Former Metro-North Property (Mott Haven)

BRONX, NEW YORK

Site Management Plan
FINAL

NYSDEC BCP Number: C203030
SCA JOB No.: 19730
SCA LLW No.: 033485

Prepared for:
New York City School Construction Authority
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Revisions to Final Approved Site Management Plan:

Revision #	Submitted By	Submitted Date	Summary of Revision	DEC Approval Date
1	TRC Engineers, Inc.	8/10/12	Addition of report Section 2.4.2.3 regarding internal notifications	8/10/12
2	Cardno ATC	12/4/13	Report-wide change of future tense to present/past tense. Modification of Section 3.2.5.3; Addition of Figures 3A, 27A, 30, 31; Update to Appendix K; and Addition of Appendices Q and R	3/27/14
3	ATC Associates	12/18/15	Removal of Groundwater Monitoring Requirements	4/29/16

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LIST OF ACRONYMS

Acronym	Definition
µg/Kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter
AOC	Area of Concern
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
BMS	Building Management System
BTEX	benzene, toluene, ethylbenzene, and xylenes
C/D	construction and demolition
CAMP	Community Air Monitoring Plan
COC	Certificate of Completion
COCs	contaminants of concern
DCR	Declaration of Covenants and Restrictions
DER	Division of Environmental Remediation
DO	dissolved oxygen
DOE, DSF	Department of Education, Division of School Facilities
DPI	differential pressure indicator
DSHM	Division of Solid and Hazardous Materials
DUSR	Data Usability Summary Report
EC	Engineering Control
ESA	Environmental Site Assessment
FER	Final Engineering Report
ft	feet
HASP	Health and Safety Plan
IC	Institutional Control
MGP	Manufactured Gas Plant
ml/min	milliliters per minute
MTA	Metropolitan Transportation Authority
NYCDEP	New York City Department of Environmental Protection
NYCSCA	New York City School Construction Authority
NYS	New York State

LIST OF ACRONYMS

Acronym	Definition
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
PFE	pressure field extension
PID	photoionization detector
ppb	parts per billion
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RSCO	Recommended Soil Cleanup Objective
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SoMP	Soil Management Plan
SPDES	State Pollution Discharge Elimination System
SSDS	sub slab depressurization system
STARS	Spill Technology and Remediation Series
SVOC	semi-volatile organic compound
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
UST	underground storage tank
VOC	volatile organic compound

SITE MANAGEMENT PLAN

1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 INTRODUCTION

This Site Management Plan (SMP) is required for fulfillment of the Remedial Action Work Plan (RAWP) prepared for the Former Metro-North Property (Mott Haven Property) located at 730 Concourse Village West, Bronx, New York. A copy of this SMP is currently maintained in the custodian's office for each of the schools located within the Mott Haven Campus as well as in PS 156 and IS 151, and will be maintained for the life of the subject schools. In addition, copies of the document will be maintained by the New York State Department of Environmental Conservation (NYSDEC) and New York City School Construction Authority (NYCSCA).

As more fully described below, a portion of the Mott Haven Property was remediated in accordance with the Brownfield Cleanup Agreement (BCA) Index #W2-1074-05-08, Site #C203030, which was executed on February 17, 2006. The remainder of the Mott Haven Property is also addressed within this SMP in response to public comment.

1.1.1 General

NYCSCA applied to the Brownfield Cleanup Program (BCP) for a seven-acre property located in Bronx County, New York City, New York which it planned to develop into four schools. The BCA covers the one-acre area accepted into the BCP (hereafter referred to as the "BCP Area") which measures 300 feet (in a general north-south direction) by approximately 125 feet (in a general east-west direction) in the northwest corner of the seven-acre property. This SMP addresses the BCP Area and the remainder of the property (hereafter referred to as the "Non-BCP Area A"), as well as the area beneath the platform that supports PS 156 and IS 151 (hereafter referred to as the

"Non-BCP Area B"). The area encompassing the BCP Area, Non-BCP Area A, and Non-BCP Area B is a total of 13 acres and will hereafter be referred to as the "Site". A map of the Site location is shown in Figure 1 and an aerial photograph with the Site boundary as well as the BCP Area, Non-BCP Area A and Non-BCP Area B boundaries is shown in Figure 2. The boundaries of the BCP Area, the Non-BCP Area A, and the Non-BCP Area B are fully described in Appendix A – Metes and Bounds.

This SMP was prepared in November 2008, by Shaw Environmental, Inc. (Shaw), on behalf of NYCSCA, in accordance with the requirements in NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation, dated December 2002, and the guidelines provided by NYSDEC. This SMP was revised in August 2012, by TRC Engineers, Inc. (TRC), on behalf of NYCSCA, and in December 2013, by Cardno ATC (ATC), on behalf of the New York City Department of Education (NYCDOE). This SMP addresses the means for implementation of Institutional Controls (ICs) and Engineering Controls (ECs), which are required by the Environmental Easement for the BCP Area and by the Declaration of Covenants and Restriction (DCR) for the Non-BCP Area A, and Non-BCP Area B.

After completion of the remedial work described in the Remedial Action Work Plan, fill material was left in the subsurface at Non-BCP Area A and Non-BCP Area B, which is hereafter referred to as 'historic urban fill.' This SMP also addresses management of the historic urban fill at the Non-BCP Area A and Non-BCP Area B in perpetuity or until extinguishment of the Environmental Easement and DCR in accordance with 6 NYCRR Part 375.

Remedial Action at the Site began in July 2006, and was completed in October 2007. All reports associated with the BCP Area, Non-BCP Area A and Non-BCP Area B can be viewed at the document repositories or by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

1.1.2 Purpose

ECs have been incorporated into the Site remedy to provide proper management of historic urban fill at Non-BCP Area A and Non-BCP Area B in the future and to protect public health and the environment. A Site-specific Environmental Easement (BCP Area) and DCR (Non-BCP Area A and Non-BCP Area B) has been recorded with the Bronx County Clerk's Office that provides an enforceable means to ensure strict adherence to all Engineering Controls and all Institutional Controls placed on this Site by

NYSDEC, by the grantor of the Environmental Easement and DCR, and any and all successors and assigns of the grantor. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP includes acceptable methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement and DCR. Compliance with this Plan is required by the grantor of the Environmental Easement and DCR and grantor's successors and assigns. This plan is subject to change by NYSDEC.

Site management is the last phase of the remedial process and is triggered by the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) by NYSDEC. The SMP continues in perpetuity or until extinguished in accordance with 6NYCRR Part 375. It is the responsibility of the Environmental Easement and DCR grantor, and its successors and assigns to ensure that all Site Management responsibilities under this plan are performed.

The SMP provides a detailed description of all procedures required to manage the Site following the completion of the Remedial Action in accordance with the BCA with NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain the Sub-Slab Depressurization System (SSDS); and (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC.

To address these needs, this SMP includes four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for the SSDS; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC.

Site Management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annual.

Important notes regarding this SMP are as follows:

- This SMP defines Site-specific implementation procedures as required by the Environmental Easement and DCR. The penalty for failure to implement the SMP is revocation of the COC;

- The BCA (Index #W2-1074-05-08; Site #C203030) for the Site requires conformance with this SMP, and therefore, serves as a contractual binding authority under which this SMP is being implemented. The Brownfield Cleanup law itself also requires the preparation of a SMP (formerly known as an Operation, Maintenance and Monitoring Plan) in ECL 27-1415 and 27-1419. Therefore, the BCA is a binding contract and the BCP law is statutory authority under which this SMP is required and is to be implemented.
- As of January 2008, the draft version of the SMP and all Site documents related to Remedial Investigation and Remedial Action are maintained at the NYSDEC Region 2 offices in Long Island City and in the repositories established for this project, which were the Melrose Branch Public Library and the Mott Haven Public Library, in the Bronx. Other Site documents such as the Remedial Investigation Report, the RAWP, and the Final Engineering Report were able to be found at the repositories during the project.

The Final Site Management Plan was submitted, in hard-copy format, to the Region 2 NYSDEC offices, located at 41-40 21st Street, Long Island City, New York, and in electronic format to NYSDEC and NYSDOH. A hardcopy of the Final Site Management Plan, Remedial Investigation Report and Remedial Action Work Plan, as well as current and historical copies of the Annual Site Management Reports are maintained in the custodian's office at the new Mott Haven Campus. For the Site Management phase of the project, the repositories are the Region 2 Office of the NYSDEC and the Bronx Community Board 4 Office located at:

Bronx Community Board 4 (CB4)
1650 Selwyn Avenue, #11A
Bronx, NY 10457
Phone: 718-299-0800
Fax: 718-294-7870
Email: bx04@cb.nyc.gov

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

The Site is located in the County of Bronx (New York City), New York and the BCP Area and Non-BCP Area A are identified as Block 2443 and Lot 78 on the Borough of Bronx Tax Map. The Non-BCP Area B is identified as Block 2443 and Lots 79 and 190 on the Borough of Bronx Tax Map. As stated above the BCA Area is approximately one acre in size on the northwest portion of the Mott Haven Property. The Site is located in a topographical depression and consists of an approximately 13-acre area bounded by East 156th Street to the north, Metropolitan Transportation Authority (MTA) rail yard to the south, MTA rail lines to the east, and a 30 foot high retaining wall with Concourse Village West just beyond the top of the retaining wall to the west (see Figure 2). The boundaries of the BCP Area, the Non-BCP Area A, and the Non-BCP Area B are more fully described in Appendix A – Metes and Bounds.

1.2.2 Site History

URS Corporation (URS) prepared a Phase I Environmental Site Assessment (ESA) of the BCP Area and Non-BCP Area A for NYCSCA, dated July 20, 2001, and conducted a Phase II Investigation to further characterize the soil and groundwater quality of the BCP Area and Non-BCP Area A. URS prepared a Phase II Environmental Investigation Report of the BCP Area and Non-BCP Area A, dated August 24, 2001 for NYCSCA. Shaw Environmental, Inc. (Shaw) completed additional site investigation activities between March and September 2005. These investigative activities were completed as two separate phases. The Remedial Investigation activities, completed pursuant to the NYSDEC approved RIWP (July 2005), were performed in the BCP Area, Non-BCP Area A, the southwest corner of Non-BCP Area B, and to the west of the Site between March and August 2005. A Supplemental Investigation (SI) was performed in Non-BCP Area B and to the north and west of the Site to identify off-site contamination which may be impacting the Mott Haven Site.

A review of historical records (Sanborn Fire Insurance Maps, Appendix B) shows that much of the Site operated as a rail yard from prior to 1891 to approximately 1975. The Sanborn maps show that the Site contained many tracks with a machine shop, carpenter shop, paint area, offices and storage areas. The tracks extended at least 700 feet beyond the northern boundary of the Site.

Properties in the vicinity of the Site and adjacent to the Site are potential sources of contamination to the Site. Of particular significance relative to the contamination identified on the Site, was the historical presence of a gasoline service station and a manufactured gas plant (MGP) in the upgradient area northwest of the BCP Area. The exact location of the MGP relative to the Site cannot be determined from the Sanborn maps. The URS Phase I ESA indicated that an auto repair shop and gasoline filling station were historically located at the southwestern corner of East 156th Street and Sheridan Avenue/Concourse Village West, adjacent to and immediately west of the Site. By 1977 the filling station was no longer depicted on the map, but the auto repair shop remained. The URS Phase I ESA report indicated that the MGP operated from prior to 1891 to 1946.

1.2.3 Geological Conditions

Site Geology

Subsurface soils at the Site were mostly brown silty sand and gravel mixed with typical urban fill and construction and demolition (C/D) type materials such as brick, concrete and wood to approximately 8 to 10 feet (ft) below ground surface (bgs). Bedrock was encountered at the Site beneath the overburden deposits at depths ranging from approximately 4 feet in the center of the Site to as deep as 70 ft bgs in the BCP Area. Figure 3 shows the soil boring locations across the site; locations of geologic cross sections are shown on Figure 4. Stratigraphic cross sections are shown on Figures 5 through 12.

Site Hydrogeology

Site hydrogeologic data indicated that the depth to groundwater varies from 4.5 to approximately 9.3 feet bgs. Groundwater resides in the fill material at the Site. The overburden groundwater flow direction, as shown on Figure 13, based on groundwater level measurements from monitoring wells (Table 1), is from northwest to southeast across the Site. Based on permeability data and horizontal hydraulic gradients, groundwater flows at a rate of approximately 10 feet per year. The Site is located in a topographic depression, the infiltration capacity of the overlying fill material is very high, and there is very little slope on the Site with many low lying areas, all of which are conducive to high rates of recharge to the aquifer.

1.3 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The SMP and all Site documents, including the Remedial Investigation and Remedial Action Work Plan, are maintained by the NYSDEC (or successor agency). At the time of publication, these reports could be found at the Region 2 NYSDEC offices in Long Island City, New York or at the repositories.

1.3.1 Summary of Remedial Investigation Findings

Specific details and findings of the investigation activities can be found in the Remedial Investigation (RI) Report that was approved by the NYSDEC on July 5, 2006:

Draft Remedial Investigation Report of Former Metro North Property at 672 Concourse Village West, Bronx, New York, Shaw Environmental, Inc., November 15, 2005.

The following activities were conducted to characterize the subsurface conditions at the Site: geophysical investigations; installation of twenty-three (23) soil gas points / implants and collection of soil vapor samples; installation of forty-seven (47) soil borings; excavation of nine (9) test pits; installation of twenty (20) groundwater monitoring wells; installation of eight (8) bedrock soil borings; site reconnaissance on surrounding properties; laboratory analysis of soil gas, soil and groundwater samples; and permeability tests to assess the hydraulic characteristics of the shallow aquifer beneath the Site.

Conceptual Model of On-Site and Off-Site Contamination

The conceptual model of groundwater flow provides the framework to assess fate and transport of contamination at the Site. Previous off-site contaminant releases from a historic MGP identified in the area northwest of the BCP Area and a historic gasoline service station located west of the Site have impacted groundwater quality by migrating vertically downward through the fill/soil materials to the water table. At the water table this contamination migrates with the groundwater flow in a southeasterly direction on to the Site. This has resulted in contamination of soils at the water table interface with VOCs and SVOCs in the BCP Area. Due to the low groundwater flow rate, the VOCs naturally attenuate. The SVOCs in the BCP Area remained adsorbed onto site soils and did not migrate in the groundwater. As a result, there was no significant migration of contamination in the downgradient direction of flow and no impacts to off-site receptors.

Excavation of the BCP Area has removed contaminated soils and the hydraulic barriers will mitigate recontamination of the BCP Area and Non-BCP Area A. Therefore groundwater quality conditions at the Site are expected to improve with time.

The principal contaminants of concern (COCs) for the Site are VOCs and SVOCs in the soil and VOCs in the groundwater. The most elevated VOC and SVOC compounds detected include benzene, toluene, ethylbenzene, xylene (BTEX), and the polynuclear aromatic hydrocarbons or PAHs (e.g. naphthalene, chrysene, benzo(a)anthracene, benzo(a)pyrene, phenanthrene). The highest organic contaminant detected was naphthalene. Figure 14 depicts the distribution of naphthalene detected in the soil, showing concentrations generally an order of magnitude higher than the Technical and Administrative Guidance Memorandum (TAGM) 4046 Recommended Soil Cleanup Objective (RSCO) of 13,000 parts per billion (ppb). The most significant contamination identified was generally confined to the BCP Area as well as upgradient (Non-BCP Area B) and off-site, at a depth corresponding to the top of the zone of saturation (water table).

Areas of Concern

Areas of concerns (AOCs) at the Site were limited to: VOC and SVOC-contaminated soils in the BCP Area. Contaminated soils in the BCP Area were generally found between 4 to 10 ft bgs.

Groundwater contaminated with VOCs was characterized at the Site in monitoring wells in the BCP Area, as well as in several off-site, upgradient monitoring wells. Figure 15 depicts the concentration of BTEX detected in the groundwater and confirms the likely source of the VOCs on the Site as the off-site upgradient historic service station. No VOCs were detected in the downgradient monitoring wells suggesting that the low groundwater seepage velocity and long travel time for contamination to move across the Site, allow for natural attenuation of the VOCs.

Below is a summary of Remedial Investigation findings:

1.3.1.1 Soil

VOCs were detected in soil samples collected across the Site as well as off-site to the west and northwest of the Site (Figures 16A and 16B are spider maps which summarize the exceedances of the RSCOs and Table 2 which show RSCO exceedances). Compounds that exceeded their applicable RSCOs include (with corresponding highest detected concentration): BTEX (benzene, 23,000 micrograms per kilogram [µg/Kg]; toluene, 9,600 µg/Kg; ethylbenzene, 43,000 µg/Kg; xylene, 75,400 µg/Kg), naphthalene (220,000 µg/Kg), isopropylbezene (4,900 µg/Kg), acetone (1,600 µg/Kg), and methylene chloride (2,000 µg/Kg). The highest concentrations of the VOCs were detected in the zone of saturation corresponding to the top of the water table.

One or more SVOCs were detected in excess of the applicable RSCO at one or more depths in 32 soil borings (Figures 17A-D and Table 2). Compounds that exceeded the RSCOs include (with corresponding highest detected concentration): benzo(a)anthracene (31,000 µg/Kg), chrysene (31,000 µg/Kg), benzo(a)pyrene (27,000 µg/Kg), dibenzofuran (7,100 µg/Kg), phenanthrene (150,000 µg/Kg), fluoranthene (79,000 µg/Kg), pyrene (69,000 µg/Kg), benzo(b)fluoranthene (34,000 µg/Kg), benzo(k)fluoranthene (11,000 µg/Kg), indeno (1,2,3-cd)pyrene (7,900 µg/Kg), dibenzo(a,h)anthracene (2,100 µg/Kg), butylbenzylphthalate (53,000 µg/Kg), naphthalene (150,000 µg/Kg), and 2-methylnaphthalene (66,000 µg/Kg).

Metals above RSCOs were encountered in all of the soil borings; most metal concentrations exceeded Eastern Background Standards (Figures 18A-C and Table 3). This Site is located in an urban setting and the concentrations observed are considered to be indicative of background and/or historic site conditions and not related to Site contamination.

No herbicides, pesticides or polychlorinated biphenyls (PCBs) were above the RSCOs. Cyanide was detected in two samples. There is no RSCO for cyanide.

1.3.1.2 On-Site and Off-Site Groundwater

Several VOCs were detected in excess of the applicable groundwater quality standards (GWQS), particularly in monitoring wells MW-7, MW-12, and MW-13 in the

BCP Area; MW-14 and MW-15 in the Non-BCP Area B (Figure 19 and Table 4); and off-site in MW-8, MW-9 and MW-18. VOCs exceeding the applicable GWQS include (with corresponding highest detected concentration): naphthalene (2,500 micrograms per liter [µg/L]), acetone (84 µg/L), cis-1,2-dichloroethene (13 µg/L), benzene (6,100 µg/L), toluene (14,000 µg/L), ethylbenzene (2,400 µg/L), xylenes (14,500 µg/L), isopropylbenzene (190 µg/L), n-propylbenzene (240 µg/L), 1,3,5-trimethylbenzene (560 µg/L), 1,2,4-trimethylbenzene (2,200 µg/L), sec-butylbenzene (21 µg/L), p-isopropylbezene (41 µg/L), n-butylbenzene (22 µg/L), tetrachloroethene (9.1 µg/L) and vinyl chloride (9.4 µg/L). Of the VOC compounds detected in these monitoring wells, only MTBE (detected in three samples) did not exceed the applicable GWQS.

Following a similar trend as the VOC contamination, the highest SVOCs impact to groundwater was observed in the BCP Area in monitoring wells MW-7, MW-8, and MW-12; in the Non-BCP Area B in monitoring wells MW-14 and MW-15; and off-site in MW-18 (Figure 20 and Table 4). Exceedances include (with corresponding highest detected concentration): naphthalene (1,300 µg/L), butylbenzylphthalate (64 µg/L), bis(2-ethylhexyl)phthalate (41 µg/L), phenol (22 µg/L) and acenaphthene (29 µg/L). Only bis(2-ethylhexyl)phthalate and butylbenzylphthalate were detected in areas outside of the BCP Area.

A number of metal constituents were detected above the GWQS in the samples collected (Figure 21 and Table 5). These included (with corresponding highest detected concentration): antimony (43.0 µg/L), arsenic (672 µg/L), barium (3,020 µg/L), beryllium (11.3 µg/L), cadmium (5.74 µg/L), chromium (530 µg/L), iron (394,000 µg/L), lead (529 µg/L), magnesium (258,000 µg/L), manganese (9,120 µg/L), and nickel (526 µg/L). Monitoring well MW-2, located toward the southern part of Non-BCP Area A had the highest metal detections. Due to the fine-grained aquifer materials, and despite following the proper protocol, there was some sediment in the groundwater samples. When the samples were preserved with nitric acid, some metals were leached out of the sediment into the water resulting in a higher detected concentration. These metal detections are associated with the nature of the historic urban fill at the Site and not a release from a contaminant source.

There was one detection for cyanide in MW-14 (15 μg/L) which was below the GWQS (Table 5). There were no detections for PCBs or pesticides in the groundwater during this investigation. Only one herbicide was detected in the groundwater samples. 2,4-dichlorophenoxyacetic acid (2,4-D) was detected in samples from monitoring wells MW-15, MW-13, MW-2 and MW-14 (Table 5); all detections were below the GWQS.

1.3.1.3 On-Site and Off-Site Soil Vapor

VOCs were detected in all of the soil gas samples collected (Figure 22). Table 6 provides a summary of the detected VOCs. The highest total VOC concentrations were observed in the BCP Area in samples SG-1 and SG-9. N-hexane (84,000 micrograms per cubic meter [$\mu g/m^3$], n-heptane (22,000 $\mu g/m^3$) and cyclohexane (9,300 $\mu g/m^3$) had the highest concentrations of all the detected VOCs. BTEX compounds were detected in most of the 23 samples collected. Most analytes in samples PSGI-9 and PSGI-10 (off-site to the west) were detected at concentrations less than 100 $\mu g/m^3$ with the exception of chloroform in PSGI-9 (510 $\mu g/m^3$) and ethanol in PSGI-10 (120 $\mu g/m^3$).

1.4 DESCRIPTION OF REMEDIAL ACTIONS

Remedial actions completed in October 2007 included the installation of the Jet Grout and Waterloo® Hydraulic Barriers, excavation of over 29,000 tons of contaminated soil from the BCP Area (approximately 300 feet by 125 feet by 12 feet deep), and backfilling the BCP Area with environmentally clean fill. The Site has been remediated in accordance with the scope of work presented in the NYSDEC-approved (approved on July 5, 2006) Remedial Action Work Plan (RAWP) dated November 15, 2005 and as amended by the Remedial Action Work Plan Addenda dated June 14, 2006, the Sub-Slab Depressurization System Letter to the New York State Department of Health (NYSDOH) dated June 16, 2006, and RAWP Addendum No. 2 dated August 3, 2007.

Below is a summary of the Remedial Actions completed and being implemented at the Site in accordance with the RAWP and supplemental voluntary activities:

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

2. The installation of a jet grout hydraulic barrier along a portion of the western side of the BCP Area and Non-BCP Area A and a steel sheeting (Waterloo Barrier®) hydraulic barrier along a portion of the northern side of the BCP Area and Non-BCP Area A;
3. Excavation of soil/fill within the defined area as shown on Figure 23 (broken out into three sections);
4. Dewatering of the excavated area to provide a solid bottom to place clean backfill material and to reduce the volume of contaminated groundwater remaining on the Site;
5. Appropriate off-Site disposal of all material removed from the BCP Area in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
6. Collection and analysis of confirmatory soil samples to evaluate the performance of the remedy with respect to attaining the RAWP goals;
7. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits of no detectable VOCs and no exceedances of RSCOs; and, (2) compliance with all Federal, State and local rules and regulations in handling and transport of material;
8. In-situ solidification of a 50 ft x 60 ft area in Non-BCP Area B to encapsulate a small pocket of soil contamination immediately north of the BCP Area;
9. Excavation of soil for off-Site disposal from five Spot Excavations in Non-BCP Area A as discussed in Section 6.0;
10. A Site Management Plan for long term management of historic urban fill as required by the Environmental Easement and DCR, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

11. Recording of an Environmental Easement and DCR to prevent future exposure to any underlying soils remaining at the Site (a copy of the Environmental Easement and DCR is provided in Appendix C);

12. A vapor barrier and an SSDS to mitigate the migration of any potential residual VOC vapors into the school building;

13. Construction and maintenance of a cover system consisting of school buildings (concrete foundation), asphalt pavement, concrete sidewalks, artificial turf on athletic fields, or two feet of clean fill on all exposed ground surfaces including landscaped areas to prevent human exposure to underlying soils remaining under Non-BCP Area A;

14. Construction and maintenance of a concrete cover on all exposed ground surfaces beneath PS 156 and IS 151 to prevent human exposure to underlying soils remaining under Non-BCP Area B; and

15. All responsibilities associated with the Remedial Action, including permitting requirements, addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities at the Site were conducted in accordance with the NYSDEC-approved RAWP for the Former Metro-North Property (Mott Haven) (November, 2005) as amended by the Remedial Action Work Plan Addenda dated June 14, 2006; the SSDS Letter to NYSDOH dated June 16, 2006; and RAWP Addendum No. 2 dated August 3, 2007. The approved RAWP is included in Appendix D. There have been no deviations from the RAWP.

1.4.1 Removal of Contaminated Materials from the BCP Area

A map of the location of areas where excavation was performed is shown in Figure 23 (including a breakout of the three sections of the excavation). The northern-most section (Section 1) was rectangular with a length (east-west direction) of 150 feet, a width (north-south direction) of 100 feet, and a depth of approximately 15 feet (to elevation 9.3 BPBD). The middle and southern sections (Sections 3 and 2, respectively) were rectangular with lengths (east-west direction) of 125 feet, widths (north-south direction) of 100 feet, and depths of approximately 15 feet (to elevation 10.0 BPBD) and 10 feet (to elevation 14.5 BPBD), respectively.

The southern-most section, Section 2, was the first area to be excavated. Excavation started on April 30, 2007 and continued through May 14, 2007. Upon completion of the excavation in Section 2, a total of 15 confirmatory samples were collected from the locations shown on the figure in Appendix O, and analyzed for Target Compound List (TCL) VOCs by USEPA Method 8260 and TCL SVOCs by USEPA Method 8270. A summary table of the results is presented in Appendix O. One (1) confirmatory soil sample in Section 2, EP-46, contained 0.069 milligrams/kilogram (mg/Kg) of benzene, which is a very marginal exceedance of the 0.060 mg/Kg TAGM RSCO. In a letter to the NYSDEC dated May 21, 2007, SCA's consultant, Shaw Environmental (Shaw), indicated that the concentration did not pose a risk to Site occupants. The NYSDEC provided an email on May 22, 2007, confirming that the area had been sufficiently excavated and that the area could be backfilled.

The northern-most section, Section 1, was the second area to be excavated. Excavation began on May 23, 2007, and continued through July 30, 2007. Upon completion of the excavation in Section 1, a total of 18 confirmatory samples were collected from the locations shown on the figure in Appendix O, and analyzed for VOCs and SVOCs. The results are presented in the summary table in Appendix O. One confirmatory sample showed VOC levels above regulatory guidance values for clean up. The NYCSCA notified NYSDEC and directed the contractor to excavate and remove an additional foot of soil in this area. Re-sampling following this additional soil removal confirmed all VOCs below regulatory guidelines. All confirmatory sample results were submitted to the NYSDEC on August 10, 2007, indicating that all of the samples from the bottom of the final excavation were below TAGM RSCOs, and that the Contractor had been directed to backfill the excavation.

Section 3 was the last area to be excavated. Excavation began on September 12, 2007, and continued through September 27, 2007. Upon completion of the excavation in Section 3, a total of 15 confirmatory samples were collected from the locations shown on the figure in Appendix O, and analyzed for VOCs and SVOCs. The results are presented in the summary table in Appendix O. One confirmatory sample showed VOC concentrations above regulatory guidance values for clean up in one area. A second sample showed SVOC concentrations above regulatory guidance values for clean up in a second area. The NYCSCA notified NYSDEC and directed the contractor to excavate and remove an additional foot of soil in both these areas. Re-sampling following this additional soil removal confirmed all VOCs and SVOCs below regulatory guidelines. All confirmatory sample results were submitted to the NYSDEC on October 4, 2007, indicating that all of the samples from the bottom of the final excavation were below TAGM RSCOs, and that the Contractor had been directed to backfill the excavation.

The majority of contaminated soils that were removed from the BCP Area were characterized as non-hazardous industrial waste (NHIW). All excavations were performed inside temporary tent structures with a fully operational vapor management system. The NHIW was transported to Clean Earth of Philadelphia (CEP) for treatment and disposal. Transportation of the NHIW to CEP began on April 30, 2007 and continued through September 27, 2007. A total of 944 truckloads transporting a total of 29,035.8 tons of NHIW were removed from the Site during this time.

Grout spoil material was generated during the installation of the jet grout hydraulic barrier on the western side of the BCP Area and Non-BCP Area A. Transportation of the grout spoil to CEP began on December 29, 2006 and continued periodically through September 18, 2007. A total of 353 truckloads transporting a total of 9,868.5 tons of this material was removed from the BCP Area and Non-BCP Area A during this time.

Soils in four small areas, three within Section 1 and one within Section 3, were characterized as hazardous waste for disposal purposes. Between June 6 and 13, 2007, thirteen (13) truck loads of soil were excavated from within Section 1 and transported off-site as hazardous waste. The hazardous waste was disposed at the Clean Earth of North Jersey facility in South Kearny, New Jersey. Also, one roll-off container of soil was excavated at this time, stored within the temporary tent structure, and was transported on August 13, 2007 as hazardous waste to EQ Detroit, in Detroit Michigan.

On September 17, 2007, the small area designated as "hazardous waste" from Section 3 was transported off-site to EQ Detroit. A total of 438.4 tons of soil characterized as hazardous waste was removed from the Site.

1.4.2 Historic Urban Fill

Based on soil and groundwater sampling in Non-BCP Area A, it was determined that the material was characteristic of historic urban fill and had not been impacted by the MGP waste and gasoline which were the contaminants of concern in the BCP Area. NYSDEC defines historic urban fill as "non-indigenous or non-native material, historically deposited or disposed in the general area of, or on, a site to create useable land by filling water bodies, wetlands or topographic depressions, which is in no way connected with the subsequent operations at the location of the emplacement, and which was contaminated prior to emplacement." Historic urban fill remaining on the Site after the remedial actions may contain concentrations of compounds in excess of corresponding TAGM RSCOs.

Historic urban fill was covered with a combination of asphalt roads, concrete sidewalks/walkways, an athletic field (artificial turf), school buildings on concrete slab, and landscaped areas. There is no historic urban fill remaining within the BCP Area.

1.4.3 Engineering and Institutional Controls

Engineering Controls for the BCP Area and Non-BCP Area A consist of: (1) cover systems to prevent exposure to underlying soils; (2) hydraulic barriers along the northern and western sides of the BCP Area and Non-BCP Area A to prevent any upgradient contaminated groundwater from flowing beneath the school buildings in the future; and (3) a vapor barrier and SSDS beneath all school buildings as an added safeguard to prevent any potential residual soil vapor from entering the school buildings in the future. Engineering Controls for the Non-BCP Area B consist of a cover system to prevent exposure to underlying soils. A series of Institutional Controls are required to implement, maintain and monitor these Engineering Controls. These Institutional Controls dictate that:

- All Engineering Controls are operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property (the BCP Area, Non-BCP Area A and Non-BCP Area B) are inspected and certified at a frequency and in a manner defined in this SMP;
- Data and information pertinent to Site Management for the Controlled Property are reported at the frequency and in a manner defined in this SMP; and
- On-Site environmental monitoring devices are protected and replaced as necessary to ensure continued functioning in the manner specified in this SMP.

The Controlled Property will have the following Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required under the Environmental Easement and DCR. Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for the intended use;
- All future activities on the Controlled Property that will disturb historic urban fill material are prohibited unless they are conducted in accordance with the soil management provisions in this SMP; and
- The Controlled Property may be used for a New York City Public School only provided the long-term Engineering and Institutional Controls included in the SMP remain in use.

These EC/ICs will:

- Prevent ingestion of groundwater with contamination levels that exceed drinking water standards;
- Prevent contact with or inhalation of volatiles from contaminated groundwater;
- Improve groundwater quality at the Site;
- Prevent the discharge of contaminants to surface water;
- Prevent contaminated groundwater from migrating on-Site;

- Prevent ingestion/direct contact with underlying soils;
- Prevent migration of contaminants that would result in off-Site groundwater or surface water contamination.

2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

2.1 INTRODUCTION

2.1.1 General

Remedial activities were completed at the Site in accordance with the NYSDEC-approved RAWP for the Former Metro-North Property (Mott Haven) (November 2005) as amended by the Remedial Action Work Plan Addenda dated June 14, 2006; the SSDS Letter to NYSDOH dated June 16, 2006; and RAWP Addendum No. 2 dated August 3, 2007. The remedial goals included:

1. Ensure that on-site contaminant concentrations in soil and groundwater and soil gas do not pose unacceptable risks to school occupants;
2. Achieve cleanup of VOCs and SVOCs to RSCOs as per TAGM 4046 to the extent practical; and
3. Maintain existing groundwater quality at the downgradient property line.

A summary of the remedial strategies and EC/ICs completed and implemented at the Site are as follows:

- Excavation of soils/fill within the area defined in the RAWP;
- Dewatering of the excavation to provide a solid bottom to place clean backfill material which concurrently removed most of the contaminated groundwater remaining on the Site;
- Maintenance of a cover system consisting of school buildings (concrete foundation), asphalt pavement, concrete sidewalks, concrete cover, artificial turf on athletic fields, or two feet of clean fill on all exposed ground surfaces including landscaped areas to prevent human exposure to underlying soils remaining under Non-BCP Area A and Non-BCP Area B;
- Registration of an Environmental Easement and DCR, including Institutional Controls, to prevent future exposure to any underlying soils remaining at the Site (copies of the Environmental Easement and DCR are provided in Appendix C);

- The installation of a jet grout hydraulic barrier along a portion of the western (upgradient) side of the BCP Area and Non-BCP Area A and a steel sheeting (Waterloo Barrier®) hydraulic barrier along a portion of the northern side of the BCP Area and Non-BCP Area A; and
- Construction of a vapor barrier and SSDS beneath the BCP Area and Non-BCP Area A to mitigate the migration of any potential residual VOC vapors into the new school buildings.

Since historic urban fill and groundwater/soil vapor exist beneath the Site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the Site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

The purpose of this Plan is to provide:

- A description of all EC/ICs on the Site;
- The basic operation and intended role of each implemented EC/IC;
- A description of the key components of the ICs created, as stated in the Environmental Easement and DCR;
- A description of the features that will be evaluated during each annual inspection and compliance certification period;
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Soil Management Plan for the safe handling of historic urban fill that may be disturbed during maintenance or redevelopment work on Non-BCP Area A and Non-BCP Area B; and
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the Site remedy, as determined by the NYSDEC.

2.2 ENGINEERING CONTROL COMPONENTS

2.2.1 Engineering Control Systems

2.2.1.1 Cover Systems

All historic urban fill areas (Non BCP Area A and Non BCP Area B) have a cover system. While no historical urban fill exists in the BCP Area, a cover system was also constructed within this area. The cover system over the BCP Area and Non BCP Area A is comprised of concrete building slabs, asphalt-covered roads, concrete-covered sidewalks, an artificial turf athletic field, or two feet of clean fill on all exposed ground surfaces including landscaped areas. In addition, a concrete cap was placed on Non-BCP Area B (this cover was not included as an engineering control in either the RAWP or Addenda since it is located beyond the Mott Haven Property and is unnecessary for meeting the RAWP objectives). This cover is included in this document to ensure that it is maintained and inspected as part of the overall management of the Site under the control of the DOE Division of School Facilities (DSF). The clean fill meets the TAGM RSCOs and contains no detectable volatile organic compounds as defined below in Section 2.3.2.6.

