOCs	TCL/CP-51 SVOCs	PCBs	TAL Metals	NYCDEP Discharge Parameters
GW-3	9.5’	10’ well screen installed at 10 to 20’ bgs	No sheen or odor	X	X	X	X	X

X - Sample analysis performed

The perched groundwater sample was analyzed for TCL and CP-51 listed VOCs plus TICs, TCL and CP-51 listed SVOCs plus TICs, PCBs and TAL metals (less Al, Ca, Fe, K, Mg and Na) (both unfiltered and laboratory filtered). In addition, the sample was analyzed for NYCDEP Sewer Discharge parameters. The sample was collected and containerized in accordance with NYSDEC/USEPA protocols. Each container was properly labeled, preserved, and placed in a cooler for transport via courier to Con-Test Analytical Laboratory of East Longmeadow, Massachusetts. Con-Test Analytical Laboratory is a NYSDOH ELAP-certified analytical laboratory, whose current certification has been verified by D&B.

Standard chain-of-custody procedures were followed. A summary of the analytical results is provided in *Tables 14 through 18* and a copy of the analytical laboratory results is attached in *Appendix E*.

Permanent groundwater monitoring wells were not installed as part of this Phase II ESI. In addition, groundwater samples from the water table were not collected as part of this Phase II ESI.

2.6 Preliminary Waste Characterization

The objective of this investigation was to provide a preliminary evaluation of the material characteristics for disposal purposes. This investigation should not be considered a substitute for waste characterization sampling required by a specific disposal facility. Completing a site-specific waste characterization for excavated/removed material is the responsibility of the construction contractor.

2.6.1 Pre-Design Waste Characterization

Three subsurface soil samples collected from Locations 1, 2 and 3 at 0 to 5 feet below grade were utilized for preliminary waste characterization purposes as discussed in Section 2.4 and were analyzed for TPH DRO/GRO and RCRA characteristics, in addition to the parameters mentioned previously. Samples for TCLP analysis were collected and placed on-hold at the laboratory but not analyzed based on the results of the totals analyses.

2.6.2 Investigation Derived Waste Sampling

Investigation derived waste (IDW) was not generated during the Phase II ESI since evidence of contamination was not observed in any of the soil borings advanced. All surplus bored material (i.e., that not needed for sample collection) was used to backfill each borehole.

3.0 SITE DESCRIPTION AND PHYSICAL CHARACTERISTICS

The Site lot consists of an irregularly-shaped 74,000-square-foot lot improved with a building that is currently used as a primary school with a playground, basketball courts, track and field, and three Transportable Classroom Units (TCUs). The existing school building is a 28,320-square-foot irregularly-shaped three-story building originally constructed in 1925, with additions constructed in 1946, 1949 and 1994. For the purposes of this Phase II ESI, the existing school building, playground north of the building, basketball courts and track and field are not considered part of the Site. The Site is defined as the approximate 12,000-square-foot area to the west of the existing school building where the three TCUs and western playground are located. The three TCUs are rectangular-shaped one-story metal-framed buildings that were installed approximately 20 years ago. Historically, the Site has been utilized as P.S. 131Q since 1925 when the existing school building was constructed. Prior to construction of the building, the Site was vacant. Adjoining properties have historically been residential and institutional.

The Site is bounded to the north by the P.S. 131Q school yard followed by 83rd Avenue; to the east by the P.S. 131Q school building and yard followed by 172nd Street; to the west by residential properties followed by 170th Street; and, to the south by 84th Avenue followed by residential properties. *Figure 1* presents a Site Location Map. A Site plan showing Site features, tax block and lot numbers and anticipated groundwater flow direction is provided in *Figure 2*.

3.1 Topography

According to the United States Geological Survey (USGS.) 7.5-Minute Quadrangle Map, Jamaica, New York, dated 2013 and information presented in the database report, the elevation of the Site is approximately 129 feet above mean sea level and the topographic gradient of the area generally slopes down to the west. The nearest surface water bodies are a small pond located in Tilly Park approximately 0.3 miles to the southwest, and Willow Lake located approximately 2 miles to the northwest. During the Site reconnaissance, the topography of the Site was observed to slope down to the east.

3.2 Geology

According to USGS Water Supply Paper 2498, *Ground-Water Resources of Kings and Queens Counties, Long Island, New York* (1999), bedrock is located approximately 575 feet below grade in the vicinity of the Site. Bedrock is overlain, in sequence, by Cretaceous-aged units of the Raritan formation, including the Lloyd aquifer, Raritan Clay and the Magothy aquifer, and the Pleistocene-aged Upper Glacial aquifer.

The Upper Glacial aquifer represents the uppermost water bearing unit at the Site, and most likely consists of ground moraine deposits at the Site. Ground moraine deposits (or till) were deposited at the base of glaciers during period of melting, and consist of an unsorted mix of clay, sand, gravel and boulders. Consistent with the USGS report, the Surficial Geologic Map of New York, Lower Hudson Sheet, dated 1989 indicates that native soil at the Site consists of glacial till. Soil encountered at the Site was described as fine to medium sand with some rock and gravel.

3.3 Hydrogeology

According to USGS Water Supply Paper 2498, *Ground-Water Resources of Kings and Queens Counties, Long Island, New York* (1999), groundwater is expected to be encountered approximately 110 feet below grade and flow in a west-northwesterly direction toward Willow Lake. However, estimated groundwater

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PUBLIC SCHOOL 131Q ADDITION
170-45 84th AVENUE
QUEENS, NEW YORK 11432**

levels and/or flow direction(s) may vary due to seasonal fluctuations in precipitation, local usage demands, geology, underground structures, or dewatering operations.

There are no surface water bodies located on or adjoining the Site. The nearest surface water bodies are a small pond located in Tilly Park approximately 0.3 miles to the southwest, and Willow Lake located approximately 2 miles to the northwest, which is part of the Flushing Bay watershed. Based on observations made during the Phase II ESI, perched groundwater was encountered at a depth of approximately 9.5 feet below grade in Location 3; perched groundwater was not encountered in Location 1 to a depth of approximately 35 feet below grade and, although apparent in Location 2 at a depth of 25 feet below grade, did not recharge into the well for sampling. The groundwater table was not encountered during the Phase II ESI since the deepest borings were only advanced to 35 feet below grade and the water table is expected to be encountered at approximately 110 feet below grade.

4.0 DISCUSSION OF FINDINGS

This section presents a discussion of the findings of the Phase II ESI. A summary of the laboratory results is presented in *Tables 9 to 18*. The sample collection logs and the complete laboratory analytical data packages are included in *Appendices D and E*, respectively. The data packages were reviewed for completeness and compliance with the applicable methods. The laboratory qualified several of the results due to several quality assurance/quality control (QA/QC) requirements being outside of the set limits (e.g., holding times, calibration criteria, surrogate recoveries, lab control samples, percent differences, etc.). Upon review, it has been determined that the qualifiers identified by the laboratory do not impact the usability of the samples results for environmental assessment purposes.

4.1 Applicable Regulatory Standards

This subsection identifies the USEPA, NYSDEC, NYSDOH and/or NYCDEP regulatory standards and guidelines used to evaluate the results of the soil vapor, subsurface soil and perched groundwater sampling. The standards and guidelines used to evaluate the specific data are described individually below.

4.1.1 Soil Vapor Guidelines

Analytical results for soil vapor samples were compared to the NYSDOH Air Guideline Values (AGVs) and to background levels of VOCs in indoor air presented in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006 (“NYSDOH Vapor Intrusion Guidance Document”), including Upper Fence Limit Indoor Air Values from “Table C-1, NYSDOH 2003: Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes,” 90th Percentile Indoor Air Values from “Table C-2, EPA 2001: Building Assessment and Survey Evaluation (BASE) Database, SUMMA Canister Method”, and the 95th Percentile Indoor Air Values from “Table C-5, Health Effects Institute (HEI) 2005: Relationship of Indoor, Outdoor and Personal Air” published in the NYSDOH Soil Vapor Intrusion Guidance Document, Appendix C (October 2006). Tetrachloroethene (PCE) levels were compared to the Air Guideline Value presented in the NYSDOH Fact Sheet on Tetrachloroethene in Indoor and Outdoor Air, dated September 2013 (see <https://www.health.ny.gov/environmental/chemicals/tetrachloroethene/docs/perc.pdf>). Trichloroethene (TCE) levels were compared to the Air Guideline Value presented in the NYSDOH Fact Sheet on Trichloroethene in Indoor and Outdoor Air, dated August 2015 (see https://www.health.ny.gov/environmental/investigations/soil_gas/svi_guidance/docs/fs_tce.pdf). The results of the analyses of the soil vapor samples were also compared to Matrices 1 and 2 in the NYSDOH Vapor Intrusion Guidance Document. *(Please note that the matrices rely in part on indoor air data and indoor air samples were not collected as part of the Phase II ESI.)*

4.1.2 Soil Cleanup Objectives (SCOs), Supplemental Soil Cleanup Objectives (SSCOs) and Soil Cleanup Levels (SCLs)

The Unrestricted Use SCOs found in 6 NYCRR 375-6, Remedial Program Soil Cleanup Objectives are the appropriate standards for use in evaluating the results of the analyses of the Phase II ESI soil samples. Soil which is free of contaminants above these standards is suitable for “unrestricted use” which is the land use category without imposed restrictions, such as environmental easements or other land use controls.

Additionally, the Supplemental Soil Cleanup Objectives (SSCOs) outlined in Table 1 of the Commissioner Policy 51 (CP-51), "Soil Cleanup Guidance", dated October 21, 2010 were used to evaluate soils data. CP-51 replaces the Technical and Administrative Guidance Memorandum (TAGM) 4046: Determination of Soil Cleanup Objectives and Cleanup Levels (January 24, 1994); the Petroleum Site Inactivation and Closure Memorandum (February 23, 1998); and, Sections III and IV of Spill Technology and Remediation Series (STARS) #1 (August 1992). The specific compounds listed in Table 1 of CP-51 had been included in former TAGM 4046 but were not included in 6 NYCRR 375-6.

Lastly, the Soil Cleanup Levels (SCLs) for Fuel Oil Contaminated Soil found in Table 3 of CP-51 were used to evaluate the VOC and SVOC soil data. CP-51 replaces the Technical and Administrative Guidance Memorandum (TAGM) 4046: Determination of Soil Cleanup Objectives and Cleanup Levels (January 24, 1994); the Petroleum Site Inactivation and Closure Memorandum (February 23, 1998); and, Sections III and IV of Spill Technology and Remediation Series (STARS) #1 (August 1992).

4.1.3 Perched Groundwater Quality Standards and Guidance Values

Analytical results for perched groundwater were compared to New York State Class GA Groundwater Standards and Guidance Values, in the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1, "Ambient Water Quality Standards and Guidance Values." Ambient water quality standards are enforceable regulatory limits. Where ambient water quality standards do not exist, ambient water quality guidance values were used to evaluate the groundwater results.