Figure 24 shows the design for each remedial cover type used on the BCP Area and Non-BCP Area A. As indicated on Figure 24, approximately 2-feet of drainage stone was placed directly below the turf surface, underlain by a network of 12-inch drainage pipes, underlain by a woven geotextile fabric. Figure 25 shows the location of each cover type at the BCP Area and Non-BCP Area A. The cover for Non-BCP Area B includes an average of eight (8) inches of crushed stone base with a minimum of four (4) inches of cement concrete cap.

A Soil Management Plan is included in Appendix E, and outlines the inspection and maintenance of the cover systems as well as procedures required in the event the cover system and underlying historic urban fill are disturbed. The Soil Management Plan is also discussed in greater detail in Section 2.3 of this EC/IC Plan. Issues related to maintenance of this cover are provided in the Monitoring Plan included in Section 4 of this SMP.

2.2.1.2 Vapor Barrier

A vapor barrier was installed beneath all of the new school buildings (BCP Area and Non-BCP Area A) as an added precaution to prevent any potential residual soil gas vapors from entering the school building in the future. The vapor barrier was installed above the gravel layer containing the SSDS. There is no routine maintenance associated with the vapor barrier. Monitoring of the vapor barrier is described in Section 3.2.2 of this document. Specifications and drawings regarding the installation of the vapor barrier are included in Appendix F of this SMP.

2.2.1.3 Jet Grout Hydraulic Barrier

A jet grout hydraulic barrier was installed along 400 feet of the retaining wall on the west side of the BCP Area and Non-BCP Area A to prevent any upgradient contaminated groundwater from flowing beneath the school buildings in the future. The hydraulic barrier has been installed to at least 30 feet in depth. There is no monitoring or maintenance associated with the hydraulic barrier. Specifications and drawings regarding the installation of the jet grout hydraulic barrier are included in Appendix G of this SMP.

2.2.1.4 Waterloo® Hydraulic Barrier

A Waterloo® hydraulic barrier was installed 370 feet along the north side of the BCP Area and Non-BCP Area A to prevent any upgradient contaminated groundwater from flowing beneath the school buildings in the future. The hydraulic barrier has been installed to approximately 30 feet in depth or to bedrock. There is no monitoring or maintenance associated with the hydraulic barrier. Specifications and drawings regarding the installation of the Waterloo® hydraulic barrier are included in Appendix H of this SMP.

2.2.1.5 Sub Slab Depressurization System

A SSDS was installed beneath all of the new school buildings (BCP Area and Non-BCP Area A) as an added precaution to prevent any potential residual soil gas vapors from entering the school buildings in the future. The SSDS has been installed beneath the vapor barrier and operated in an active mode for the life of the school facility unless there is clear demonstration that the subsurface VOC contamination emanating from upgradient source(s) has been removed or treated. Specifications and drawings regarding the installation of the SSDS are included as Appendix I of this SMP.

Procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan (Section 4 of this SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of this SMP).

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

2.2.2.1 Cover Systems

The cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals as presented in the Soil Management Plan for the life of the schools.

2.2.2.2 Sub Slab Depressurization System

An active SSDS was also installed beneath the schools as an added precaution to prevent any potential residual soil gas vapors from entering the school buildings in the future. The SSDS has been installed beneath the vapor barrier and will continue to be operated in an active mode for the life of the school facility. On the clear demonstration that the subsurface VOC contamination emanating from the upgradient sources has been removed or treated, SCA may submit a petition for its discontinuation of the SSDS.

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

2.2.2.3 Vapor Barrier

The vapor barrier is a permanent control which was installed beneath the school as an added precaution to prevent any potential residual soil gas vapors from entering the school buildings in the future. The vapor barrier was placed above the gravel layer containing the SSDS. There is no routine maintenance associated with the vapor barrier. Monitoring of the vapor barrier is described in Section 3.2.2 of this document.

2.2.2.4 Jet Grout Hydraulic Barrier

A jet grout hydraulic barrier was installed along 400 feet of the retaining wall on the west side of the BCP Area and Non-BCP Area A to prevent any upgradient contaminated groundwater from flowing beneath the school buildings in the future. The hydraulic barrier has been installed to at least 30 feet in depth. There is no monitoring or maintenance associated with the hydraulic barrier.

2.2.2.5 Waterloo® Hydraulic Barrier

A Waterloo® hydraulic barrier was installed 370 feet along the north side of the BCP Area and Non-BCP Area A to prevent any upgradient contaminated groundwater from flowing beneath the school buildings in the future. The hydraulic barrier has been installed to approximately 30 feet in depth or to bedrock. There is no monitoring or maintenance associated with the hydraulic barrier.

2.2.2.6 Groundwater Monitoring

Groundwater monitoring activities were performed until June 2015 to assess groundwater quality in order to monitor the performance of the remedial actions listed in Section 1.4 and to evaluate any changes in the upgradient groundwater quality at the Site. In December 2015, the NYSDEC approved termination of the groundwater monitoring program since the upgradient spill was being addressed under another NYSDEC program and since the RAWP remedial objectives for groundwater at the Site were consistently achieved. Monitoring activities are outlined in the Monitoring Plan of the SMP.

2.3 INSTITUTIONAL CONTROLS COMPONENTS

2.3.1 Institutional Controls

A series of Institutional Controls are required under the RAWP to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to underlying soils by controlling disturbances of the underlying soils; and, (3) restrict the use of the Site to a public school campus. Adherence to these Institutional Controls on the Site (Controlled Property) is required under the Environmental Easement and DCR and will be implemented under this Site Management Plan. These Institutional Controls require:

- Compliance with the Environmental Easement and DCR by the Grantor and the Grantor's successors and assigns with all elements of this SMP;

- All Engineering Controls must be operated and maintained as specified in this SMP;
- The cover system consisting of concrete building slabs, asphalt pavement, concrete covered sidewalks, an artificial turf athletic field, or two feet of clean fill on all exposed ground surfaces including landscaped areas in the BCP Area and Non-BCP Area A must be inspected, certified and maintained as required in this SMP;
- The cover system consisting of a concrete cap on all exposed ground surfaces beneath PS 156 and IS 151 to prevent human exposure to underlying soils remaining under Non-BCP Area B;
- A soil vapor mitigation system consisting of a vapor barrier and a SSDS under all building structures (BCP Area and Non-BCP Area A) must be inspected, certified, operated and maintained as required in this SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;
- On-Site environmental monitoring devices must be protected and replaced as necessary to ensure the devices function in the manner specified in this SMP; and
- Engineering Controls may not be discontinued without an amendment or the extinguishment of this Environmental Easement or DCR and approval by NYSDEC and NYSDOH.

The Controlled Property will have the following Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required by the Environmental Easement and DCR. Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- The use of the groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for its intended purpose;
- All future activities on the Controlled Property that will disturb historic urban fill material (Non-BCP Area A and Non BCP Area B) are prohibited unless

they are conducted in accordance with the soil management provisions in this SMP;

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

2.3.2 Soil/Materials Management Plan

This portion of the SMP is applicable to future intrusive work that will disturb the historic fill material remaining on the Non-BCP Area A and Non-BCP Area B following completion of the remedial measures. The 13-acre Site was remediated for restricted use as a school campus. Any future intrusive work (i.e., after the completion of this Remedial Action) that will disturb the historic urban fill in the Non-BCP Area A and Non-BCP Area B and modifications or repairs to the existing cover system will be performed in compliance with the Soil Management Plan (SoMP), which is included in this SMP. Any future intrusive construction work must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the Site. The Soil Management Plan is presented in Appendix E of the SMP. The HASP and the CAMP will be prepared by the approved general contractor and approved by the NYCDOE or other designated entity prior to any intrusive work. The HASP and CAMP are the responsibility of the property owner and will be in compliance with DER-10 Technical Guide and 29 CFR 1910 and 1926, and all other applicable Federal, State and local regulations. Any intrusive construction work must be certified as compliant with the SMP and included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 5). The SoMP also includes details on the inspection of the cover systems.

2.3.2.1 Soil Screening Methods

Visual, olfactory and photoionization detector (PID) soil screening and assessment will be performed by a qualified environmental professional during all future development excavations into historic urban fill. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Screening will be performed by qualified environmental professionals. Resumes will be provided in the Annual Site Management Report for all personnel conducting invasive work field screening (i.e. those representing the Remedial Engineer) for historic urban fill during development work.

2.3.2.2 Stockpile Methods

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

A dedicated water truck equipped with a water cannon will be available on-Site for dust control.

2.3.2.3 Materials Excavation and Load Out

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

The owner of the Controlled Property and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site will be investigated by the Remedial Engineer. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site.

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

A truck wash will be operated on-Site. The Remediation Engineer will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the intrusive work is complete.

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

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

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

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities performed under the Remedial Action Work Plan.

In the highly unlikely event that historic urban fill exhibits unanticipated field evidence of contamination, the subject fill will be removed and confirmatory sampling will be completed.

Mechanical processing of historical fill or excavated material on-site is prohibited.

2.3.2.4 Materials Transport Off-Site

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

The truck transport route from the Site is as follows:

1. Turn right onto Morris Avenue from the Site;
2. Head south on Morris Avenue to 138th Street;
3. Turn right onto 138th Street;
4. Head west on 138th Street and enter either Interstate 87 northbound or southbound, depending upon the quickest route to the disposal facility.

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

The out-bound truck route to the Site is shown in Figure 26. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

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

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

Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be prohibited.

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

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

2.3.2.5 Materials Disposal Off-Site

The final disposal locations will be identified and reported to NYSDEC in the Annual Site Management Report.

For large projects, the total quantity of material expected to be disposed off-Site will be reported to NYSDEC prior to performance of work. This will include quantity, breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc.

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

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer, Contractor, or Site Owner to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed was generated at an environmental remediation site in New York State and subject to the 6NYCRR Part 360 Regulations. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material.

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

Historic urban fill from Non-BCP Area A or Non-BCP Area B (all historic fill has been removed from the BCP Area) is prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

On-site non-hazardous soils other than historic fill to be removed from the Site will be considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC to be C/D materials and not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on- Site or off- Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Annual Site Management Report will include an accounting of the destination of all material removed from the Site during work performed under this plan, including, but not limited to, excavated soil, historic fill, other solid waste, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the Annual Site Management Report.

Bill of Lading system or equivalent will be used for off-Site movement of all material removed from the Site. This information will be reported in the Annual Site Management Report.

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

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

2.3.2.6 Materials Reuse On-Site

Material that has been tested and found to contain levels of organic compounds and inorganic analytes that do not exceed TAGM RSCOs and no detectable VOCs meeting the gradation requirements described below may be reused on the Site, and is referred to as "Environmentally Clean Fill and Backfill." Environmentally Clean Fill shall contain no particles exceeding four inches in the largest diameter. No more than 30 percent of the material shall be retained on a ¾ inch sieve. The material passing the ¾ inch sieve shall contain, by weight, no more than 40 percent passing the No. 100 sieve and 12 percent passing the No. 200 sieve.

The following restrictions of reuse of on-site materials will apply:

- Concrete crushing or processing on-site is prohibited.
- Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-site.

- On-site material removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms or as backfill for subsurface utility lines.
- Concrete and asphalt pavement that are removed from the Site cannot be re-used.

2.3.2.7 Fluids Management

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

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

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

2.3.2.8 Backfill from Off-Site Sources

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this SMP prior to receipt at the Site.

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

All imported soils will meet the definition of Environmentally Clean Fill as specified in Section 2.3.2.6.

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

2.3.2.9 Contingency Plan

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

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

2.3.2.10 Community Air Monitoring Plan

The Contractor shall prepare and implement a CAMP consistent with the NYSDOH requirements for a Generic Community Air Monitoring Plan and provide the CAMP to the Owner a minimum of two weeks prior to commencement of earth disturbance activities. The CAMP must be approved by the Owner, the NYSDEC and the NYSDOH prior to the start of work. The fixed and mobile monitoring stations will be established as specified in the NYSDOH Generic CAMP. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

2.3.2.11 Odor, Dust and Nuisance Control Plan

2.3.2.11.1 Odor Control Plan

Odor control methods will be implemented during Site disturbance activities to control emissions of nuisance odors from excavations or stockpiles. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Controlled Property owner's Remediation Engineer, who is responsible for certifying the Annual Site Management Report.

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

2.3.2.11.2 Dust Control Plan

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

- Dust suppression will be achieved though the use of an on-Site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

2.4 INSPECTIONS AND NOTIFICATIONS

2.4.1 Inspections

Inspections of the vapor barrier, SSDS and cover system will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive Site-wide inspection will be conducted annually. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed;

- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP, the Environmental Easement, and the DCR;
- Sampling and analysis of appropriate media during monitoring events;
- If Site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Site Management Reporting Plan (Section 5).

Unscheduled inspections and/or sampling may take place when a suspected failure of the cover systems or SSDS has been reported or in an emergency, such as a natural disaster, to verify the effectiveness of the EC/ICs implemented at the Site by a qualified environmental professional as determined by NYSDEC.

2.4.2 Notifications

2.4.2.1 NYSDEC-acceptable Electronic Database

The following information is presented in Appendix J in an electronic database format:

- A Site summary;
- The name of the current Site owner and/or the remedial party implementing the SMP for the Site;
- The location of the Site;
- The current status of Site remedial activity;
- A copy of the Environmental Easement and DCR; and
- A contact name and phone number of a person knowledgeable about the Environmental Easement and DCR requirements, in order for NYSDEC to obtain additional information, as necessary.

This information will be: 1) modified as conditions change; (2) revised in Appendix J of this document; and, (3) submitted to NYSDEC in the Annual Site

Monitoring Report. Should the Environmental Easement or DCR be modified or terminated, the copy of the revised Environmental Easement or DCR will also be updated in this manner.

2.4.2.2 Non-routine Notifications

Non-routine notifications are to be submitted by the property owner(s) to the NYSDEC, the Bronx Borough President's Office, the New York City Council Representative for the district, and Community Board 4 on an as-needed basis for the following reasons:

- 120-day advance notice of any proposed changes in Site use that are consistent with the terms of the BCA;
- 15-day advance notice of any proposed ground-intrusive activities that are non-routine and non-emergency;
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action taken to mitigate the damage or defect;
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of action taken and the impact to the environment and the public; and
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

2.4.2.3 Internal Notifications

In order to enhance communication between the SCA's Industrial and Environmental Hygiene (IEH) Division and SCA's Construction Management (CM) Division and the DOE DSF responsible for Site work, SCA has expanded their current communication network. SCA CM and DOE DSF have been made aware of the SMP requirements of the Site. SCA CM and DOE DSF staff are required to contact IEH for direction prior to proceeding with work at the Site.

3.0 MONITORING PLAN

3.1 INTRODUCTION

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the implemented ECs in reducing or mitigating contamination at the Site. ECs at the BCP Area and Non-BCP Area A include a cover system, SSDS, vapor barrier, and jet grout and steel sheet hydraulic barriers. ECs at Non-BCP Area B include a cover system. This Monitoring Plan is subject to revision by NYSDEC.

3.1.2 Purpose

This Monitoring Plan describes the methods to be used for:

- Groundwater sampling and analysis;
- Evaluating Site information periodically to confirm that the remedy continues to be effective as per the design;
- Preparing the necessary reports for the various monitoring activities;
- Assessing compliance with NYSDEC groundwater standards; and
- Assessing achievement of the remedial performance criteria.

To adequately address these issues, this Monitoring Plan provides information on:

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems (e.g., well logs);
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control requirements;
- Monitoring well decommissioning procedures; and
- Annual inspection and certification.

Quarterly groundwater monitoring was conducted for one year following installation of the barrier walls, and semi-annual monitoring was conducted until June 2015. In December 2015, the NYSDEC approved termination of the groundwater monitoring program since the upgradient spill was being addressed under another NYSDEC program and since the RAWP remedial objectives for groundwater at the Site were consistently achieved. The groundwater monitoring program is summarized in the table below and outlined in detail in Section 3.2 below.

Monitoring/Inspection Schedule

Monitoring Program	Frequency*	Matrix	Analysis
Cover Systems	Monthly	Custodial Engineer	DOE
	Annual	Independent Professional Engineer	DOE
Groundwater Monitoring Well Sampling	Quarterly for 1st year, semi-annual thereafter until the upgradient source was addressed	Groundwater	US EPA Method 8260 for VOCs**

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH

** The 1st round of quarterly groundwater samples were also analyzed by US EPA Method 8270 for SVOCs.

3.2 ENGINEERING CONTROL SYSTEM MONITORING

The following sections discuss the monitoring activities for each of the ECs.

3.2.1 Cover System Monitoring

Exposure to subsurface soils is prevented by a cover system that has been constructed on the Site. The cover system for the BCP Area and Non-BCP Area A is comprised of concrete building slabs, asphalt covered roads, concrete covered sidewalks, a artificial turf athletic field, or two feet of clean fill on all exposed ground surfaces including landscaped areas. In addition, NYCSCA installed a concrete cap over Non-BCP Area B. Figure 24 shows the design (i.e., cross section) of each type of cover built at the BCP Area and Non-BCP Area A and Figure 25 shows the location of each cover type to be built at the BCP Area and Non-BCP Area A. The design of the cover for Non-BCP Area B includes an average of eight (8) inches of crushed stone base with a minimum of four (4) inches of cement concrete cap. School personnel will be provided training in both the operation and maintenance of the artificial turf system, and the custodian will conduct monthly inspections of the turf. DOE will replace the turf when standard repairs are no longer practical.

3.2.1.1 Cover System Monitoring Schedule

Monthly inspections will be performed by the school custodian who will identify any observed changes to the cover system. In the event of a change in previous conditions, the custodian will log the information and immediately request an inspection from DOE, DSF. Annual inspections of the BCP Area, Non-BCP Area A, and Non-BCP Area B cover systems will be performed by an independent professional engineer retained by the DOE, DSF and in the presence of custodial staff. Monthly and Annual Inspection Checklists are provided in Appendix M.

Inspection frequency is subject to change by NYSDEC and NYSDOH. Unscheduled inspections and/or sampling may take place when a suspected failure of any part of the cover systems has been reported or an emergency occurs that is deemed likely to affect the operation of the cover system. Monitoring deliverables for the cover system are specified in Section 5.4.

3.2.2 Vapor Barrier Monitoring

A vapor barrier was installed beneath all of the school buildings in the BCP Area and Non-BCP Area A as an added precaution to prevent any potential residual soil gas vapors from entering the school buildings in the future. The vapor barrier was installed above the gravel layer containing the SSDS. At the time of installation, a smoke test was performed on the vapor barrier as a Quality Assurance (QA)/Quality Control (QC) measure to demonstrate its integrity to the satisfaction of an independent professional engineer. This QA/QC step is a requirement of the manufacturer in order to issue a warranty for the vapor barrier system. In addition, if cracks are visually observed in any of the basement concrete floor slabs of the school building during the annual Site inspection, a smoke test will be performed to verify that there is no communication between the sub-slab and indoor environments. If required, the annual smoke test will utilize environmentally safe smoke tubes to inspect the basement floors of the school buildings for leaks through concrete cracks and floor joints consistent with the October 2006 NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. There are no subsurface building foundation walls in the school building, so the inspection and smoke testing will be limited to basement floor slabs and pits. There is no routine maintenance associated with the vapor barrier. Specifications and drawings regarding the installation of the vapor barrier are included in Appendix F of this SMP. The Annual Inspection Checklist is provided in Appendix M. Referenced documents, if applicable, also relate to the design of the vapor barrier.

3.2.3 Jet Grout Hydraulic Barrier Monitoring

A jet grout hydraulic barrier was installed along 400 feet of the retaining wall on the west side of the BCP Area and Non-BCP Area A to prevent any upgradient contaminated groundwater from flowing beneath the school buildings in the future. The hydraulic barrier has been installed to at least 30 feet in depth. There is no monitoring or maintenance associated with the hydraulic barrier. Specifications and drawings regarding the installation of the jet grout hydraulic barrier are included in Appendix G of this SMP. Referenced documents, if applicable, also relate to the design of the vapor barrier.

3.2.4 Waterloo® Hydraulic Barrier Monitoring

A Waterloo® hydraulic barrier was installed 370 feet along the north side of the BCP Area and Non-BCP Area A to prevent any upgradient contaminated groundwater from flowing beneath the school buildings in the future. The hydraulic barrier has been installed to approximately 30 feet in depth or to bedrock. There is no monitoring or maintenance associated with the hydraulic barrier. Specifications and drawings regarding the installation of the Waterloo® hydraulic barrier are included in Appendix H of this SMP. Referenced documents, if applicable, also relate to the design of the vapor barrier.

3.2.5 SSDS Monitoring

A SSDS was installed beneath the school buildings in the BCP Area and Non-BCP Area A as an added precaution to prevent any potential residual soil gas vapors from entering the school buildings in the future. The SSDS will continue to operate in the active mode for the life of the school facility unless there is clear demonstration that the subsurface VOC contamination emanating from upgradient source(s) has been removed or treated. Specifications regarding the installation of the SSDS are included as Appendix I of this SMP and the plans for the Vapor Barrier are included in Appendix F of the SMP.

After the SSDS was installed and prior to school occupancy, a start-up test was performed to evaluate the effectiveness of the SSDS. The first step was to start each of the SSDS fans on the roofs of the buildings to document that the fans are functioning properly and to document the air flow velocity at each SSDS effluent stack. Once the fans were fully operational at the roof level, a digital micromanometer was used to collect vacuum readings from the pressure field extension (PFE) monitoring stations in the basements of each building. The PFE monitoring stations in each building were designed to be installed in basement locations furthest from SSDS effluent stacks, and therefore furthest from the fans, to ensure that the SSDS is effective across the entire footprint of each building. PFE measurements collected at start-up easily achieved the minimum of 0.01 inches of water vacuum consistent with the performance requirements of the October 2006 NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

The operation of the SSDS is currently monitored through a state-of-the art Building Maintenance System (BMS) which provides 24/7 digital input on the operation of the SSDS, via differential pressure switches installed near the inlet of each SSDS fan. In the event of a BMS alarm, its notification system will sequentially notify the Custodial Engineer and other DOE personnel. The level of notification will be dependent on the response time of each personnel identified in the notification sequence.

3.2.5.1 SSDS Monitoring Schedule

All of the major SSDS components are continuously monitored by the BMS.

In addition, unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or if an emergency occurs that is deemed likely to affect the operation of the system. Monitoring deliverables for the SSDS are specified later in Section 5.0.

Monthly inspections of the SSDS will be performed by the Custodial Engineer and annual inspections will be performed by an independent professional engineer retained by the DOE, DSF. Monthly and Annual Inspection Checklists are provided in Appendix M.

3.2.5.2 General Equipment Monitoring

A visual inspection of the above ground components of the SSDS will be conducted by an independent professional engineer retained by the DOE, DSF during the annual inspection. The "General Equipment Monitoring" covers the operational components of the SSDS (i.e., fans, inline filter/bird screens, etc.) which will be monitored during the annual inspection. As stated above, all of the major SSDS components are continuously monitored by the BMS.

A complete list of BMS components to be checked was provided to the custodian and independent professional engineer during SSDS operation and maintenance training completed prior to the school opening. If in the future any equipment readings are not within their typical range, any equipment is observed to be malfunctioning, or the SSDS system is not performing within specifications, maintenance and repair as per the Operation and Maintenance Plan will be initiated immediately and the SSDS will be restored to its design specifications.

3.2.5.3 SSDS System Monitoring Devices and Alarms (BMS)

As mentioned above, the SSDS is connected to a BMS which has a warning device to indicate that the system is not operating properly. In the event that there is an interruption in service, an alarm will appear on a control panel that indicates the time and date of the alarm. The date and time at which the alarm is cleared will be noted. The BMS notification process involves several levels of electronic notification depending on the response time of each personnel identified in the notification sequence and operates 24/7. The system will be inspected and applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSDS will be restored to its design specifications. In the event of a prolonged/substantial shutdown of the SSDS, indoor air sampling will be performed. The NYSDEC will ultimately make decisions regarding the sampling procedures, with input from NYCDOE and the NYSDOH, who will also be reviewing the sampling results. Additional key parts (i.e., fan belts, motor) are on-hand to facilitate replacements, as necessary. Operational problems will be noted in the Annual Site Management Report.

3.3 GROUNDWATER MONITORING PROGRAM

Quarterly groundwater monitoring was conducted for one year starting December 2007, and semi-annual monitoring was conducted until June 2015. In December 2015, the NYSDEC approved termination of the groundwater monitoring program since the upgradient spill was being addressed under another NYSDEC program and since the RAWP remedial objectives for groundwater at the Site were consistently achieved.

3.3.1 Monitoring System Design

The network of monitoring wells is designed to monitor groundwater conditions at the Site. The network of wells has been located based on the criteria in the following table:

Groundwater Monitoring Well Network

Monitoring Well Number	Depth of Well (ft)	Screened Interval of Well (ft)	Frequency*	Matrix	Analysis	Location Rationale
MW-3R[1]	15	4-15	Quarterly for 1st Year, Semiannual thereafter	Groundwater	US EPA Method 8260 for VOCs	Previously sampled, centrally located downgradient well
MW-5R[1]	15	4-15	Quarterly for 1st Year, Semiannual thereafter	Groundwater	US EPA Method 8260 for VOCs	Previously sampled, northeast located downgradient well
MW-11R[1]	18	8-18	Quarterly for 1st Year, Semiannual thereafter	Groundwater	US EPA Method 8260 for VOCs	Previously sampled, southeast located downgradient well
MW-23	15	5-15	Quarterly for 1st Year, Semiannual thereafter	Groundwater	US EPA Method 8260 for VOCs	Immediately downgradient of Waterloo® Hydraulic Barrier
MW-24	13	3-13	Quarterly for 1st Year, Semiannual thereafter	Groundwater	US EPA Method 8260 for VOCs	Immediately downgradient of Jet Grout Hydraulic Barrier
MW-25R[2]	12	2-12	Quarterly for 1st Year, Semiannual thereafter	Groundwater	US EPA Method 8260 for VOCs	Inside of Waterloo® Hydraulic Barrier (NYSDEC Request)
MW-26R[3]	15	5-15	Quarterly for 1st Year, Semiannual thereafter	Groundwater	US EPA Method 8260 for VOCs	Inside of Waterloo® Hydraulic Barrier (NYSDEC Request)

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH.

[1] MW-3A, MW-5A and MW-11A were destroyed and replaced by MW-3R, MW-5R and MW-11R after the 7th Sampling Event.

[2] MW-25 was destroyed and replaced by MW-26R after the 5th Sampling Event.

[3] MW-26 was destroyed after the 1st Quarterly Sampling Event by school construction activities. MW-26R was installed in the same location and to the same depth.

The locations of these wells are shown on Figure 27 of this SMP (Figure 27A shows locations of the replacement wells as of December 2013). Baseline water levels and groundwater flow patterns are shown on Figure 13. All of the on-Site groundwater monitoring wells installed during the RI have been decommissioned in place, as part of the school construction. All of the remaining on-Site and off-Site groundwater monitoring wells were decommissioned in accordance with NYSDEC's Commissioner Policy 43 (CP-43, November 2009) following the NYSDEC's approval to terminate the groundwater monitoring program in December 2015.

3.3.2 Groundwater Well Construction

The groundwater monitoring network consists of seven (7) monitoring wells. Monitoring wells MW-3A and MW-23 were installed utilizing a hollow stem auger drill rig, and MW-5A, MW-11A, MW-24, MW-25 and MW-26R were installed with a Geoprobe® rig. Monitoring wells MW-3A, MW-5A and MW-11A were decommissioned following the 7th Sampling Event and replaced by monitoring wells MW-3R, MW-5R and MW-11R utilizing a Geoprobe rig. The two wells installed with the hollow stem auger rig were constructed of 2-inch diameter polyvinyl chloride (PVC) with 10-foot long, 0.010-inch machine slotted well screen. The eight wells installed by the Geoprobe rig were constructed with 1.5-inch diameter PVC with 10-foot long, 0.010-inch machine slotted well screen. Each well screen is surrounded by a sand pack with a bentonite seal. The remainder of the annulus is sealed with concrete and completed at the surface with either a locking flush-mounted manhole or with a stick-up steel protective casing. All of the on-Site and off-Site monitoring wells were decommissioned in accordance with CP-43 following the NYSDEC's approval to terminate the groundwater monitoring program in December 2015.

Copies of the well construction logs for these wells are included in Appendix K of this SMP.

3.3.3 Monitoring Schedule

The seven (7) groundwater wells in the monitoring network were sampled on a quarterly basis for the first year and semi-annual monitoring was conducted until June 2015. In December 2015, the NYSDEC approved the termination of the groundwater monitoring program since the upgradient spill was being addressed under another

NYSDEC program and since RAWP objectives for groundwater were continuously achieved.

Deliverables for the groundwater-monitoring program are specified below.

3.3.4 Sampling Event Protocol

All well sampling activities were recorded in a field book and a groundwater-sampling log presented in Appendix L. Other observations (e.g., well integrity, etc.) were noted on the well sampling log. The well sampling log served as the inspection form for the groundwater monitoring well network. The following sampling procedures were followed for each groundwater sampling event:

1. Measure Water Level.
2. Install Tubing: Slowly lower the peristaltic pump tubing into the well to the depth specified for that well. The bottom of the tubing must be kept at least 2 feet above the bottom of the well to prevent disturbance and resuspension of any sediment present in the bottom of the well. Record the depth to which the tubing is lowered.
3. Measure the water level again with the tubing in the well. Leave the water level measuring device in the well.
4. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level will be monitored approximately every 5 minutes. Ideally, a steady flow rate will be maintained which should result in a stabilized water level (drawdown of 0.3 feet or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Care should be taken to avoid entrainment of air in the tubing (i.e., allow the water level to drop down to the pump intake). Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.
5. Monitor Indicator Parameters: During purging of the well, monitor and record the field indicator parameters (temperature, specific conductance, pH, redox potential, and dissolved oxygen [DO]) approximately every 5 minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows:

- ±0.1 for pH
- ±3% for specific conductance (conductivity)
- ±10 mv for redox potential
- ±10% for DO
    1. Dissolved oxygen usually requires the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.

6. Remove Tubing: Slowly remove the tubing from the well and properly discard. Slowly lower a dedicated, disposable 1-inch polyethylene bailer into the well. The bottom of the bailer must be kept at least two feet from the bottom of the well. Slowly remove the bailer from the well and pour the contents of the bailer into the sample containers. The VOC sample containers must be filled prior to any other sample containers.
7. Measure and record well depth.
8. Close and lock the well.

Following sample collection, the samples were submitted to a NYSDOH-certified laboratory for volatile organic analysis by US EPA Method 8260. The first round of sampling also included semi-volatile organic analysis by US EPA Method 8270. The monitoring reporting requirements are discussed in Section 3.7 of this SMP.

3.4 WELL REPLACEMENT/REPAIRS AND DECOMMISSIONING

Repairs and/or replacement of wells in the monitoring well network were performed based on assessments of structural integrity and overall performance. Well decommissioning, for the purpose of replacement, was reported to NYSDEC prior to performance and in the annual report. Well decommissioning without replacement was approved by the NYSDEC for all on-Site and off-Site wells in December 2015 and completed in accordance with the NYSDEC's CP-43.

3.5 SITE-WIDE INSPECTION

A Site-wide inspection will be performed monthly by the School custodian and annually by an independent professional engineer retained by the DOE, DSF. Site-wide inspections will also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (Appendix M). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- Description of general Site conditions at the time of the inspection;
- Site management activities being conducted including, where appropriate, confirmatory sampling and a health and safety inspection;
- Compliance with permits and schedules included in the Operation and Maintenance Plan; and
- Confirmation that Site records are up to date.

3.6 MONITORING QUALITY ASSURANCE/QUALITY CONTROL

All sampling and analyses have been, and will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the Site (Appendix N). Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
    - Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.
    - Sample holding times will be in accordance with the NYSDEC ASP requirements.
    - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.

- Sample Tracking and Custody;
- Calibration Procedures:
    - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
    - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Data Reduction and Validation:
    - Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:
        - Verification of 100% of all QC sample results (both qualitative and quantitative);
        - Verification of the identification of 10% of all sample results (both positive hits and non-detects);
        - Recalculation of 10% of all investigative sample results; and
        - A Data Usability Summary Report (DUSR) which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

3.7 MONITORING REPORTING REQUIREMENTS

Forms and any other information generated during regular Site monitoring events and Site inspections will be kept on file with the DOE, DSF and at each school custodians' office on the Mott Haven Campus. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Annual Site Management Report, as specified in the Reporting Plan of the SMP.

All groundwater monitoring results were reported to NYSDEC on an annual basis in the Site Management Report. A report or letter was prepared for submission subsequent to each groundwater sampling event. The report (or letter) included, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- Type of samples collected (i.e., groundwater);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (also to be submitted electronically in the NYSDEC-identified format);
- A copy of the laboratory certification;
- Any observations, conclusions, or recommendations; and
- A determination as to whether plume conditions have changed since the last reporting event.

Data were reported in hard copy and digital format as determined by NYSDEC. A summary of the groundwater monitoring program deliverables are presented below.

Monitoring/Inspection Deliverables

Task	Frequency of Sampling*	Reporting Requirements
Groundwater Monitoring	Quarterly for the First Year, Semi-annually afterwards until the upgradient source(s) of contamination were addressed	Quarterly Groundwater Monitoring Reports and Annual Groundwater Monitoring Report

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC/ NYSDOH.

3.8 CERTIFICATIONS

Site inspections and sampling activities will take place as outlined above. Frequency of inspection is subject to change by NYSDEC. Inspection certification for all ICs and ECs will be submitted to NYSDEC on a calendar year basis and must be submitted by the date stipulated by NYSDEC. An independent professional engineer registered to practice in New York State retained by DOE, DSF will perform the Annual Site Inspection and will provide the certification. Further information on the certification requirements are outlined in the Reporting Plan of the SMP. Information regarding the training requirements and qualifications for the personnel conducting the monitoring and inspections is presented in Table 7.

4.0 OPERATION AND MAINTENANCE PLAN

4.1 INTRODUCTION

The Operation and Maintenance Plan describes the measures necessary to operate and maintain any mechanical components of the remedy selected for the BCP Area and Non-BCP Area A (i.e., SSDS). This Operation and Maintenance Plan:

- Includes the steps necessary to allow individuals unfamiliar with the BCP Area and Non-BCP Area A to operate and maintain the SSDS;
- Includes an operation and maintenance contingency plan; and,
- Will be updated periodically to reflect changes in conditions in the BCP Area and Non-BCP Area A or the manner in which the SSDS is operated and maintained.

Information on non-mechanical Engineering Controls (i.e. cover system, vapor barrier, and jet grout and Waterloo® barriers) can be found in Section 2 - Engineering and Institutional Control Plan. A copy of this Operation and Maintenance Plan, along with the complete SMP, is kept in the school custodian's office within the Mott Haven Campus. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the SMP. The Operation and Management Plan is subject to NYSDEC revision.

4.2 ENGINEERING CONTROL SYSTEM OPERATION AND MAINTENANCE

The following sections describe the operation and maintenance plan for the SSDS system.

4.2.1 Scope

The SSDS fan units, which are located on the school building roofs, have a number of parts that require routine maintenance. Key parts of the SSDS fans include motor and fan bearings, fan belt, fan back draft damper, and differential pressure switch. Maintenance will be performed on the SSDS fans at least annually. Maintenance consists of replacing worn parts when necessary (i.e., the fan belt). The electric motors for the fans have a life expectancy of 25 years. The motors will be replaced after 22 to 24 years of service.