Perched groundwater data were also compared to the daily limits set forth in the NYCDEP Bureau of Wastewater Treatment "Limitations for Effluent to Sanitary or Combined Sewers."

4.1.4 Preliminary Waste Characterization

Analytical results for the preliminary waste characterization sampling were compared to the NYSDEC 6 NYCRR Part 373 regulations for characteristic hazardous waste. In addition, the analytical results were compared to typical analytical requirements for selected disposal facilities.

4.2 Geophysical Survey Findings

A geophysical survey was performed on April 7, 2016 by Diversified Geophysics, Inc. of Mineola, New York to verify that the proposed sample locations were clear of subsurface structures and utilities. All boring locations were cleared for obstructions. Anomalies indicative of potential underground storage tanks were not identified during the geophysical survey. The geophysical survey report is presented as *Appendix B*.

4.3 Soil Vapor Survey Findings

4.3.1 Soil Vapor Sampling Findings

A review of the soil vapor sample analytical results indicates that 19 of the 26 VOCs analyzed utilizing USEPA Method TO-15 for the parameters listed in Table 1 were detected in one or more samples. A summary of the analytical results for VOCs in soil vapor is summarized in *Table 9*. The complete analytical data report is presented in *Appendix E*. A summary of the detected compounds at a concentration greater than anticipated background levels and/or the AGV is provided below:

Table 4
Summary of Detected VOCs Concentrations Greater Than AGV and/or
Background Concentrations in Soil Vapor

Sample ID Sampling Date Units	SV-1 04/09/16 ug/m ³	SV-2 04/09/16 ug/m ³	SV-3 04/09/16 ug/m ³	NYSDOH Air Guideline Value ug/m ³	NYSDOH Table C-1 Upper Fence Limit (indoor) ug/m ³	NYSDOH Table C-2 90th Percentile Value (indoor) ug/m ³	NYSDOH Table C-5 95th Percentile Value (indoor) ug/m ³
1,2,4-Trimethylbenzene	24	31	23	--	9.8	9.5	--
1,3,5-Trimethylbenzene	5.9	11	5.6	--	3.9	3.7	--
Chlorobenzene	<0.16	<0.16	2	--	0.4	<0.9	--
m,p-Xylenes	26	27	15	--	11	22.2	22.2
o-Xylene	9.4	11	5.3	--	7.1	7.9	7.24
Toluene	180	170	65	--	57	43	39.8
Trichloroethene (TCE)	3.4	3.2	3.1	2	0.5	4.2	1.36

Qualifiers:

<: Analyzed but not detected

Notes:

ug/m³: Micrograms per cubic meter

--: Not calculated or no guideline value

Exceeds the NYSDOH Air Guideline Value

Exceeds the maximum concentration of NYSDOH Table C-1, C-2 and C-5

The following compounds were detected at concentrations greater than the anticipated range of background concentrations: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, chlorobenzene, m,p-xylenes, o-xylene and toluene. All three samples exhibited one or more of these compounds at concentrations greater than the anticipated range of background concentrations. The exceedances were primarily of fuel-related compounds and were fairly consistent in all three samples.

The NYSDOH has established Air Guideline Values (AGVs) for three of the VOCs analyzed (i.e., methylene chloride, PCE, and TCE). TCE was detected at concentrations greater than the AGV of 2 µg/m³ in all three soil vapor samples at consistent concentrations (3.1 µg/m³, 3.2 µg/m³ and 3.4 µg/m³). Methylene chloride and PCE were not detected at concentrations greater than their AGVs of 60 µg/m³ and 30 µg/m³, respectively, in any of the soil vapor samples.

The soil vapor sampling results for carbon tetrachloride and TCE were compared to Matrix 1 of the NYSDOH Vapor Intrusion Guidance Document. The concentrations of carbon tetrachloride reported by the laboratory ranged from non-detect to 0.23 µg/m³. The concentrations of TCE reported by the laboratory ranged from 3.1 µg/m³ to 3.4 µg/m³. Based on Matrix 1, the recommended actions for carbon tetrachloride and TCE concentrations less than 5 µg/m³ in soil vapor is either “no further action” or “take reasonable and practical actions to identify source(s) and reduce exposures”, depending on corresponding indoor air concentrations.

The soil vapor sampling results for PCE and 1,1,1-TCA were compared to Matrix 2 of the NYSDOH Vapor Intrusion Guidance Document. The concentrations of PCE reported by the laboratory ranged from 3.7 µg/m³ to 11 µg/m³. The concentrations of 1,1,1-TCA reported by the laboratory ranged from non-detect to 0.13 µg/m³. Based on Matrix 2, the recommended actions for PCE and 1,1,1-TCA concentrations less than 100 µg/m³ in soil vapor is either “no further action” or “take reasonable and practical actions to identify source(s) and reduce exposures”, depending on corresponding indoor air concentrations.

1,2,4-Trimethylbenzene, 1,3,5-trimethylbenzene, chlorobenzene, m,p-xylenes, o-xylene, toluene and trichloroethene were not detected in the soil samples. 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, chlorobenzene, m,p-xylenes, o-xylene and trichloroethene were not detected in the perched groundwater sample. Toluene was detected in the perched groundwater sample at a concentration below its Class GA Groundwater Standard. Information on the flow of perched water at the Site is not available. The highest concentrations of toluene detected in the soil vapor samples were from locations where perched groundwater was either not observed or could not be collected (i.e., Locations 1 and 2). As a result, the detected concentrations of these VOCs in the soil vapor are likely attributable to off-site sources.

4.4 Soil Sampling Findings

4.4.1 Volatile Organic Compounds (VOCs) in Soil

A review of the soil sampling analytical results indicates that 1 of the 78 VOCs analyzed was detected in one sample. The detected VOC is methylene chloride, which is a common laboratory contaminant and likely not indicative of on-site contamination. Tentatively Identified Compounds (TICs) were not detected in the samples. The detected VOC concentration is below its Unrestricted Use SCO, SCL, and/or Supplemental SCO. Summaries of the analytical results for VOCs in soil are presented in *Table 10*. The analytical data package is presented as *Appendix E*.

4.4.2 Semivolatile Organic Compounds (SVOCs) in Soil

A review of the subsurface soil sampling analytical results indicates that 12 of the 74 SVOCs analyzed were detected in one or more samples. Tentatively Identified Compounds (TICs) were identified in one sample at a total concentration of 800 ug/kg (GP-3 [0-5]). A summary of the compounds and concentrations which exceed Unrestricted Use SCOs, SCLs, and/or Supplemental SCOs is provided below:

**Table 5
Detected SVOC Concentrations Above Unrestricted Use SCOs and/or Supplemental SCOs in Soil**

Sample ID	GP-1 (0-5)	GP-2 (0-5)	GP-3 (0-5)	6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives	CP-51 Fuel Oil Contaminated Soil Cleanup Levels	CP-51 Residential Use SCOs
Sampling Date	04/09/16	04/09/16	04/09/16			
Start Depth (in Feet)	0	0	0			
End Depth (in Feet)	5	5	5			
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzo(b)fluoranthene	<0.19	<0.18	1.1	1	1	--
Indeno(1,2,3-cd)pyrene	<0.19	<0.18	0.56	0.5	0.5	--

Footnotes/Qualifiers:

<: Analyzed for but not detected

Notes:

mg/kg: Milligrams per kilogram

Exceed Soil Cleanup Criteria

These two SVOCs were detected in soil sample GP-3 (0 to 5 feet), which is located in the southeastern portion of the Site. As summarized above, these two SVOCs were detected at concentrations exceeding the Unrestricted Use SCOs and SCLs in this sample. Evidence of contamination was not observed during field screening. The source of these SVOCs can likely be attributed to historic fill present at the Site.

Summaries of the analytical results for SVOCs in soil are presented in *Table 11*. The analytical data package is presented as *Appendix E*.

4.4.3 Metals and Cyanide in Soil

A review of the subsurface soil sampling analytical results indicates that 13 of the 17 metals analyzed were detected in one or more samples. A summary of the metals and concentrations which exceed Unrestricted Use SCOs is provided below:

Table 6
Detected Metals and Cyanide Concentrations above
Unrestricted Use SCOs and/or Supplemental SCOs in Soil

Sample ID	GP-1 (0-5)	GP-2 (0-5)	GP-3 (0-5)	6 NYCRR Part 375	CP-51
Sampling Date	4/09/2016	4/09/2016	4/09/2016	Unrestricted Use	Residential
Start Depth (in Feet)	0	0	0	Soil Cleanup	Use
End Depth (in Feet)	5	5	5	Objectives	SCOs
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Mercury	<0.029	<0.028	0.38	0.18	--

Qualifiers:

<: Analyzed for but not detected

Notes:

mg/kg: Milligrams per kilogram

--: No standard or not analyzed

Exceeds Unrestricted Use SCOs

The detected mercury concentration in the soil sample exceeding its Unrestricted Use SCO may be attributable to the characteristics of the fill material present at the Site. Visual and olfactory evidence of contamination was not observed in the soil borings. Summaries of the analytical results for metals in soil are presented in *Table 12*. The analytical data package is presented as *Appendix E*.

4.4.4 Pesticides, Herbicides and PCBs in Soil

A review of the subsurface soil sampling analytical results indicates that 1 of the 24 pesticide compounds, 1 of the 10 herbicide compounds and none of the 9 PCB aroclors analyzed were detected in the samples. The detected pesticide is 4,4'-DDT and the detected herbicide is MCPA. The detected pesticide and herbicide concentrations are below the Unrestricted Use SCOs, SCLs, and/or Supplemental SCOs. Summaries of the analytical results for pesticides, herbicides and PCBs in soil are presented in *Table 13*. The complete analytical data report is presented in *Appendix E*.

4.4.5 Total Petroleum Hydrocarbons (TPH) in Soil

A review of the subsurface soil sampling analytical results indicates that total petroleum hydrocarbons (TPH) were detected in all three samples analyzed. A summary of the detected concentrations is provided below:

Table 7
Summary of Total Petroleum Hydrocarbons (TPH) Concentrations in Soil

Sample ID	GP-1 (0-5)	GP-2 (0-5)	GP-3 (0-5)
Sampling Date	4/09/2016	4/09/2016	4/09/2016
Start Depth (in Feet)	0	0	0
End Depth (in Feet)	5	5	5
Units	mg/kg	mg/kg	mg/kg
Gasoline Range Organics (GRO)	<2.1	<2.3	<0.85
Diesel Range Organics (DRO)	2.6 J	2.2 J	27

Qualifiers:

<: Analyzed for but not detected

J: Estimated value

Notes:

mg/kg: Milligrams per kilogram

The concentrations of TPH detected in soil range from non-detect to 27 mg/kg. There are no applicable regulatory comparison criteria for TPH. TPH results provide information on soil disposal options for soil excavated for construction of the new school building addition, since disposal facilities in the New York City metropolitan area typically require TPH analyses prior to accepting soil for disposal. The concentrations of TPH noted in the samples will not impact potential soil disposal options.

Summaries of the analytical results for TPH in soil are presented in *Table 12*. The analytical data package is presented in *Appendix E*.

4.5 Perched Groundwater Sampling Findings

Perched groundwater was encountered at a depth of approximately 9.5 feet below grade at Location 3; perched groundwater was not encountered in Location 1 to a depth of approximately 35 feet below grade and, although apparent in Location 2 at a depth of 25 feet below grade, did not recharge into the well for sampling. The depth to perched groundwater was measured on April 9, 2016 utilizing a temporary monitoring well. As indicated previously, the groundwater table was not encountered during the Phase II ESI since the deepest borings were only advanced to 35 feet below grade and the water table is expected to be encountered at approximately 110 feet below grade and flow in a west-northwesterly direction. Permanent surveyed wells were not installed on-site; therefore, a groundwater contour map was not prepared as part of this Phase II ESI report.

A review of the field parameters indicates that elevated PID readings and visual evidence of contamination (abnormally low dissolved oxygen, Eh, pH below 5.5 or greater than 9, discoloration, free product, orange precipitate, etc.) were not observed. The results of the analyses of the perched groundwater samples are presented in *Tables 14 through 18*. The complete analytical data report is presented in *Appendix E*. A review of the perched groundwater analytical results is presented below.

4.5.1 Volatile Organic Compounds (VOCs) in Perched Groundwater

A review of the results of the analyses of perched groundwater for VOCs indicates that 1 of the 78 compounds analyzed was detected in the sample. Toluene was detected at a concentration below its Class GA Groundwater Standard/Guidance Value. Tentatively Identified Compounds (TICs) were not

detected in the sample. Summaries of the analytical results for VOCs in perched groundwater are presented in *Table 14*. The complete analytical data report is presented in *Appendix E*.

4.5.2 Semivolatile Organic Compounds (SVOCs) in Perched Groundwater

A review of the results of the analyses of groundwater for SVOCs indicates that none of the 74 compounds analyzed were detected in the sample. Tentatively Identified Compounds (TICs) were also not detected in the sample. Summaries of the analytical results for SVOCs in perched groundwater are presented in *Table 15*. The complete analytical data report is presented in *Appendix E*.

4.5.3 Total and Dissolved (Filtered) Metals in Perched Groundwater

A review of the results of the metal analyses of groundwater indicates that 6 of the 17 metals analyzed were detected in the sample. The detected metals include barium, chromium, copper, manganese, nickel and vanadium. A summary of the detected metals at concentrations greater than the corresponding Class GA Groundwater Standard or Guidance Value is provided below:

Table 8
Detected Filtered Metals Concentrations in Groundwater above State Criteria

Sample ID Sampling Date Total/Dissolved Units	GW-3 4/9/2016 total mg/l	GW-3 4/9/2016 dissolved mg/l	NYSDEC Class GA Groundwater Standard/ Guidance Value mg/l
Manganese	0.66	0.7	0.3

Notes:
mg/l: Milligrams per liter

Exceeds Class GA Standard or Guidance Value

Manganese was the only metal detected in the perched groundwater sample at a concentration exceeding its Class GA Groundwater Standard. Manganese was detected at similar concentrations in both the filtered and unfiltered samples.

Manganese was detected in all three soil samples but at concentrations below its Unrestricted Use SCO. Manganese is typically detected at elevated concentrations in regional groundwater. As a result, the presence of manganese in the perched groundwater is likely attributable to natural conditions rather than on-site or off-site sources.

Summaries of the analytical results for metals in perched groundwater are presented in *Table 16*. The complete analytical data report is presented in *Appendix E*.

4.5.4 PCBs in Perched Groundwater

A review of the analytical results indicates that PCBs were not detected in the perched groundwater sample collected. A summary of the analytical results for PCBs in perched groundwater is presented in *Table 17*. The analytical data package is presented as *Appendix E*.

4.5.5 NYCDEP Discharge Parameters in Perched Groundwater

The perched groundwater sample was analyzed for New York City Department of Environmental Protection (NYCDEP) discharge parameters. All NYCDEP discharge parameters were below their respective effluent limits. A summary of the analytical results for NYCDEP Discharge Limits in perched groundwater is presented in *Table 18*. The analytical data package is presented in *Appendix E*.

4.6 Pre-Design Waste Characterization Sampling Findings

4.6.1 Pre-Design Characterization Sampling Results

All waste characterization parameters were below their respective characteristic hazardous waste threshold values and no evidence of contamination was identified. Samples for TCLP analysis were collected and placed on-hold at the laboratory but not analyzed based on the results of the totals analyses. A detailed summary of the analytical results for waste characterization sampling is presented in *Table 12*. The analytical data package is presented in *Appendix E*.

Based on a preliminary characterization of the soil quality during this investigation and a review of the analytical requirements for selected solid waste management facilities, elevated concentrations of select SVOCs and metals will require disposal as nonhazardous excavated material.

4.6.2 Investigation Derived Waste Management and Disposal

Investigation derived waste (IDW) was not generated during the Phase II ESI. All surplus bored material (i.e., that was not needed for sample collection) was used to backfill each borehole. In addition, all purged perched groundwater was introduced back into the borehole prior to backfill.

4.7 Summary of Findings

D&B performed a Phase II ESI consisting of a geophysical survey, soil borings and the collection and laboratory analysis of soil vapor, soil and perched groundwater samples within the proposed Site. The results of the Phase II ESI indicate the following:

- Based on observations made during the Phase II ESI, perched groundwater was encountered at Location 3 at approximately 9.5 feet below the ground surface elevation; perched groundwater was not encountered in Location 1 to a depth of approximately 35 feet below grade and, although apparent in Location 2 at a depth of 25 feet below grade, did not recharge into the well for sampling. The groundwater table was not encountered during the Phase II ESI since the deepest borings were only advanced to 35 feet below grade and the water table is expected to be encountered at approximately 110 feet below grade and flow in a west-northwesterly direction.
- The Phase I ESA identified historic fill of unknown origin as a REC/VEC for the Site. Three soil borings were advanced on-site to depths of 20, 30 and 35 feet below ground surface. During the Phase II ESI, fill material consisting of rock fragments was encountered in the on-site borings, with a maximum thickness of approximately 5 feet. Native material consisting of fine to medium sand with some rock and gravel was observed below the fill material. Evidence of contamination was not observed during the field sampling.

- The geophysical survey cleared the boring locations for obstructions and did not detect any underground anomalies.
- Three soil vapor samples were collected and analyzed for VOCs. Seven petroleum and chlorinated solvent-related compounds were detected in the soil vapor samples at concentrations exceeding the range of published background concentrations. In addition, TCE was detected at concentrations exceeding its NYSDOH Air Guideline Value in all three samples. These elevated concentrations in soil vapor are likely attributable to off-site sources. The results of the analyses of the soil vapor samples were also evaluated with respect to the matrices provided in the NYSDOH Vapor Intrusion Guidance Document, which indicates that “no further action” or “take reasonable and practical actions to identify source(s) and reduce exposures” are the recommended actions, depending upon the corresponding indoor air concentrations.
- For soil, two SVOCs (benzo[b]fluoranthene and indeno[1,2,3-cd]pyrene) and one metal (mercury) were detected in one soil sample (GP-3 [0-5]) at concentrations exceeding the Unrestricted Use SCOs. These detected concentrations exceeding the regulatory criteria are likely attributable to the characteristics of the fill material present at the Site; visual evidence of contamination was not observed in the soil samples. VOCs, pesticides, herbicides and PCBs were not detected in the soil samples at concentrations exceeding the Unrestricted Use SCOs.
- For perched groundwater, field screening did not observe evidence of contamination in the perched groundwater sample. VOCs, SVOCs and PCBs were either not detected or were detected in the perched groundwater sample at concentrations below the Class GA Groundwater Standards/Guidance Values. The perched groundwater sample analyses exhibited manganese at concentrations exceeding its NYSDEC Class GA Groundwater Standards in the both the unfiltered (totals) and filtered (dissolved) samples, at similar concentrations. Manganese was detected in all three soil samples but at concentrations below its Unrestricted Use SCO. Manganese is typically detected at elevated concentrations in regional groundwater. As a result, the presence of manganese in the perched groundwater is likely attributable to natural conditions rather than on-site or off-site sources.
- The perched groundwater sample (i.e., GW-3) was also analyzed for NYCDEP Sewer Use Discharge Limits. All the NYCDEP discharge parameters were below their respective effluent limits.
- Free phase product was not encountered during the field activities.
- All waste characterization parameters were below their respective characteristic hazardous waste threshold values.
- Due to concentrations of select SVOCs and metals exceeding the Unrestricted Use SCOs, the soil encountered at the Site should be classified as nonhazardous excavated material.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the Phase II Environmental Site Investigation (ESI), D&B concludes the following:

- The RECs/VECs identified in the Phase I ESA were adequately investigated.
- Trichloroethene was detected at concentrations exceeding its New York State Department of Health (NYSDOH) Air Guideline Value (AGV) in all three soil vapor samples. Petroleum and chlorinated solvent-related VOCs were detected in soil vapor at concentrations exceeding published background concentrations. These detections are likely attributable to off-site sources.
- Benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene and mercury were detected in one soil sample at concentrations exceeding the Unrestricted Use SCOs. These detected concentrations exceeding the regulatory criteria are likely attributable to the characteristics of the fill material present at the Site; visual evidence of contamination was not observed in the soil samples. VOCs, pesticides, herbicides and PCBs were not detected in the soil samples at concentrations exceeding the Unrestricted Use SCOs.
- VOCs, SVOCs and PCBs were either not detected or were detected in the perched groundwater sample at concentrations below the Class GA Groundwater Standards/Guidance Values. The perched groundwater sample analyses exhibited manganese at concentrations exceeding its NYSDEC Class GA Groundwater Standards in the both the unfiltered (total) and filtered (dissolved) samples, at similar concentrations. Manganese was detected in all three soil samples but at concentrations below its Unrestricted Use SCO. Manganese is typically detected at elevated concentrations in regional groundwater. As a result, the presence of manganese in the perched groundwater is likely attributable to natural conditions rather than on-site or off-site sources.
- Due to concentrations of select SVOCs and metals exceeding the Unrestricted Use SCOs, the soil encountered at the Site should be classified as nonhazardous excavated material.