In the event that an SSDS fan fails, the fan will be repaired or replaced and documented for inclusion in the Annual Site Management Report. Key spare parts (i.e., fan belts, motor) are kept at the school to reduce the time necessary to replace the parts. Once a spare fan part has been put into operation, a new fan part will be ordered and kept at the school as a spare.

The BMS continuously monitors the SSDS operational status as indicated in Section 3.2.5.3. The custodial staff will monitor the status of the system in this manner. A log book will be set up to confirm on-going custodial oversight of the SSDS. The custodial staff will be instructed to contact the DOE, DSF in the event of a change in the operation of the SSDS.

Annual inspection of the SSDS, as well as other engineering controls, will be performed by an independent professional engineer retained by the DOE, DSF to ensure that all engineering controls are functioning properly.

Monthly walk-throughs of the Site will be performed by the custodian, who will identify any observed changes to the lowest interior floor surfaces as well as changes to the exterior ground surfaces (i.e., asphalt pavement, artificial athletic turf, walkways, etc.). This procedure will be followed for the entire period the Site is used as a school. In the event of a change in previous conditions, the custodian will log the information and immediately request an inspection from the DOE. A follow-up inspection and report will be generated and the NYSDEC will be informed of all findings and recommendations.

4.2.2 System Start-Up and Testing

The specifications for the SSDS system describe the components of the system and how they are installed. The specifications required the Contractor to pressure test the system during various phases of the installation and prior to start up, and to make any necessary repairs or replacements.

After the SSDS was installed and prior to school occupancy, a start-up test was performed to evaluate the effectiveness of the SSDS. The first step was to start each of the SSDS fans on the roofs of the buildings to document that the fans are functioning properly and to document the air flow velocity at each SSDS effluent stack. Once the fans were fully operational at the roof level, a digital micromanometer was used to collect vacuum readings from the PFE monitoring stations in the basements of each building. The PFE monitoring stations in each building were designed to be installed in basement locations furthest from SSDS effluent stacks, and therefore furthest from the fans, to ensure that the SSDS is effective across the entire footprint of each building. PFE measurements collected at start-up easily achieved the minimum of 0.01 inches of water vacuum consistent with the performance requirements of the October 2006 NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

The system testing described above will be conducted if, in the course of the SSDS lifetime, significant changes are made to the system, and the system restarted.

4.2.3 SSDS Operation: Routine Operation Procedures

The contractor was responsible for submitting all manufacturers' product data, manuals, and drawings related to the SSDS components including the fans, switches, dampers, and pressure gauges to the Owner. Copies of these materials are maintained on-site and available for reference in the event of troubleshooting, adjustments or repairs are necessary.

4.2.4 SSDS Operation: Routine Equipment Maintenance

Following startup and balance of the SSDS, all gauges and flow element settings were recorded for future comparison purposes if the system is malfunctioning. The manufacturer's recommendations regarding operation of the blower will be followed.

4.2.5 SSDS Operation: Non-Routine Equipment Maintenance

In the event of a BMS alarm, its notification system will sequentially notify the Custodial Engineer and other DOE personnel. Following notification the source of the problem will be determined and repairs or replacements will be made as required in accordance with the component manuals.

4.3 GROUNDWATER MONITORING WELL MAINTENANCE

All on-Site and off-Site groundwater monitoring wells were decommissioned in accordance with CP-43 following the NYSDEC's approval to terminate the groundwater monitoring program in December 2015.

4.4 MAINTENANCE REPORTING REQUIREMENTS

Maintenance reports and any other information generated during regular operations at the Site will be kept on-file in the school custodian's office on the Site. All reports, forms, and other relevant information will be available to the NYSDEC upon request and submitted as part of the Annual Site Management Report, as specified in the Section 5 of this SMP.

4.4.1 Routine Maintenance Reports

Routine maintenance activities will be recorded by the custodial staff in a log book. The log book will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

For all routine EC maintenance completed by a contractor, the contractor will submit a summary report of the completed maintenance, along with a list of parts and materials used, to the DOE with a copy to the school custodian within 30 days.

4.4.2 Non-Routine (Severe Condition) Maintenance Reports

Any non-routine maintenance event will be recorded in the custodial staff's log book and will include, but not be limited to, the following information:

- Date;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Other repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet);
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form); and
- A log of the Emergency Contact correspondence.

For all non-routine EC maintenance completed by a contractor, the contractor will submit a summary report of the completed maintenance, along with a list of parts and materials used, to the DOE with a copy to the school custodian within 30 days.

4.5 CONTINGENCY PLAN

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

4.5.1 Emergency Telephone Numbers

In the event of any environmentally-related situation or unplanned occurrence requiring assistance the Owner or Owner's representative(s) will contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel will be contacted. Prompt contact will also be made to the qualified environmental professional. These emergency contact lists must be maintained in an easily accessible location at the Site.

Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility markout)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

Additional Emergency Contact Numbers

School Custodian	Work Telephone Number: 718/292-2036
NYCDOE DSF, Director Bernie Orlan	Work Telephone Number: 718/361-3808 Cell Telephone Number: 347/386-4418
NYCSCA, IEH Director Alex Lempert	Work Telephone Number: 718/472-8501 Cell Telephone Number: 917/642-2716

* Note: Contact numbers subject to change and will be updated as necessary

4.5.2 Map and Directions to Nearest Health Facility

Site Location: 730 Concourse Village West, Bronx, New York

Nearest Hospital Name: Lincoln Hospital

Hospital Location: 234 East 149th Street, Bronx, New York

Hospital Telephone: (718) 993-3860

Directions to the Hospital:

1. Go northeast on Concourse Village West (<0.1 mile)
2. Turn right onto East 156th Street (0.1 mile)
3. Turn right onto Concourse Village East (<0.1 mile)

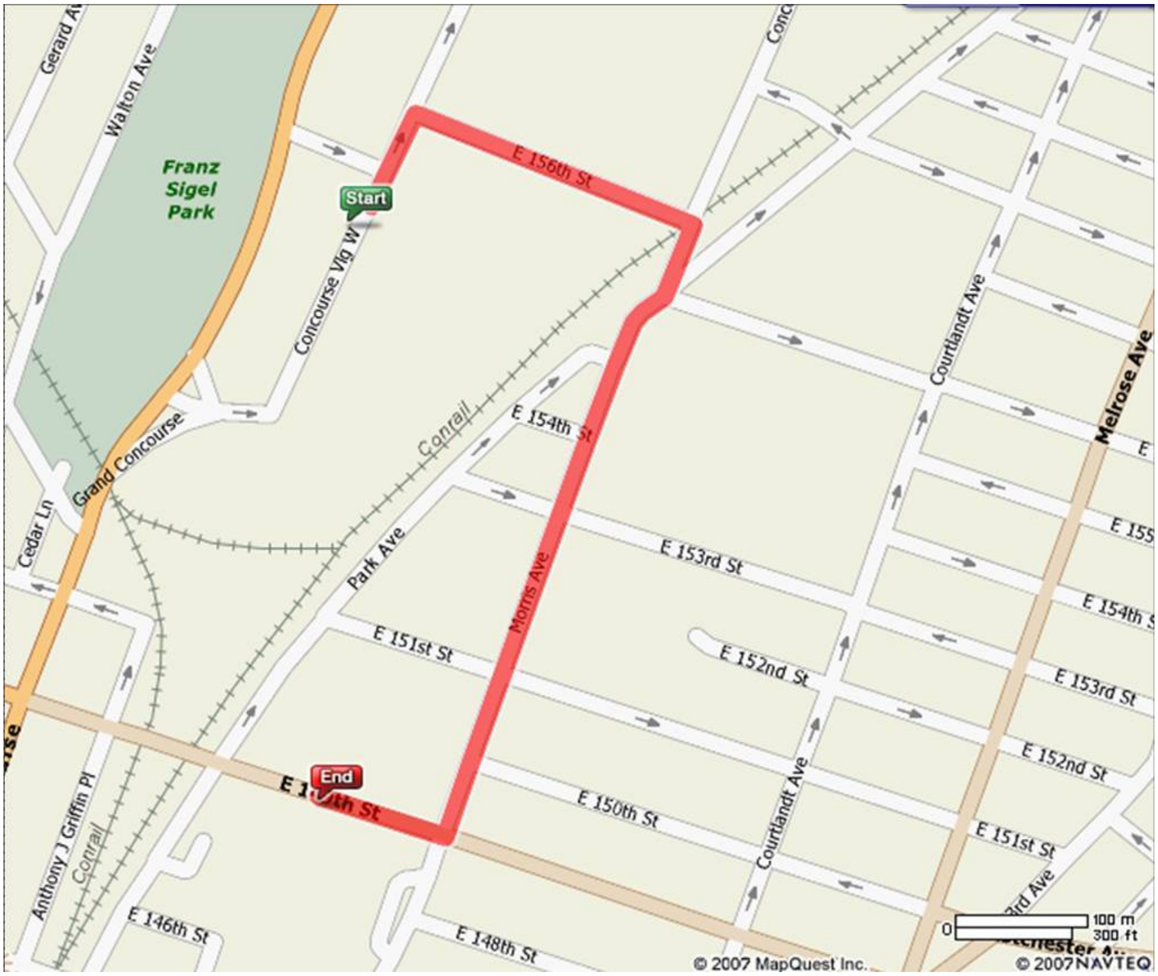
4. Stay straight and go onto Morris Avenue (0.5 mile)

5. Turn right onto East 149th Street (<0.1 mile)

Total Distance: 0.7 miles

Total Estimated Time: 2 minutes

Map Showing Route from the Site to the Hospital:



4.5.3 Response Procedures

4.5.3.1 Emergency Contacts/Notification System

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan. The list is also posted prominently at the Site and made readily available to all personnel at all times.

4.5.3.2 SSDS/Vapor Barrier

Unscheduled inspections and/or sampling will take place when a suspected failure of the SSDS has been reported by the BMS or if an emergency occurs that is deemed likely to affect the operation of the system.

Indoor air monitoring is not required by the State remedial program, except as noted in Section 3.2.5.3, since monitoring of the engineering controls is believed to be sufficient for protection of human health.

4.6 OPERATION AND MAINTENANCE TRAINING

The training, qualification and reporting requirements for personnel conducting the monitoring and maintenance of the Engineering Controls are presented in Table 7.

5.0 SITE MANAGEMENT REPORTING PLAN

5.1 INTRODUCTION

An Annual Site Management Report will be submitted to NYSDEC by the date stipulated by NYSDEC. The Annual Site Management Report will be prepared in accordance with NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation requirements. This Site Management Reporting Plan and its requirements are subject to revision by NYSDEC.

This report will include the following:

- Identification of all required EC/ICs required by the RAWP and this SMP for the BCP Area, Non-BCP Area A and Non-BCP Area B;
- An evaluation of the Engineering and Institutional Control Plan and the Monitoring Plan for adequacy in meeting remedial goals;
- Assessment of the continued effectiveness of all Institutional and Engineering Controls for the Site;
- Certification of the EC/ICs;
- Results of the required periodic Site Inspections;
- All deliverables generated during the reporting period, as specified in Section 2 EC/IC Plan, Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan; and
- Signed and Sealed by a New York State Professional Engineer.

5.2 CERTIFICATION OF ENGINEERING AND INSTITUTIONAL CONTROLS

Information on EC/ICs can be found in the Engineering and Institutional Control Plan portion of the SMP. Inspection of the EC/ICs will occur at a frequency described in Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan. After the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will sign and certify the document. The document will certify that:

- On-Site ECs/ICs are unchanged from the previous certification;

- They remain in-place and effective;
- The systems are performing as designed;
- Nothing has occurred that would impair the ability of the controls to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any operation and maintenance plan for such controls;
- Access is available to the Site by NYSDEC and NYSDOH to evaluate continued maintenance of such controls; and
- Site usage is compliant with the environmental easement.

The signed certification will be included in the Annual Site Management Report (see Section 5.3).

5.3 SITE INSPECTIONS

5.3.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedules provided in Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan of this SMP. At a minimum, a Site-wide inspection will be conducted:

- Monthly by custodial staff;
- Annually by an independent professional engineer retained by DOE, DSF;
- When a breakdown of the SSDS has occurred (inspection of the BCP Area and Non-BCP Area A); and
- Whenever a severe condition has taken place, such as any erosion or flooding event that may affect the ECs.

5.3.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms for their respective system (refer to Appendix L for groundwater sampling). Additionally, a general Site-wide inspection form (which includes the cover systems) will be completed during the Site-wide inspection (see Appendix M). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records (including all sampling data of groundwater at the Site and system maintenance reports) generated for the Site during the calendar year will be included in the Annual Site Management Report.

5.3.3 Evaluation of Records and Reporting

The results of the inspection and Site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; and
- The Site remedy continues to be protective of public health and the environment and is performing as designed in the RAWP and FER.

5.4 SITE MANAGEMENT REPORT

The Site Management Report will be submitted annually and will be submitted by the date stipulated by NYSDEC. Other activities such as groundwater monitoring reports were submitted quarterly for the first year, and semi-annually thereafter until June 2015, with those results also incorporated into the Annual Site Management Report. The report will include:

- EC/IC certification;
- All applicable inspection forms and other records generated for the Site during the reporting period;
- Cumulative data summary tables and/or graphical representations of contaminants of concern for groundwater, which include a listing of all compounds analyzed along with the applicable standards, with all exceedances highlighted;

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables required for all points sampled during the calendar year (also to be submitted electronically in the NYSDEC-specified format);
- A performance summary for the SSDS during the calendar year, including information such as:
  - The number of days the system was operational during the reporting period;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A summary of the performance and/or effectiveness monitoring;
  - Comments, conclusions, and recommendations based on data evaluation; and
  - Description of the resolution of performance problems.
- A Site evaluation, which will address the following:
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored; and
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan.
- A figure showing sampling and well locations, and significant analytical values at sampling locations; and
- Comments, conclusions, and recommendations, based on an evaluation of the information included in the report, regarding EC/ICs at the Site.

The Annual Site Management Report will be submitted, in hard-copy format, to the Region 2 NYSDEC offices, located at 41-40 21st Street, Long Island City, New York, and in electronic format to NYSDEC, NYSDOH and Bronx CB4. A hardcopy of the Final Site Management Plan, Remedial Investigation and Remedial Action Work Plan, as well as current and historical copies of the Annual Site Management Reports will be maintained at the custodian's office on the new Mott Haven Campus.

6.0 SUPPLEMENTAL OFF-SITE REMEDIAL ACTIVITIES

Remedial actions beyond those required by the RAWP have been undertaken adjacent to the BCP Area as part of NYCSCA's voluntary efforts, as well as NYCSCA's proactive outreach to the community.

The Remedial Investigation findings identified a small pocket of soil contamination in the Non-BCP Area B, immediately north of the BCP Area (see Figure 28), which is hereafter referred to as the Supplemental Remedial Area (SRA). The zone of contamination was confined to a small pocket of soil in the center of the SRA, at a depth between 3 and 8 feet below ground surface, corresponding to the top of the zone of saturation (water table).

Remedial Action Objectives were established to ensure that the SRA remedy was fully effective in addressing this soil contamination.

Excavation of the contaminated soil, similar to the BCP Area, was not a feasible remedial alternative due to potential adverse impacts to the structural stability of the columns that support nearby school buildings. NYCSCA's consulting engineers determined that the contaminants should be stabilized and encapsulated using an in-situ solidification technology. The injection of jet grout columns was determined to be the best alternative to stabilize and contain the contaminants within the solid matrix. During August 2007, the small pocket of contaminated soil and a 5 to 10 foot buffer of uncontaminated soil were encapsulated in a grout monolith using the jet grout injection technology. A total of 100, 8-ft diameter, overlapping jet grout columns, as shown on Figure 29, were installed to 15 feet below the existing grade. Approximately 4 weeks after the columns had been installed, a total of four (4) confirmation cores were collected from the locations shown on Figure 29. The confirmation cores confirmed that the columns formed a single grout monolith, and that the Remedial Action Objectives had been achieved.

In addition, to address a recommendation in the Center for Public Environmental Oversight (CPEO) report entitled "Independent Review of the Cleanup of the Mott Haven Schools Complex, Bronx, New York", the NYCSCA installed a concrete cover beneath PS 156 and IS 151 in Non-BCP Area B. The cap is discussed in Sections 2.2.1.1, 3.2.1, and 4.2.1 above.

Supplemental voluntary on-Site remedial actions in Non-BCP Area A, beyond those required by the RAWP (Spot Excavations and Soil Gas Sampling), are presented in Appendix P.

TABLES

Table 1
New York City School Construction Authority
Former Metro-NorthProperty (Mott Haven)
Bronx, New York
Monitoring Well Gauging Data

		MW Elevation:	DTW:	DTP:	DTB:	Water Column Height:	**Groundwater Elevation:**	Final Temperature:	Final Conductivity:	Final pH:	Final Turbidity:
Units		feet	feet	feet	feet	feet	**feet**	ºCelsius	mS/cm	---	NTU
MW-1	5/18/2005	23.11	6.53	---	16.06	9.53	**16.58**	14.06	1.971	6.5	21.3
	9/13/2005	23.11	7.41	---	NM	8.65	**15.7**	---	---	---	---
MW-2	5/19/2005	18.29	5.11	---	11.71	6.6	**13.18**	17.14	1.039	6.78	1339.3
	9/13/2005	18.29	7.25	---	NM	4.46	**11.04**	---	---	---	---
MW-3**	5/16/2005	18.07	6.61	---	11.2	4.59	**11.46**	12.71	1.341	6.6	3.0
	9/13/2005	18.07	7.99	---	NM	3.21	**10.08**	---	---	---	---
MW-4**	5/16/2005	19.58	3.89	---	10.08	6.19	**15.69**	16.31	0.904	7.15	25.0
	9/13/2005	19.58	6.26	---	NM	3.82	**13.32**	---	---	---	---
MW-5**	5/16/2005	18.19	4.1	---	11.55	7.45	**14.09**	14.92	0.926	6.68	49.9
	9/13/2005	18.19	4.91	---	NM	6.64	**13.28**	---	---	---	---
MW-6**	5/16/2005	18.92	6.35	---	15.25	8.9	**12.57**	14.66	1.748	6.62	12.8
	9/13/2005	18.92	7.78	---	NM	7.47	**11.14**	---	---	---	---
MW-7***	5/16/2005	23.88	3.41	---	13	9.59	**20.47**	12.92	2.893	6.68	7.1
	9/13/2005	23.88	4.60	---	NM	8.40	**19.28**	---	---	---	---
MW-8	5/18/2005	49.43	28.29	---	40.18	11.89	**21.14**	22.03	2.428	2.74	31.6
	9/13/2005	49.43	29.47	---	NM	10.71	**19.96**	---	---	---	---
MW-9	5/18/2005	56.11	34.06	---	42.02	7.96	**22.05**	24.81	2.739	7.14	7.6
	9/13/2005	56.11	33.58	---	NM	8.44	**22.53**	---	---	---	---
MW-10	5/16/2005	19.41	6.05	---	15.1	9.05	**13.36**	15.19	1.672	6.91	8.2
	9/13/2005	19.41	6.47	---	NM	8.63	**12.94**	---	---	---	---
MW-11	5/16/2005	18.75	8.1	---	13.75	5.65	**10.65**	16.16	1.366	6.79	31.3
	9/13/2005	18.75	9.33	---	NM	4.42	**9.42**	---	---	---	---
MW-12***	5/16/2005	24.65	4.15	---	13	8.85	**20.5**	14.22	6.8	3.637	1.5
	9/13/2005	24.65	5.42	---	NM	7.58	**19.23**	---	---	---	---
MW-13***	5/16/2005	23.32	3.75	---	13	9.25	**19.57**	12.16	6.63	2.943	3.6
	9/13/2005	23.32	5.11	---	NM	7.89	**18.21**	---	---	---	---
MW-14*, ***	5/16/2005	21.16	0.5	---	13	12.5	**20.66**	12.36	7.26	2.958	5.2
	9/13/2005	21.16	1.81	---	NM	11.19	**19.35**	---	---	---	---
MW-15*,***	5/16/2005	21.13	0.5	---	13	12.5	**20.63**	11.35	7.11	2.498	3.8
	9/13/2005	21.13	1.64	---	NM	11.36	**19.49**	---	---	---	---
MW-18	9/13/2005	48.11	24.32	---	32.3	7.98	**23.79**	19.3	1.517	6.79	215
MW-19	9/13/2005	59.81	dry	---	NM	---	---	---	---	---	---
MW-20	9/13/2005	40.82	20.69	---	27.20	6.51	**20.13**	19.2	0.930	6.85	71
MW-21	9/13/2005	40.37	21.23	---	24.97	3.74	**19.14**	18.6	0.860	7.05	66

Notes:

MW Elevation: Height of inner casing or PVC
DTW: Depth to Water
DTP: Depth to Product
DTB: Depth to Bottom
*: estimated DTW elevation
**: DTB taken from Well Development Form
***: DTB taken from Well Construction Logs

Table 2
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Organics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective*															
	Sample ID:	BALLAST-1	BALLAST-2	NWTPGRAB	NWSB	SB20	SB21	SB22	SB22	SB22	SB23	SB24	SB25	SB25	SB25	SB25A
	Sample Depth (ft.):	NA	NA	NA	NA	14-16	4-6	3-5	6-8	10-11	6-8	6-8	2-4	6-8	14-16	4-6
	Sample Date:	04/20/05	04/20/05	04/06/05	04/06/05	04/19/05	04/18/05	04/27/05	04/27/05	04/27/05	04/15/05	04/18/05	04/15/05	04/15/05	04/15/05	04/15/05
	Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Volatile Organic Compounds (ppb)																
Acetone	200	3.8 U	3.7 U	700 U	580 U	4.1 U	3.7 UJ	12 JB	560 U	11 JB	4.6 U	30 J	130	50	22 J	81
Carbon Disulfide	2700	0.42 U	0.40 U	83 U	69 U	2.6 J	0.41 UJ	0.46 U	66 U	0.47 U	0.50 U	2.4 J	4.9 J	0.44 U	0.43 U	8.2
Methylene Chloride	100	2.1 U	2.0 U	130 U	110 U	2.2 U	2.0 UJ	3.3 JB	110 U	2.3 U	4.0 J	3.3 UJ	3.8 J	4.0 J	4.0 J	2.7 J
2-Butanone	300	3.2 U	3.1 U	600 U	500 U	3.5 U	3.1 UJ	3.5 U	480 U	3.6 U	3.9 U	3.6 J	7.0 J	3.4 U	3.3 U	7.2 J
1,1-Dichloropropene	^	0.37 U	0.35 U	160 U	140 U	0.40 U	0.36 UJ	0.41 U	130 U	0.41 U	0.54 U	0.38 UJ	0.37 U	0.39 U	0.38 U	0.39 U
cis-1,2-Dichloroethene	^	0.45 U	0.43 U	79 U	66 U	0.48 U	0.44 UJ	0.49 U	63 U	0.50 U	6.4 J	0.43 UJ	0.45 U	0.47 U	0.46 U	0.47 U
Benzene	60	0.46 UJ	0.44 U	51 U	42 U	29 J	0.44 UJ	0.50 U	23000	0.51 U	0.55 U	0.46 UJ	0.45 U	0.48 U	0.46 U	0.48 U
Trichloroethene	700	0.35 U	0.34 U	140 U	120 U	0.38 U	0.34 UJ	0.38 U	110 U	0.39 U	25	0.36 UJ	0.35 U	0.37 U	0.36 U	0.37 U
Toluene	1500	0.46 U	0.44 U	300 J	760 J	2.3 J	0.45 UJ	0.51 U	9600	0.51 U	0.55 U	0.47 UJ	2.0 J	0.48 U	0.47 U	0.48 U
Tetrachloroethene	1400	0.83 U	0.80 U	70 U	58 U	0.89 U	0.81 UJ	0.91 U	56 U	0.92 U	18	0.85 UJ	0.83 U	0.87 U	0.85 U	0.87 U
Ethylbenzene	5500	0.40 U	0.39 U	6900	19000	2.3 J	0.39 UJ	0.44 U	43000 D	0.45 U	0.48 U	0.41 UJ	0.40 U	0.42 U	0.41 U	0.42 U
m/p-Xylenes	1200	0.99 U	0.94 U	25000	50000	14	0.96 UJ	1.1 U	45000	1.1 U	1.2 U	1.0 UJ	0.98 U	1.0 U	1.0 U	1.0 U
o-Xylenes	1200	0.44 U	0.42 U	4600	6400	4.5 J	0.43 UJ	0.48 U	3300	0.49 U	0.53 U	0.45 UJ	0.44 U	0.46 U	0.45 U	0.46 U
Isopropylbenzene	^	0.48 U	0.45 U	1600	4900	41	0.46 UJ	0.52 U	12000	0.53 U	0.57 U	0.48 UJ	0.47 U	0.50 U	0.48 U	0.50 U
1,2,3-Trichloropropane	400	0.38 U	0.36 U	96 U	80 U	0.41 U	0.37 UJ	0.42 U	76 U	0.42 U	0.46 U	0.39 UJ	0.38 U	0.40 U	0.39 U	0.40 U
n-Propylbenzene	^	0.61 U	0.58 U	3600	11000	51	0.6 UJ	0.67 U	24000	0.68 U	0.73 U	0.62 UJ	0.61 U	0.64 U	0.62 U	0.64 U
1, 3, 5-Trimenthylbenzene	^	0.56 U	0.54 U	9600	14000	21	0.55 UJ	0.62 U	9900	0.63 U	0.68 U	0.57 UJ	0.56 U	0.59 U	0.57 U	0.59 U
1,2,4-Trimethylbenzene	^	0.43 U	0.41 U	30000	93000 D	150	0.42 UJ	2.5 J	83000 D	0.48 U	0.52 U	0.44 UJ	1.8 J	0.45 U	0.44 U	0.45 U
Sec-butylbenzene	^	0.48 U	0.46 U	730 J	75 U	5.4 J	0.46 UJ	0.52 U	3000	0.53 U	0.57 U	0.49 UJ	0.48 U	0.50 U	0.49 U	0.50 U
p-Isopropyltoluene	^	0.49 U	0.46 U	1600	3200	2.1 J	0.47 UJ	1.3 J	3400	0.54 U	0.58 U	0.49 UJ	190	16	20	4.0 J
n-Butylbenzene	^	0.39 U	0.37 U	1500	4500	5.8 J	0.38 UJ	0.42 U	8200	0.43 U	0.46 U	0.39 UJ	0.38 U	0.40 U	0.39 U	0.40 U
Naphthalene	13000	0.67 U	0.64 U	7100	27000	4.7 J	0.65 UJ	9.4	32000	4.1 J	0.80 U	0.68 UJ	60	6.3	27	3.2 J
Semi-Volatile Organic Compounds (ppb)																
bis(2-Chloroethyl)ether	^	590 U	570 U	55 U	45 U	64 UJ	57 U	650 U	70 U	65 U	71 U	60 U	120 U	62 U	60 U	120 U
3+4-Methylphenols	900	590 U	570 U	270 J	42 U	64 UJ	57 U	650 U	70 U	65 U	71 U	60 U	120 U	61 U	60 U	120 U
Naphthalene	13,000	630 U	610 U	1500	96000 D	69 U	62 U	700 U	840	70 U	76 U	65 U	150 J	69 J	65 U	130 U
2-Methylnaphthalene	36,400	620 U	600 U	770 J	57000 D	68 U	61 U	690 U	510	69 U	75 U	63 U	150 J	66 J	64 U	130 U
Acenaphthylene	41,000	1200 J	580 U	160 J	1200	66 U	59 U	670 U	80 J	67 U	73 U	62 U	510 J	63 U	62 U	180 J
Acenaphthene	50,000	910 J	640 U	250 J	11000 D	72 U	64 U	730 U	130 J	73 U	80 U	68 U	650 J	100 J	68 J	170 J
Dibenzofuran	6,200	620 J	590 U	120 J	7100	67 U	60 U	680 U	73 U	68 U	74 U	63 U	770	120 J	75 J	130 U
Fluorene	50,000	1100 J	600 U	280 J	12000 D	68 U	61 U	690 U	78 J	70 U	76 U	64 U	630 J	140 J	95 J	190 J
Phenanthrene	50,000	12000	570 U	2400	40000 D	64 U	58 U	4700	240 J	66 U	71 U	60 U	8100 D	1000	680	2500
Anthracene	50,000	3100 J	540 U	440 J	11000 D	61 U	55 U	860 J	100 J	62 U	68 U	57 U	1200	160 J	120 J	590 J
Fluoranthene	50,000	17000	1700 J	2500	24000 D	60 U	75 J	6400	510	61 U	67 U	56 U	9800 D	1100	630	3900
Pyrene	50,000	17000	1700 J	2400	28000 D	72 U	65 J	7800	1200	73 U	79 U	67 U	7700 D	820	420	4400
Butylbenzylphthalate	50,000	600 U	580 U	37 U	31 U	65 U	59 U	660 U	71 U	67 U	72 U	61 U	1500	63 U	62 U	25000 D
Benzo(a)anthracene	224 or MDL	9500	920 J	970 J	7400 D	57 U	51 U	3000 J	360 J	58 U	63 U	53 U	3300	310 J	150 J	1700
Chrysene	400	9400	750 J	1100 J	6700 D	73 U	65 U	2900 J	450	74 U	80 U	68 U	3400	300 J	140 J	2000
bis(2-Ethylhexyl)phthalate	50,000	710 U	690 U	490 J	150 J	78 U	70 U	790 U	85 U	79 U	86 U	73 U	3300	110 J	79 J	360 J
Benzo(b) fluoranthene	1,100	16000 J	1200 J	1100	6600	44 U	62 J	3800 J	460	45 U	49 U	42 U	4100	260 J	110 J	2400
Benzo(k)fluoranthene	1,100	5100 J	790 U	380 J	2200	89 U	80 U	1600 J	140 J	91 U	99 U	84 U	1400	99 J	84 U	700 J
Benzo(a)pyrene	61 or MDL	8400 J	840 J	900 J	5100	65 U	58 U	3000 J	460	66 U	72 U	61 U	2400	160 J	74 J	1500
Indeno (1,2,3-cd)pyrene	3,200	1300 J	680 J	360 J	1500	51 U	46 U	1500 J	160 J	52 U	57 U	48 U	530 J	81 J	49 U	260 J
Dibenz(a,h)anthracene	14 or MDL	470 UJ	450 U	33 U	190 J	51 U	45 U	510 U	55 U	52 U	56 U	48 U	96 J	49 U	48 U	98 U
Benzo(g,h,i)perylene	50,000	3200 J	760 J	470 J	1900	67 U	60 U	1900 J	310 J	68 U	74 U	63 U	850	95 J	63 U	510 J
Pesticides/PCBs/Herbicides (ppb)																
4,4-DDE	2,100	0.88 U	0.85 U	NR	NR	0.96 U	0.87 U	7.2	1.1 U	0.99 U	1.1 U	0.90 U	0.89 U	0.93 U	0.91 U	0.93 U
4,4-DDD	2,900	0.79 U	0.76 U	NR	NR	0.86 U	0.77 U	32	0.94 U	0.88 U	0.95 U	0.80 U	0.79 U	0.83 U	0.81 U	0.83 U
alpha-Chlordane	110	0.94 U	0.90 U	NR	NR	1.0 U	0.92 U	5.9	1.1 U	1.1 U	1.1 U	0.96 U	0.94 U	0.99 U	0.97 U	0.99 U
gamma-Chlordane	540	0.98 U	0.94 U	NR	NR	1.1 U	0.96 U	5.7 P	1.2 U	1.1 U	1.2 U	1.0 U	0.98 U	1.0 U	1.0 U	1.0 U
Aroclor-1254	10,000	1.9 U	1.8 U	NR	NR	2.0 U	1.8 U	2.1 U	2.2 U	2.1 U	2.3 U	1.9 U	1.9 U	1.9 U	1.9 U	2.0 U
Aroclor-1260	10,000	640 J	170 P	NR	NR	5.1 U	4.6 U	5.2 U	5.6 U	5.3 U	5.7 U	4.8 U	190 P	4.9 U	4.8 U	5.0 U

Table 2
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Organics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective*																	
	Sample ID:	SB25A	SB26	SB27 ⇧	SB27DUP ⇧	SB-28	SB-29	SB-30	SB-30	SB-30	SB-33	SB-34	SB35	SB-36	SB37	SB41	SB42	SB43 ⇧
	Sample Depth (ft.):	6-8	10-12	14-16	14-16	4-6	4-6	0-2	6-8	12-14	0-4	6-8	0-2	2-4	4-6	4-6	4-6	2-4
	Sample Date:	04/15/05	04/15/05	04/19/05	04/19/05	04/14/05	04/13/05	04/14/05	04/14/05	04/14/05	04/14/05	04/13/05	04/20/05	04/14/05	04/20/05	04/15/05	04/20/05	04/19/05
Compound	Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Volatile Organic Compounds (ppb)																		
Acetone	200	**140**	**11 J**	63 UJ	37 UJ	3.7 U	3.9 U	3.8 U	**24 JB**	4.0 U	4.0 U	**7.8 JB**	**6.0 J**	3.7 U	**40**	**6.5 J**	**6.1 JB**	6.5 UJ
Carbon Disulfide	2700	**5.2 J**	0.43 U	0.61 U	0.50 UJ	0.41 U	0.43 U	**2.5 J**	0.44 U	0.44 U	0.44 U	0.44 U	0.40 U	0.40 U	0.44 U	0.47 U	0.43 U	0.44 U
Methylene Chloride	100	**3.6 J**	**3.5 J**	3.0 U	2.5 UJ	**2.9 J**	**4.9 J**	**2.9 J**	2.2 U	**3.9 J**	**4.5 J**	2.2 U	2.0 U	**5.6**	2.2 U	**4.1 J**	**2.5 JB**	2.2 U
2-Butanone	300	**17 J**	3.3 U	**9.9 J**	**7.2 J**	0.36 U	3.3 U	3.2 U	3.4 U	3.4 U	3.4 U	3.4 U	3.1 U	3.1 U	**4.2 J**	3.6 U	3.3 U	3.4 U
1,1-Dichloropropene	^	0.41 U	0.38 U	0.53 U	0.44 UJ	0.36 U	0.46 U	0.44 U	0.47 U	0.47 U	0.47 U	0.47 U	0.35 U	0.43 U	0.39 U	0.41 U	0.38 U	0.39 U
cis-1,2-Dichloroethene	^	0.50 U	0.46 U	0.65 U	0.53 UJ	0.45 U	0.38 U	0.37 U	0.39 U	0.39 U	0.39 U	0.39 U	0.43 U	0.36 U	0.47 U	0.5 U	0.46 U	0.47 U
Benzene	60	0.51 U	0.46 U	0.66 U	0.54 UJ	0.44 U	0.46 U	0.45 U	0.48 U	0.48 U	0.48 U	0.48 U	0.43 U	0.44 U	0.48 U	0.51 U	0.47 U	0.48 U
Trichloroethene	700	0.39 U	0.36 U	0.51 U	0.41 UJ	0.34 U	0.36 U	0.35 U	0.37 U	0.37 U	0.37 U	0.37 U	0.33 U	0.34 U	0.37 U	0.39 U	**3.6 J**	0.37 U
Toluene	1500	0.51 U	0.47 U	0.67 U	0.55 UJ	0.45 U	0.47 U	0.46 U	0.49 U	0.48 U	0.49 U	0.48 U	0.44 U	0.45 U	0.49 U	0.51 U	**1.5 J**	0.49 U
Tetrachloroethene	1400	0.92 U	0.85 U	1.2 U	0.98 UJ	0.81 U	0.85 U	0.82 U	0.88 U	0.87 U	0.88 U	0.87 U	0.79 U	0.80 U	0.88 U	0.92 U	**29**	0.87 U
Ethylbenzene	5500	0.45 U	0.41 U	0.58 U	0.48 UJ	0.39 U	0.41 U	0.40 U	0.43 U	0.42 U	0.43 U	0.42 U	0.38 U	0.39 U	0.43 U	0.45 U	0.41 U	0.42 U
m/p-Xylenes	1200	1.1 U	1.0 U	1.4 U	1.2 UJ	0.96 U	**1.7 J**	0.97 U	**1.5 J**	1.0 U	1.0 U	1.0 U	0.94 U	0.95 U	1.0 U	1.1 U	1.0 U	1.0 U
o-Xylenes	1200	0.49 U	0.45 U	0.63 U	0.52 UJ	0.43 U	0.45 U	0.43 U	**1.3 J**	0.46 U	0.46 U	0.46 U	0.42 U	0.42 U	0.46 U	0.49 U	0.45 U	0.46 U
Isopropylbenzene	^	0.53 U	0.48 U	0.68 U	0.56 UJ	0.46 U	0.48 U	0.47 U	0.50 U	0.50 U	0.50 U	0.50 U	0.45 U	0.46 U	0.50 U	0.53 U	0.49 U	0.50 U
1,2,3-Trichloropropane	400	0.42 U	0.39 U	0.55 U	0.45 UJ	0.37 U	0.39 U	0.38 U	0.40 U	0.40 U	0.40 U	0.40 U	0.36 U	0.37 U	0.40 U	0.42 U	0.39 U	0.40 U
n-Propylbenzene	^	0.68 U	0.62 U	0.88 U	0.72 UJ	0.6 U	0.62 U	0.60 U	0.65 U	0.64 U	0.65 U	0.64 U	0.58 U	0.59 U	0.65 U	0.68 U	0.63 U	0.64 U
1, 3, 5-Trimenthylbenzene	^	0.63 U	0.57 U	0.81 U	0.66 UJ	0.55 U	0.57 U	0.56 U	**16**	0.59 U	0.60 U	0.59 U	0.54 U	0.54 U	0.60 U	0.63 U	0.58 U	0.59 U
1,2,4-Trimethylbenzene	^	**3.0 J**	**1.9 J**	0.63 U	0.51 UJ	0.42 U	**1.2 J**	0.43 U	**25**	0.45 U	0.46 U	0.45 U	0.41 U	0.42 U	0.46 U	0.48 U	0.45 U	0.46 U
Sec-butylbenzene	^	0.53 U	0.49 U	0.69 U	0.56 UJ	0.46 U	0.49 U	0.47 U	0.50 U	0.50 U	0.50 U	0.50 U	0.45 U	0.46 U	0.50 U	0.53 U	0.49 U	0.50 U
p-Isopropyltoluene	^	**1200 D**	0.49 U	0.70 U	0.57 UJ	0.47 U	0.49 U	0.48 U	**6.9**	0.51 U	**24**	0.51 U	0.46 U	0.47 U	0.51 U	**14**	0.50 U	0.51 U
n-Butylbenzene	^	0.43 U	0.39 U	0.56 U	0.45 UJ	0.38 U	0.39 U	0.38 U	**3.5 J**	0.40 U	0.41 U	0.40 U	0.37 U	0.37 U	0.41 U	0.43 U	0.40 U	0.40 U
Naphthalene	13000	**5.7 J**	0.68 U	0.96 U	0.79 UJ	0.65 U	**1.2 J**	0.66 U	**7900 D**	0.70 U	0.70 U	0.70 U	**2.5 J**	0.64 U	0.71 U	**6.8**	**38**	0.70 U
Semi-Volatile Organic Compounds (ppb)																		
bis(2-Chloroethyl)ether	^	66 U	60 U	**1900 J**	70 UJ	58 U	60 U	580 U	62 U	62 U	250 U	61 U	560 U	57 U	63 U	66 U	610 U	620 U
3+4-Methylphenols	900	65 U	60 U	85 U	70 U	58 U	60 U	580 U	62 U	62 U	250 U	61 U	560 U	57 U	62 U	66 U	610 U	620 U
Naphthalene	13,000	71 U	65 U	92 U	76 U	62 U	65 U	630 U	67 U	67 U	270 U	66 U	610 U	62 U	68 U	**87 J**	660 U	670 U
2-Methylnaphthalene	36,400	69 U	63 U	90 U	74 U	61 U	64 U	610 U	66 U	65 U	260 U	65 U	590 U	60 U	66 U	69 U	640 U	650 U
Acenaphthylene	41,000	67 U	62 U	88 U	72 U	59 U	62 U	**1700 J**	64 U	64 U	**280 J**	63 U	**2600 J**	58 U	64 U	67 U	**770 J**	630 U
Acenaphthene	50,000	74 U	68 U	96 U	79 U	65 U	68 U	650 U	70 U	70 U	280 U	69 U	630 U	64 U	70 U	74 U	**850 J**	700 U
Dibenzofuran	6,200	69 U	63 U	89 U	73 U	60 U	63 U	610 U	65 U	65 U	260 U	64 U	590 U	60 U	65 U	69 U	**1400 J**	650 U
Fluorene	50,000	70 U	64 U	91 U	75 U	62 U	64 U	620 U	67 U	66 U	270 U	66 U	**610 J**	61 U	67 U	70 U	**2000 J**	660 U
Phenanthrene	50,000	**100 J**	60 U	86 U	71 U	58 U	**560**	**5500**	**94 J**	62 U	**1800**	**240 J**	**6200**	**93 J**	63 U	**670**	**19000**	620 U
Anthracene	50,000	63 U	57 U	82 U	67 U	55 U	**87 J**	**1800 J**	59 U	59 U	**410 J**	59 U	**2700 J**	54 U	60 U	**87 J**	**4400**	590 U
Fluoranthene	50,000	**99 J**	56 U	80 U	66 U	54 U	**840**	**14000**	**83 J**	58 U	**4000**	**800**	**20000**	**240 J**	59 U	**790**	**17000**	**1600 J**
Pyrene	50,000	**80 J**	67 U	96 U	78 U	65 U	**710**	**13000**	70 U	69 U	**3500**	**690**	**18000**	**200 J**	70 U	**660**	**13000**	**1500 J**
Butylbenzylphthalate	50,000	67 U	61 U	87 U	72 U	59 U	62 U	590 U	64 U	63 U	260 U	63 U	570 U	58 U	64 U	67 U	620 U	630 U
Benzo(a)anthracene	224 or MDL	58 U	53 U	76 U	62 U	51 U	**320 J**	**8300**	55 U	55 U	**1900**	**380 J**	**9300**	**110 J**	55 U	**250 J**	**4900**	**860 J**
Chrysene	400	74 U	68 U	97 U	80 U	66 U	**370 J**	**8700**	71 U	70 U	**2200**	**410**	**10000**	**150 J**	71 U	**280 J**	**5700**	**980 J**
bis(2-Ethylhexyl)phthalate	50,000	80 U	73 U	100 U	85 U	70 U	**93 J**	700 U	76 U	**91 J**	**360 J**	**88 J**	680 U	69 U	76 U	80 U	740 U	750 U
Benzo(b) fluoranthene	1,100	46 U	42 U	60 U	49 U	40 U	**390**	**14000**	43 U	43 U	**2700**	**500**	**14000**	**170 J**	44 U	**290 J**	**5200**	**1200 J**
Benzo(k)fluoranthene	1,100	91 U	84 U	120 U	97 U	80 U	**130 J**	**4500**	87 U	86 U	**870 J**	**160 J**	**4100**	79 U	87 U	**100 J**	**1500 J**	860 U
Benzo(a)pyrene	61 or MDL	66 U	61 U	86 U	71 U	58 U	**270 J**	**9500**	63 U	63 U	**1700**	**360 J**	**9600**	**100 J**	63 U	**230 J**	**3500 J**	**780 J**
Indeno (1,2,3-cd)pyrene	3,200	53 U	48 U	69 UJ	56 UJ	46 U	**100 J**	**2800 J**	50 U	50 U	**560 J**	**170 J**	**5700**	**58 J**	50 U	**150 J**	**1700 J**	500 U
Dibenz(a,h)anthracene	14 or MDL	52 U	48 U	68 UJ	56 UJ	46 U	48 U	460 U	49 U	49 U	200 U	49 U	**510 J**	45 U	50 U	52 U	480 U	490 U
Benzo(g,h,i)perylene	50,000	69 U	63 U	89 UJ	73 UJ	60 U	**140 J**	**4300**	65 U	65 U	**740 J**	**230 J**	**5400**	**69 J**	65 U	**220 J**	**1900 J**	650 U
Pesticides/PCBs/Herbicides (ppb)																		
4,4-DDE	2,100	0.99 U	0.91 U	1.3 U	1.1 U	0.87 U	0.90 U	0.88 U	0.94 U	0.93 U	0.94 U	0.92 U	0.85 U	0.86 U	0.94 U	0.99 U	0.92 U	0.93 U
4,4-DDD	2,900	0.88 U	0.81 U	1.1 U	0.94 U	0.77 U	0.80 U	0.78 U	0.84 U	0.83 U	0.84 U	0.82 U	0.75 U	0.77 U	0.84 U	0.88 U	0.82 U	0.83 U
alpha-Chlordane	110	1.1 U	0.97 U	1.4 U	1.1 U	0.92 U	0.96 U	0.93 U	1.0 U	0.99 U	1.0 U	0.98 U	0.90 U	0.91 U	1.0 U	1.1 U	0.98 U	0.99 U
gamma-Chlordane	540	1.1 U	1.0 U	1.4 U	1.2 U	0.96 U	1.0 U	0.98 U	1.0 U	1.0 U	1.0 U	1.0 U	0.94 U	0.95 U	1.0 U	1.1 U	1.0 U	1.0 U
Aroclor-1254	10,000	2.1 U	1.9 U	2.7 U	2.2 U	1.8 U	1.9 U	1.8 U	2.0 U	2.0 U	2.0 U	2.0 U	1.8 U	1.8 U	2.0 U	2.1 U	1.9 U	1.9 U
Aroclor-1260	10,000	5.3 U	4.9 U	6.8 U	5.6 U	4.6 U	**65**	**770 D**	5.0 U	5.0 U	**190**	5.0 U	**1900 DP**	4.6 U	5.0 U	5.3 U	4.9 U	**600 PD**

Table 2
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Organics in Soil
Remedial Investigation

	TAGM 4046 Recc. Soil Cleanup Objective*																
	Sample ID:	SB44 ⇧	SB44 ⇧	SB44 DUP ⇧	SB44 ⇧	SB45	SB45DL	SB45	SB45	SB46	SB46	SB46	SB47	SB47	SB47	SB48	SB48
	Sample Depth (ft.):	3-5	5-7	5-7	14-15	2-4	2-4	5-7	14-15	3-5	8-10	13-14	2-4	7-8	13-15	2-4	8-9
	Sample Date:	04/27/05	04/27/05	04/27/05	04/27/05	04/27/05	04/27/05	04/27/05	04/27/05	04/28/05	04/28/05	04/28/05	04/28/05	04/28/05	04/28/05	04/28/05	04/28/05
Compound	Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Volatile Organic Compounds (ppb)																	
Acetone	200	20 UJ	520 U	530 U	26 UJ	4.0 U	**880 JD**	510 U	4.0 U	**25 J**	4.0 U	4.1 U	540 U	550 U	**31 J**	**21 J**	550 U
Carbon Disulfide	2700	0.45 U	62 U	62 U	0.45 U	**17**	57 UD	60 U	0.44 U	0.43 U	0.43 U	0.45 U	63 U	65 U	0.47 U	0.44 U	65 U
Methylene Chloride	100	3.1 UJ	98 U	100 U	5.3 UJ	2.1 U	91 UD	96 U	**9.6 B**	2.1 U	2.1 U	2.2 U	100 U	100 U	2.3 U	**2.9 J**	**180 JB**
2-Butanone	300	3.4 U	450 U	450 U	**8.0 J**	3.3 U	420 UD	440 U	3.4 U	3.3 U	3.3 U	3.4 U	460 U	470 U	3.6 U	3.3 U	470 U
1,1-Dichloropropene	^	0.40 U	120 U	120 U	0.49 UJ	0.38 U	110 UD	120 U	0.39 U	0.38 U	0.38 U	0.40 U	120 U	130 U	0.41 U	0.38 U	130 U
cis-1,2-Dichloroethene	^	0.48 U	59 U	60 U	**4.1 J**	0.46 U	55 UD	58 U	0.47 U	0.46 U	0.46 U	0.48 U	61 U	62 U	0.5 U	0.47 U	62 U
Benzene	60	0.49 U	**4300 J**	**8600 J**	**5.9 J**	**12**	35 UD	37 U	**2.2 J**	0.47 U	**5.5 J**	**52**	**91 J**	**830 J**	0.51 U	0.47 U	**730 J**
Trichloroethene	700	0.38 U	110 U	110 U	0.38 U	0.36 U	99 UD	100 U	0.37 U	0.36 U	0.36 U	0.38 U	110 U	110 U	0.39 U	0.36 U	110 U
Toluene	1500	0.49 U	**1100 J**	**3400 J**	**18**	**70**	57 UD	**7700**	0.49 U	0.48 U	0.48 U	**3.6 J**	**370 J**	**310 J**	0.51 U	0.48 U	64 U
Tetrachloroethene	1400	0.89 U	52 UJ	53 U	0.90 U	0.86 U	49 UD	51 U	0.88 U	0.86 U	0.86 U	0.89 U	54 U	55 U	0.92 U	0.86 U	55 U
Ethylbenzene	5500	**2.3 J**	**14000**	**23000**	**160**	**530 E**	60 UD	**61000 D**	**5.7 J**	0.42 U	0.42 U	0.43 U	**1300**	**9200**	0.45 U	0.42 U	**7100**
m/p-Xylenes	1200	**11**	**18000**	**35000**	**340**	**1600 E**	**140 D**	**130000 D**	**26**	1.0 U	1.0 U	**28**	**3900**	**6800**	1.1 U	**2.2 J**	**2600**
o-Xylenes	1200	**2.5 J**	**2500 J**	**7800 J**	**25**	**300 E**	**54 D**	**30000**	**6.0**	0.45 U	0.45 U	**5.5 J**	**2300**	**3900**	0.49 U	**4.4 J**	**1800**
Isopropylbenzene	^	0.51 U	**2400**	**2600**	**11 J**	**94**	49 UD	**18000**	**3.2 J**	0.49 U	**2.1 J**	**17**	**280 J**	**1600**	0.53 U	**22**	**960**
1,2,3-Trichloropropane	400	0.41 UJ	72 UJ	72 UJ	0.41 U	0.39 U	66 UD	70 U	0.40 U	0.39 U	**49**	0.41 U	73 U	75 U	0.42 U	0.40 U	75 U
n-Propylbenzene	^	**1.4 J**	**4100**	**3800**	**17 J**	**230**	**120 JD**	**36000 D**	**5.9 J**	0.63 U	**3.8 J**	**12**	**360 J**	**1500**	0.68 U	**8.4**	**1300**
1, 3, 5-Trimenthylbenzene	^	**3.5 J**	**5400**	**7300**	**37**	**1000 E**	**500 JD**	**59000 D**	**21**	0.58 U	**1.6 J**	**13**	**1800**	**3300**	0.63 U	**11**	**2100**
1,2,4-Trimethylbenzene	^	**12**	**27000**	**24000**	**140**	**3600 D**	**3600 D**	**250000 D**	**52**	0.45 U	**2.4 J**	**2.2 J**	**4000**	**10000**	**1.4 J**	**35**	**8300**
Sec-butylbenzene	^	0.51 U	**720 J**	**610 J**	0.52 UJ	0.49 U	63 UD	**6100**	**1.6 J**	0.49 U	0.49 U	0.51 U	69 U	71 U	0.53 U	0.49 U	71 U
p-Isopropyltoluene	^	0.52 U	**620 J**	**600 J**	**1.4 J**	0.50 U	53 UD	**13000**	**6.2**	0.50 U	0.50 U	0.52 U	**540 J**	**1800**	0.54 U	**17**	**770 J**
n-Butylbenzene	^	0.41 U	**1400**	**1300**	**3.1 J**	**370 E**	**310 JD**	**16000**	**10**	0.40 U	0.40 U	0.41 U	76 U	**580 J**	0.43 U	0.40 U	**380 J**
Naphthalene	13000	**5.4 J**	**33000 J**	**91000 J**	**62**	**3800 D**	**3800 D**	**220000 D**	**3.6 J**	0.69 U	**4.8 J**	**15**	**31000**	**180000 D**	**9.2**	**59**	**120000 D**
Semi-Volatile Organic Compounds (ppb)																	
bis(2-Chloroethyl)ether	^	130 U	330 U	66 U	64 U	61 U	NR	640 U	62 U	61 U	61 U	63 U	270 U	1400 U	65 U	120 U	69 U
3+4-Methylphenols	900	130 U	330 U	66 U	64 U	61 U	NR	640 U	62 U	61 U	61 U	63 U	270 U	1400 U	65 U	120 U	69 U
Naphthalene	13,000	140 U	**40000 J**	**7,000 JD**	**230 J**	**3100**	NR	**50000 D**	**120 J**	**110 J**	66 U	68 U	**13000**	**150000 D**	**130 J**	**2400**	**9400 D**
2-Methylnaphthalene	36,400	130 U	**19000 J**	**3000 JD**	**81 J**	**2600 D**	NR	**21000**	66 U	65 U	64 U	67 U	**9200**	**66000**	**84 J**	**710 J**	**3400**
Acenaphthylene	41,000	130 U	**2700 J**	**500 J**	66 U	**150 J**	NR	660 U	64 U	63 U	62 U	65 U	**600 J**	**6500 J**	67 U	**320 J**	**240 J**
Acenaphthene	50,000	140 U	**4400**	**950**	72 U	**440**	NR	**2000 J**	70 U	69 U	68 U	71 U	**1800**	**25000**	74 U	**420 J**	**870**
Dibenzofuran	6,200	130 U	340 U	69 U	67 U	64 U	NR	**950 J**	65 U	64 U	64 U	66 U	280 U	1400 U	68 U	130 U	72 U
Fluorene	50,000	140 U	**4500 J**	**920 J**	68 U	**370 J**	NR	**1900 J**	67 U	**78 J**	65 U	68 U	**3400**	**31000**	70 U	**610 J**	**1400**
Phenanthrene	50,000	**1000**	**36000 J**	**6400 J**	**110 J**	**3000**	NR	**10000**	63 U	**560**	61 U	64 U	**19000 D**	**150000 D**	**190 J**	**2700**	**6800 D**
Anthracene	50,000	**190 J**	**7200 J**	**1500 J**	61 U	**560**	NR	**2100 J**	60 U	**140 J**	58 U	60 U	**1900**	**26000**	62 U	**600 J**	**680**
Fluoranthene	50,000	**680 J**	**13000 J**	**2400 J**	60 U	**780**	NR	**4000 J**	59 U	**640**	57 U	60 U	**8600**	**45000**	**68 J**	**2500**	**1900**
Pyrene	50,000	**630 J**	**29000 J**	**4900 J**	**110 J**	**1800**	NR	**7900**	70 U	**540**	68 U	71 U	**13000**	**69000**	**100 J**	**3600**	**2600**
Butylbenzylphthalate	50,000	**790 J**	330 U	68 U	65 U	63 U	NR	660 U	64 U	63 U	62 U	65 U	280 U	1400 U	67 U	130 U	71 U
Benzo(a)anthracene	224 or MDL	**360 J**	**7400 J**	**1300 J**	57 U	**500**	NR	**2400 J**	55 U	**270 J**	54 U	56 U	**4500**	**26000**	58 U	**1400**	**910**
Chrysene	400	**590 J**	**7100 J**	**1400 J**	73 U	**440**	NR	**2300 J**	71 U	**300 J**	69 U	72 U	**4600**	**24000**	74 U	**1400**	**940**
bis(2-Ethylhexyl)phthalate	50,000	**540 J**	400 U	81 U	78 U	74 U	NR	**880 J**	76 U	74 U	74 U	77 U	330 U	1700 U	79 U	150 U	84 U
Benzo(b) fluoranthene	1,100	**610 J**	**6100 J**	**1200 J**	45 U	**390**	NR	**2400 J**	43 U	**420**	42 U	44 U	**4700**	**22000**	45 U	**1800**	**810**
Benzo(k)fluoranthene	1,100	**240 J**	**1700 J**	**380 J**	89 U	**150 J**	NR	890 U	87 U	**150 J**	85 U	88 U	**1700 J**	**9300**	91 U	**700 J**	**320 J**
Benzo(a)pyrene	61 or MDL	**400 J**	**8400 J**	**1700 J**	65 U	**590**	NR	**2500 J**	63 U	**280 J**	61 U	64 U	**4100**	**27000**	66 U	**1700**	**1000**
Indeno (1,2,3-cd)pyrene	3,200	**130 J**	**1600 J**	**310 J**	51 U	**200 J**	NR	**910 J**	50 U	**54 J**	49 U	51 U	**540 J**	**2200 J**	52 U	**200 J**	**130 J**
Dibenz(a,h)anthracene	14 or MDL	100 U	**380 J**	**65 J**	51 U	49 U	NR	510 U	50 U	49 U	48 U	50 U	**450 J**	**2100 J**	52 U	98 U	**64 J**
Benzo(g,h,i)perylene	50,000	**200 J**	**3700 J**	**690**	67 U	**460**	NR	**1800 J**	65 U	64 U	64 U	66 U	**2000**	**8200 J**	68 U	**760 J**	**380 J**
Pesticides/PCBs/Herbicides (ppb)																	
4,4-DDE	2,100	0.95 U	0.98 U	1.0 U	0.96 U	0.91 U	NR	0.96 U	0.94 U	0.92 U	0.92 U	0.96 U	1.0 U	1.0 U	0.98 U	0.93 U	1.0 U
4,4-DDD	2,900	0.85 U	0.88 U	0.90 U	0.86 U	0.82 U	NR	**8.8 P**	0.84 U	0.82 U	0.82 U	0.85 U	0.91 U	0.93 U	0.88 U	0.83 U	0.93 U
alpha-Chlordane	110	1.0 U	1.0 U	1.1 U	1.0 U	0.97 U	NR	1.0 U	1.0 U	0.98 U	0.98 U	1.0 U	1.1 U	1.1 U	1.0 U	0.99 U	1.1 U
gamma-Chlordane	540	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	NR	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.1 U	1.2 U	1.1 U	1.0 U	1.2 U
Aroclor-1254	10,000	**63 J**	2.1 U	2.1 U	2.0 U	1.9 U	NR	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	2.1 U	2.2 U	2.1 U	2.0 U	2.2 U
Aroclor-1260	10,000	5.1 U	5.3 U	5.4 U	5.2 U	4.9 U	NR	**44**	5.1 U	4.9 U	4.9 U	5.1 U	5.4 U	5.6 U	5.3 U	5.0 U	5.6 U

Table 2
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Organics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective*																
	Sample ID:	SB48	SB49 ⇑	SB49 ⇑	SB49 DUP ⇑	SB49 ⇑	TP11	TP12	TP13	TP14	TP15	TP16	TP19 .⇑	TP19 DUP ⇑	TP20 ⇑	TP21	MW-18(27-29)
	Sample Depth (ft.):	14-15	3-5	8-10	8-10	13-15	3-4	4-5	3-4	3-4	3-4	3-4	5-6	5-6	4-5	4-5	27-29
	Sample Date:	04/28/05	04/29/05	04/29/05	04/29/05	04/29/05	04/19/05	04/19/05	04/18/05	04/19/05	04/19/05	04/19/05	04/18/05	04/18/05	04/18/05	04/18/05	08/23/05
	Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Volatile Organic Compounds (ppb)																	
Acetone	200	**45**	**78 JB**	4.2 U	4.1 U	26 UJ	4.0 U	3.9 U	3.7 U	4.1 U	3.9 U	3.9 U	4.3 U	4.3 UJ	4.0 U	3.9 U	**1600 J**
Carbon Disulfide	2700	0.53 U	2.0 U	0.46 U	0.45 U	**3.0 J**	0.44 U	0.42 U	0.40 U	0.45 U	0.42 U	0.42 U	0.47 U	0.47 UJ	0.44 U	0.43 U	66 U
Methylene Chloride	100	**2.8 J**	**54 B**	8.9 U	13 U	15 U	2.2 U	2.1 U	**2.8 J**	**2.5 JB**	**2.8 JB**	**2.6 JB**	2.3 U	2.4 UJ	2.4 UJ	2.1 U	110 U
2-Butanone	300	4.1 U	16 U	3.5 U	3.5 U	3.3 U	3.4 U	3.2 U	3.1 U	3.5 U	3.3 U	3.2 U	3.6 U	3.6 UJ	3.4 U	3.3 U	480 U
1,1-Dichloropropene	^	0.47 U	1.8 U	0.40 U	0.40 U	0.38 U	0.39 U	0.37 U	0.36 U	0.40 U	0.38 U	0.37 U	0.41 U	0.42 UJ	0.39 U	0.38 U	130 U
cis-1,2-Dichloroethene	^	0.57 U	2.2 U	0.49 U	0.48 U	0.46 U	0.47 U	0.45 U	0.43 U	0.48 U	0.45 U	0.45 U	0.5 U	0.5 UJ	0.46 U	0.45 U	97 U
Benzene	60	0.58 U	2.2 U	**17**	**5.5 U**	0.47 U	0.48 U	0.46 U	0.44 U	0.49 U	0.46 U	0.46 U	0.51 U	0.51 UJ	0.48 U	0.46 U	**150 J**
Trichloroethene	700	0.45 U	1.7 U	0.38 U	0.38 U	0.36 U	0.37 U	0.35 U	0.34 U	0.38 U	0.36 U	0.35 U	0.39 U	0.40 UJ	0.37 U	0.36 U	110 U
Toluene	1500	0.59 U	2.2 U	0.50 U	0.50 U	0.47 U	0.48 U	0.47 U	0.45 U	0.50 U	0.47 U	0.46 U	0.51 U	0.52 UJ	0.48 U	0.47 U	65 U
Tetrachloroethene	1400	1.1 U	4.1 U	0.90 U	0.90 U	0.85 U	0.87 U	0.84 U	0.80 U	0.90 U	**1.7 J**	0.84 U	0.93 U	0.94 UJ	0.87 U	0.84 U	56 U
Ethylbenzene	5500	0.51 U	2.0 U	0.44 U	0.44 U	0.41 U	0.42 U	0.41 U	0.39 U	0.44 U	0.41 U	0.41 U	0.45 U	0.45 UJ	0.42 U	0.41 U	**1100**
m/p-Xylenes	1200	1.3 U	4.8 U	**6.4**	**6.2**	1.0 U	1.0 U	0.99 U	0.95 U	**2.3 J**	**2.8 J**	0.99 U	1.1 U	1.3 UJ	1.0 U	**1.6 J**	**1000 J**
o-Xylenes	1200	0.56 U	2.1 U	0.48 U	0.47 U	0.45 U	0.46 U	0.44 U	0.42 U	0.47 U	0.44 U	0.44 U	0.49 U	0.49 UJ	0.46 U	0.44 U	**830 J**
Isopropylbenzene	^	0.60 U	2.3 U	**11**	**9.2**	**1.5 J**	0.50 U	0.48 U	0.46 U	0.51 U	0.48 U	0.48 U	0.53 U	0.53 UJ	0.50 U	0.48 U	**250 J**
1,2,3-Trichloropropane	400	0.48 U	1.9 U	0.41 U	0.41 U	0.39 U	0.40 U	0.38 U	0.37 U	0.41 U	0.39 U	0.38 U	0.42 U	0.43 UJ	0.40 U	0.39 U	76 U
n-Propylbenzene	^	0.78 U	3.0 U	**15**	**16**	0.63 U	0.64 U	0.62 U	0.59 U	0.66 U	0.62 U	0.61 U	0.68 U	0.69 UJ	0.64 U	0.62 U	**220 J**
1, 3, 5-Trimenthylbenzene	^	0.72 U	2.7 U	**1.3 J**	**3.1 J**	**1.3 J**	0.59 U	0.57 U	0.54 U	0.61 U	0.57 U	0.57 U	0.63 U	0.63 UJ	0.59 U	0.57 U	**1200**
1,2,4-Trimethylbenzene	^	0.55 U	2.1 U	**4.5 J**	**4.4 J**	0.44 U	0.45 U	0.44 U	0.42 U	0.47 U	**1.5 J**	0.44 U	0.48 U	0.49 UJ	0.45 U	0.44 U	**2500**
Sec-butylbenzene	^	0.61 U	2.3 U	**2.1 J**	**2.8 J**	0.49 U	0.50 U	0.48 U	0.46 U	0.52 U	0.48 U	0.48 U	0.53 U	0.54 UJ	0.50 U	0.48 U	72 U
p-Isopropyltoluene	^	0.62 U	2.4 U	0.53 U	0.52 U	0.50 U	0.51 U	0.49 U	0.47 U	0.52 U	0.49 U	0.49 U	0.54 U	0.55 UJ	0.51 U	0.49 U	61 U
n-Butylbenzene	^	0.49 U	1.9 U	**2.4 J**	**4.6 J**	0.40 U	0.40 U	0.39 U	0.37 U	0.42 U	0.39 U	0.39 U	0.43 U	0.43 UJ	0.40 U	0.39 U	79 U
Naphthalene	13000	0.85 U	**22 J**	**16 J**	**28 J**	**2.3 J**	0.70 U	**1.2 J**	0.64 U	0.72 U	0.68 U	0.67 U	0.74 U	0.75 UJ	0.70 U	0.68 U	**220000 D**
Semi-Volatile Organic Compounds (ppb)																	
bis(2-Chloroethyl)ether	^	75 U	58 U	64 U	64 U	61 U	620 U	600 U	1100 U	640 U	240 U	240 U	1300 U	1300 U	620 U	240 U	140 U
3+4-Methylphenols	900	75 U	58 U	64 U	64 U	61 U	620 U	600 U	1100 U	640 U	240 U	240 U	1300 U	1300 U	620 U	240 U	140 U
Naphthalene	13,000	81 U	**540**	69 U	69 U	66 U	670 U	650 U	1200 U	690 U	260 U	260 U	**4600 J**	1400 U	670 U	260 U	**37000 D**
2-Methylnaphthalene	36,400	80 U	**200 J**	68 U	68 U	65 U	650 U	630 U	1200 U	680 U	250 U	250 U	**2400 J**	1400 U	660 U	260 U	**12000 D**
Acenaphthylene	41,000	77 U	**170 J**	66 U	66 U	63 U	**720 J**	610 U	1200 U	**930 J**	**280 J**	**340 J**	**1600 J**	1400 U	640 U	250 U	**9100 D**
Acenaphthene	50,000	85 U	**150 J**	72 U	72 U	69 U	700 U	670 U	1300 U	720 U	270 U	270 U	**9200 J**	**3600 J**	700 U	270 U	**4500 JD**
Dibenzofuran	6,200	79 U	**400**	67 U	67 U	64 U	650 U	630 U	1200 U	670 U	250 U	250 U	**6800 J**	**2200 J**	650 U	250 U	150 U
Fluorene	50,000	80 U	**300 J**	68 U	69 U	65 U	660 U	**670 J**	1200 U	680 U	250 U	**280 J**	**11000 J**	**4200 J**	660 U	260 U	**8400 JD**
Phenanthrene	50,000	76 U	**610**	64 U	65 U	62 U	**8000**	**3500**	1100 U	**4800**	**760 J**	**3300**	**65000 J**	**33000 J**	**1800 J**	**1700**	**41000 D**
Anthracene	50,000	72 U	**230 J**	61 U	61 U	58 U	**1600 J**	**82 J**	1100 U	**1100 J**	**250 J**	**890 J**	**17000 J**	**8600 J**	590 U	**360 J**	**7200**
Fluoranthene	50,000	71 U	**910**	60 U	60 U	57 U	**13000**	**5700**	**2000 J**	**13000**	**2200**	**5800**	**79000 D**	**45000**	**3300 J**	**3300**	**15000 D**
Pyrene	50,000	84 U	**1100**	72 U	72 U	68 U	**12000**	**4900**	**1800 J**	**11000**	**2200**	**5500**	**63000 J**	**37000 J**	**2700 J**	**3900**	**21000 D**
Butylbenzylphthalate	50,000	77 U	59 U	65 U	66 U	63 U	630 U	610 U	1200 U	**2300 J**	240 U	240 U	1300 U	1400 U	**53000 D**	250 U	**140**
Benzo(a)anthracene	224 or MDL	67 U	**530**	57 U	57 U	54 U	**6400**	**2700**	**1100 J**	**6100**	**1300 J**	**2900**	**31000**	**19000**	**1400 J**	**1800**	**6800 JD**
Chrysene	400	85 U	**550**	73 U	73 U	69 U	**6900**	**2900**	1300 U	**7500**	**1400 J**	**3100**	**31000**	**19000**	**1500 J**	**1800**	**6000**
bis(2-Ethylhexyl)phthalate	50,000	91 U	70 U	78 U	78 U	74 U	750 U	730 U	1400 U	**2200 J**	290 U	290 U	1600 U	1600 U	**4100**	290 U	170 U
Benzo(b) fluoranthene	1,100	52 U	**850**	44 U	45 U	43 U	**8100**	**3100**	**1600 J**	**8800**	**1900**	**4200**	**34000**	**23000**	**2500 J**	**1900**	**6900**
Benzo(k)fluoranthene	1,100	100 U	**380**	89 U	90 U	85 U	**2200 J**	**120 J**	1600 U	**2900 J**	**730 J**	**1300 J**	**11000**	**7000 J**	860 U	**690 J**	**3300**
Benzo(a)pyrene	61 or MDL	76 U	**580**	65 U	65 U	62 U	**5500**	**2400**	1200 U	**5600**	**1400 J**	**2600**	**23000**	**15000**	**1800 J**	**1500 J**	**6600 JD**
Indeno (1,2,3-cd)pyrene	3,200	60 U	**130 J**	51 UJ	52 UJ	49 UJ	**2000 J**	**1000 J**	910 U	**2200 J**	**690 J**	**580 J**	**7900 J**	**4700 J**	**660 J**	**340 J**	**1400 JD**
Dibenz(a,h)anthracene	14 or MDL	60 U	46 U	51 U	51 U	49 U	490 U	470 U	900 U	510 U	190 U	190 U	**1100 J**	1100 U	490 U	190 U	**500 J**
Benzo(g,h,i)perylene	50,000	79 U	**230 J**	67 U	67 U	64 U	**2500 J**	**1100 J**	1200 U	**2400 J**	**780 J**	**970 J**	**9300**	**6300 J**	**1100 J**	**590 J**	**3500**
Pesticides/PCBs/Herbicides (ppb)																	
4,4-DDE	2,100	1.1 U	NR	NR	NR	NR	0.92 U	0.90 U	0.86 U	0.96 U	0.90 U	0.90 U	0.99 U	1.0 U	0.93 U	0.90 U	N/A
4,4-DDD	2,900	1.0 U	NR	NR	NR	NR	0.82 U	0.80 U	0.77 U	0.85 U	0.80 U	0.80 U	0.88 U	0.89 U	0.83 U	0.81 U	N/A
alpha-Chlordane	110	1.2 U	NR	NR	NR	NR	0.98 U	0.96 U	0.91 U	1.0 U	0.95 U	0.95 U	1.1 U	1.1 U	0.99 U	0.96 U	N/A
gamma-Chlordane	540	1.3 U	NR	NR	NR	NR	1.0 U	1.0 U	0.95 U	1.1 U	0.99 U	0.99 U	1.1 U	1.1 U	1.0 U	1.0 U	N/A
Aroclor-1254	10,000	2.4 U	NR	NR	NR	NR	2.0 U	1.9 U	1.8 U	2.0 U	1.9 U	1.9 U	2.1 U	2.1 U	2.0 U	1.9 U	N/A
Aroclor-1260	10,000	6.0 U	NR	NR	NR	NR	**720 D**	**350**	4.6 U	**260**	**120**	**290**	**390 J**	**880 J**	5.0 U	4.9 U	N/A