Based on the results of the Phase II ESI, the following remedial actions and/or engineering controls are required to render the Site suitable for use as a public school facility:

- As a safeguard to prevent potential volatile organic compounds in soil vapor from entering the new school building addition in the future, an active sub-slab depressurization system (SSDS) and a soil vapor barrier should be integrated into the new building addition design including integration with any proposed damp-proofing or waterproofing components of the new building addition design. The design of the system should take into account the shallow perched groundwater elevation at the Site and consideration should be given toward designing a system capable of handling high moisture air with minimal system maintenance and downtime.

In addition, D&B recommends the following as part of the NYCSCA standard construction requirements:

- All material excavated during construction activities should be properly characterized and disposed, including collection and analysis of additional samples if required by the contractor-selected solid waste management facilities.

**PHASE II ENVIRONMENTAL SITE INVESTIGATION
PUBLIC SCHOOL 131Q ADDITION
170-45 84th AVENUE
QUEENS, NEW YORK 11432**

- Any dewatering necessary during school construction activities must be performed in accordance with applicable local, state and federal regulations. Dewatering required during construction should be minimized to mitigate potential influx of contaminated water from off-site sources toward the Site.
- Any exposed soil (landscaped areas) must be covered with at least two feet of environmentally clean fill.
- Suspect ACM, LBP, and/or PCB-containing materials should be properly managed during construction or demolition activities.

Based on the Phase II ESI results, additional investigation is not recommended for the Site. A description of the remedial engineering controls and associated cost estimates is included in *Appendix G*.

6.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

D&B Engineers and Architects, P.C. (D&B) has performed a Phase II Environmental Site Investigation (ESI) of the Public School 131Q Addition located at 170-45 84th Avenue, Queens, New York. The scope of the Phase II ESI was consistent with the scope of work dated March 18, 2016, as stated in Section 2.0.

D&B Engineers and Architects, P.C.

Prepared By: 
Emily Hepding
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Technical Review By: 
Maria Wright, P.E.
Senior Engineer
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Reviewed By: 
Michael Hofgren
Senior Associate

7.0 REFERENCES

D&B Engineers and Architects, P.C., *Phase I Environmental Site Assessment of Public School 131Q Addition, 170-45 84th Avenue, Queens, New York, 11432*, March 18, 2016.

D&B Engineers and Architects, P.C., *Proposal/Scope of Work for Phase II Environmental Site Investigation at Public School 131Q Addition, 170-45 84th Avenue, Queens, New York, 11432*, March 18, 2016.

ASTM E 2600-10 “Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions.”

Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006; prepared by the New York State Department of Health Center for Environmental Health, Bureau of Environmental Exposure Investigation.

Tetrachloroethene (PERC) in Indoor and Outdoor Air, September 2013 Fact Sheet, New York State Department of Health.

Trichloroethene (TCE) in Indoor and Outdoor Air, August 2015 Fact Sheet, New York State Department of Health.

6 NYCRR § 375, effective December 14, 2006; New York State Department of Environmental Conservation Rules and Regulations, Remedial Program Requirements.

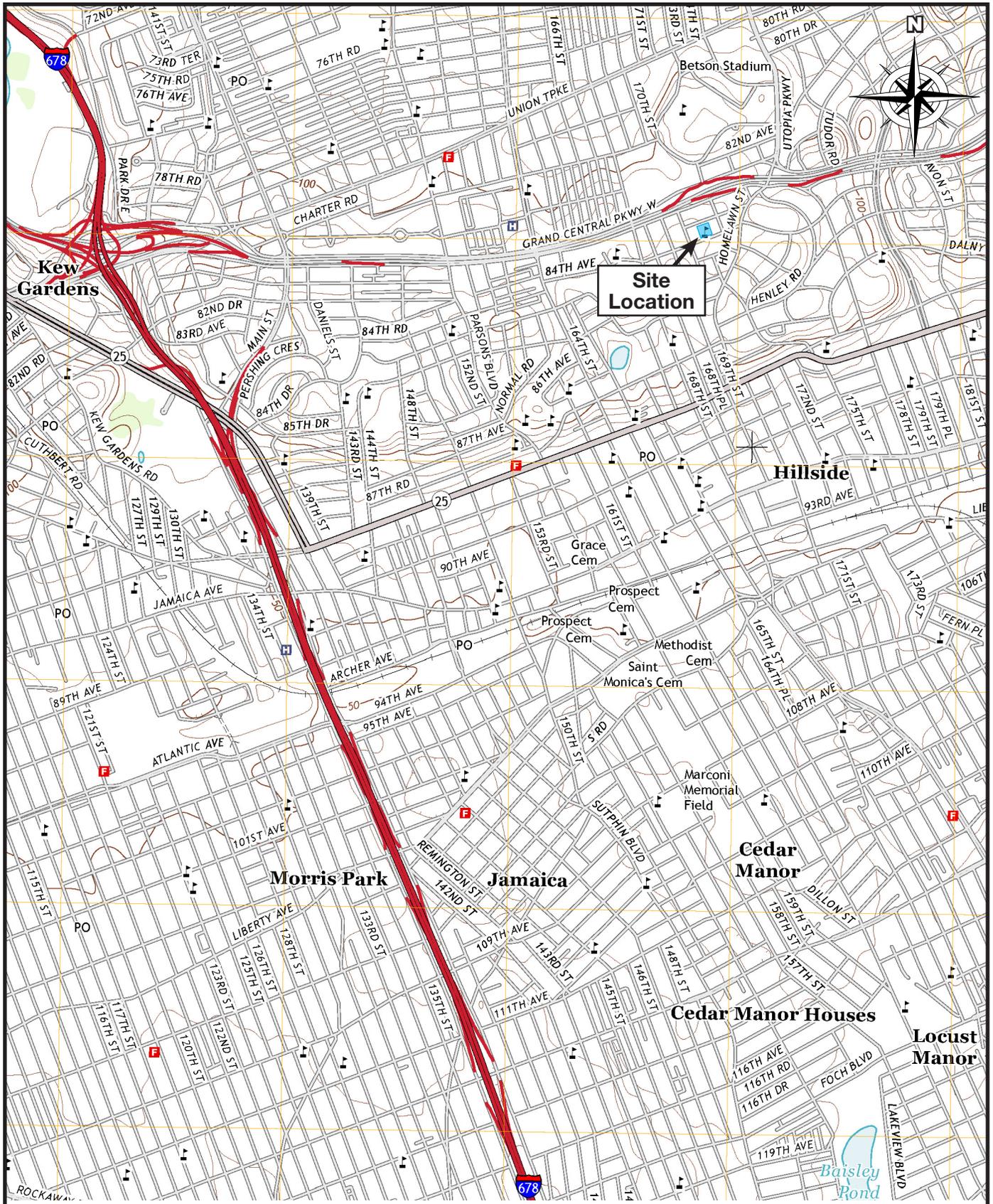
6 NYCRR Chapter X § 700 – 706; New York State Department of Environmental Conservation Water Quality Regulations, Surface Water and Groundwater Classifications and Standards.

CP-51/Soil Cleanup Guidance; New York State Department of Environmental Conservation, October 21, 2010.

ASTM Standards Related to the Phase II Environmental Site Assessment Process, 2nd Edition.

DER-10 Technical Guidance for Site Investigation and Remediation (5/3/2010).