Table 2
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Organics in Soil
Remedial Investigation

	TAGM 4046 Recc. Soil Cleanup Objective*							
	Sample ID:	MW-20(17-19)	MW-20(19-21)	MW-21 (5-7)	RB-41905(A)	RB-41905(B)	RB-42005	TB-42005
	Sample Depth (ft.):	17-19	19-21	5-7	-------	-------	-------	-------
	Sample Date:	8/24/2005	08/23/05	08/23/05	4/19/2005	4/19/2005	4/20/2005	4/20/2005
Compound	Sample Classification:	SOIL	SOIL	SOIL	WATER	WATER	WATER	WATER
Volatile Organic Compounds (ppb)								
Acetone	200	3.9 U	3.9 U	**21 J**	2.3 U	2.3 U	2.3 U	2.3 U
Carbon Disulfide	2700	0.43 U	0.43 U	0.42 U	0.4 U	0.4 U	0.4 U	0.4 U
Methylene Chloride	100	**3.5 J**	**8.6**	**3.1 J**	0.43 U	0.43 U	0.43 U	0.43 U
2-Butanone	300	3.3 U	3.3 U	3.2 U	1.1 U	1.1 U	1.1 U	1.1 U
1,1-Dichloropropene	^	0.32 U	0.45 U	0.44 U	0.62 U	0.62 U	0.62 U	0.62 U
cis-1,2-Dichloroethene	^	0.38 U	0.38 U	0.33 U	0.29 U	0.29 U	0.29 U	0.29 U
Benzene	60	0.47 U	0.46 U	0.45 U	0.39 U	0.39 U	0.39 U	0.39 U
Trichloroethene	700	0.36 U	0.36 U	0.35 U	0.46 U	0.46 U	0.46 U	0.46 U
Toluene	1500	0.48 U	0.47 U	0.46 U	0.36 U	0.36 U	0.36 U	0.36 U
Tetrachloroethene	1400	0.86 U	0.84 U	0.83 U	0.48 U	0.48 U	0.48 U	0.48 U
Ethylbenzene	5500	0.42 U	0.41 U	0.4 U	0.45 U	0.45 U	0.45 U	0.45 U
m/p-Xylenes	1200	1.0 U	1.0 U	**2.0 J**	1.2 U	1.2 U	1.2 U	1.2 U
o-Xylenes	1200	0.45 U	0.44 U	**2.6 J**	0.46 U	0.46 U	0.46 U	0.46 U
Isopropylbenzene	^	0.49 U	0.48 U	**1.8 J**	0.44 U	0.44 U	0.44 U	0.44 U
1,2,3-Trichloropropane	400	0.39 U	0.39 U	0.38 U	0.58 U	0.58 U	0.58 U	0.58 U
n-Propylbenzene	^	0.63 U	0.62 U	**4.6 J**	0.49 U	0.49 U	0.49 U	0.49 U
1, 3, 5-Trimenthylbenzene	^	0.58 U	0.57 U	**39**	0.42 U	0.42 U	0.42 U	0.42 U
1,2,4-Trimethylbenzene	^	0.45 U	0.44 U	**120**	0.44 U	0.44 U	0.44 U	0.44 U
Sec-butylbenzene	^	0.49 U	0.48 U	**10**	0.44 U	0.44 U	0.44 U	0.44 U
p-Isopropyltoluene	^	0.50 U	0.49 U	**30**	0.49 U	0.49 U	0.49 U	0.49 U
n-Butylbenzene	^	0.40 U	0.39 U	**24**	0.49 U	0.49 U	0.49 U	0.49 U
Naphthalene	13000	**16**	**3.8 J**	**96**	0.34 U	0.34 U	0.34 U	0.34 U
Semi-Volatile Organic Compounds (ppb)								
bis(2-Chloroethyl)ether	^	61 U	61 U	580 U	1.5 U	1.5 U	1.5 U	NR
3+4-Methylphenols	900	61 U	61 U	580 U	1.4 U	1.4 U	1.4 U	NR
Naphthalene	13,000	66 U	66 U	630 U	1.4 U	1.4 U	1.4 U	NR
2-Methylnaphthalene	36,400	64 U	64 U	610 U	1.1 U	1.1 U	1.1 U	NR
Acenaphthylene	41,000	63 U	62 U	590 U	1.3 U	1.3 U	1.3 U	NR
Acenaphthene	50,000	69 U	68 U	650 U	1.4 U	1.4 U	1.4 U	NR
Dibenzofuran	6,200	**64 J**	64 U	610 U	1.3 U	1.3 U	1.3 U	NR
Fluorene	50,000	65 U	65 U	**620**	1.5 U	1.5 U	1.5 U	NR
Phenanthrene	50,000	**120 J**	**110 J**	**1500 J**	1.5 U	1.5 U	1.5 U	NR
Anthracene	50,000	58 U	58 U	550 U	1.5 U	1.5 U	1.5 U	NR
Fluoranthene	50,000	**130 J**	57 U	**2200 J**	1.3 U	1.3 U	1.3 U	NR
Pyrene	50,000	**87 J**	**69 J**	**1700 J**	1.5 U	1.5 U	1.5 U	NR
Butylbenzylphthalate	50,000	**87 J**	62 U	590 U	1.5 U	1.5 U	1.5 U	NR
Benzo(a)anthracene	224 or MDL	54 U	54 U	**820 J**	1.2 U	1.2 U	1.2 U	NR
Chrysene	400	69 U	69 U	**890 J**	1.7 U	1.7 U	1.7 U	NR
bis(2-Ethylhexyl)phthalate	50,000	**280 J**	74 U	700	1.6 U	1.6 U	1.6 U	NR
Benzo(b) fluoranthene	1,100	42 U	42 U	**940 J**	0.780 U	0.780 U	0.780 U	NR
Benzo(k)fluoranthene	1,100	85 U	85 U	810 U	2.0 U	2.0 U	2.0 U	NR
Benzo(a)pyrene	61 or MDL	62 U	61 U	**690 J**	1.2 U	1.2 U	1.2 U	NR
Indeno (1,2,3-cd)pyrene	3,200	49 U	49 U	470 U	0.860 U	0.860 U	0.860 U	NR
Dibenz(a,h)anthracene	14 or MDL	48 U	48 U	460 U	0.900 U	0.900 U	0.900 U	NR
Benzo(g,h,i)perylene	50,000	64 U	64 U	610 U	1.1 U	1.1 U	1.1 U	NR
Pesticides/PCBs/Herbicides (ppb)								
4,4-DDE	2,100	N/A	N/A	N/A	0.008 U	0.008 U	0.008 U	NR
4,4-DDD	2,900	N/A	N/A	N/A	0.007 U	0.007 U	0.007 U	NR
alpha-Chlordane	110	N/A	N/A	N/A	0.008 U	0.008 U	0.008 U	NR
gamma-Chlordane	540	N/A	N/A	N/A	0.008 U	0.008 U	0.008 U	NR
Aroclor-1254	10,000	N/A	N/A	N/A	0.04 U	0.04 U	0.04 U	NR
Aroclor-1260	10,000	N/A	N/A	N/A	0.16 U	0.16 U	0.16 U	NR

Table 2
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Organics in Soil
Remedial Investigation

Notes:

General Comments

All results are in µg/kg (microgram per kilogram or parts per billion (ppb)).
Only those parameters detected in at least one sample are reported on this table.
Bold face indicates that analyte was detected above laboratory limit.
Bold face and shaded values indicate an exceedence of TAGM value.
Only 20% of samples were used for the Data Usability Study Report (DUSR, Category B Laboratory Package).
NR - Not reported or not analyzed
.⇧ = Sample was used for the DUSR; only validator qualifiers were used.

Standards

* = NYSDEC TAGM Memorandum No. 4046, revised January 24, 1994
^ = No standard or guidance value is available for this compound.
MDL = Method Detection Limit

Validator Qualifiers

U - Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
J - The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
UJ - The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting quality (QC) data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

Laboratory Qualifiers - Organic

U - Indicates the compound was analyzed for but was not detected.
J - Indicates an estimated value. This flag is used:
(1) When estimating, a concentration for a tentatively identified compound
(2) When the mass spectral data indicated the identification, however the result was less than the specified detection limit greater than zero.
B - Indicates the analyte was found in the blank as well as the sample.
E - Indicates the analyte's concentration exceeds the calibrated range of the instrument for that specific analysis.
D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.
P - This flag is used for Pesticide/polychlorinated biphenyl (PCB) target analyte when there is >25% difference for detected concentrations between the two gas chromatography (GC) columns. The lower of the two values is reported.
N - This flag indicates presumptive evidence of a compound. This is only used for tentatively identified compounds (TICS), where the identification is based on a mass spectral library search. It applies to all TIC results.

Table 3
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective**	TAGM Eastern USA Background**	NYSDEC Region 3 Background Soil Heavy Metals Conc. ^^											
			Sample ID:	BALLAST-1 ⇧	BALLAST-2	NWTPGRAB	NWSB	SB20 .⇧	SB21 ⇧	SB22	SB22	SB22	SB23	SB24 ⇧
			Sample Depth (ft.):	NA	NA	NA	NA	14-16	4-6	3-5	6-8	10-11	6-8	6-8
			Sample Date:	04/20/05	04/20/05	04/06/05	04/06/05	04/19/05	04/18/05	04/27/05	04/27/05	04/27/05	04/15/05	04/18/05
			Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
TAL Metals (mg/kg)														
Aluminum	SB	33000	N/A	6390	10200	6160	3090	6400	3380	8170	8590	6080	8560	10400
Antimony	SB	N/A	N/A	2.260 J	0.542 J	8.120 J	15.6	0.404 U	3.800 U	0.880 J	1.760 J	0.410 U	1.140 J	1.110 U
Arsenic	7.5 or SB	3-12	2.2-23.1	72.7	15.3	6.300 N	27.6 N	2.340 U	7.080	3.860	7.960	0.628 J	1.490	1.960
Barium	300 or SB	15-600	38.5-187	122	108	1040 N	153 N	385	49.1	1120	891	23.2 J	51.0	72.1
Beryllium	0.16 or SB	0-1.75	0.24-2.2	0.349 J	0.957	0.486 JN	0.237 JN	0.256 J	0.486 J	0.477 J	0.497 J	0.321 J	0.456 J	0.497 J
Cadmium	1 or SB	0.1-1	0.04U-1.2	1.380 U	0.352 J	1.250 N	0.751 N	0.041 U	0.036 U	0.041 U	3.350	0.041 U	0.045 U	0.038 U
Calcium	SB	130-35,000	N/A	27100	59100	29200	15600	6760	71300	37400	12400	928	2440	7600
Chromium	10 or SB	1.5-40	11.2-51.2	53.2	21.9	23.5 N	34.9 N	11.9	11.5 J	21.8 N	17.2 N	8.930 N	11.4 N	20.4 J
Cobalt	30 or SB	2.5-60	N/A	14.3	10.5	9.610 N	6.710 JN	5.840 J	4.900 J	10.0	13.5	2.960 J	5.450 J	10.1
Copper	25 or SB	1-50	5.8-64.8	299	155	90.2 N	309 N	18.1	166	44.6	627	21.8	11.4	28.6
Iron	2,000 or SB	2,000-550,000	N/A	71400	34400	16200	51500	10100	17600	15000	22300	12100	12900	15800
Lead	SB	200-500	6.9-303	742 J	146	1970 N	989 N	53.9 J	199 J	283	1170	37.2	35.0	74.1 J
Magnesium	SB	100-5,000	N/A	12200	31800	5990	2240	4070	46800	9400	2600	2490	2480	8120
Manganese	SB	50-5,000	N/A	616	942	417	307	137	294	219	110	96.2	138	232
Mercury	0.1	0.001-0.2	0.04-0.92	0.540	0.120 N	0.520	0.423	0.067	0.102	0.274 N	0.583 N	0.009 JN	0.643 N	0.232
Nickel	13 or SB	0.5-25	8.7-54.5	54.0	17.1	27.3 N	19.9 N	11.6	13.2	17.1	28.4	9.780	10.6	17.1
Potassium	SB	8,500-43,000	N/A	1150 J	1240	1440 N	444 JN	1080 J	770 J	3130	866	793	701 N	3320 J
Selenium	2 or SB	0.1-3.9	0.20-2.9	0.388 U	0.370 U	0.531 U	0.440 U	0.420 U	0.377 U	0.428 U	1.600	0.426 U	0.464 U	0.395 U
Silver	SB	N/A	N/A	4.670 J	3.250 N	0.381 J	2.390	0.805 J	0.087 UN*	0.371 JN	2.360 N	0.099 UN	1.320 J	0.091 UN*
Sodium	SB	6,000-8,000	N/A	260 J	776	675 JN	279 JN	238 J	167 UJ	356 J	435 J	179 J	65.8 JN	162 UJ
Thallium	SB	N/A	N/A	0.600 U	0.572 U	0.559 U	1.620	0.650 U	1.980 U	0.661 U	0.700 U	0.658 U	2.320	0.610 U
Vanadium	150 or SB	1-300	N/A	61.8	64.9	40.2 N	43.8 N	14.1	13.5	31.4	15.6	11.0	16.1 N	27.7
Zinc	20 or SB	9-50	35.7-225	364	302	901 N	218 N	227	82.1	731	1250	46.7	42.0 N	72.7
Total Petroleum Hydrocarbons (mg/kg)														
TPH	^	N/A	N/A	NR	560	NR	NR	NR	NR	NR	NR	NR	NR	NR
Wet Chemistry (mg/kg)														
Cyanide	^	N/A	N/A	0.569 U	0.543 U	0.847 U	0.702 U	0.617 U	0.558 U	0.627 U	0.678 U	0.637 U	0.688 U	0.585 U

Table 3
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective**	TAGM Eastern USA Background**	NYSDEC Region 3 Background Soil Heavy Metals Conc. ^^											
			Sample ID:	SB25	SB25	SB25	SB25A	SB25A	SB26	SB27 ⇧	SB27DUP ⇧	SB-28	SB-29	SB-30
			Sample Depth (ft.):	2-4	6-8	14-16	4-6	6-8	10-12	14-16	14-16	4-6	4-6	0-2
			Sample Date:	04/15/05	04/15/05	04/15/05	04/15/05	04/15/05	04/15/05	04/19/05	04/19/05	04/14/05	04/13/05	04/14/05
			Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
TAL Metals (mg/kg)														
Aluminum	SB	33000	N/A	6790	7630	6260	5060	6340	2340	10300	7390	5010	8770	4280
Antimony	SB	N/A	N/A	2.490 J	0.874 J	1.010 J	4.540 J	1.500 J	0.730 J	0.534 U	0.443 U	1.420 J	0.384 U	3.530 J
Arsenic	7.5 or SB	3-12	2.2-23.1	8.600	1.560	0.423 J	9.330	2.760	0.448 U	0.638 U	1.760 U	3.730	3.080	39.2
Barium	300 or SB	15-600	38.5-187	336	88.9	84.6	553	125	23.6	69.7	56.6	54.9	135	158
Beryllium	0.16 or SB	0-1.75	0.24-2.2	0.311 J	0.308 J	0.286 J	0.373 J	0.355 J	0.154 J	0.529 J	0.383 UJ	0.264 J	0.499 J	0.253 J
Cadmium	1 or SB	0.1-1	0.04U-1.2	0.321 J	0.055 U	0.054 U	0.374 J	0.130 J	0.038 U	0.130 UJ	0.045 U	0.037 U	0.039 U	1.020
Calcium	SB	130-35,000	N/A	37500	10200	13200	42500	7120	24600	3880 J	12800 J	40800	40300	75400
Chromium	10 or SB	1.5-40	11.2-51.2	17.1 N	13.9 N	14.0 N	20.4 N	14.5 N	6.540 N	16.7	14.1	10.9 N	14.4 N	41.5 N
Cobalt	30 or SB	2.5-60	N/A	6.200	4.840 J	7.670	8.410	4.340 J	3.920 J	6.310 J	6.020 J	5.490 J	5.870	8.110
Copper	25 or SB	1-50	5.8-64.8	93.0	27.8	16.8	141	29.8	8.990	14.9 J	62.4 J	24.0	23.0	228
Iron	2,000 or SB	2,000-550,000	N/A	15700	10700	10700	29200	9530	5490	10600	11900	10400	12400	59000
Lead	SB	200-500	6.9-303	341	72.0	14.8	422	81.4	11.0	10.5 J	33.1 J	72.5	77.0	698
Magnesium	SB	100-5,000	N/A	7220	3720	6980	5140	3990	11400	4220	5110	17700	5580	15300
Manganese	SB	50-5,000	N/A	262	140	100	315	131	106	98.7 J	224 J	238	224	413
Mercury	0.1	0.001-0.2	0.04-0.92	0.450 N	0.097 N	0.007 UN	0.310 N	0.063 N	0.007 UN	0.034 N	0.052 N	0.006 U	0.088	0.317
Nickel	13 or SB	0.5-25	8.7-54.5	19.0	13.2	13.5	24.7	13.5	5.890	14.4 J	25.1 J	11.3 N	14.1 N	36.0 N
Potassium	SB	8,500-43,000	N/A	2260 N	1050 N	3300 N	1470 N	707 N	915 N	1030 J	1800 J	1970 N	1600 N	1100 N
Selenium	2 or SB	0.1-3.9	0.20-2.9	0.358 U	0.372 U	0.365 U	0.372 U	0.390 U	0.358 U	0.555 U	0.460 U	1.310	0.930 J	1.430
Silver	SB	N/A	N/A	0.120 U	0.125 U	0.123 U	0.125 U	0.471 J	0.120 U	0.129	0.107	0.088 U	0.092 U	0.088 U
Sodium	SB	6,000-8,000	N/A	526 JN	146 JN	260 JN	312 JN	223 JN	215 JN	49.0 UJ	281 J	75.2 JN	421 JN	37.9 JN
Thallium	SB	N/A	N/A	0.602 J	0.626 U	0.385 U	0.626 U	1.260	1.250	0.858 U	0.711 U	0.586 U	0.616 U	1.870
Vanadium	150 or SB	1-300	N/A	29.8	14.3 N	20.4 N	31.1 N	22.3 N	8.580	17.7	19.3	16.2	26.8	43.9
Zinc	20 or SB	9-50	35.7-225	558	127 N	54.5 N	445 N	112 N	23.5	86.5	65.5	98.9	125	239
Total Petroleum Hydrocarbons (mg/kg)														
TPH	^	N/A	N/A	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Wet Chemistry (mg/kg)														
Cyanide	^	N/A	N/A	0.571 U	0.594 U	0.583 U	0.594 U	0.630 U	0.583 U	0.822 U	0.675 U	0.556 U	0.585 U	0.561 U

Table 3
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective**	TAGM Eastern USA Background**	NYSDEC Region 3 Background Soil Heavy Metals Conc. ^^											
			Sample ID:	SB-30	SB-30	SB-33	SB-34	SB35	SB-36	SB37	SB41	SB42	SB43 ⇑	SB44 ⇑
			Sample Depth (ft.):	6-8	12-14	0-4	6-8	0-2	2-4	4-6	4-6	4-6	2-4	3-5
			Sample Date:	04/14/05	04/14/05	04/14/05	04/13/05	04/20/05	04/14/05	04/20/05	04/15/05	04/20/05	04/19/05	04/27/05
			Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
TAL Metals (mg/kg)														
Aluminum	SB	33000	N/A	**10400**	**10100**	**6160**	**26500**	**3760**	**11200**	**12600**	**9370**	**8050**	**7260**	**12300**
Antimony	SB	N/A	N/A	0.387 U	0.386 U	**0.482 J**	**0.555 J**	**1.400 J**	0.361 U	0.393 U	0.699 U	**1.620 J**	1.370 UJ	0.398 U
Arsenic	7.5 or SB	3-12	2.2-23.1	**1.410**	**0.560 J**	**16.2**	**0.481 J**	**70.3**	**2.340**	**4.160**	**3.250**	**9.400**	**7.280**	**9.690**
Barium	300 or SB	15-600	38.5-187	**26.9**	**41.2**	**153**	**25.6**	**89.1**	**129**	**58.8**	**200**	**145**	**117**	**338 J**
Beryllium	0.16 or SB	0-1.75	0.24-2.2	**0.429 J**	**0.907**	**0.384 J**	**0.397 J**	**0.388 J**	**0.385 J**	**0.429 J**	**0.454 J**	**0.542 J**	**0.425 J**	0.467 UJ
Cadmium	1 or SB	0.1-1	0.04U-1.2	0.039 U	0.039 U	**0.353 J**	0.039 U	**0.885**	0.036 U	0.040 U	0.057 U	**0.626**	0.753 U	0.040 U
Calcium	SB	130-35,000	N/A	**945**	**56900**	**42800**	**151000 D**	**64200**	**28000**	**2740**	**9320**	**29400**	**20100**	**43800**
Chromium	10 or SB	1.5-40	11.2-51.2	**14.5 N**	**14.3**	**14.7 N**	**17.3 N**	**28.2**	**23.5 N**	**17.7**	**14.0 N**	**20.8**	**17.0**	**9.140 J**
Cobalt	30 or SB	2.5-60	N/A	**9.620**	**28.2**	**8.050**	**5.73 J**	**7.820**	**12.9**	**8.350**	**7.480**	**13.9**	**8.480**	**3.090 J**
Copper	25 or SB	1-50	5.8-64.8	**13.6**	**16.5**	**170**	**7.25**	**178**	**38.2**	**42.6**	**16.5**	**103**	**130**	**7.710**
Iron	2,000 or SB	2,000-550,000	N/A	**19300**	**13500**	**17900**	**6200**	**42100**	**19500**	**16800**	**14200**	**42200**	**16400**	**7350**
Lead	SB	200-500	6.9-303	**11.5**	**2.610**	**241**	**3.91**	**543**	**96.1**	**121**	**57.0**	**390**	**891 N**	**187**
Magnesium	SB	100-5,000	N/A	**3130**	**44900**	**13100**	**69200**	**25000**	**17200**	**4340**	**6850**	**16100**	**10700**	**3590**
Manganese	SB	50-5,000	N/A	**221**	**604**	**254**	**166**	**440**	**249**	**243**	**652**	**346**	**277**	**167**
Mercury	0.1	0.001-0.2	0.04-0.92	**0.132**	0.007 U	**0.809 D**	0.007 U	**0.552 ND**	**0.101**	**0.058 N**	**0.161 N**	**0.888 ND**	**1.1 ND**	**0.132 N**
Nickel	13 or SB	0.5-25	8.7-54.5	**12.7 N**	**39.3 N**	**16.5 N**	**5.31 N**	**29.2**	**21.7 N**	**15.9**	**13.7**	**27.5**	**18.8**	**6.050**
Potassium	SB	8,500-43,000	N/A	**557 JN**	**2400 N**	**2590 N**	**594 JN**	**989**	**7770 N**	**1470**	**1460 N**	**1990**	**1940**	**1040 J**
Selenium	2 or SB	0.1-3.9	0.20-2.9	0.402 U	0.401 U	**0.772 J**	0.405 U	0.372 U	0.376 U	0.408 U	0.388 U	0.399 U	0.406 U	0.414 U
Silver	SB	N/A	N/A	0.093 U	0.093 U	**0.285 J**	0.094 U	**3.330 N**	**0.515 J**	**1.250 N**	0.130 U	**6.430 N**	0.094 UN	0.096 UJ
Sodium	SB	6,000-8,000	N/A	30.4 UN	**247 JN**	**256 JN**	**178 JN**	**231 J**	**171 JN**	**60.2 J**	**184 JN**	**292 J**	**197 J**	**1710**
Thallium	SB	N/A	N/A	0.621 U	0.620 U	0.636 U	0.627 U	0.575 U	0.580 U	0.631 U	**1.410**	0.616 U	0.628 U	0.640 U
Vanadium	150 or SB	1-300	N/A	**18.2**	**21.5**	**27.1**	**35**	**47.7**	**35.7**	**23.8**	**18.7 N**	**29.6**	**25.4**	**17.9 J**
Zinc	20 or SB	9-50	35.7-225	**47.8**	**94.7**	**338**	**30.3**	**239**	**92.7**	**68.7**	**89.7 N**	**487**	**492**	**265 J**
Total Petroleum Hydrocarbons (mg/kg)														
TPH	^	N/A	N/A	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Wet Chemistry (mg/kg)														
Cyanide	^	N/A	N/A	0.601 U	0.594 U	0.604 U	0.595 U	0.545 U	0.551 U	0.605 U	0.633 U	0.590 U	0.596 U	0.613 U

Table 3
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective**	TAGM Eastern USA Background**	NYSDEC Region 3 Background Soil Heavy Metals Conc. ^^											
			Sample ID:	SB44 ⇑	SB44 DUP ⇑	SB44	SB45	SB45	SB45	SB46	SB46	SB46	SB47	SB47
			Sample Depth (ft.):	5-7	5-7	14-15	2-4	5-7	14-15	3-5	8-10	13-14	2-4	7-8
			Sample Date:	04/27/05	04/27/05	04/27/05	04/27/05	04/27/05	04/27/05	04/28/05	04/28/05	04/28/05	04/28/05	04/28/05
			Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
TAL Metals (mg/kg)														
Aluminum	SB	33000	N/A	6900	5620	5550	9100	1720	6770	4390	6780	4780	9360	6930
Antimony	SB	N/A	N/A	0.464 J	0.422 U	0.407 U	0.383 U	992	0.767 J	6.150 J	0.454 J	0.392 U	3.410 J	0.435 U
Arsenic	7.5 or SB	3-12	2.2-23.1	3.580	2.730	1.020 J	4.090	14.6	0.758 J	4.720	0.459 U	0.468 U	4.330	1.020 J
Barium	300 or SB	15-600	38.5-187	40.3 J	31.8 J	13.5 J	42.4	116	27.1	51.7	34.6	16.7 J	115	26.5 J
Beryllium	0.16 or SB	0-1.75	0.24-2.2	0.395 UJ	0.343 UJ	0.341 UJ	0.455 J	0.251 J	0.398 J	0.238 J	0.249 J	0.193 J	0.375 J	0.227 J
Cadmium	1 or SB	0.1-1	0.04U-1.2	0.042 U	0.042 U	0.041 U	0.038 U	0.143 J	0.040 U	0.038 U	0.039 U	0.039 U	0.042 U	0.044 U
Calcium	SB	130-35,000	N/A	11700	9570	1140	28700	9680	1400	6900	949	4810	36900	3260
Chromium	10 or SB	1.5-40	11.2-51.2	10.5 J	7.640 J	13.6 J	7.460 N	8.88 N	14.9 N	8.290	15.5	8.150	14.9	12.6
Cobalt	30 or SB	2.5-60	N/A	5.070 J	3.920 J	3.980 J	1.720 J	4.210 J	4.970 J	6.870	4.630 J	5.170 J	3.850 J	5.140 J
Copper	25 or SB	1-50	5.8-64.8	42.3 J	12.7 J	11.6	4.330	144	11.7	98.6	16.0	10.7	34.4	14.0
Iron	2,000 or SB	2,000-550,000	N/A	12200	8910	9040	6940	12400	10200	16800	10500	9850	11500	10300
Lead	SB	200-500	6.9-303	73.1 J	15.5 J	12.1	6.190	150000 D	139	456	89.0	4.650	163	36.6
Magnesium	SB	100-5,000	N/A	5590 J	2980 J	2650	2110	2130	3040	4290	2790	4780	12300	3410
Manganese	SB	50-5,000	N/A	184	127	123	201	255	99.0	175	103	210	439	165
Mercury	0.1	0.001-0.2	0.04-0.92	0.056 N	0.046 N	0.007 UN	0.007 UN	0.014 N	0.008 JN	0.539	0.008 J	0.007 J	0.249	0.025
Nickel	13 or SB	0.5-25	8.7-54.5	10.3	7.900	10.9	2.810 J	7.870	13.7	10.7	11.0	10.6	12.7	10.6
Potassium	SB	8,500-43,000	N/A	1130 J	747 J	793 J	589	360 J	1110	466 J	814	554 J	2260	714
Selenium	2 or SB	0.1-3.9	0.20-2.9	0.434 U	0.439 U	0.424 U	0.398 U	0.424 U	0.412 U	0.394 U	0.399 U	0.407 U	0.438 U	0.452 U
Silver	SB	N/A	N/A	1.330 UJ	0.102 UJ	0.993 UJ	0.092 UN	6.030 N	0.271 JN	0.102 JN*	0.092 UN*	0.094 UN*	0.102 UN*	0.489 JN*
Sodium	SB	6,000-8,000	N/A	260 J	245 J	32.1 U	1340	263 J	74.5 J	90.5 J	112 J	151 J	1180	150 J
Thallium	SB	N/A	N/A	0.671 U	0.678 U	0.655 U	0.615 U	5.330	0.636 U	0.609 U	0.617 U	0.629 U	0.678 U	0.699 U
Vanadium	150 or SB	1-300	N/A	16.4 J	11.9 J	13.6 J	11.0	10.3	14.9	12.3	13.1	10.3	21.1	13.1
Zinc	20 or SB	9-50	35.7-225	77.9 J	54.7 J	38.5 J	10.1	108	42.0	96.3	71.3	52.6	180	38.9
Total Petroleum Hydrocarbons (mg/kg)														
TPH	^	N/A	N/A	NR	NR	NR	200	2700	31 U	960	110	150	NR	NR
Wet Chemistry (mg/kg)														
Cyanide	^	N/A	N/A	0.637 U	0.644 U	0.621 U	0.589 U	3.730	0.604 U	0.589 U	0.591 U	0.609 U	0.649 U	0.663 U

Table 3
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective**	TAGM Eastern USA Background**	NYSDEC Region 3 Background Soil Heavy Metals Conc. ^^											
			Sample ID:	SB47	SB48	SB48	SB48	SB49 ⇮	SB49 ⇮	SB49 DUP ⇮	SB49	TP11	TP12	TP13
			Sample Depth (ft.):	13-15	2-4	8-9	14-15	3-5	8-10	8-10	13-15	3-4	4-5	3-4
			Sample Date:	04/28/05	04/28/05	04/28/05	04/28/05	04/29/05	04/29/05	04/29/05	04/29/05	04/19/05	04/19/05	04/18/05
			Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
TAL Metals (mg/kg)														
Aluminum	SB	33000	N/A	**6720**	**7320**	**5880**	**5480**	**2610**	**8410**	**5210**	**2540**	**5630**	**5410**	**5180**
Antimony	SB	N/A	N/A	0.415 U	**4.300 J**	0.432 U	0.469 U	**3.930 J**	0.558 UJ	0.574 UJ	0.388 U	**4.990 J**	**7.250**	**1.270 J**
Arsenic	7.5 or SB	3-12	2.2-23.1	**3.040**	**3.880**	0.517 U	**9.880**	**4.840**	0.679 UJ	0.485 U	**2.470**	**21.5**	**19.7**	**4.810**
Barium	300 or SB	15-600	38.5-187	**25.2 J**	**479**	**25.6 J**	**30.1**	**38.7 J**	**101 J**	**28.8 J**	**13.8 J**	**531**	**74.6**	**103**
Beryllium	0.16 or SB	0-1.75	0.24-2.2	**0.309 J**	**0.348 J**	**0.217 J**	**0.283 J**	0.179 UJ	**0.431 J**	0.243 UJ	0.135 UJ	**0.343 J**	**0.348 J**	**0.247 J**
Cadmium	1 or SB	0.1-1	0.04U-1.2	0.042 U	**0.093 J**	0.044 U	0.047 U	0.036 U	0.040 U	0.041 U	0.039 U	**1.450**	**0.404 J**	**0.365 J**
Calcium	SB	130-35,000	N/A	**2190**	**20700**	**946**	**4110**	**28800**	**888**	**885**	**1840**	**37300**	**20700**	**35600**
Chromium	10 or SB	1.5-40	11.2-51.2	**11.9**	**31.9**	**10.5**	**10.6**	**20.6 J**	**16.0 J**	**8.850 J**	**9.810 J**	**28.6**	**20.7**	**12.4 N**
Cobalt	30 or SB	2.5-60	N/A	**7.350**	**5.610**	**4.350 J**	**5.530 J**	**5.340 J**	**6.960**	**3.490 J**	**3.240 J**	**6.500**	**9.180**	**5.620**
Copper	25 or SB	1-50	5.8-64.8	**16.4**	**58.0**	**9.240**	**15.2**	**67.3**	**20.6**	**8.000**	**4.450**	**199**	**198**	**58.8**
Iron	2,000 or SB	2,000-550,000	N/A	**12900**	**14200**	**8900**	**14700**	**19600**	**11700**	**8130**	**6520**	**25900**	**34200**	**12200**
Lead	SB	200-500	6.9-303	**4.510**	**649**	**5.890**	**3.470**	**120**	**8.300**	**3.660**	**2.380**	**660 N**	**361 N**	**239**
Magnesium	SB	100-5,000	N/A	**3960**	**7360**	**2650**	**4260**	**16900**	**4400**	**2640**	**1290**	**6820**	**9560**	**15700**
Manganese	SB	50-5,000	N/A	**106**	**263**	**97.1**	**165**	**173**	**114**	**79.3**	**56.8**	**343**	**330**	**201**
Mercury	0.1	0.001-0.2	0.04-0.92	**0.010 J**	**0.870 D**	0.008 U	**0.011 J**	**0.125**	0.014 U	0.007 U	0.007 U	**0.927 ND**	**0.465 N**	**0.271**
Nickel	13 or SB	0.5-25	8.7-54.5	**15.1**	**11.5**	**10.4**	**11.6**	**14.8**	**16.8**	**10.2**	**4.750**	**23.1**	**21.9**	**13.8**
Potassium	SB	8,500-43,000	N/A	**708**	**1080**	**644 J**	**547 J**	**1140**	**1390**	**643**	**342 J**	**1300**	**2650**	**1370**
Selenium	2 or SB	0.1-3.9	0.20-2.9	0.432 U	0.406 U	0.450 U	0.487 U	0.371 U	0.418 U	0.422 U	0.404 U	0.402 U	0.393 U	0.367 U
Silver	SB	N/A	N/A	0.100 UN	**1.100 JN***	**0.476 JN***	0.113 UN*	0.086 UJ	0.097 UJ	0.098 UJ	0.093 UJ	0.093 UN	**3.290 N**	0.085 UN*
Sodium	SB	6,000-8,000	N/A	**65.2 J**	**307 J**	**131 J**	**70.9 J**	67.4 UJ	31.7 UJ	51.2 UJ	178 UJ	**403 J**	**170 J**	**216 JN**
Thallium	SB	N/A	N/A	0.667 U	0.627 U	0.695 U	0.753 U	0.573 U	0.647 U	0.652 U	0.624 U	0.621 U	0.608 U	0.567 U
Vanadium	150 or SB	1-300	N/A	**15.6**	**24.9**	**11.5**	**21.7**	**12.7**	**19.1**	**10.2**	**20.6**	**30.8**	**33.2**	**24.5**
Zinc	20 or SB	9-50	35.7-225	**46.5**	**159**	**31.0**	**42.8**	**35.7**	**57.2**	**32.3**	**44.8**	**504**	**162**	**223**
Total Petroleum Hydrocarbons (mg/kg)														
TPH	^	N/A	N/A	NR	**790**	**150**	**170**	NR	NR	NR	NR	**2700**	**1200**	**2100**
Wet Chemistry (mg/kg)														
Cyanide	^	N/A	N/A	0.633 U	0.595 U	0.666 U	0.729 U	0.554 U	0.620 U	0.619 U	0.592 U	0.595 U	0.577 U	0.549 U