FIGURES



SOURCE: UNITED STATES GEOLOGICAL SURVEY (USGS) TOPOGRAPHIC QUADRANGLE JAMAICA, NY 2013

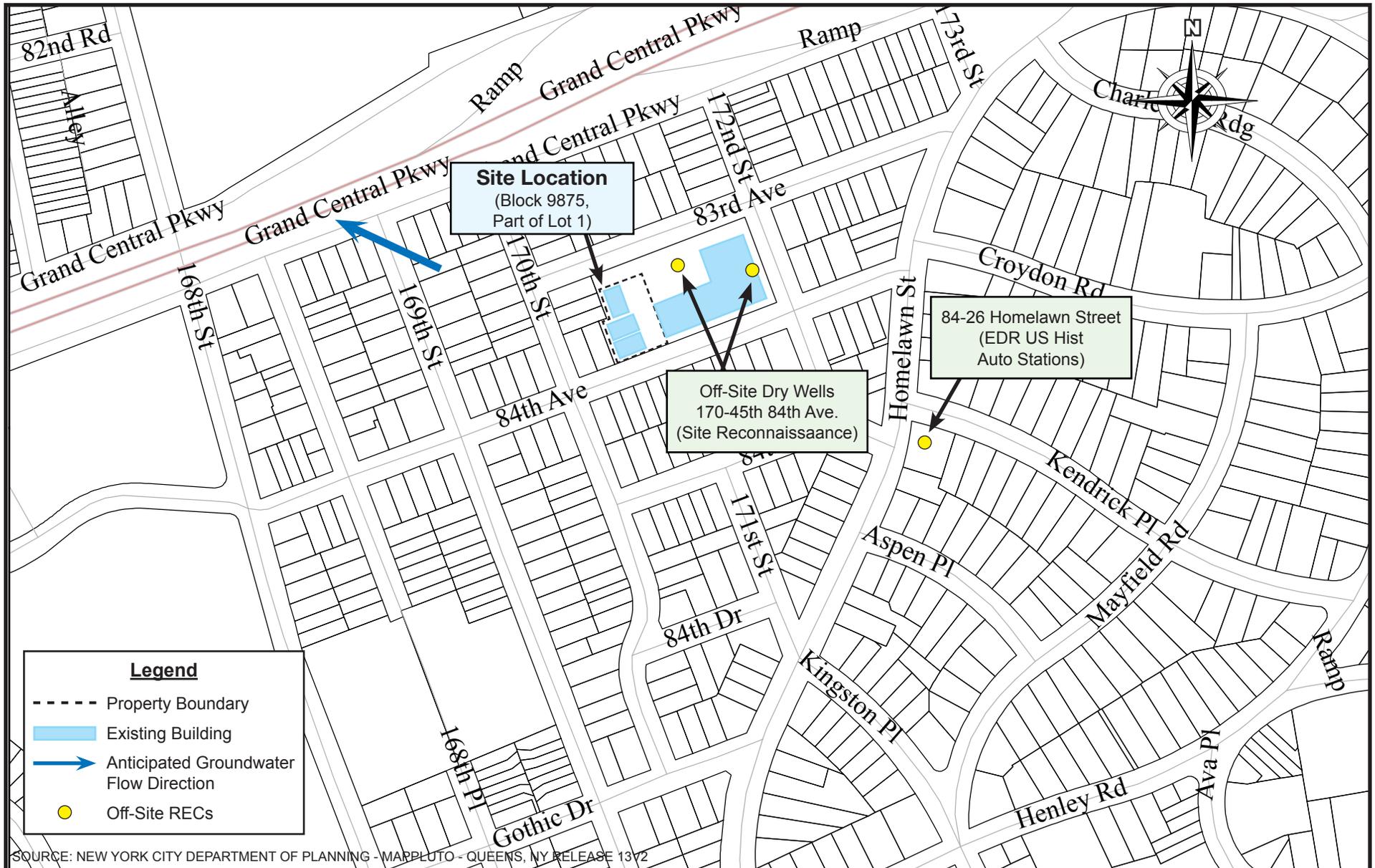


NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

170-45 84TH AVENUE
QUEENS, NEW YORK
SITE LOCATION MAP



FIGURE 1

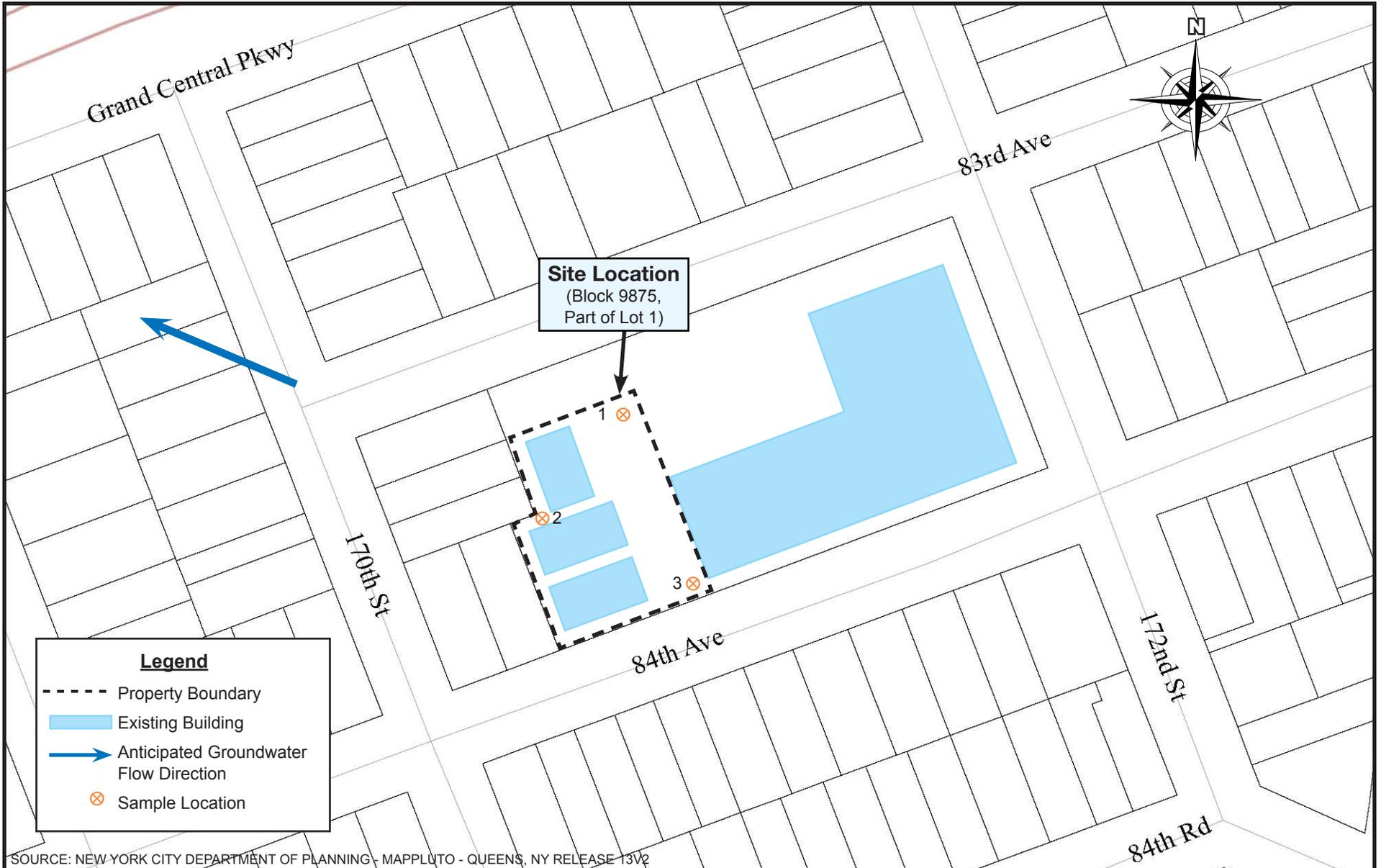


NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

170-45 84TH AVENUE
QUEENS, NEW YORK 11432
SITE PLAN WITH OFF-SITE RECS



FIGURE 2



Site Location
 (Block 9875,
 Part of Lot 1)

Legend

- Property Boundary
- Existing Building
- Anticipated Groundwater Flow Direction
- ⊗ Sample Location

SOURCE: NEW YORK CITY DEPARTMENT OF PLANNING - MAPPLUTO - QUEENS, NY RELEASE 13V2

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

170-45 84TH AVENUE
 QUEENS, NY 11432

SITE PLAN WITH SAMPLE LOCATIONS



FIGURE 3

TABLES

Table 9
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Soil Vapor Analytical Results
Volatile Organic Compounds

Sample ID	SV-1	SV-2	SV-3	NYSDOH Air Guideline Value ug/m3	NYSDOH Table C-1 Upper Fence Limit (indoor) ug/m3	NYSDOH Table C-2 90th Percentile Value (indoor) ug/m3	NYSDOH Table C-5 95th Percentile Value (indoor) ug/m3
Sampling Date	04/09/16	04/09/16	04/09/16				
Dilution Factor	2	2	2				
Units	ug/m3	ug/m3	ug/m3				
1,1,1-Trichloroethane (TCA)	<0.098	0.13 J	<0.098	--	2.5	20.6	--
1,1-Dichloroethane	<0.11	<0.11	0.35 J	--	0.4	<0.7	--
1,1-Dichloroethene	<0.097	<0.097	<0.097	--	0.4	<1.4	--
1,2,4-Trimethylbenzene	24	31	23	--	9.8	9.5	--
1,2-Dichlorobenzene	<0.16	<0.16	<0.16	--	0.5	<1.2	--
1,2-Dichloroethane	<0.11	<0.11	<0.11	--	0.4	<0.9	--
1,2-Dichloropropane	<0.16	<0.16	<0.16	--	0.4	<1.6	--
1,3,5-Trimethylbenzene	5.9	11	5.6	--	3.9	3.7	--
1,3-Dichlorobenzene	0.31 J	<0.13	<0.13	--	0.5	<2.4	--
Benzene	8.5	4.6	2.2	--	13	9.4	10
Carbon Tetrachloride	0.23 J	0.19 J	<0.15	--	1.3	<1.3	1.1
Chlorobenzene	<0.16	<0.16	2	--	0.4	<0.9	--
Chloroethane	0.32	<0.1	0.55	--	0.4	<1.1	--
Chloromethane	1.4	0.41	0.69	--	4.2	3.7	--
cis-1,2-Dichloroethylene	<0.15	<0.15	<0.15	--	0.4	<1.9	--
Ethylbenzene	6.6	6.5	3.4	--	6.4	5.7	7.62
m,p-Xylenes	26	27	15	--	11	22.2	22.2
Methyl tert-Butyl Ether (MTBE)	<0.11	<0.11	0.55	--	14	11.5	36
Methylene Chloride	0.91 J	0.74 J	1.7 J	60	16	10	7.5
Naphthalene	1.8	1.8	2.6	--	--	5.1	--
o-Xylene	9.4	11	5.3	--	7.1	7.9	7.24
Tetrachloroethylene (PCE)	11	6.5	3.7	30	2.5	15.9	6.01
Toluene	180	170	65	--	57	43	39.8
trans-1,2-Dichloroethene	<0.1	<0.1	<0.1	--	--	--	--
Trichloroethylene (TCE)	3.4	3.2	3.1	2	0.5	4.2	1.36
Vinyl Chloride	<0.11	<0.11	<0.11	--	0.4	<1.9	--
Total Volatile Organic Compounds	279.77	274.07	134.74	--	--	--	--

Qualifiers:
 <: Analyzed but not detected
 J: Estimated value

Notes:
 ug/m3: Micrograms per cubic meter
 -- : Not calculated or no guideline value
Exceeds the NYSDOH Air Guideline Value.
Exceeds the maximum concentration of NYSDOH Table C-1, C-2 and C-5

Table 10
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Soil Analytical Results
Volatile Organic Compounds

Sample ID Sampling Date Start Depth (in Feet) End Depth (in Feet) Units	GP-1 (0-5) 04/09/16 0 5 mg/kg	GP-2 (0-5) 04/09/16 0 5 mg/kg	GP-3 (0-5) 04/09/16 0 5 mg/kg	6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives mg/kg	CP-51 Fuel Oil Contaminated Soil Cleanup Levels mg/kg	CP-51 Residential Use SCOs mg/kg
1,1,1-Trichloroethane	<0.0013	<0.0014	<0.0016	0.68	--	--
1,1,1,2-Tetrachloroethane	<0.0013	<0.0014	<0.0016	--	--	35
1,1,2-Trichloroethane	<0.0026	<0.0029	<0.0032	--	--	--
1,1,2-Trichlorotrifluoroethane	<0.0066	<0.0072	<0.0079	--	--	100
1,1,2,2-Tetrachloroethane	<0.0013	<0.0014	<0.0016	--	--	--
1,1-Dichloroethane	<0.0013	<0.0014	<0.0016	0.27	--	--
1,1-Dichloroethylene	<0.0026	<0.0029	<0.0032	0.33	--	--
1,1-Dichloropropene	<0.0013	<0.0014	<0.0016	--	--	--
1,2,3-Trichlorobenzene	<0.0013	<0.0014	<0.0016	--	--	--
1,2,3-Trichloropropane	<0.0013	<0.0014	<0.0016	--	--	80
1,2,4-Trichlorobenzene	<0.0013	<0.0014	<0.0016	--	--	--
1,2,4-Trimethylbenzene	<0.0013	<0.0014	<0.0016	3.6	3.6	--
1,2-Dibromo-3-chloropropane	<0.0026	<0.0029	<0.0032	--	--	--
1,2-Dibromoethane	<0.00066	<0.00072	<0.00079	--	--	--
1,2-Dichlorobenzene	<0.0013	<0.0014	<0.0016	1.1	--	--
1,2-Dichloroethane	<0.0013	<0.0014	<0.0016	0.02	--	--
1,2-Dichloropropane	<0.0013	<0.0014	<0.0016	--	--	--
1,3,5-Trichlorobenzene	<0.0013	<0.0014	<0.0016	--	--	--
1,3,5-Trimethylbenzene	<0.0013	<0.0014	<0.0016	8.4	8.4	--
1,3-Dichlorobenzene	<0.0013	<0.0014	<0.0016	2.4	--	--
1,3-Dichloropropane	<0.00066	<0.00072	<0.00079	--	--	--
1,4-Dichlorobenzene	<0.0013	<0.0014	<0.0016	1.8	--	--
1,4-Dioxane	<0.066	<0.072	<0.079	0.1	--	--
2,2-Dichloropropane	<0.0013	<0.0014	<0.0016	--	--	--
2-Butanone (MEK)	<0.026	<0.029	<0.032	0.12	--	100
2-Chlorotoluene	<0.0013	<0.0014	<0.0016	--	--	--
2-Hexanone (MBK)	<0.013	<0.014	<0.016	--	--	--
4-Chlorotoluene	<0.0013	<0.0014	<0.0016	--	--	--
4-Methyl-2-pentanone (MIBK)	<0.013	<0.014	<0.016	--	--	--
Acetone	<0.066	<0.072	<0.079	0.05	--	--
Acrylonitrile	<0.0040	<0.0043	<0.0047	--	--	--
Benzene	<0.0013	<0.0014	<0.0016	0.06	0.06	--
Bromobenzene	<0.0013	<0.0014	<0.0016	--	--	--
Bromochloromethane	<0.0013	<0.0014	<0.0016	--	--	--
Bromodichloromethane	<0.0013	<0.0014	<0.0016	--	--	--
Bromoform	<0.0013	<0.0014	<0.0016	--	--	--
Bromomethane	<0.0066	<0.0072	<0.0079	--	--	--
Carbon Disulfide	<0.0040	<0.0043	<0.0047	--	--	100
Carbon Tetrachloride	<0.0013	<0.0014	<0.0016	0.76	--	--
Chlorobenzene	<0.0013	<0.0014	<0.0016	1.1	--	--
Chloroethane	<0.013	<0.014	<0.016	--	--	--
Chloroform	<0.0026	<0.0029	<0.0032	0.37	--	--
Chloromethane	<0.0066	<0.0072	<0.0079	--	--	--
cis-1,2-Dichloroethene	<0.0013	<0.0014	<0.0016	0.25	--	--
cis-1,3-Dichloropropene	<0.00066	<0.00072	<0.00079	--	--	--
Dibromochloromethane	<0.00066	<0.00072	<0.00079	--	--	--
Dibromomethane	<0.0013	<0.0014	<0.0016	--	--	--
Dichlorodifluoromethane (Freon 12)	<0.013	<0.014	<0.016	--	--	--
Diethyl Ether	<0.013	<0.014	<0.016	--	--	--
Diisopropyl Ether (DIPE)	<0.00066	<0.00072	<0.00079	--	--	--
Ethylbenzene	<0.0013	<0.0014	<0.0016	1	1	--
Hexachlorobutadiene	<0.0013	<0.0014	<0.0016	--	--	--
Isopropylbenzene	<0.0013	<0.0014	<0.0016	--	2.3	100

See next page for Qualifiers/Notes

Table 10
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Soil Analytical Results
Volatile Organic Compounds

Sample ID Sampling Date Start Depth (in Feet) End Depth (in Feet) Units	GP-1 (0-5) 04/09/16 0 5 mg/kg	GP-2 (0-5) 04/09/16 0 5 mg/kg	GP-3 (0-5) 04/09/16 0 5 mg/kg	6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives mg/kg	CP-51 Fuel Oil Contaminated Soil Cleanup Levels mg/kg	CP-51 Residential Use SCOs mg/kg
m/p-Xylenes	<0.0026	<0.0029	<0.0032	0.26	0.26	--
Methyl Acetate	<0.0013	<0.0014	<0.0016	--	--	--
Methyl tert-Butyl Ether	<0.0026	<0.0029	<0.0032	0.93	0.93	--
Methylcyclohexane	<0.0013	<0.0014	<0.0016	--	--	--
Methylene Chloride	0.0048 J	<0.014	<0.016	0.05	--	--
Naphthalene	<0.0026	<0.0029	<0.0032	12	12	--
n-Butylbenzene	<0.0013	<0.0014	<0.0016	12	12	--
n-propylbenzene	<0.0013	<0.0014	<0.0016	3.9	3.9	--
o-Xylene	<0.0013	<0.0014	<0.0016	0.26	0.26	--
p-Isopropyltoluene	<0.0013	<0.0014	<0.0016	--	10	--
sec-Butylbenzene	<0.0013	<0.0014	<0.0016	11	11	--
Styrene	<0.0013	<0.0014	<0.0016	--	--	--
tert-Amyl Methyl Ether (TAME)	<0.00066	<0.00072	<0.00079	--	--	--
tert-Butyl Alcohol (TBA)	<0.026	<0.029	<0.032	--	--	--
tert-Butyl Ethyl Ether (TBEE)	<0.00066	<0.00072	<0.00079	--	--	--
trans-1,3-Dichloropropene	<0.00066	<0.00072	<0.00079	--	--	--
tert-Butylbenzene	<0.0013	<0.0014	<0.0016	5.9	5.9	--
Tetrachloroethylene	<0.0013	<0.0014	<0.0016	1.3	--	--
Tetrahydrofuran	<0.0066	<0.0072	<0.0079	--	--	--
Toluene	<0.0013	<0.0014	<0.0016	0.7	0.7	--
trans-1,2-Dichloroethylene	<0.0013	<0.0014	<0.0016	0.19	--	--
trans-1,4-Dichloro-2-butene	<0.0026	<0.0029	<0.0032	--	--	--
Trichloroethene	<0.0013	<0.0014	<0.0016	0.47	--	--
Trichlorofluoromethane	<0.0066	<0.0072	<0.0079	--	--	--
Vinyl Chloride	<0.0066	<0.0072	<0.0079	0.02	--	--
Total Volatile Compounds	0.0048	0	0	--	--	--
Total TICs Volatile Compounds	0	0	0	--	--	--

Qualifiers:

<: Analyzed for but not detected
J: Estimated value

Notes:

mg/kg: Milligrams per kilogram
--: No standard

Table 11
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Soil Analytical Results
Semivolatile Organic Compounds

Sample ID Sampling Date Start Depth (in Feet) End Depth (in Feet) Units	GP-1 (0-5) 04/09/16 0 5 mg/kg	GP-2 (0-5) 04/09/16 0 5 mg/kg	GP-3 (0-5) 04/09/16 0 5 mg/kg	6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives mg/kg	CP-51 Fuel Oil Contaminated Soil Cleanup Levels mg/kg	CP-51 Residential Use SCOs mg/kg
1,2,4,5-Tetrachlorobenzene	<0.38	<0.37	<0.36	--	--	--
1,2,4-Trichlorobenzene	<0.38	<0.37	<0.36	--	--	--
1,2-Dichlorobenzene	<0.38	<0.37	<0.36	1.1	--	100
1,2-Diphenylhydrazine (as Azobenzene)	<0.38	<0.37	<0.36	--	--	--
1,3-Dichlorobenzene	<0.38	<0.37	<0.36	2.4	--	17
1,4-Dichlorobenzene	<0.38	<0.37	<0.36	1.8	--	9.8
1-Methylnaphthalene	<0.19	<0.18	<0.18	--	--	--
2,2-oxybis(1-Chloropropane)	<0.38	<0.37	<0.36	--	--	--
2,4,5-Trichlorophenol	<0.38	<0.37	<0.36	--	--	100
2,4,6-Trichlorophenol	<0.38	<0.37	<0.36	--	--	--
2,4-Dichlorophenol	<0.38	<0.37	<0.36	--	--	100
2,4-Dimethylphenol	<0.38	<0.37	<0.36	--	--	--
2,4-Dinitrophenol	<0.73	<0.71	<0.70	--	--	100
2,4-Dinitrotoluene	<0.38	<0.37	<0.36	--	--	--
2,6-Dinitrotoluene	<0.38	<0.37	<0.36	--	--	1.03
2-Chloronaphthalene	<0.38	<0.37	<0.36	--	--	--
2-Chlorophenol	<0.38	<0.37	<0.36	--	--	100
2-Methylnaphthalene	<0.19	<0.18	<0.18	--	--	0.41
2-Methylphenol	<0.38	<0.37	<0.36	0.33	--	--
2-Nitroaniline	<0.38	<0.37	<0.36	--	--	--
2-Nitrophenol	<0.38	<0.37	<0.36	--	--	--
3,3-Dichlorobenzidine	<0.19	<0.18	<0.18	--	--	--
3+4-Methylphenols	<0.38	<0.37	<0.36	0.33	--	--
3-Nitroaniline	<0.38	<0.37	<0.36	--	--	--
4,6-Dinitro-2-methylphenol	<0.38	<0.37	<0.36	--	--	--
4-Bromophenyl-phenylether	<0.38	<0.37	<0.36	--	--	--
4-Chloro-3-methylphenol	<0.73	<0.71	<0.70	--	--	--
4-Chloroaniline	<0.73	<0.71	<0.70	--	--	100
4-Chlorophenyl-phenylether	<0.38	<0.37	<0.36	--	--	--
4-Nitroaniline	<0.38	<0.37	<0.36	--	--	--
4-Nitrophenol	<0.73	<0.71	<0.70	--	--	--
Acenaphthene	<0.19	<0.18	<0.18	20	20	--
Acenaphthylene	<0.19	<0.18	<0.18	100	100	--
Acetophenone	<0.38	<0.37	<0.36	--	--	--
Aniline	<0.38	<0.37	<0.36	--	--	48
Anthracene	<0.19	<0.18	<0.18	100	100	--
Benzidine	<0.73	<0.71	<0.70	--	--	--
Benzo(a)anthracene	<0.19	<0.18	0.82	1	1	--
Benzo(a)pyrene	<0.19	<0.18	0.87	1	1	--
Benzo(b)fluoranthene	<0.19	<0.18	1.1	1	1	--
Benzo(g,h,i)perylene	<0.19	<0.18	0.55	100	100	--
Benzo(k)fluoranthene	<0.19	<0.18	0.41	0.8	0.8	--
Benzoic Acid	0.31 J	0.3 J	<1.1	--	--	--
Bis(2-chloroethoxy)methane	<0.38	<0.37	<0.36	--	--	--
Bis(2-chloroethyl)ether	<0.38	<0.37	<0.36	--	--	--
Bis(2-Ethylhexyl)phthalate	<0.38	<0.37	<0.36	--	--	50
Butylbenzylphthalate	<0.38	<0.37	<0.36	--	--	100
Carbazole	<0.19	<0.18	<0.18	--	--	--
Chrysene	<0.19	<0.18	0.73	1	1	--

See next page for Qualifiers\Notes

Table 11
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Soil Analytical Results
Semivolatile Organic Compounds