Table 3
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective**	TAGM Eastern USA Background**	NYSDEC Region 3 Background Soil Heavy Metals Conc. ^^										
			Sample ID:	TP14	TP15	TP16	TP19 ⇮	TP19 DUP ⇮	TP20 ⇮	TP21	MW-18(27-29)	MW-20(17-19)	MW-20(19-21)
			Sample Depth (ft.):	3-4	3-4	3-4	5-6	5-6	4-5	4-5	27-29	17-19	19-21
			Sample Date:	04/19/05	04/19/05	04/19/05	04/18/05	04/18/05	04/18/05	04/18/05	8/22/2005	08/23/05	08/23/05
			Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
TAL Metals (mg/kg)													
Aluminum	SB	33000	N/A	5760	5260	6450	4950	4350	8630	6790	8160	5930	6360
Antimony	SB	N/A	N/A	3.100 J	3.490 J	5.410 J	15.4	10.8	0.913 UJ	0.376 U	0.441 UN	0.383 U	0.381 UN
Arsenic	7.5 or SB	3-12	2.2-23.1	9.710	11.9	21.4	22.7	22.9	4.910	4.880	1.730	1.010 J	1.930
Barium	300 or SB	15-600	38.5-187	469	61.5	82.5	137	114	693	90.7	102 N	23.7	28.8 N
Beryllium	0.16 or SB	0-1.75	0.24-2.2	0.382 J	0.529 J	0.498 J	0.461 J	0.317 J	0.384 J	0.566 J	0.321 J	0.249 J	0.233 J
Cadmium	1 or SB	0.1-1	0.04U-1.2	0.461 J	0.038 U	0.038 U	2.150	1.420	1.120	0.038 U	0.044 U	0.039 U	0.038 U
Calcium	SB	130-35,000	N/A	53600	53900	35200	25100	19700	34000	56800	1820	876	958
Chromium	10 or SB	1.5-40	11.2-51.2	19.8	16.5	24.7	40.7 J	31.4 J	18.0 J	13.7 N	12.2	6.78	7.520
Cobalt	30 or SB	2.5-60	N/A	5.480 J	6.300	8.740	8.230	7.420	7.080 J	6.810	4.330 J	4.2 J	4.570 J
Copper	25 or SB	1-50	5.8-64.8	79.5	125	150	467 J	231 J	46.8	52.2	35	10	11.2
Iron	2,000 or SB	2,000-550,000	N/A	17200	29000	41900	43400	52700	14900	13500	14600	11500	12500
Lead	SB	200-500	6.9-303	525 N	219 N	365 N	1220 J	877 J	216 J	110	93.3	4.18	4.450
Magnesium	SB	100-5,000	N/A	7130	30300	17700	9660	8900	4440	32700	2290	2580	2630
Manganese	SB	50-5,000	N/A	243	370	446	418	365	255	322	90.7	317	449
Mercury	0.1	0.001-0.2	0.04-0.92	0.584 N	0.429 N	0.407 N	0.726 D	1.1 D	0.276	0.301	0.144	0.007 U	0.016
Nickel	13 or SB	0.5-25	8.7-54.5	17.4	20.4	24.5	35.1	25.8	13.9	10.1	8.840	8.250	8.100
Potassium	SB	8,500-43,000	N/A	1170	1340	1490	746 J	688 J	1910 J	1590	925 N	723 U	710
Selenium	2 or SB	0.1-3.9	0.20-2.9	0.414 U	0.392 U	0.392 U	0.434 U	0.437 U	0.405 U	0.391 U	0.897 J	0.399 U	0.396 U
Silver	SB	N/A	N/A	0.096 UN	0.091 UN	0.091 UN	0.101 UN*	0.101 UN*	1.430 UJ	0.091 UN*	0.239 J	0.092 U	0.092 U
Sodium	SB	6,000-8,000	N/A	277 J	71.3 J	139 J	374 J	149 UJ	784 J	169 JN	247 JN	37.6 J	30.0 U
Thallium	SB	N/A	N/A	0.639 U	0.606 U	0.605 U	0.720 UJ	2.590 UJ	0.625 U	0.605 U	0.708 U	0.981 J	1.7
Vanadium	150 or SB	1-300	N/A	35.7	26.3	38.1	55.2	47.8	29.4	22.4	14	8.67	9.290
Zinc	20 or SB	9-50	35.7-225	391	122	197	995 J	328 J	597	134	44.3	35.6	32.900
Total Petroleum Hydrocarbons (mg/kg)													
TPH	^	N/A	N/A	2300	720	1400	NR	NR	NR	520	N/A	N/A	N/A
Wet Chemistry (mg/kg)													
Cyanide	^	N/A	N/A	0.619 U	0.575 U	0.574 U	0.636 U	2.240	0.593 U	0.579 U	N/A	N/A	N/A

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Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Soil
Remedial Investigation

Compound	TAGM 4046 Recc. Soil Cleanup Objective**	TAGM Eastern USA Background**	NYSDEC Region 3 Background Soil Heavy Metals Conc. ^^				
			Sample ID:	MW-21 (5-7)	RB-41905A	RB-41905B	RB-42005
			Sample Depth (ft.):	5-7	---	---	---
			Sample Date:	8/24/2005	4/19/2005	4/19/2005	4/19/2005
			Sample Classification:	SOIL	WATER	WATER	WATER
TAL Metals (mg/kg)							
Aluminum	SB	33000	N/A	**9790**	**12.4 J**	**10.1 J**	5.310 U
Antimony	SB	N/A	N/A	0.367 U	3.170 U	3.170 U	3.170 U
Arsenic	7.5 or SB	3-12	2.2-23.1	**3.450**	**4.510 J**	**3.520 J**	3.320 U
Barium	300 or SB	15-600	38.5-187	**136**	**0.930 J**	0.732 U	0.732 U
Beryllium	0.16 or SB	0-1.75	0.24-2.2	**0.325 J**	**0.145 J**	**0.170 J**	**0.160 J**
Cadmium	1 or SB	0.1-1	0.04U-1.2	0.037 U	0.327 U	**0.510 J**	**0.450 J**
Calcium	SB	130-35,000	N/A	**43000**	**850 J**	**1.340 J**	**1.860 J**
Chromium	10 or SB	1.5-40	11.2-51.2	**17.6**	**4.93 J**	**5.150 J**	**5.200 J**
Cobalt	30 or SB	2.5-60	N/A	**7.86**	**3.640 J**	**4.380 J**	**5.380 J**
Copper	25 or SB	1-50	5.8-64.8	**109**	**8.190 J**	**5.670 J**	**6.920 J**
Iron	2,000 or SB	2,000-550,000	N/A	**14500**	**84.0 J**	27.0 U	27.0 U
Lead	SB	200-500	6.9-303	**134**	2.180 U	2.180 U	2.180 U
Magnesium	SB	100-5,000	N/A	**21700**	**194 J**	**21.7 J**	**22.8 J**
Manganese	SB	50-5,000	N/A	**297**	**2.220 J**	**0.980 J**	**0.810 J**
Mercury	0.1	0.001-0.2	0.04-0.92	**0.202**	0.0300 U	0.0300 U	0.0300 U
Nickel	13 or SB	0.5-25	8.7-54.5	**15.7**	**3.540 J**	**3.530 J**	**3.060 J**
Potassium	SB	8,500-43,000	N/A	**3940**	**71.4 J**	**116 J**	**85.5 J**
Selenium	2 or SB	0.1-3.9	0.20-2.9	0.381 U	3.040 U	3.040 U	3.040 U
Silver	SB	N/A	N/A	0.088 U	**3.440 J**	**4.420 J**	**4.770 J**
Sodium	SB	6,000-8,000	N/A	**561**	**1240 J**	**912 J**	**1320 J**
Thallium	SB	N/A	N/A	**1.73**	3.050 U	3.050 U	3.050 U
Vanadium	150 or SB	1-300	N/A	**38.1**	**2.390 J**	**2.680 J**	**2.100 J**
Zinc	20 or SB	9-50	35.7-225	**223**	**6.800 J**	0.611 U	0.611 U
Total Petroleum Hydrocarbons (mg/kg)							
TPH	^	N/A	N/A	N/A	NR	NR	NR
Wet Chemistry (mg/kg)							
Cyanide	^	N/A	N/A	N/A	0.010 U	0.010 U	0.010 U

Table 3
New York City School Construction Authority
Former Metro-North Property (Mott Haven)
Bronx, New York
Summary of Inorganic Soil Analytical Data

Notes:

General Comments

All results are in mg/kg (milligram per kilogram or parts per million (ppm)).
Only those parameters detected in at least one sample are reported on this table.
Bold face indicates that analyte was detected above laboratory limit.
Bold face and shaded values indicate an exceedence of TAGM value.
Only 20% of samples were used for the Data Usability Study Report (DUSR, Category B Laboratory Package).
NR - Not reported or not analyzed
.⇑ = Sample was used for the DUSR; only validator qualifiers were used.

Standards

** - NYSDEC TAGM Memorandum No. 4046, Revised January 24, 1994.
^^ - NYSDEC Reg. 3 "Background Levels of Heavy Metals in Soils of the Lower Hudson Valley", July 1, 2003. Values listed are minimum & maximum concentrations reported on Table 2.
^ - No standard or guidance value is available for this compound.
SB - Site Background
N/A - Not Available

Validator Qualifiers

U - Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
J - The compound/analyte was positively identified; the reported value is the estimated concentration of theconstituent detected in the sample analyzed.
UJ - The compound/analyte was analyzed for, but no detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

Laboratory Qualifiers - Organic

U - Indicates the compound was analyzed for but was not detected.
J - If the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but the greater than or equal to the Instrument Detection Limit (IDL).
E - The reported value is estimated because of the presence of interference
N - Spiked sample recovery not within control limits.
* - Duplicate analysis not within control limits.
D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.

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Table 4
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Organics in Groundwater
Remedial Investigation

Compound	NYSDEC Class GA Groundwater Standard ^^	MW1-GW 5/18/2005	MW2-GW 5/19/2005	MW3-GW 5/16/2005	MW4-GW 5/17/2005	MW-5GW 5/16/2005	MW-5GW DUP 5/16/2005	MW6-GW 5/17/2005	MW7-GW 5/18/2005	MW8-GW 5/18/2005
Volatile Organic Compounds (ppb)										
Vinyl Chloride	2	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Acetone	50*	**84**	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U
Methyl tert-Butyl Ether	10*	**1.6 J**	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	**0.73 J**	0.28 U	0.28 U
Methylene Chloride	5	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
Chloroform	7	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
cis-1,2-Dichloroethene	5	0.29 U	**2.2 J**	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Naphthalene	10*	0.34 U	0.34 U	0.34 U	0.34 U	0.29 U	0.34 U	0.34 U	**1300 D**	**270 D**
Benzene	1	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	**6100 D**	**170**
Toluene	5	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	**150 D**	**14000 D**
Tetrachloroethene	5	**9.1**	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
Ethylbenzene	5	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	**1600 D**	**1600 D**
m,p-Xylene	5	**1.4 J**	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	**1800 D**	**9800 D**
o-Xylene	5	**0.68 J**	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	**310 D**	**4700 D**
Isopropylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	**180**	**110**
N-propylbenzene	5	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	**140 D**	**140 D**
1,3,5-Trimethylbenzene	5	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	**170 D**	**360 D**
1,2,4-Trimethylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	**1300 D**	**1500 JD**
sec-butylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	**18**
p-Isoproylbenzne	5	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	**30**	**32**
n-butylbenzene	5	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	**18**	**16**
Base Neutral Compounds (ppb)										
Phenol	1	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	**22**	1.3 U
2-Methylphenol	^	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	**7.9 J**
3+4-Methylphenols	^	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
2,4-Dimethylphenol	1	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	**24**	**6.7 J**
Benzoic acid	^	1.2 U	1.2 U	1.2 UJ	1.2 U	1.2 U	1.2 UJ	1.2 UJ	1.2 U	1.2 U
Naphthalene	10	1.4 U	1.5 U	1.5 U	1.4 U	1.4 U	1.4 U	1.4 U	**750 D**	**220 D**
2-Methylnaphthalene	^	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	**130 D**	**45**
Acenaphthylene	^	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.3 U	1.3 U	**2.1 J**	1.4 U
Acenaphthene	20*	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	**29**	1.4 U
Dibenzofuran	^	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.4 U
Fluorene	50*	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	**13**	1.5 U
Phenanthrene	50*	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	**27**	1.5 U
Anthracene	50*	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	**4.5 J**	1.5 U
Di-n-butylphthalate	^	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	**1.4 J**
Fluoranthene	50*	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	**2.2 J**	1.3 U
Pyrene	50*	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	**5.2 J**	1.5 U
Butylbenzylphthalate	50*	**38**	**41**	**12**	**18**	**20**	**19**	**23**	1.5 U	**37**
bis(2-Ethylhexyl)phthalate	5	**8.5 J**	**19**	1.6 U	**2.9 J**	1.6 U	1.6 U	**3.5 J**	1.6 U	**14**
Benzo(a)anthracene	0.002*	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Chrysene	0.002*	1.7 U	1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.8 U
Benzo(b)fluoranthene	0.002*	0.780 U	0.790 U	0.790 U	0.780 U	0.780 U	0.780 U	0.780 U	0.780 U	0.800 U
Benzo(k)fluoranthene	0.002*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Benzo(a)pyrene	ND	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Indeno(1,2,3-cd)pyrene	0.002*	0.860 U	0.870 U	0.870 U	0.860 U	0.860 U	0.860 U	0.860 U	0.860 U	0.880 U
Benzo(g,h,i)perylene	^	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U

Table 4
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Organics in Groundwater
Remedial Investigation

Compound	NYSDEC Class GA Groundwater Standard ^^	MW9-GW 5/18/2005	MW-9 4/19/2005	MW10-GW 5/17/2005	MW11-GW 5/17/2005	MW12-GW 5/19/2005	MW13-GW 5/19/2005	MW14-GW 5/19/2005	MW15-GW 5/19/2005	TW-SB37-GW 4/21/2005
Volatile Organic Compounds (ppb)										
Vinyl Chloride	2	0.33 U	0.33 U	**9.4**	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Acetone	50*	2.3 U	**61**	2.3 U	2.3 U	2.3 U	**13 J**	**29**	2.3 U	**11 JB**
Methyl tert-Butyl Ether	10*	0.28 U	0.28 U	**1.5 J**	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Methylene Chloride	5	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
Chloroform	7	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
cis-1,2-Dichloroethene	5	0.29 U	0.29 U	**13**	0.29 U	0.29 U	**3.5 J**	**4.4 J**	**8.0**	**5.6**
Naphthalene	10*	**170 D**	**130**	0.34 U	0.34 U	**2500 D**	**48**	**950 D**	**1600 D**	0.34 U
Benzene	1	**23**	**13**	0.39 U	0.39 U	**3700 D**	**1200 D**	**470 D**	**1400 D**	0.39 U
Toluene	5	**1400 D**	**170**	0.36 U	0.36 U	**450 D**	**55**	**230 D**	**39**	0.36 U
Tetrachloroethene	5	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
Ethylbenzene	5	**870 D**	**580 D**	0.45 U	0.45 U	**2400 D**	**47**	**280 D**	**470 D**	0.45 U
m,p-Xylene	5	**3700 D**	**3200 D**	1.2 U	1.2 U	**3900 D**	**200**	**450 D**	**200**	1.2 U
o-Xylene	5	**1800 D**	**1400 D**	0.46 U	0.46 U	**910 D**	**25**	**240 D**	**140**	0.46 U
Isopropylbenzene	5	**110**	**100**	0.44 U	0.44 U	**190**	**96**	**46**	**64**	0.44 U
N-propylbenzene	5	**200**	**160**	0.49 U	0.49 U	**240 D**	**130**	**50**	**77**	0.49 U
1,3,5-Trimethylbenzene	5	**350 D**	**560 D**	0.42 U	0.42 U	**410 D**	**61**	**61**	**84**	0.42 U
1,2,4-Trimethylbenzene	5	**1400 D**	**1900 D**	0.44 U	0.44 U	**2200 D**	**3.7 J**	**150 D**	**120**	0.44 U
sec-butylbenzene	5	**19**	**21**	0.44 U	0.44 U	0.44 U	**4.4 J**	**4.3 J**	0.44 U	0.44 U
p-Isoproylbenzne	5	**34**	**41**	0.49 U	0.49 U	**31**	**0.69 J**	**9.7**	**7.2**	0.49 U
n-butylbenzene	5	**14**	**22**	0.49 U	0.49 U	**18**	**7.2**	**3.8 J**	**3.2 J**	0.49 U
Base Neutral Compounds (ppb)										
Phenol	1	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	**8.0 J**	1.3 U	1.3 U
2-Methylphenol	^	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
3+4-Methylphenols	^	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	**5.4 J**	1.4 U	1.4 U
2,4-Dimethylphenol	1	**9.0 J**	1.2 U	1.2 U	1.2 U	**4.5 J**	1.2 U	**2.4 J**	1.2 U	1.3 U
Benzoic acid	^	1.2 U	1.2 U	1.2 UJ	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	**1.6 J**
Naphthalene	10	**80**	1.5 U	1.5 U	1.5 U	**1300 D**	**28**	**310 D**	**750 D**	1.5 U
2-Methylnaphthalene	^	**22**	1.1 U	1.1 U	1.1 U	**80 JD**	**21**	**60**	**78 JD**	1.2 U
Acenaphthylene	^	1.4 U	1.4 U	1.4 U	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U	1.4 U
Acenaphthene	20*	1.4 U	1.4 U	1.4 U	1.4 U	**17**	**2.8 J**	**19**	**8.6 J**	1.4 U
Dibenzofuran	^	1.4 U	1.4 U	1.4 U	1.4 U	**3.0 J**	1.3 U	1.4 U	1.3 U	1.4 U
Fluorene	50*	1.5 U	1.5 U	1.5 U	1.5 U	**5.6 J**	1.5 U	**6.3 J**	**7.4 J**	1.5 U
Phenanthrene	50*	1.5 U	1.5 U	1.5 U	1.5 U	**9.1 J**	1.5 U	**10 J**	**16**	1.5 U
Anthracene	50*	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Di-n-butylphthalate	^	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Fluoranthene	50*	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Pyrene	50*	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Butylbenzylphthalate	50*	**64**	1.5 U	**41**	**49**	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
bis(2-Ethylhexyl)phthalate	5	**3.5 J**	**2.0 J**	**4.6 J**	**41**	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Benzo(a)anthracene	0.002*	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Chrysene	0.002*	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U
Benzo(b)fluoranthene	0.002*	0.800 U	0.790 U	0.790 U	0.790 U	0.780 U	0.780 U	0.790 U	0.780 U	0.800 U
Benzo(k)fluoranthene	0.002*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Benzo(a)pyrene	ND	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Indeno(1,2,3-cd)pyrene	0.002*	0.880 U	0.870 U	0.910 U	0.870 U	0.900 U	0.860 U	0.870 U	0.900 U	0.880 U
Benzo(g,h,i)perylene	^	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U

Table 4
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Organics in Groundwater
Remedial Investigation

Compound	NYSDEC Class GA Groundwater Standard ^^	TW-SB42-GW	MW-18	MW-20	MW-21
		4/21/2005	9/15/2005	9/15/2005	9/15/2005
Volatile Organic Compounds (ppb)					
Vinyl Chloride	2	0.33 U	0.33 U	0.33 U	0.33 U
Acetone	50*	**25 B**	**13 JB**	2.3 U	2.3 U
Methyl tert-Butyl Ether	10*	0.28 U	0.28 U	0.28 U	0.28 U
Methylene Chloride	5	0.43 U	0.43 U	0.43 U	0.43 U
Chloroform	7	0.33 U	0.33 U	**27**	**7.2**
cis-1,2-Dichloroethene	5	0.29 U	0.29 U	0.29 U	0.29 U
Naphthalene	10*	**43**	**1400 D**	0.34 U	0.34 U
Benzene	1	0.39 U	**8.0**	0.39 U	0.39 U
Toluene	5	0.36 U	0.36 U	0.36 U	0.36 U
Tetrachloroethene	5	0.48 U	0.48 U	0.48 U	0.48 U
Ethylbenzene	5	0.45 U	0.45 U	0.45 U	0.45 U
m,p-Xylene	5	1.2 U	**17**	1.2 U	1.2 U
o-Xylene	5	0.46 U	**26**	0.46 U	0.46 U
Isopropylbenzene	5	0.44 U	**2.9 J**	0.44 U	0.44 U
N-propylbenzene	5	0.49 U	**1.1 J**	0.49 U	0.49 U
1,3,5-Trimethylbenzene	5	0.42 U	**9.1**	0.42 U	0.42 U
1,2,4-Trimethylbenzene	5	0.44 U	**16**	0.44 U	0.44 U
sec-butylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U
p-Isoproylbenzne	5	0.49 U	**1.7 J**	0.49 U	0.49 U
n-butylbenzene	5	0.49 U	0.49 U	0.49 U	0.49 U
Base Neutral Compounds (ppb)					
Phenol	1	1.3 U	2.7 U	1.3 U	1.3 U
2-Methylphenol	^	1.5 U	3.1 U	1.6 U	1.6 U
3+4-Methylphenols	^	1.4 U	2.8 U	1.4 U	1.4 U
2,4-Dimethylphenol	1	1.5 U	2.5 U	1.2 U	1.2 U
Benzoic acid	^	**4.3 J**	2.4 U	1.2 U	1.2 U
Naphthalene	10	**25**	**56**	1.4 U	1.5 U
2-Methylnaphthalene	^	**6.9 J**	**41**	1.1 U	1.1 U
Acenaphthylene	^	1.3 U	**35**	1.3 U	1.4 U
Acenaphthene	20*	**8.5 J**	**15 J**	1.4 U	1.4 U
Dibenzofuran	^	**5.5 J**	2.7 U	1.3 U	1.4 U
Fluorene	50*	**6.8 J**	**36**	1.5 U	1.5 U
Phenanthrene	50*	**9.9 J**	**190 D**	1.5 U	1.5 U
Anthracene	50*	**1.9 J**	**38**	1.5 U	1.5 U
Di-n-butylphthalate	^	1.4 U	2.7 U	1.4 U	1.4 U
Fluoranthene	50*	**2.6 J**	**94**	1.3 U	1.3 U
Pyrene	50*	1.5 U	**140**	1.5 U	1.5 U
Butylbenzylphthalate	50*	1.5 U	3.0 U	1.5 U	1.5 U
bis(2-Ethylhexyl)phthalate	5	**2.0 J**	3.2 U	1.6 U	**2.1 J**
Benzo(a)anthracene	0.002*	1.1 U	**42**	1.2 U	1.2 U
Chrysene	0.002*	1.7 U	**41**	1.7 U	1.8 U
Benzo(b)fluoranthene	0.002*	0.770 U	**45**	0.780 U	0.790 U
Benzo(k)fluoranthene	0.002*	1.9 U	**9.0 J**	2.0 U	2.0 U
Benzo(a)pyrene	ND	1.2 U	**50**	1.2 U	1.2 U
Indeno(1,2,3-cd)pyrene	0.002*	0.850 U	**27**	0.860 U	0.870 U
Benzo(g,h,i)perylene	^	1.1 U	**41**	1.1 U	1.1 U

Table 4
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Organics in Groundwater
Remedial Investigation

Compound	NYSDEC Class GA Groundwater Standard ^^	RB041905 4/19/2005	RB051805 5/18/2005	TB-42105 04/21/05	TB-051605 04/21/05	TB-051705 04/21/05	TB-051805 5/18/2005	TB-051905 5/19/2005	TB-091505 9/15/2005
Volatile Organic Compounds (ppb)									
Vinyl Chloride	2	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Acetone	50*	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U
Methyl tert-Butyl Ether	10*	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Methylene Chloride	5	0.43 U	0.43 U	0.43 U	0.43 U	**1.6 JB**	0.43 U	0.43 U	**3.8 J**
Chloroform	7	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
cis-1,2-Dichloroethene	5	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Naphthalene	10*	0.29 U	0.29 U	0.29 U	0.34 U	0.34 U	0.29 U	0.29 U	0.34 U
Benzene	1	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Toluene	5	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
Tetrachloroethene	5	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
Ethylbenzene	5	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
m,p-Xylene	5	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
o-Xylene	5	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
Isopropylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
N-propylbenzene	5	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U
1,3,5-Trimethylbenzene	5	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
1,2,4-Trimethylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
sec-butylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
p-Isoproylbenzne	5	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U
n-butylbenzene	5	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U
Base Neutral Compounds (ppb)									
Phenol	1	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA
2-Methylphenol	^	1.6 U	1.6 U	NA	NA	NA	NA	NA	NA
3+4-Methylphenols	^	1.4 U	1.4 U	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	1	1.2 U	1.2 U	NA	NA	NA	NA	NA	NA
Benzoic acid	^	1.2 U	1.2 U	NA	NA	NA	NA	NA	NA
Naphthalene	10	1.4 U	1.4 U	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	^	1.1 U	1.1 U	NA	NA	NA	NA	NA	NA
Acenaphthylene	^	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA
Acenaphthene	20*	1.4 U	1.4 U	NA	NA	NA	NA	NA	NA
Dibenzofuran	^	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA
Fluorene	50*	1.5 U	1.5 U	NA	NA	NA	NA	NA	NA
Phenanthrene	50*	1.5 U	1.5 U	NA	NA	NA	NA	NA	NA
Anthracene	50*	1.5 U	1.5 U	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	^	1.4 U	1.4 U	NA	NA	NA	NA	NA	NA
Fluoranthene	50*	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA
Pyrene	50*	1.5 U	1.5 U	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50*	1.5 U	1.5 U	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	5	**1.8 J**	1.6 U	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.002*	1.2 U	1.2 U	NA	NA	NA	NA	NA	NA
Chrysene	0.002*	1.8 U	1.7 U	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002*	0.800 U	0.780 U	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.002*	2.0 U	2.0 U	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	ND	1.2 U	1.2 U	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002*	0.880 U	0.860 U	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	^	1.2 U	1.1 U	NA	NA	NA	NA	NA	NA

Table 4
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Organics in Groundwater
Remedial Investigation

Notes:

General Comments

All results are in parts per billion (ppb).
Only those parameters detected in at least one sample are reported on this table.
Bold face indicates that analyte was detected above laboratory limit.
Bold face and shaded values indicate an exceedence of the Class GA Groundwater Standard.
Only 20% of samples were used for the Data Usability Study Report (DUSR, Category B Laboratory Package).
ppb = µg/L (microgram per Liter)
NA - Not analyzed
.⇧ = Sample was used for the DUSR; only validator qualifiers were used.

Standards

^^ = NYSDEC TOGS Series 1.1.1, Ambient Groundwater Quality Standards & Guidance Values & Groundwater Effluent Limitations, Revised June 1998.
^ = No standard or guidance value available.
* = No standard available; value listed is a guidance value.
SB - Site Background
N/A - Not Available

Validator Qualifiers

U - Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.

J - The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ - The compound/analyte was analyzed for, but no detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate of imprecise. The non-detect result should be estimated.

Laboratory Qualifiers - Organic

U - Indicates the compound was analyzed for but was not detected.
J - If the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but the greater than or equal to the Instrument Detection Limit (IDL).
E - The reported value is estimated because of the presence of interference
N - Spiked sample recovery not within control limits.
* - Duplicate analysis not within control limits.
D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.
B = Indicates the analyte was found in the laboratory method blank as well as the sample.

Table 5
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Groundwater
Remedial Investigation

Compound	NYSDEC Class GA Groundwater Standard ^^	MW1-GW 5/18/2005	MW2-GW 5/19/2005	MW3-GW 5/16/2005	MW4-GW 5/17/2005	MW-5GW 5/16/2005	MW-5GWD 5/16/2005	MW6-GW 5/17/2005	MW7-GW 5/18/2005	MW8-GW 5/18/2005	MW9-GW 5/18/2005
TAL Metals (ppb)											
Aluminum	^	**1240**	**245000**	85.2 UJ	**1010 N**	**828 J**	**378 J**	**581 J**	**142 J**	**701**	**3880**
Antimony	3	3.170 U	**8.280 J**	3.480 UJ	3.170 UN	3.170 U	3.170 U	3.170 UN	3.170 U	3.170 U	3.170 U
Arsenic	25	3.320 U	**28.9**	3.320 U	3.320 UN	5.160 UJ	3.560 UJ	15.0 UJ	3.320 U	**5.000 J**	**11.6**
Barium	1,000	**69.0 JN**	**3020**	**141 J**	**93.0 JN**	**105 J**	**87.4 J**	**150 J**	**212 N**	**144 JN**	**195 JN**
Beryllium	3	0.090 U	**11.3**	0.090 U	0.090 U	0.375 UJ	0.295 UJ	0.090 U	0.090 U	0.090 U	**0.185 J**
Cadmium	5	0.327 U	**5.740**	0.327 U	**4.000 JN**	0.865 UJ	0.327 U	1.000 UJ	0.327 U	0.327 U	**0.765 J**
Calcium	^	**204000**	**307000**	**138000 J**	**132000**	**151000 J**	**12700 J**	**198000**	**176000**	**180000**	**166000**
Chromium	50	**4.380 JN**	**530**	0.343 UJ	**15.0** N	1.860 UJ	1.450 UJ	0.343 UN	0.343 UN	**9.270 JN**	**11.8 N**
Cobalt	^	**3.060 J**	**328**	2.210 UJ	**12.0 JN**	1.740 UJ	**3.480 J**	0.370 UN	0.370 U	**2.900 J**	**6.300 J**
Copper	200	**38.2**	**862**	**69.0 J**	**28.0 N**	**11.6 J**	**14.8 JN**	3.640 UN	3.640 U	**9.280 J**	**36.8**
Iron	300	**2010**	**394000**	**22200**	2650 N**	**15100**	**12300**	**9650 J**	**28400**	**16700**	**9070**
Lead	25	2.180 U	**493**	5.260 U	**65.0 N**	**63.1**	**43.7**	**45.0 N**	**20.1**	**9.640**	**22.6**
Magnesium	35000*	**74100**	**258000**	**21200**	**44600**	**46100**	**38700**	**67500**	**56700**	**44100**	**29000**
Manganese	300	**537**	**8220**	**1150**	**203**	**1930**	**1600**	**1700**	**2680**	**9120**	**1170**
Mercury	0.7	0.0300 U	**0.7000**	0.1800 UJ	**0.1300 J**	0.2400 U	0.2200 U	0.1200 UJ	0.0300 U	0.0300 U	**0.0400 J**
Nickel	100	**6.810 J**	**526**	1.560 U	**15.0 J**	1.56 U	1.950 UJ	1.560 U	1.560 U	**10.7 J**	**12.1 J**
Potassium	^	**12300**	**146000 N**	**8940 J**	**23000 N**	4010 UJ	3040 UJ	**8310 J**	**30400**	**28600**	**21600**
Selenium	10	**8.650 J**	**6.890 J**	3.040 U	**8.000 JN**	5.460 UJ	4.400 UJ	3.040 UN	8.720 J	**4.720 J**	**5.980 J**
Silver	50	1.640 U	**13.6**	1.640 U	1.640 UN	1.640 U	2.190 UJ	1.640 UN	1.640 U	1.640 U	1.640 U
Sodium	20000	**123000**	**41600**	**43200 J**	**22100**	**15400 J**	**12900 J**	**65200 J**	**196000**	**123000**	**242000**
Thallium	0.5*	3.050 U	3.050 U	3.050 U	3.050 UN	3.050 U	3.050 U	3.050 UN	3.050 U	3.050 U	3.050 U
Vanadium	^	**5.580 J**	**655**	2.060 UJ	**13.0 JN**	1.430 UJ	0.701 U	0.701 UN	0.701 U	**1.280 J**	**10.2 J**
Zinc	2000*	**28.4**	**1710**	**29.6**	**55.0 N**	**36.7**	**32.7**	**58.0 J**	**28.0**	**12.2 J**	**65.3**
Wet Chemistry (ppm)											
Cyanide	200	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Pesticides/Herbicides/PCBs (ppb)											
2,4-D	50	0.050 U	**0.58 P**	0.050 UJ	0.050 U	0.050 UJ	0.050 UJ	0.050 U	0.050 U	0.050 U	0.050 U

Table 5
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Groundwater
Remedial Investigation

Compound	NYSDEC Class GA Groundwater Standard ^^	MW-9 4/19/2005	MW10-GW 5/17/2005	MW11-GW 5/17/2005	MW12-GW 5/19/2005	MW13-GW 5/19/2005	MW14-GW 5/19/2005	MW15-GW 5/19/2005	TW-SB37-GW 4/21/2005	TW-SB42-GW 4/21/2005	MW-18 9/15/2005	MW-20 9/15/2005	MW-21 9/15/2005	RB-041905 4/19/2005	RB051805 5/18/2005
TAL Metals (ppb)															
Aluminum	^	46600	220 J	3410 N	70.2 J	701	242	365	6560	4210	36900	4290	1400	47.7 J	5.310 U
Antimony	3	13.5 J	3.170 UN	43.0 JN	3.170 U	3.170 U	3.170 U	3.170 U	6.120 J	15.3 J	7.7 J	3.2 U	3.2 U	3.17 U	3.170 U
Arsenic	25	8.490 J	6.000 UJ	672 N	3.320 U	8.650 J	7.640 J	4.880 J	6.290 J	4.160 J	10.8	3.3 U	3.3 U	3.32 U	3.320 U
Barium	1,000	585	57.0 J	219 N	205	287	140 J	227	332	366	651	54.2 J	131 J	4.1 J	1.44 JN
Beryllium	3	2.620 J	0.090 U	0.090 U	0.090 U	0.030 U	0.090 U	0.090 U	0.835 J	0.590 J	0.09 U	0.09 U	0.09 U	0.755 J	0.09 U
Cadmium	5	0.327 U	0.327 UN	0.327 UN	0.625 J	0.750 J	0.327 U	0.327 U	0.327 U	0.327 U	0.33 U	0.33 U	0.33 U	0.755 J	0.327 U
Calcium	^	95700	231000	1.170 U	165000	149000	129000	140000	200000	342000	40900	30300	26700	13.1 J	1350 J
Chromium	50	78.7	0.343 UN	0.343 UN	0.465 J	1.270 J	0.343 U	0.343 U	10.9 N	5.740 JN	98.5	37.8	38.2	0.343 U	0.343 UN
Cobalt	^	40.8 J	1.000 UJ	0.370 UN	0.540 J	0.815 J	0.370 U	0.370 U	11.0 JN	10.1 JN	38.5 J	0.37 U	0.37 U	0.370 U	1.220 J
Copper	200	214	3.640 UN	3.640 UN	16.0 J	20.1 J	10.8 J	3.640 U	31.2	43.2	191	36.5	10.4 J	3.640 U	3.640 U
Iron	300	64400 N	522 J	27.0 UN	36800	45100	11200	15000	34500 N	16800 N	64500	8670	4180	27.0 UN	272
Lead	25	223	3.000 J	24.0 N	195	2.180 U	4.760 J	2.180 U	63.6	131	529	12.8	5.4	2.180 U	2.180 U
Magnesium	35000*	30300	45600	8.300 U	44000	27600	32400	35600	59900	56800	19700	5180	10100	8.3 U	8.300 U
Manganese	300	1170	175	0.106 U	5550	5780	2220	4500	6200	3630	1780	100	57.0	0.56 J	1.520 J
Mercury	0.7	1.66	0.0300 U	0.0300 U	0.0700 J	0.0800 J	0.0900 J	0.0900 J	0.0700 J	0.1800 J	2.180	0.0300 U	0.0300 U	0.06 J	0.0300 U
Nickel	100	76.7	4.000 J	1.560 U	1.900 J	3.520 J	3.380 J	1.560 U	8.490 JN	11.3 JN	78.4	25.4 J	28.3 J	1.56 U	3.100 J
Potassium	^	30900	13300 J	61.8 UN	20300 N	26900 N	34300 N	16200 N	18700	32900	20200	3720 J	15000	61.8 U	61.8 U
Selenium	10	3.040 U	3.040 UN	3.040 UN	4.760 J	7.280 J	3.040 U	6.130 J	3.040 U	3.040 U	5.6 J	3.0 U	3.0 U	3.04 U	3.040 U
Silver	50	1.640 UN	2.000 UJ	1.640 UN	1.640 U	1.640 U	1.640 U	1.640 U	1.640 UN	1.640 UN	99.9	1.6 U	1.6 U	1.64 UN	1.640 U
Sodium	20000	165000	58500 J	332 U	339000	143000	227000	166000	47100	28300	339000	25800	35700	332 U	332
Thallium	0.5*	3.050 U	3.050 UN	3.050 UN	3.050 U	3.050 U	3.050 U	3.050 U	3.050 U	3.050 U	3.1 U	3.1 U	3.1 U	3.05 U	3.540 J
Vanadium	^	127	0.701 UN	0.701 UN	2.440 J	3.540 J	5.960 J	0.701 U	18.2 J	14.0 J	93.7	7.4 J	0.70 U	0.701 U	0.701 U
Zinc	2000*	462	42.0 J	0.611 UN	13.5 J	18 J	19.6 J	9.180 J	45.2	184	364	64.1	51.3	2.78 J	22.8
Wet Chemistry (ppm)															
Cyanide	200	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.015	0.010 U	0.010 U	0.010 U	NA	NA	NA	0.010 U	0.010 U
Pesticides/Herbicides/PCBs (ppb)															
2,4-D	50	NA	0.050 U	0.050 U	0.050 U	0.31 P	0.97 P	0.60 P	NR	NR	NA	NA	NA	0.050 U	0.050 U

Table 5
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of Inorganics in Groundwater
Remedial Investigation

Notes:

General Comments

All results are in parts per billion (ppb).