Sample ID Sampling Date Start Depth (in Feet) End Depth (in Feet) Units	GP-1 (0-5) 04/09/16 0 5 mg/kg	GP-2 (0-5) 04/09/16 0 5 mg/kg	GP-3 (0-5) 04/09/16 0 5 mg/kg	6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives mg/kg	CP-51 Fuel Oil Contaminated Soil Cleanup Levels mg/kg	CP-51 Residential Use SCOs mg/kg
Dibenzo(a,h)anthracene	<0.19	<0.18	0.16 J	0.33	0.33	--
Dibenzofuran	<0.38	<0.37	<0.36	7	--	--
Diethylphthalate	<0.38	<0.37	<0.36	--	--	100
Dimethylphthalate	<0.38	<0.37	<0.36	--	--	100
Di-n-butylphthalate	<0.38	<0.37	<0.36	--	--	100
Di-n-octyl phthalate	<0.38	<0.37	<0.36	--	--	100
Fluoranthene	<0.19	<0.18	1.4	100	100	--
Fluorene	<0.19	<0.18	<0.18	30	30	--
Hexachlorobenzene	<0.38	<0.37	<0.36	0.33	--	0.41
Hexachlorobutadiene	<0.38	<0.37	<0.36	--	--	--
Hexachlorocyclopentadiene	<0.38	<0.37	<0.36	--	--	--
Hexachloroethane	<0.38	<0.37	<0.36	--	--	--
Indeno(1,2,3-cd)pyrene	<0.19	<0.18	0.56	0.5	0.5	--
Isophorone	<0.38	<0.37	<0.36	--	--	100
Naphthalene	<0.19	<0.18	<0.18	12	12	--
Nitrobenzene	<0.38	<0.37	<0.36	--	--	3.7
N-Nitrosodi-n-propylamine	<0.38	<0.37	<0.36	--	--	--
N-Nitrosodimethylamine	<0.38	<0.37	<0.36	--	--	--
N-Nitrosodiphenylamine	<0.38	<0.37	<0.36	--	--	--
Pentachloronitrobenzene	<0.38	<0.37	<0.36	--	--	--
Pentachlorophenol	<0.38	<0.37	<0.36	0.8	--	--
Phenanthrene	<0.19	<0.18	0.1 J	100	100	--
Phenol	<0.38	<0.37	<0.36	0.33	--	--
Pyrene	<0.19	<0.18	1.4	100	100	--
Pyridine	<0.38	<0.37	<0.36	--	--	--
Total Semivolatile Compounds	0.31	0.3	8.1	--	--	--
Benzo[e]pyrene	ND	ND	0.8	--	--	--
Total TICs Semivolatile Compounds	0	0	0.8	--	--	--

Qualifiers:

<: Analyzed for but not detected

J: Estimated value

Notes:

mg/kg: Milligrams per kilogram

--: No standard

Exceeds Unrestricted Use SCOs

ND: Not detected

Table 12
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Soil Analytical Results
Metals, Petroleum Hydrocarbon Analyses and Conventional Chemistry Parameters

Sample ID	GP-1 (0-5)	GP-2 (0-5)	GP-3 (0-5)	6 NYCRR Part 375	CP-51
Sampling Date	04/09/16	04/09/16	04/09/16	Unrestricted Use	Residential
Start Depth (in Feet)	0	0	0	Soil Cleanup	Use
End Depth (in Feet)	5	5	5	Objectives	SCOs
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<u>Metals</u>					
Antimony	<2.7	<2.7	<2.5	--	--
Arsenic	<2.7	<2.7	0.46 J	13	--
Barium	65	57	65	350	--
Beryllium	0.34	0.43	0.43	7.2	--
Cadmium	0.25 J	0.3	0.4	2.5	--
Chromium	15	18	20	30	--
Cobalt	6.1	7.7	7.5	--	30
Copper	12	20	22	50	--
Lead	3.7	8.5	35	63	--
Manganese	400	310	250	1600	--
Mercury	<0.029	<0.028	0.38	0.18	--
Nickel	16	16	17	30	--
Selenium	<5.5	<5.3	<4.9	3.9	--
Silver	<0.55	<0.53	<0.49	2	--
Thallium	<2.8	<2.7	<2.5	--	--
Vanadium	23	22	25	--	100
Zinc	29	36	55	109	--
<u>Petroleum Hydrocarbons Analyses</u>					
Gasoline Range Organics (GRO)	<2.1	<2.3	<0.85	--	--
Diesel Range Organics (DRO)	2.6 J	2.2 J	27	--	--
<u>Conventional Chemistry Parameters</u>					
Cyanide	<0.30	<0.34	<0.52	27	--
Hexavalent Chromium	0.29	<1.7	<1.7	1	--
Reactive Cyanide	<3.9	<4.0	<3.9	--	--
Reactive Sulfide	<20	<20	<19	--	--
Corrosivity (SU)	7.7	7.7	7.5	--	--
Ignitability	Absent	Absent	Absent	--	--

Qualifiers:

<: Analyzed for but not detected
J: Estimated value

Notes:

mg/kg: Milligrams per kilogram
--: No standard

Exceeds Unrestricted Use SCOs

Table 13
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Soil Analytical Results
Pesticides, Polychlorinated Biphenyls (PCBs) and Herbicides

Sample ID	GP-1 (0-5)	GP-2 (0-5)	GP-3 (0-5)	6 NYCRR Part 375	CP-51
Sampling Date	04/09/16	04/09/16	04/09/16	Unrestricted Use	Residential
Start Depth (in Feet)	0	0	0	Soil Cleanup	Use
End Depth (in Feet)	5	5	5	Objectives	SCOs
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<u>PESTICIDES</u>					
4,4-DDD	<0.0011	<0.0011	<0.0011	0.0033	2.6
4,4-DDE	<0.0011	<0.0011	<0.0011	0.0033	1.8
4,4-DDT	<0.0011	<0.0011	0.00086 J	0.0033	1.7
Aldrin	<0.0022	<0.0022	<0.0021	0.005	0.019
alpha BHC	<0.0055	<0.0054	<0.0053	0.02	0.097
alpha-Chlordane	<0.0055	<0.0054	<0.0053	0.094	0.91
beta-BHC	<0.0055	<0.0054	<0.0053	0.036	0.072
delta-BHC	<0.0055	<0.0054	<0.0053	0.04	100
Dieldrin	<0.0011	<0.0011	<0.0011	0	0.039
Endosulfan I	<0.0055	<0.0054	<0.0053	2.4	4.8
Endosulfan II	<0.0089	<0.0087	<0.0085	2	4.8
Endosulfan Sulfate	<0.0089	<0.0087	<0.0085	2.4	4.8
Endrin	<0.0089	<0.0087	<0.0085	0.014	2.2
Endrin Aldehyde	<0.0089	<0.0087	<0.0085	--	--
Endrin Ketone	<0.0089	<0.0087	<0.0085	--	--
gamma-BHC (Lindane)	<0.0022	<0.0022	<0.0021	0.1	0.28
gamma-Chlordane	<0.0055	<0.0054	<0.0053	--	0.00054
Heptachlor	<0.0055	<0.0054	<0.0053	0.042	0.42
Heptachlor Epoxide	<0.0055	<0.0054	<0.0053	--	0.000077
Methoxychlor	<0.055	<0.054	<0.053	--	0.1
Toxaphene	<0.11	<0.11	<0.11	--	--
Alachlor	<0.022	<0.022	<0.021	--	--
Chlordane	<0.022	<0.022	<0.021	0.094	0.91
Hexachlorobenzene	<0.0067	<0.0065	<0.0063	0.33	0.33
<u>PCBS</u>					
Aroclor-1016	<0.11	<0.11	<0.10	0.1	1
Aroclor-1221	<0.11	<0.11	<0.10	0.1	1
Aroclor-1232	<0.11	<0.11	<0.10	0.1	1
Aroclor-1242	<0.11	<0.11	<0.10	0.1	1
Aroclor-1248	<0.11	<0.11	<0.10	0.1	1
Aroclor-1254	<0.11	<0.11	<0.10	0.1	1
Aroclor-1260	<0.11	<0.11	<0.10	0.1	1
Aroclor-1262	<0.11	<0.11	<0.10	0.1	1
Aroclor-1268	<0.11	<0.11	<0.10	0.1	1
Total PCBs	0	0	0	0.1	1
<u>HERBICIDES</u>					
2,4,5-T	<0.0027	<0.0027	<0.0027	--	100
2,4,5-TP (Silvex)	<0.0027	<0.0027	<0.0027	4	--
2,4-D	<0.027	<0.027	<0.027	--	100
2,4-DB	<0.027	<0.027	<0.027	--	--
Dalapon	<0.069	<0.068	<0.067	--	--
Dicamba	<0.0027	<0.0027	<0.0027	--	--
Dichlorprop	<0.027	<0.027	<0.027	--	--
Dinoseb	<0.014	<0.014	<0.013	--	--
MCPA	<2.7	<2.7	0.58	--	--
MCPP	<2.7	<2.7	<2.7	--	--

Qualifiers:
 <: Analyzed for but not detected

Notes:
 ug/kg: Micrograms per kilogram
 --: No standard

Table 14
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Perched Groundwater Analytical Results
Volatile Organic Compounds

Sample ID Sampling Date Units	GW-3 4/9/2016 ug/l	NYSDEC Class GA Groundwater Standard/ Guidance Value ug/l
1,1,1,2-Tetrachloroethane	<1.0	5
1,1,1-Trichloroethane	<1.0	5
1,1,2,2-Tetrachloroethane	<0.50	5
1,1,2-Trichloroethane	<1.0	1
1,1,2-Trichlorotrifluoroethane	<1.0	5
1,1-Dichloroethane	<1.0	5
1,1-Dichloroethene	<1.0	5
1,1-Dichloropropene	<2.0	--
1,2,3-Trichlorobenzene	<5.0	5
1,2,3-Trichloropropane	<2.0	0.04
1,2,4-Trichlorobenzene	<1.0	5
1,2,4-Trimethylbenzene	<1.0	5
1,2-Dibromo-3-chloropropane	<5.0	0.04
1,2-Dibromoethane	<0.50	0.0006
1,2-Dichlorobenzene	<1.0	3
1,2-Dichloroethane	<1.0	0.6
1,2-Dichloropropane	<1.0	1
1,3,5-Trichlorobenzene	<1.0	--
1,3,5-Trimethylbenzene	<1.0	5
1,3-Dichlorobenzene	<1.0	3
1,3-Dichloropropane	<0.50	5
1,4-Dichlorobenzene	<1.0	3
1,4-Dioxane	<50	--
2,2-Dichloropropane	<1.0	5
2-Butanone (MEK)	<20	50
2-Chlorotoluene	<1.0	50
2-Hexanone (MBK)	<10	50
4-Chlorotoluene	<1.0	5
4-Methyl-2-pentanone (MIBK)	<10	--
Acetone	<50	50
Acrylonitrile	<5.0	5
Benzene	<1.0	1
Bromobenzene	<1.0	5
Bromochloromethane	<1.0	5
Bromodichloromethane	<0.50	50
Bromoform	<1.0	50
Bromomethane	<2.0	5
Carbon Disulfide	<4.0	60
Carbon Tetrachloride	<5.0	5
Chlorobenzene	<1.0	5
Chloroethane	<2.0	5
Chloroform	<2.0	7
Chloromethane	<2.0	5
cis-1,2-Dichloroethene	<1.0	5
cis-1,3-Dichloropropene	<0.50	0.4
Dibromochloromethane	<0.50	50
Dibromomethane	<1.0	5
Dichlorodifluoromethane (Freon 12)	<2.0	5
Diethyl Ether	<2.0	--
Diisopropyl Ether (DIPE)	<0.50	--
Ethylbenzene	<1.0	5
Hexachlorobutadiene	<0.50	0.5

See next page for Qualifiers/Notes

Table 14
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Perched Groundwater Analytical Results
Volatile Organic Compounds

Sample ID Sampling Date Units	GW-3 4/9/2016 ug/l	NYSDEC Class GA Groundwater Standard/ Guidance Value ug/l
Isopropylbenzene (Cumene)	<1.0	5
m+p-Xylene	<2.0	5
Methyl Acetate	<5.0	--
Methyl Cyclohexane	<1.0	--
Methyl tert-Butyl Ether	<1.0	10
Methylene Chloride	<5.0	5
Naphthalene	<2.0	10
n-Butylbenzene	<1.0	5
n-Propylbenzene	<1.0	5
o-Xylene	<1.0	5
p-Isopropyltoluene (p-Cymene)	<1.0	5
sec-Butylbenzene	<1.0	5
Styrene	<1.0	5
tert-Amyl Methyl Ether (TAME)	<0.50	--
tert-Butyl Alcohol (TBA)	<20	--
tert-Butyl Ethyl Ether (TBEE)	<0.50	--
trans-1,3-Dichloropropene	<0.50	0.4
tert-Butylbenzene	<1.0	5
Tetrachloroethylene	<1.0	5
Tetrahydrofuran	<10	50
Toluene	0.96 J	5
trans-1,2-Dichloroethylene	<1.0	5
trans-1,4-Dichloro-2-butene	<2.0	5
Trichloroethene	<1.0	5
Trichlorofluoromethane	<2.0	5
Vinyl Chloride	<2.0	2
Total Volatile Compounds	0.96	--
Total TICs Volatile Compounds	0	--

Qualifiers:

<: Analyzed for but not detected

J: Estimated value

Table 15
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Perched Groundwater Analytical Results
Semivolatile Organic Compounds

Sample ID Sampling Date Units	GW-3 4/9/2016 ug/l	NYSDEC Class GA Groundwater Standard/ Guidance Value ug/l
1,2,4,5-Tetrachlorobenzene	<10	5
2,2-oxybis(1-Chloropropane)	<10	--
1,2,4-Trichlorobenzene	<5.0	5
1,2-Dichlorobenzene	<5.0	3
1,2-Diphenylhydrazine	<10	--
1,3-Dichlorobenzene	<5.0	3
1,4-Dichlorobenzene	<5.0	3
1-Methylnaphthalene	<5.0	--
2,4,5-Trichlorophenol	<10	1
2,4,6-Trichlorophenol	<10	1
2,4-Dichlorophenol	<10	5
2,4-Dimethylphenol	<10	50
2,4-Dinitrophenol	<10	10
2,4-Dinitrotoluene	<10	5
2,6-Dinitrotoluene	<10	5
2-Chloronaphthalene	<10	10
2-Chlorophenol	<10	1
2-Methylnaphthalene	<5.0	--
2-Methylphenol	<10	1
2-Nitroaniline	<10	5
2-Nitrophenol	<10	1
3,3-Dichlorobenzidine	<10	5
3+4-Methylphenols	<10	1
3-Nitroaniline	<10	5
4,6-Dinitro-2-methylphenol	<10	1
4-Bromophenyl-phenylether	<10	--
4-Chloro-3-methylphenol	<10	1
4-Chloroaniline	<10	5
4-Chlorophenylphenyl ether	<10	--
4-Nitroaniline	<10	5
4-Nitrophenol	<10	1
Acenaphthene	<5.0	20
Acenaphthylene	<5.0	--
Acetophenone	<10	--
Aniline	<5.0	5
Anthracene	<5.0	50
Benzidine	<20	--
Benzo(a)anthracene	<5.0	0.002
Benzo(a)pyrene	<5.0	ND
Benzo(b)fluoranthene	<5.0	0.002
Benzo(g,h,i)perylene	<5.0	--
Benzo(k)fluoranthene	<5.0	0.002
Benzoic Acid	<10	--
Bis(2-chloroethoxy)methane	<10	5
Bis(2-chloroethyl)ether	<10	1
Bis(2-ethylhexyl)phthalate (BEHP)	<10	5
Butylbenzylphthalate	<10	50
Carbazole	<10	--
Chrysene	<5.0	0.002
Dibenzo(a,h)anthracene	<5.0	--
Dibenzofuran	<5.0	--

Table 15
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Perched Groundwater Analytical Results
Semivolatile Organic Compounds

Sample ID Sampling Date Units	GW-3 4/9/2016 ug/l	NYSDEC Class GA Groundwater Standard/ Guidance Value ug/l
Diethylphthalate	<10	50
Dimethylphthalate	<10	50
Di-n-butylphthalate	<10	50
Di-n-octyl phthalate	<10	50
Fluoranthene	<5.0	50
Fluorene	<5.0	50
Hexachlorobenzene	<10	0.04
Hexachlorobutadiene	<10	0.5
Hexachlorocyclopentadiene	<10	5
Hexachloroethane	<10	5
Indeno(1,2,3-cd)pyrene	<5.0	0.002
Isophorone	<10	50
Naphthalene	<5.0	10
Nitrobenzene	<10	0.4
N-Nitrosodimethylamine	<10	--
N-Nitroso-di-n-propylamine	<10	--
N-Nitrosodiphenylamine	<10	50
Pentachloronitrobenzene	<10	--
Pentachlorophenol	<10	1
Phenanthrene	<5.0	50
Phenol	<10	1
Pyrene	<5.0	50
Pyridine	<5.0	--
Total Semivolatile Compounds	0	--
Total TICs Semivolatile Compounds	0	--

Qualifiers:

<: Analyzed for but not detected

J: Estimated value

A: Peaks that are suspected to be aldol-condensation reaction products

B: Detected in associated method blank

Notes:

ug/l: Micrograms per liter

--: No standard

Table 16
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Perched Groundwater Analytical Results
Metals

Sample ID	GW-3	GW-3	NYSDEC Class GA Groundwater Standard/ Guidance Value mg/l
Sampling Date Total/Dissolved Units	4/9/2016 total mg/l	4/9/2016 dissolved mg/l	
Antimony	<0.050	<0.050	0.003
Arsenic	<0.010	<0.010	0.025
Barium	0.039 J	0.04 J	1
Beryllium	<0.0040	<0.0040	0.003
Cadmium	<0.0040	<0.0040	0.005
Chromium	0.0025 J	0.0035 J	0.05
Cobalt	<0.050	<0.050	--
Copper	0.0068 J	<0.010	0.2
Lead	<0.010	<0.010	0.025
Manganese	0.66	0.7	0.3
Mercury	<0.00010	<0.00010	0.0007
Nickel	0.0096 J	0.0095 J	0.1
Selenium	<0.050	<0.050	0.01
Silver	<0.0050	<0.0050	0.05
Thallium	<0.050	<0.050	0.0005
Vanadium	0.0095 J	0.011	--
Zinc	<0.020	<0.020	2

Qualifiers:

<: Analyzed for but not detected

J: Estimated value

Notes:

mg/l: Milligrams per liter

--: No standard

Exceeds Class GA Standard or Guidance Value

Table 17
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Perched Groundwater Analytical Results
Polychlorinated Biphenyls (PCBs)

Sample ID Sampling Date	GW-3 4/9/2016	NYSDEC Class GA Groundwater Standard/ Guidance Value
Units	ug/l	ug/l
Aroclor-1016	<0.040	0.09
Aroclor-1221	<0.040	0.09
Aroclor-1232	<0.040	0.09
Aroclor-1242	<0.040	0.09
Aroclor-1248	<0.040	0.09
Aroclor-1254	<0.040	0.09
Aroclor-1260	<0.040	0.09
Aroclor-1262	<0.040	0.09
Aroclor-1268	<0.040	0.09
Total PCBs	0	0.09

Qualifiers:
 <: Analyzed for but not detected

Notes:
 ug/l: Micrograms per liter

Table 18
Public School 131Q Addition
170-45 84th Avenue, Queens, New York
Summary of Perched Groundwater Analytical Results
NYCDEP Sewer Discharge Parameters

Sample ID Sampling Date	GW-3 4/9/2016	NYCDEP LIMITATION FOR EFFLUENT TO SEWERS
<u>VOCs in ug/l</u>		
1,1,1-Trichloroethane	<1.0	--
1,2,4-Trichlorobenzene	<1.0	--
1,4-Dichlorobenzene	<1.0	--
Benzene	<1.0	134
Carbon Tetrachloride	<5.0	--
Chloroform	<2.0	--
Ethyl Benzene	<1.0	380
Methyl tert-Butyl Ether	<1.0	50
Naphthalene	<2.0	47
Tetrachloroethene	<1.0	20
Toluene	0.96 J	74
Total Xylenes	<3.0	74
<u>SVOCs in mg/l</u>		
Phenol	0.049 J	--
<u>PCBs in ug/l</u>		
Aroclor-1016	<0.040	--
Aroclor-1221	<0.040	--
Aroclor-1232	<0.040	--
Aroclor-1242	<0.040	--
Aroclor-1248	<0.040	--
Aroclor-1254	<0.040	--
Aroclor-1260	<0.040	--
Aroclor-1262	<0.040	--
Aroclor-1268	<0.040	--
Total PCBs	0	1
<u>Metal in mg/l</u>		
Cadmium	<0.0040	0.69
Copper	0.0068 J	5
Lead	<0.010	2
Mercury	<0.00010	0.05
Nickel	0.0096 J	3
Zinc	<0.020	5
<u>Other in mg/l</u>		
Oil & Grease (HEM)	<1.6	--
CBOD5	<4.0 H	--
Chloride	200	--
Flashpoint (°F)	> 212 °F	>140
Hexavalent Chromium	<0.0040 H	5
Nitrate+Nitrite	2	--
pH (SU)	7.1 H	5-12
TKN	0.53 J	--
Total Nitrogen	2	--
TS	680	--
TSS	56	350

Qualifiers:

<: Analyzed for but not detected
H: Sample analysis out of hold time
J: Estimated value

Notes:

ug/l: Micrograms per liter
mg/l: Milligrams per liter
--: No standard