Only those parameters detected in at least one sample are reported on this table.

Bold face indicates that analyte was detected above laboratory limit.

Bold face and shaded values indicate an exceedence of the Class GA Groundwater Standard.

Only 20% of samples were used for the Data Usability Study Report (DUSR, Category B Laboratory Package).

ppb = µg/L (microgram per Liter)

ppm = mg/L (milligram per Liter)

NA - Not analyzed

. = Sample was used for the DUSR; only validator qualifiers were used.

Standards

^^ = NYSDEC TOGS Series 1.1.1, Ambient Groundwater Quality Standards & Guidance Values & Groundwater Effluent Limitations, Revised June 1998.

^ = No standard or guidance value available.

* = No standard available; value listed is a guidance value.

SB - Site Background

N/A - Not Available

Validator Qualifiers

U - Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.

J - The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ - The compound/analyte was analyzed for, but no detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate of imprecise. The non-detect result should be estimated.

Laboratory Qualifiers - Inorganic

U - Indicates the compound was analyzed for but was not detected.

J - If the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but the greater than or equal to the Instrument Detection Limit (IDL).

N = Presumptive evidence of a compound.

** = Duplicate analysis was not within control limits.

P - There is a >25% difference for detected concentrations between the two GC columns. The lower of the two values is reported.

Table 6
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of VOCs in Soil-Gas
Remedial Investigation

Compound	SG1	SG9	SG11	SG-19	SG-20	SG-21	SG-27	SG-28
	3/31/05	3/31/05	3/31/05	4/1/05	4/1/05	4/1/05	4/1/05	4/1/05
Volatile Organic Compounds								
Propene	71 U	700 U	**20 M**	**5.9 M**	**50 M**	**8.3 M**	**8.6**	6.7 U
Dichlorodifluoromethane (CFC 12)	71 U	700 U	2.7 U	**7.1**	**4.2**	**3.1**	**4.6**	**28**
Chloromethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Vinyl Chloride	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,3-Butadiene	71 U	700 U	2.7 U	2.7 U	0.66 U	**0.62 M**	**1.3**	6.7 U
Bromomethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Chloroethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Ethanol	710 U	7,000 U	27 U	27 U	6.6 U	**8.0**	7.0 U	67 U
Acetone	710 U	7,000 U	**71**	**60**	**320 M**	**48**	**52**	67 U
Trichlorofluoromethane	71 U	700 U	2.7 U	2.7 U	**6.4**	**4.7**	**9.5**	**63**
Isopropyl Alcohol	71 U	700 U	2.7 U	**3.9**	**15**	**0.92**	**0.90**	6.7 U
1,1-Dichloroethene	71 U	700 U	2.7 U	2.7 U	**6.6**	0.61 U	0.70 U	6.7 U
Methylene chloride	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Trichlorotrifluoroethane	71 U	700 U	2.7 U	2.7 U	**3.6**	0.61 U	**0.93**	6.7 U
Carbon Disulfide	71 U	700 U	**7.3**	**11**	**2.4**	**5.0**	**7.0**	**9.5**
trans-1,2-Dichloroethene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,1-Dichloroethane	71 U	700 U	2.7 U	2.7 U	**5.0**	0.61 U	0.70 U	6.7 U
Methyl tert-Butyl Ether	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Vinyl Acetate	140 U	1,400 U	5.4 U	5.4 U	1.3 U	1.2 U	1.4 U	13 U
2-Butanone (MEK)	71 U	700 U	2.7 U	**5.0**	**2.3**	**3.8**	**3.9**	6.7 U
cis-1,2-Dichloroethene	71 U	700 U	2.7 U	2.7 U	**15**	0.61 U	0.70 U	6.7 U
Ethyl Acetate	71 U	700 U	**3.9**	2.7 U	**3.7**	**5.0**	**0.83**	6.7 U
n-Hexane	**53,000**	**84,000**	**17**	**2.7**	**69**	**2.9**	**9.3**	6.7 U
Chloroform	71 U	700 U	**130**	2.7 U	**41**	**0.79**	**0.70**	6.7 U
Tetrahydrofuran	71 U	700 U	2.7 U	2.7 U	**3.3**	**3.5**	0.70 U	6.7 U
1,2-Dichloroethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,1,1-Trichloroethane	71 U	700 U	2.7 U	2.7 U	**39**	0.61 U	0.70 U	6.7 U
Benzene	**1,000**	700 U	**2.8**	**3.7**	**2.1**	**3.3**	**6.8**	6.7 U
Carbon Tetrachloride	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Cyclohexane	**4,000**	**9,300**	**10**	**4.9**	**17**	**7.2**	**7.0**	6.7 U
1,2-Dichloropropane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Bromodichloromethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Trichloroethene	71 U	700 U	2.7 U	2.7 U	**240**	0.61 U	0.70 U	6.7 U
1,4-Dioxane	71 U	700 U	2.7 U	2.7 U	0.66 U	**0.67 M**	0.70 U	6.7 U
n-Heptane	**7,700**	**22,000**	**13**	**4.4**	**25**	**3.9**	**8.5**	6.7 U
cis-1,3-Dichloropropene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
4-Methyl-2-pentanone	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
trans-1,3-Dichloropropene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,1,2-Trichloroethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Toluene	**210**	**700**	**11**	**12**	**11**	**8.5**	**14**	**9.6**
2-Hexanone	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Dibromochloromethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,2-Dibromoethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Tetrachloroethene	71 U	700 U	**11**	**19**	**26**	**10**	**18**	**11**
Chlorobenzene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Ethylbenzene	71 U	700 U	2.7 U	2.7 U	**4.7**	**1.5**	**2.7**	**35**
m,p -Xylenes	140 U	1,400 U	**9.7**	**7.1**	**19**	**5.6**	**8.4**	13 U
Bromoform	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Styrene	71 U	700 U	2.7 U	2.7 U	**1.1**	0.61 U	**0.75**	**47**
o-Xylene	71 U	700 U	2.7 U	2.7 U	**7.1**	**1.5**	**2.6**	6.7 U
1,1,2,2-Tetrachloroethane	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
4-Ethyltoluene	71 U	700 U	2.7 U	2.7 U	**3.5**	**1.2**	**1.4**	6.7 U
1,3,5-Trimethylbenzene	71 U	700 U	2.7 U	2.7 U	**3.6**	0.61 U	**0.96**	6.7 U
1,2,4-Trimethylbenzene	71 U	700 U	**2.8**	2.7 U	**13**	**1.7**	**2.9**	6.7 U
Benzyl Chloride	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,3-Dichlorobenzene	71 U	700 U	2.7 U	2.7 U	**1.0**	0.61 U	0.70 U	6.7 U
1,4-Dichlorobenzene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,2-Dichlorobenzene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
1,2,4-Trichlorobenzene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U
Hexachlorobutadiene	71 U	700 U	2.7 U	2.7 U	0.66 U	0.61 U	0.70 U	6.7 U

Notes:
All analytical results expressed in micrograms per cubic meter ($\mu g/m^3$)
M = Matrix interference; results may be biased high.
U = Analyte not detected above laboratory reporting limit.
Duplicate 4/1/05 sample collected at SG-29.

Table 6
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of VOCs in Soil-Gas
Remedial Investigation

Compound	SG-29	Dup040105	SG37	SG38	SG45	SG46	SG47	SG54	SG49
	4/1/05	4/1/05	4/4/05	4/4/05	4/4/05	4/4/05	4/4/05	4/4/05	4/4/05
Volatile Organic Compounds									
Propene	5.6 M	6.2 M	7.1 M	34 M	7.2 M	24 M	2.9 M	11 M	27 M
Dichlorodifluoromethane (CFC 12)	6.8	7.5	3.7	5.1	7.5	5.9	4.1	2.5	2.3
Chloromethane	0.64 U	0.76	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Vinyl Chloride	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,3-Butadiene	0.64 U	0.66 U	0.69 U	1.1 M	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Bromomethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Chloroethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Ethanol	6.6	6.6 U	200	340	350	160	83	200	140
Acetone	34	39	150	89	28	95	77	49	190
Trichlorofluoromethane	13	15	15	15	32	35	20	7.9	1.5
Isopropyl Alcohol	0.64 U	0.66 U	32	52	50	23	11	30	29
1,1-Dichloroethene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Methylene chloride	0.64 U	0.66 U	1.4	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Trichlorotrifluoroethane	0.66	0.66 U	0.69	0.70 U	0.67 U	0.69 U	0.78	0.65 U	0.69 U
Carbon Disulfide	6.0	6.7	15	24	1.2	15	1.9	2.7	13
trans-1,2-Dichloroethene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,1-Dichloroethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Methyl tert-Butyl Ether	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69
Vinyl Acetate	1.3 U	1.3 U	1.4 U	1.4 U	1.3 U	1.4 U	1.4 U	1.3 U	1.4 U
2-Butanone (MEK)	3.1	5.3	20	3.4	1.1	8.4	2.7	1.3	10
cis-1,2-Dichloroethene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Ethyl Acetate	1.7	5.5	0.69 U	0.70 U	0.67 U	0.73	1.5	0.81	1.2
n-Hexane	10	11	6.2	12	1.4	32	2.9	20	3.4
Chloroform	0.69	0.76	1.5	0.70 U	3.7	0.84	3.0	4.1	1.1
Tetrahydrofuran	2.3	4.6	0.69 U	0.70 U	0.67 U	0.90	2.0	0.65 U	4.9
1,2-Dichloroethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,1,1-Trichloroethane	0.64 U	0.66 U	0.69 U	0.70 U	0.82	0.69	0.69 U	0.65 U	0.69 U
Benzene	3.5	3.6	6.0	5.3	0.67 U	2.7	0.73	0.83	8.2
Carbon Tetrachloride	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Cyclohexane	4.8	5.4	6.2	8.4	1.2	4.4	6.3	2.3	19
1,2-Dichloropropane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Bromodichloromethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Trichloroethene	0.91	0.66 U	3.2	1.7	1.6	0.69 U	0.69 U	0.65 U	0.92
1,4-Dioxane	0.64 U	0.66 U	0.75	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
n-Heptane	5.7	6.4	9.7	10	0.67 U	32	3.5	4.0	9.3
cis-1,3-Dichloropropene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
4-Methyl-2-pentanone	0.64 U	0.66 U	2.6	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
trans-1,3-Dichloropropene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,1,2-Trichloroethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Toluene	9.8	11	68	110	61	31	12	28	52
2-Hexanone	0.64 U	0.66 U	2.7	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Dibromochloromethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,2-Dibromoethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Tetrachloroethene	26	29	67	18	19	10	7.5 B	5.7	11
Chlorobenzene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Ethylbenzene	1.7	1.9	6.1	12	5.1	33	2.0	3.4	5.7
m,p-Xylenes	5.5	6.3	21	34	14	8.7	7.6	11	18
Bromoform	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Styrene	0.64 U	0.66 U	0.72	1.1	2.5	500	0.69 U	0.65 U	0.71
o-Xylene	1.7	1.9	6.8	11	4.6	2.7	2.0	3.9	5.2
1,1,2,2-Tetrachloroethane	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
4-Ethyltoluene	0.84	0.88	1.6	1.3	0.67 U	2.9	1.3	0.97	1.0
1,3,5-Trimethylbenzene	0.64 U	0.66 U	1.5	0.70 U	0.67 U	0.69 U	0.69 U	0.66	0.69 U
1,2,4-Trimethylbenzene	1.8	2.2	4.3	2.5	1.4	2.0	3.0	2.2	1.9
Benzyl Chloride	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,3-Dichlorobenzene	0.64 U	0.66 U	7.5	80	29	9.5	2.0	24	31
1,4-Dichlorobenzene	2.9	3.9	0.69 U	0.70 U	0.67 U	0.70	0.69 U	0.67	0.96
1,2-Dichlorobenzene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
1,2,4-Trichlorobenzene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U
Hexachlorobutadiene	0.64 U	0.66 U	0.69 U	0.70 U	0.67 U	0.69 U	0.69 U	0.65 U	0.69 U

Notes:
All analytical results expressed in micrograms per cubic meter (µg/m³)
M = Matrix interference; results may be biased high.
U = Analyte not detected above laboratory reporting limit.
Duplicate 4/1/05 sample collected at SG-29.

Table 6
New York City School Construction Authority
Former Metro North Property (Mott Haven)
Bronx, New York
Summary of VOCs in Soil-Gas
Remedial Investigation

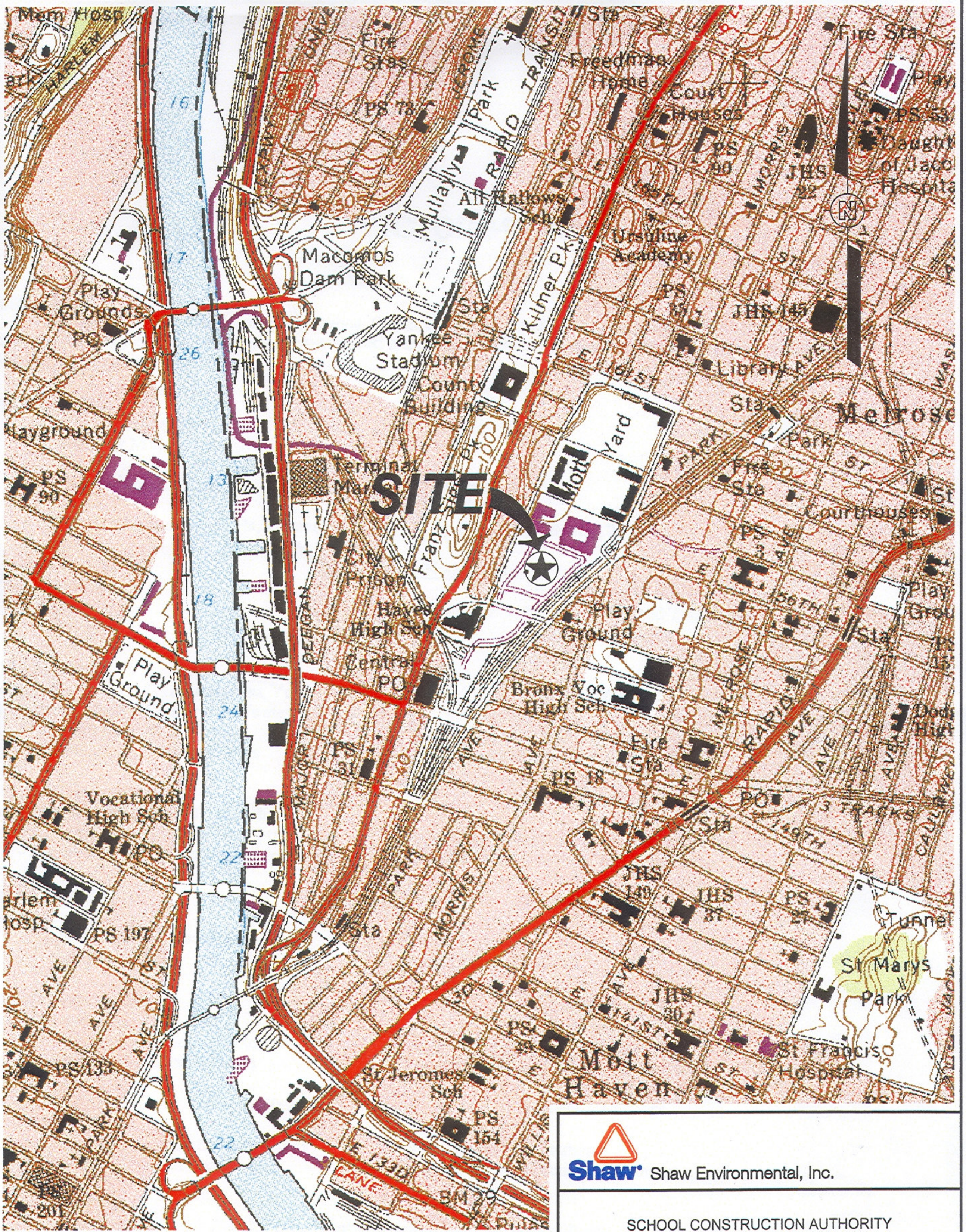
Compound	PSGI-9	PSGI-10	Trip Blank	Trip Blank	Trip Blank
	8/17/05	9/21/05	3/31/05	4/4/05	4/1/05
Volatile Organic Compounds					
Propene	**89 M**	**6.0**	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC 12)	**2.6**	**2.8**	0.50 U	0.50 U	0.50 U
Chloromethane	**1.4**	**0.71**	0.50 U	0.50 U	0.50 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Vinyl Chloride	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,3-Butadiene	**2.8 M**	0.64 U	0.50 U	0.50 U	0.50 U
Bromomethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Chloroethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Ethanol	12.00 U	**120**	5.00 U	5.00 U	5.00 U
Acetone	**71**	**63**	5.00 U	5.00 U	5.00 U
Trichlorofluoromethane	**6.2**	**7.5**	0.50 U	0.50 U	0.50 U
Isopropyl Alcohol	1.20 U	**4.9**	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Methylene chloride	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Trichlorotrifluoroethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Carbon Disulfide	**24**	**3.9**	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Methyl tert-Butyl Ether	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Vinyl Acetate	**9.2 M**	0.64 U	1.00 U	1.00 U	1.00 U
2-Butanone (MEK)	**9.2**	**9.3**	0.50 U	0.50 U	**0.84**
cis-1,2-Dichloroethene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Ethyl Acetate	1.20 U	**0.87**	0.50 U	0.50 U	0.50 U
n-Hexane	**6.4**	**3.9**	0.50 U	0.50 U	0.50 U
Chloroform	**510**	**3.2**	0.50 U	0.50 U	0.50 U
Tetrahydrofuran	1.20 U	**14**	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	**2.7**	0.64 U	0.50 U	0.50 U	0.50 U
Benzene	**4.2**	**1.2**	0.50 U	0.50 U	0.50 U
Carbon Tetrachloride	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Cyclohexane	**6.1**	**6.4**	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	**2.3**	0.64 U	0.50 U	0.50 U	0.50 U
Trichloroethene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,4-Dioxane	1.20 U	**0.72**	0.50 U	0.50 U	0.50 U
n-Heptane	**3.0**	**1.4**	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone	**1.6**	0.64 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Toluene	**11**	**28**	0.50 U	**0.56**	**0.56**
2-Hexanone	**3.1**	**8.2**	0.50 U	0.50 U	0.50 U
Dibromochloromethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	**68**	**24**	0.50 U	**0.85**	**0.85**
Chlorobenzene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	**2.5**	**3.8**	0.50 U	0.50 U	0.50 U
m,p-Xylenes	**9.2**	**15**	1.00 U	1.00 U	1.00 U
Bromoform	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Styrene	**2.7**	**1.7**	0.50 U	0.50 U	0.50 U
o-Xylene	**3.1**	**5.2**	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
4-Ethyltoluene	**1.3**	**1.4**	0.50 U	0.50 U	0.50 U
1,3,5-Trimethylbenzene	1.20 U	**1.0**	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	**4.2**	**3.5**	0.50 U	0.50 U	0.50 U
Benzyl Chloride	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	1.20 U	0.64 U	0.50 U	0.50 U	0.50 U

Notes:
All analytical results expressed in micrograms per cubic meter (µg/m³)
M = Matrix interference; results may be biased high.
U = Analyte not detected above laboratory reporting limit.
Duplicate 4/1/05 sample collected at SG-29.

Table 7
New York City School Construction Authority
Mott Haven Campus
SMP Monitoring & Maintenance Activities

Engineering Control	Monitoring Frequency	Monitoring Personnel	Personnel Qualifications	Maintenance Frequency	Maintenance Personnel	Reporting Requirements	Training Requirements	Training Personnel	Responsible Agency
Cover Systems	Monthly	Custodial Engineer	Completion of Initial SMP Training and up to date with Annual SMP Refresher Training - Synthetic Turf Training	As needed	Custodial Engineer	Submit Monthly Inspection Checklist to DOE by 15th of Each Month	Initial SMP Training; Annual SMP Refresher Training; Synthetic Turf Training	Initial & Refresher SMP Training by Independent Professional Engineer; Initial Synthetic Turf Training by Manufacturer	DOE
	Annual	Independent Professional Engineer	Minimum 5 years experience in the design and operation of cover systems, gas vapor barriers, and SSDSs; thorough understanding of SMP requirements	---	---	Provide Annual Site Management Report to NYSDEC by March 1st of the following year	Complete understanding of SMP requirements and ability to educate all parties responsible for its implmentation	Synthetic Turf manufacturer	DOE
	Annual (for duration of warranty)	Turf Manufacturer	Fully knowledgeable of the materials, construction, installation and repair of the turf	Annual (minimum)	Employees of Turf Installer	All repairs to the turf will be documented and included in the Annual Site Management Report	Skilled employees of an Installer certified by the Manufacturer	Synthetic Turf Manufacturer	DOE
Sub-slab Depressurization System	24/7	Custodial Engineer (Building Management System)	Completion of Intiial SMP & BMS Training and up to date with Annual SMP Refresher Training	---	---	In the event of an alarm, perform inspection on fans & contact DOE, DSF immediately	Initial SMP and BMS Training; Annual SMP Refresher Training	Initial & Refresher SMP Training by Independent Professional Engineer - BMS training by manufacturer	DOE
	Monthly	Custodial Engineer	Completion of Initial SMP Training and up to date with Annual SMP Refresher Training; Synthetic Turf Training	---	---	Submit Monthly Inspection Checklist to DOE by 15th of Each Month	Initial SMP Training; Annual SMP Refresher Training	Initial & Refresher SMP Training by Independent Professional Engineer	DOE
	Annual	Independent Professional Engineer	Minimum 5 years experience in the design and operation of cover systems, gas vapor barriers, and SSDSs; thorough understanding of SMP requirements	---	---	Provide Annual Site Management Report to NYSDEC by March 1st of the following year	---	---	DOE
Vapor Barrier	Annual	Independent Professional Engineer	See above for Cover Systems; Must also be familiar with proper use and interpretation of smoke tests for verifying integrity of vapor barrier	---	---	Provide Annual Site Management Report to NYSDEC by March 1st of the following year	---	---	DOE
Groundwater Monitoring	Quarterly for one year, semiannual afterwards	Qualified Environmental Professional	HAZWOPER training plus 2 years experience for sample collection; data evaluation and interpretation to be performed by geologist/hydrogeologist with at least 7 years of related experience	As needed	Qualified Contractor	Quarterly and Semi-Annual Reports submitted to NYSDEC; annual summary in Annual Site Management Report	---	---	SCA

FIGURES



NOT TO SCALE

REFERENCE:

BASE MAP SOURCR: www.nysgis.state.ny.us

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
ALBANY, NY	10/13/05	H. FARIELLO	S. SHKOLNIK			114926A3

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Plot Date/Time: 10/13/05 11:57am
Plotted by: Samuil.Shkolnik

Xref: .
Image: 04007368

Shaw® Shaw Environmental, Inc.

SCHOOL CONSTRUCTION AUTHORITY

FIGURE 1
SITE VICINITY MAP

FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

N

LEGEND:

- SITE
- BCP AREA
- NON-BCP AREA A
- NON-BCP AREA B

SCALE

0 150 300 FEET

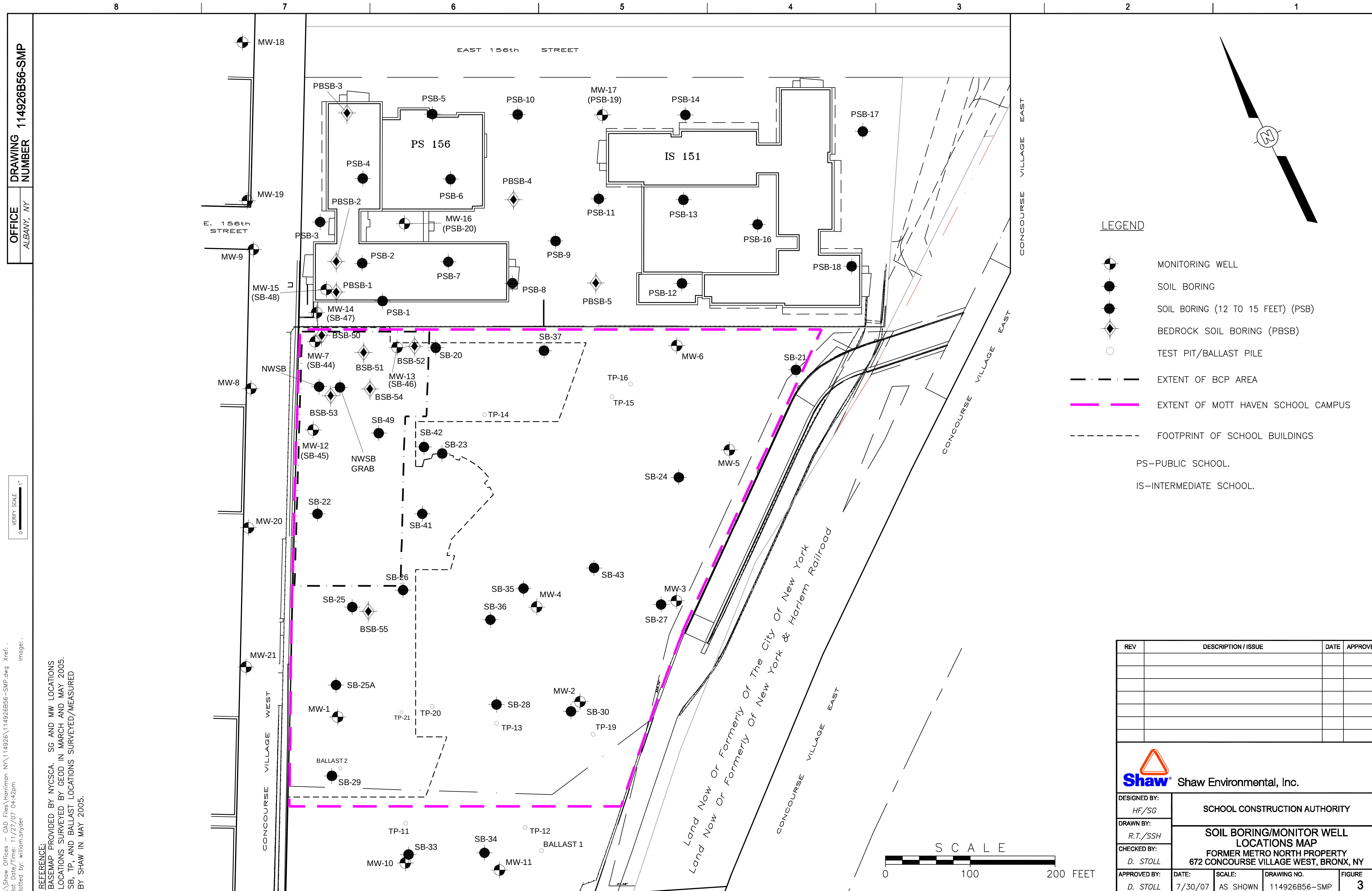
Shaw® Shaw Environmental, Inc.

DESIGNED BY: CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: B. Snyder	FIGURE 2 SITE LOCATION MAP FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: C. Kraemer	

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	8/13/08	AS SHOWN	Figure 2 8-13-08	2

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	8/13/08	--	B. Snyder	C. Kraemer	--	Figure 2 8-13-08

File: O:\Shaw Offices - CAD Files\Harriman NY\Mott Haven Campus\FIGURE 2 8-13-08.dwg
Plot Date/Time: Aug 13, 2008 - 1:40pm Xref:
Plotted By: william.snyder Image: Site Aerial.jpg



OFFICE ALBANY, NY
DRAWING NUMBER 114926B56-SMP
EAST 156th STREET
E. 156th STREET
PS 156
IS 151
CONCOURSE VILLAGE EAST
CONCOURSE VILLAGE WEST
Land Now Or Formerly Of The City Of New York
Land Now Or Formerly Of New York & Harlem Railroad
MW-18
MW-19
MW-9
MW-15 (SB-48)
MW-14 (SB-47)
MW-7 (SB-44)
MW-8
NWSB
BSB-53
MW-12 (SB-45)
NWSB GRAB
SB-22
MW-20
MW-21
SB-25
BSB-55
SB-26
SB-25A
MW-1
BALLAST 2
SB-29
TP-11
SB-33
MW-10
PBSB-3
PSB-5
PSB-10
MW-17 (PSB-19)
PSB-14
PSB-17
PSB-4
PSB-6
PBSB-4
PBSB-2
PSB-3
MW-16 (PSB-20)
PSB-2
PSB-7
PSB-9
PSB-11
PSB-13
PSB-16
PSB-18
PSB-12
PBSB-1
PSB-8
PBSB-5
PSB-1
BSB-50
BSB-51
BSB-52
SB-20
MW-13 (SB-46)
BSB-54
SB-37
MW-6
SB-21
TP-16
TP-15
TP-14
SB-49
SB-42
SB-23
MW-5
SB-24
SB-41
SB-43
SB-35
MW-4
SB-36
MW-3
SB-27
TP-21
TP-20
SB-28
TP-13
MW-2
SB-30
TP-19
TP-12
SB-34
BALLAST 1
MW-11
LEGEND
MONITORING WELL
SOIL BORING
SOIL BORING (12 TO 15 FEET) (PSB)
BEDROCK SOIL BORING (PBSB)
TEST PIT/BALLAST PILE
EXTENT OF BCP AREA
EXTENT OF MOTT HAVEN SCHOOL CAMPUS
FOOTPRINT OF SCHOOL BUILDINGS
PS–PUBLIC SCHOOL.
IS–INTERMEDIATE SCHOOL.
SCALE
0 100 200 FEET
VERIFY SCALE 0 1"
REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.
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Plot Date/Time: 11/27/07 04:42pm Image: .
Plotted by: william.snyder
REV | DESCRIPTION / ISSUE | DATE | APPROVED
Shaw Shaw Environmental, Inc.
DESIGNED BY: HF/SG
DRAWN BY: R.T./SSH
CHECKED BY: D. STOLL
APPROVED BY: D. STOLL
SCHOOL CONSTRUCTION AUTHORITY
SOIL BORING/MONITOR WELL LOCATIONS MAP
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY
DATE: 7/30/07
SCALE: AS SHOWN
DRAWING NO. 114926B56-SMP
FIGURE 3

LEGEND

- MONITORING WELL
- SOIL BORING
- SOIL BORING (12 TO 15 FEET) (PSB)
- BEDROCK SOIL BORING (PBSB)
- TEST PIT/BALLAST PILE
- EXTENT OF BCP AREA
- EXTENT OF MOTT HAVEN SCHOOL CAMPUS
- FOOTPRINT OF SCHOOL BUILDINGS

PS–PUBLIC SCHOOL.

IS–INTERMEDIATE SCHOOL.

Decommissioned Monitoring Well

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SOIL BORING/MONITOR WELL LOCATIONS MAP FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B56-SMP	3A

OFFICE ALBANY, NY

DRAWING NUMBER 114926B56-SMP

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

VERIFY SCALE 0 1"

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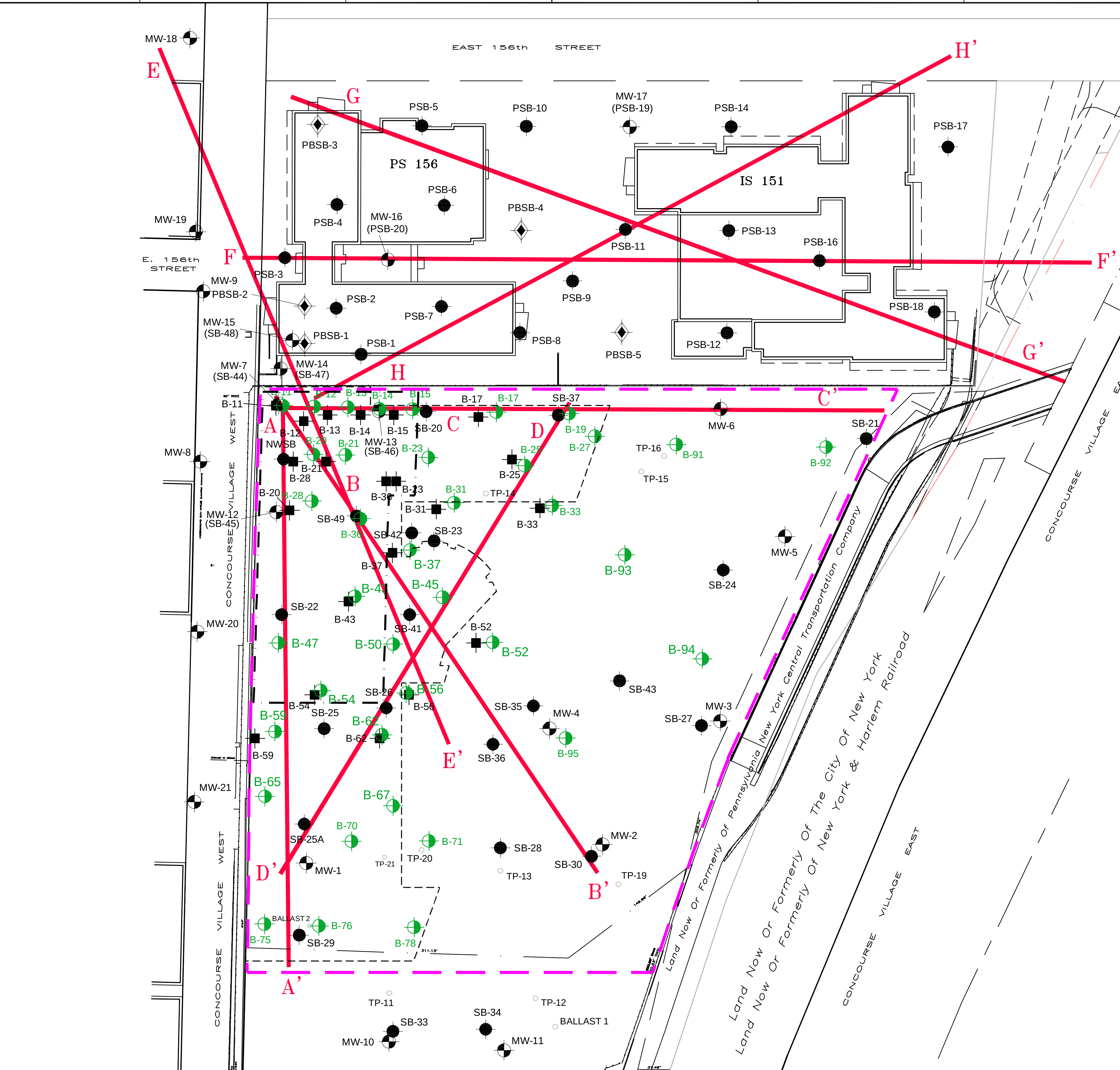
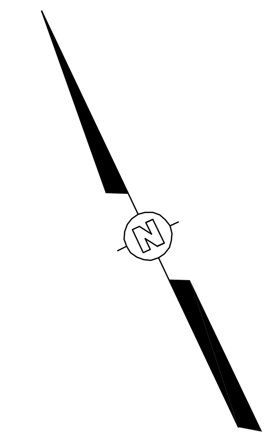
Plotted by: william.snyder

OFFICE	DRAWING NUMBER
ALBANY, NY	114926B58-SMP





LEGEND

- GEOTECHNICAL SOIL BORINGS
- MONITORING WELL
- SOIL BORING
- TEST PIT/BALLAST PILE
- GEOTECHNICAL BORINGS (BY LANGAN ENGINEERING)
- BEDROCK SOIL BORING
- EXTENT OF BCP AREA
- EXTENT OF MOTT HAVEN SCHOOL CAMPUS
- FOOTPRINT OF SCHOOL BUILDINGS

SCALE

0 100 200 FEET

VERIFY SCALE 0 1"

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	CROSS SECTION LOCATIONS
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B58-SMP	4

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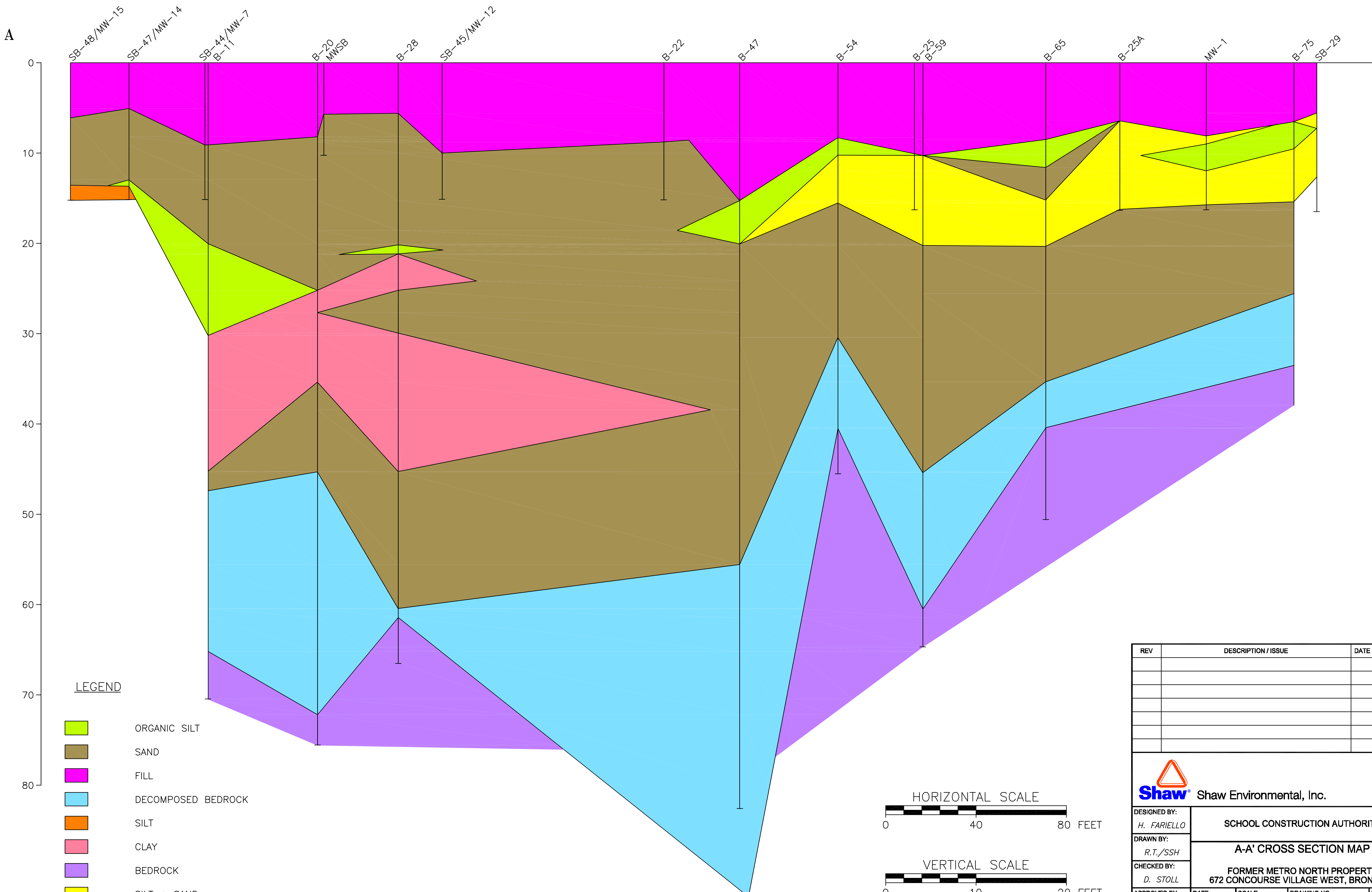
Plotted by: william.snyder



OFFICE ALBANY, NY

DRAWING NUMBER 114926B20-SMP

VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

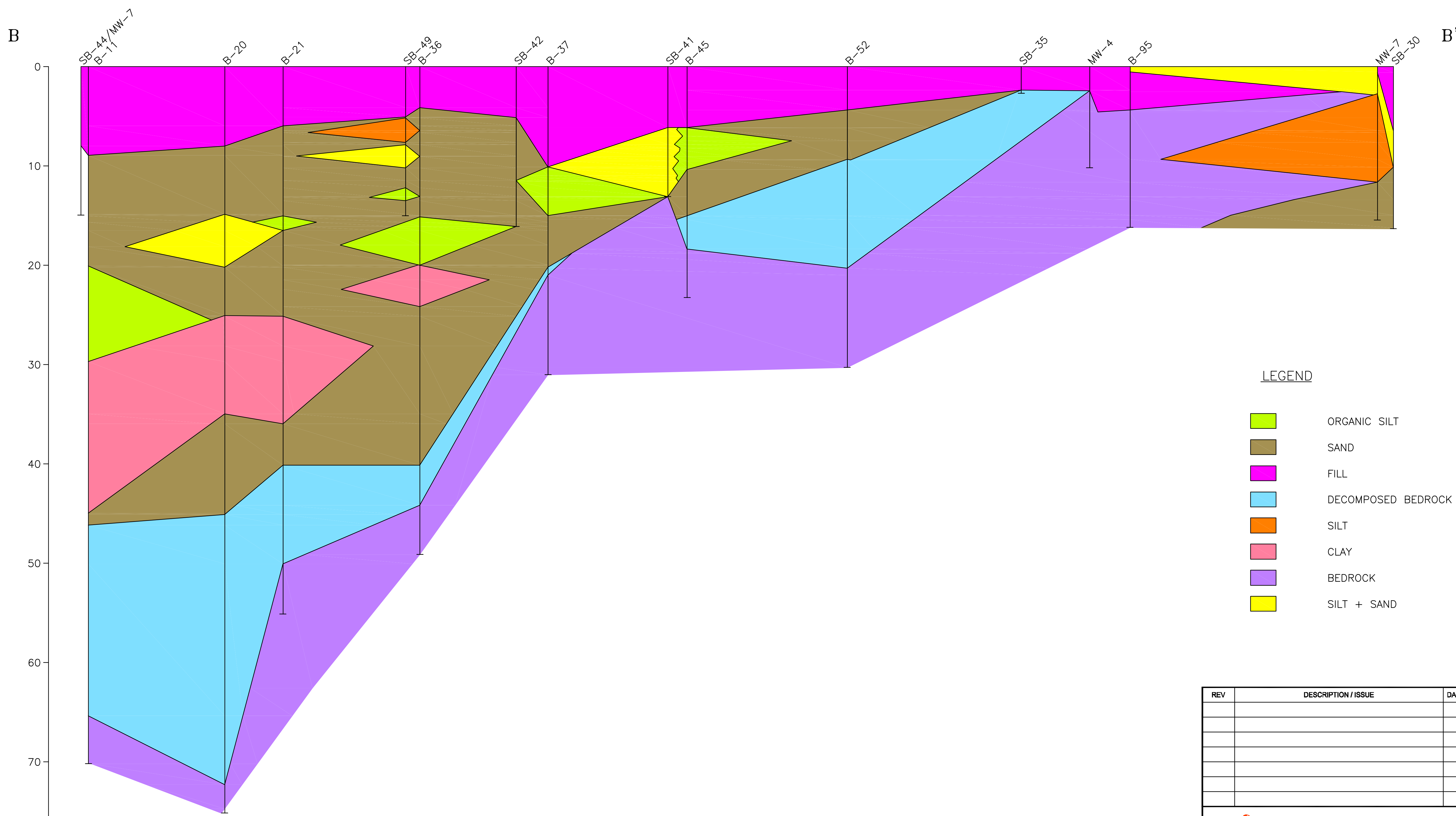
DESIGNED BY: H. FARIELLO	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	A-A' CROSS SECTION MAP
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B20-SMP	5

Plot Date/Time: 07/30/07 07:23am
Plotted by: william.snyder

OFFICE ALBANY, NY

DRAWING NUMBER 114926B17-SMP



HORIZONTAL SCALE

0 40 80 FEET

VERTICAL SCALE

0 10 20 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: H. FARIELLO	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	B-B' CROSS SECTION MAP
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B17-SMP	6

VERIFY SCALE 0 1"

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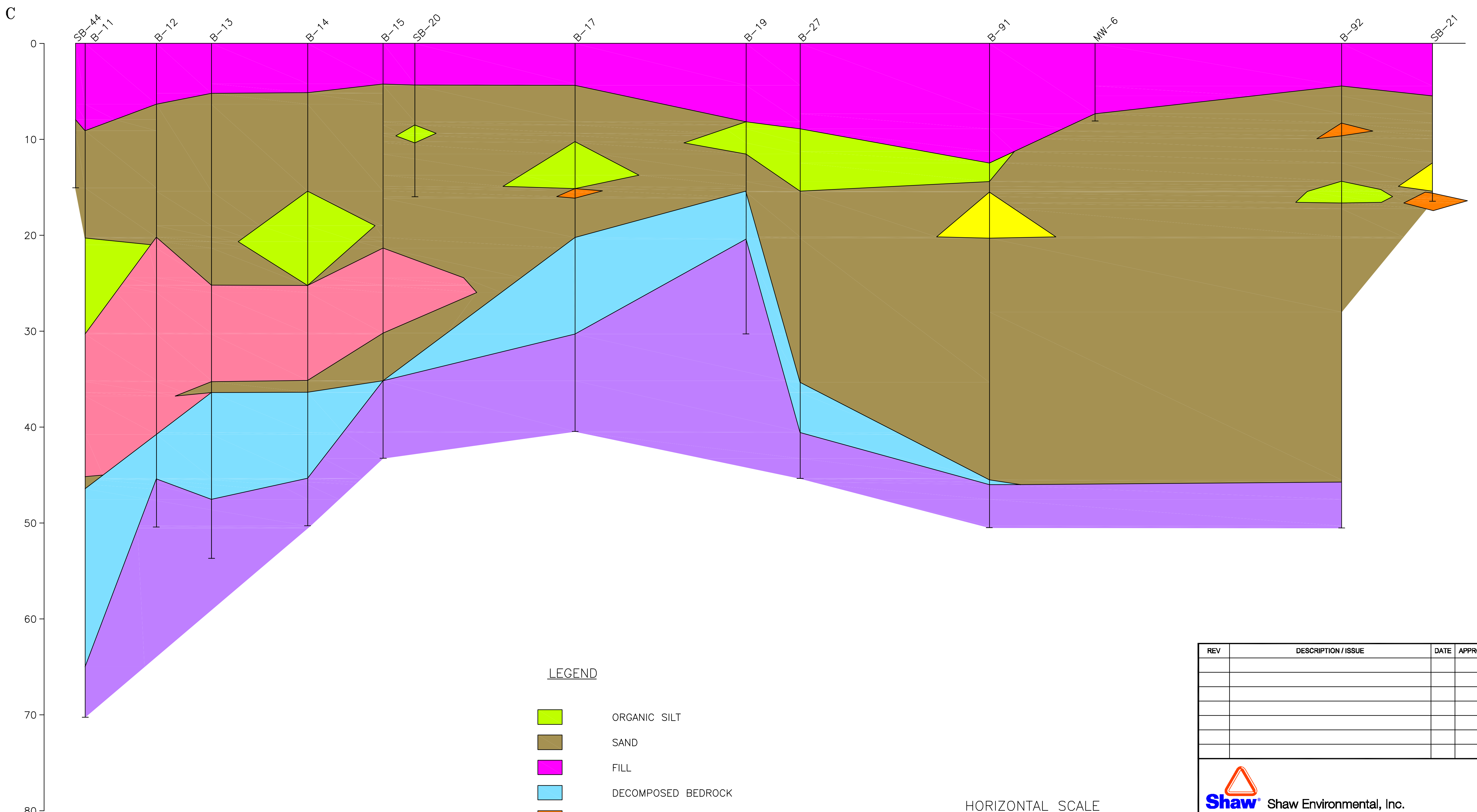
Plotted by: william.snyder
Image: .

OFFICE
ALBANY, NY

DRAWING NUMBER 114926B18-SMP



LEGEND

ORGANIC SILT
SAND
FILL
DECOMPOSED BEDROCK
SILT
CLAY
BEDROCK
SILT + SAND

HORIZONTAL SCALE

0 40 80 FEET

VERTICAL SCALE

0 10 20 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: H. FARIELLO

DRAWN BY: R.T./SSH

CHECKED BY: D. STOLL

APPROVED BY: D. STOLL

SCHOOL CONSTRUCTION AUTHORITY

C-C' CROSS SECTION MAP

FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

DATE:	SCALE:	DRAWING NO.	FIGURE
7/30/07	AS SHOWN	114926B18-SMP	7

VERIFY SCALE 0 1"

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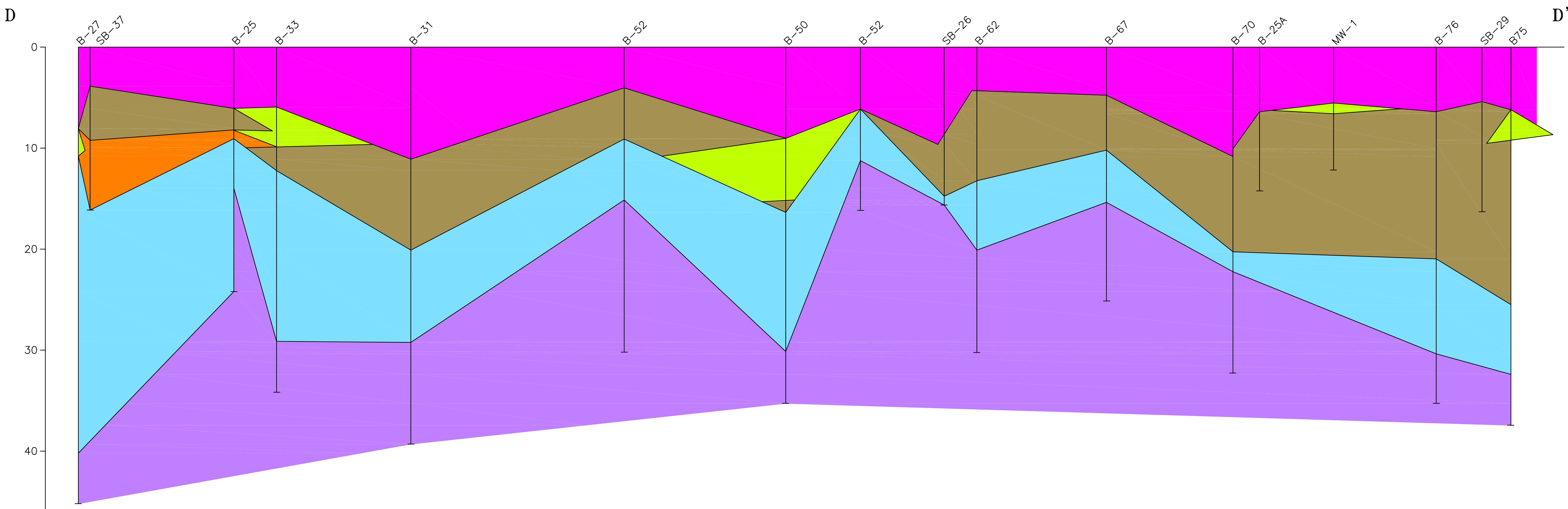
Plotted by: william.snyder
Image: .

OFFICE ALBANY, NY
DRAWING NUMBER 114926B19-SMP



LEGEND

- ORGANIC SILT
- SAND
- FILL
- DECOMPOSED BEDROCK
- SILT
- CLAY
- BEDROCK
- SILT + SAND

HORIZONTAL SCALE
0 40 80 FEET

VERTICAL SCALE
0 10 20 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: H. FARIELLO	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	D-D' CROSS SECTION MAP
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B19-SMP	8

VERIFY SCALE 0 1"

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Plotted by: william.snyder
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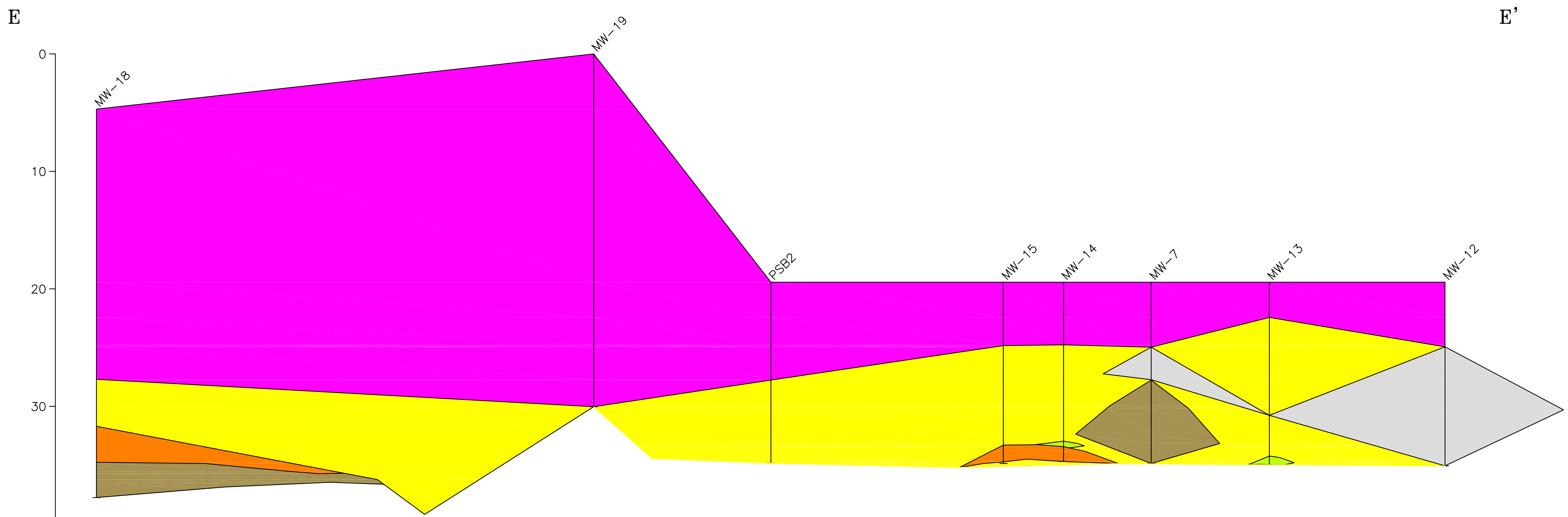

NOTES:

A) TAR LIKE GRAVEL OBSERVED IN MW-18 FROM 26-27 FEET BELOW GROUND SURFACE (bgs).

B) PRODUCT OBSERVED IN MW-15 FROM 5-10 FEET (bgs).

LEGEND

- ORGANIC SILT
- SAND
- FILL
- GRAVEL, SILT + SAND
- SILT
- SILT + SAND

HORIZONTAL SCALE: 0 40 80 FEET

VERTICAL SCALE: 0 10 20 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: H. FARIELLO	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	E-E' CROSS SECTION MAP
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B37-SMP	9

OFFICE ALBANY, NY

DRAWING NUMBER 114926B37-SMP

VERIFY SCALE 0 1"

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Plotted by: william.snyder
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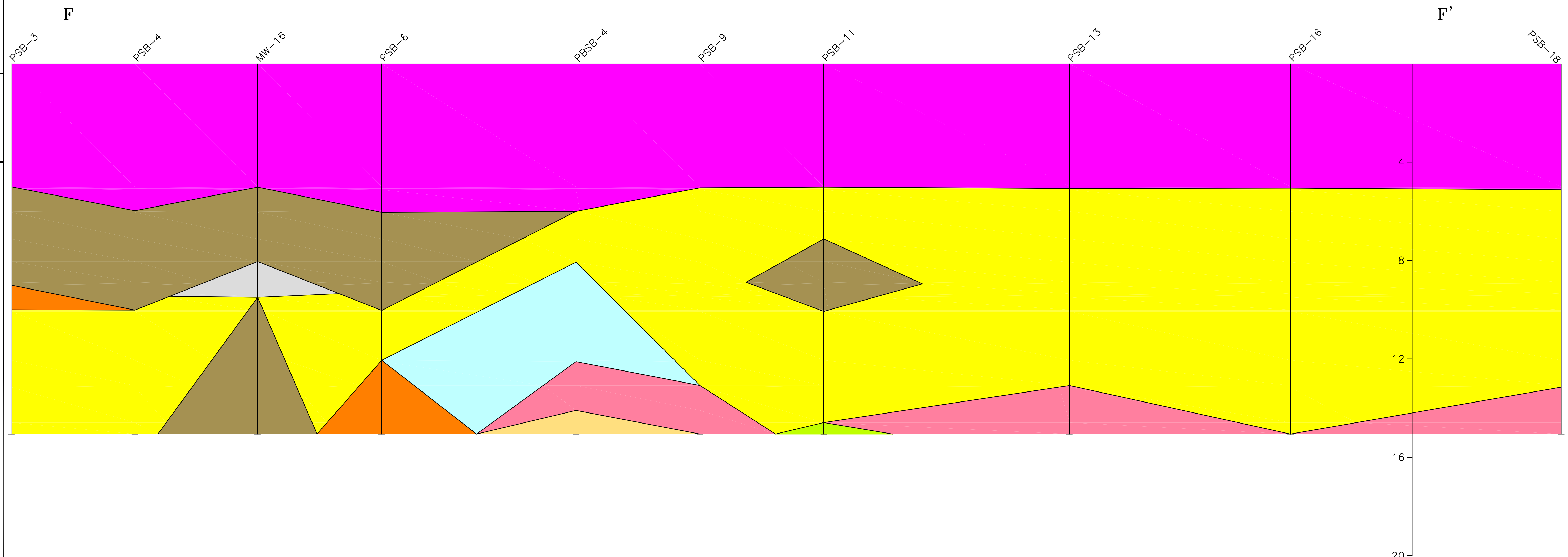

LEGEND

- ORGANIC SILT
- SAND
- FILL
- SILT
- SILT + SAND
- CLAY
- SAND + GRAVEL
- CLAY + SILT
- SAND + SILT + CLAY

HORIZONTAL SCALE
0 40 80 FEET

VERTICAL SCALE
0 4 8 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: JN/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: S. SHKOLNIK	F-F' CROSS SECTION MAP
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B59-SMP	10

DRAWING NUMBER 114926B59-SMP
OFFICE ALBANY, NY

VERIFY SCALE 0 1"

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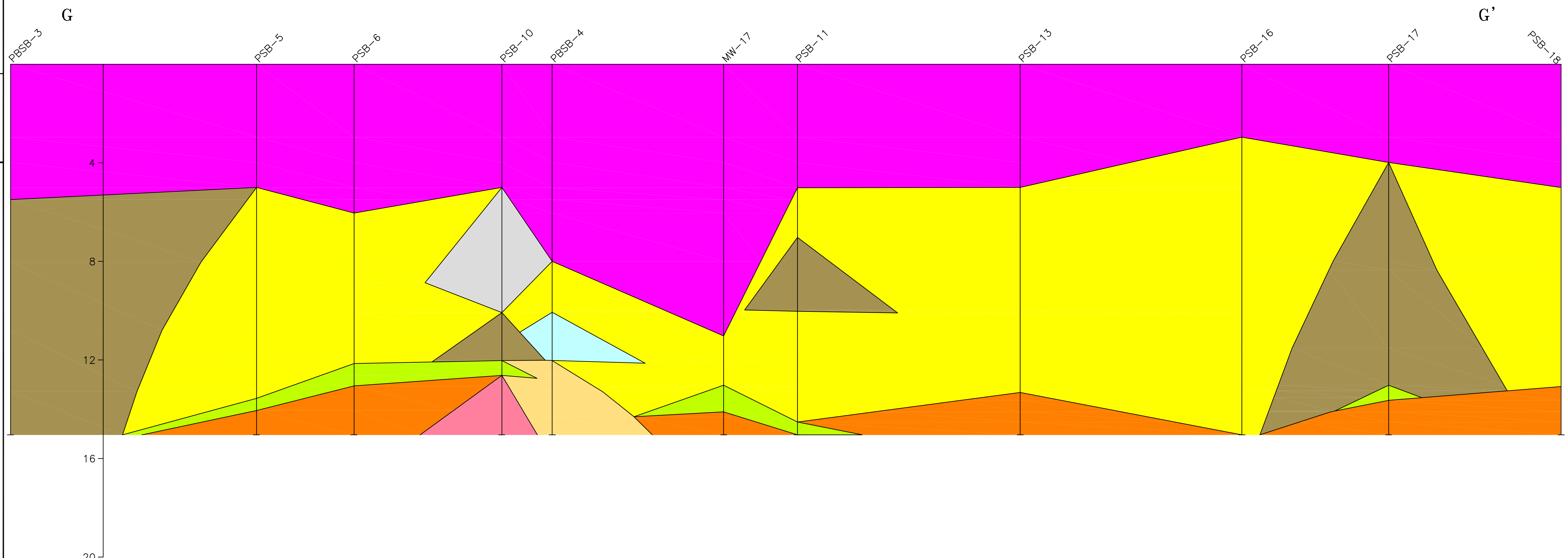
Plot Date/Time: 07/30/07 08:08am
Plotted by: william.snyder

OFFICE ALBANY, NY

DRAWING NUMBER 114926B60-SMP



LEGEND

- ORGANIC SILT
- SAND
- FILL
- SILT
- SILT + SAND
- CLAY
- GRAVEL
- CLAY + SILT
- SAND + SILT + CLAY

APPROXIMATE HORIZONTAL SCALE

0 40 80 FEET

VERTICAL SCALE

0 4 8 FEET

VERIFY SCALE 0 1"

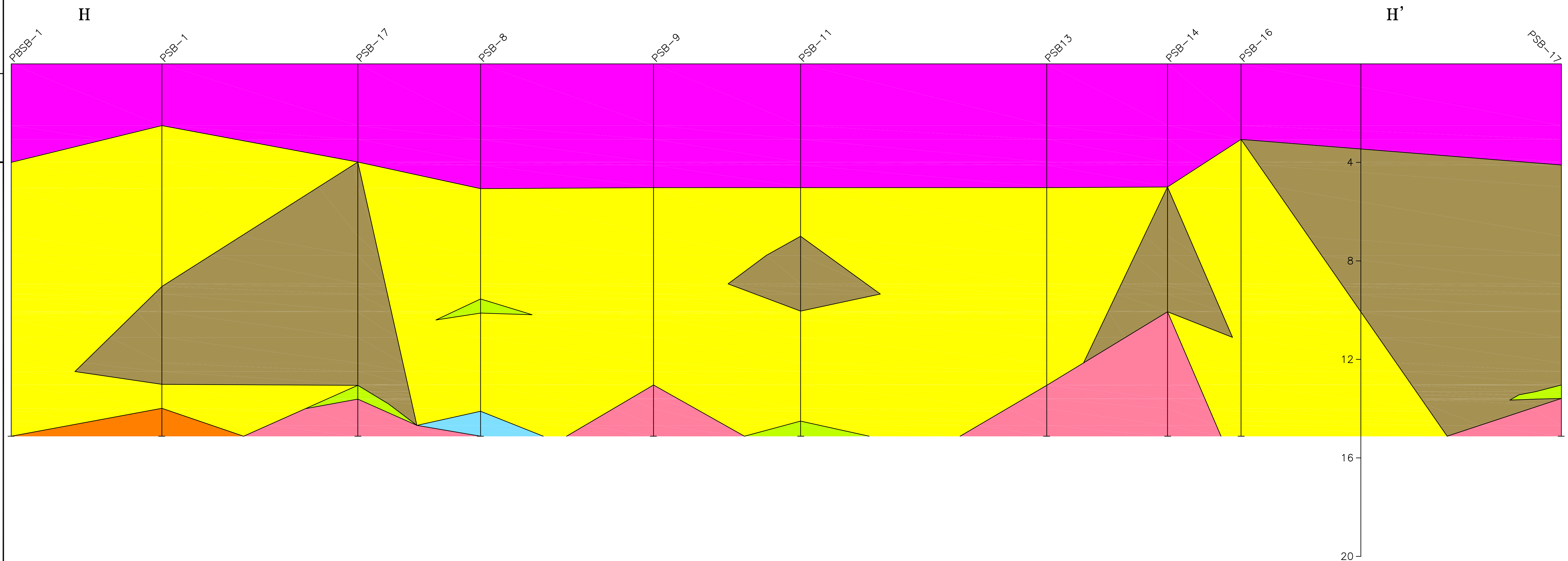
REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: JN/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: S. SHKOLNIK	G-G' CROSS SECTION MAP
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B60-SMP	11

\\seiharfs01\Common\PROJ\NYC-SCA\Matt Haven\114926\SIR & RIR\114926B60-SMP.dwg Image: . Plot Date/Time: 07/30/07 08:15am Plotted by: william.snyder



LEGEND

- ORGANIC SILT
- SAND
- FILL
- SILT
- SILT + SAND
- CLAY
- DECOMPOSED BEDROCK

HORIZONTAL SCALE
0 40 80 FEET

VERTICAL SCALE
0 4 8 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: J. NAFUS
DRAWN BY: S. SHKOLNIK
CHECKED BY: D. STOLL
APPROVED BY: D. STOLL

SCHOOL CONSTRUCTION AUTHORITY

H-H' CROSS SECTION MAP

FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

DATE: 7/30/07 | SCALE: AS SHOWN | DRAWING NO. 114926B61-SMP | FIGURE 12

OFFICE ALBANY, NY
DRAWING NUMBER 114926B61-SMP

VERIFY SCALE 0 1"

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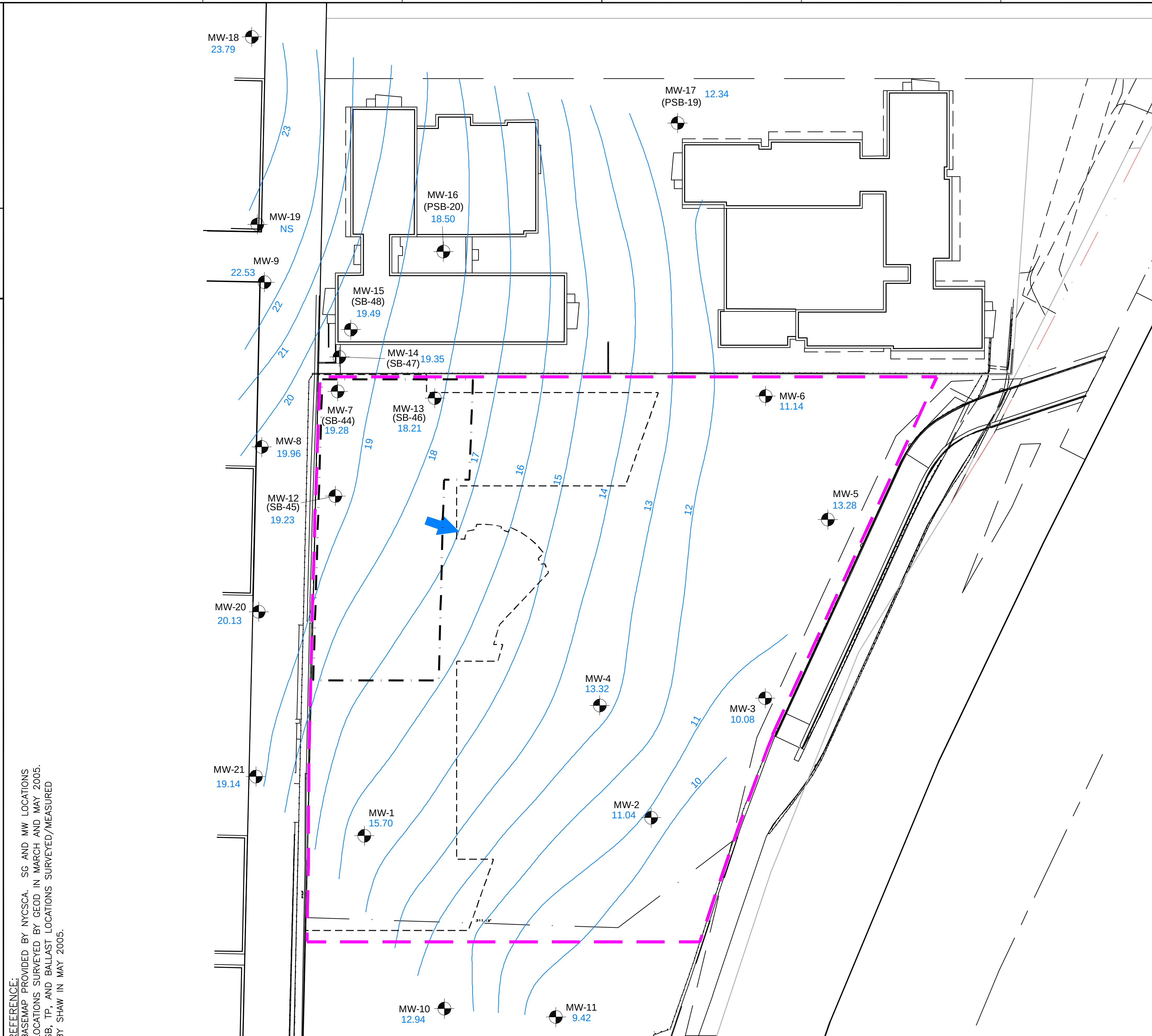
Plot Date/Time: 07/30/07 08:23am
Plotted by: william.snyder
Image: .

OFFICE ALBANY, NY

DRAWING NUMBER 114926B46-SMP



LEGEND

	MONITORING WELL (MW)
11.14	GROUNDWATER ELEVATION
	GROUNDWATER CONTOUR
	GROUNDWATER FLOW DIRECTION
NS	NOT SAMPLED
	EXTENT OF BCP AREA
	EXTENT OF MOTT HAVEN SCHOOL CAMPUS
	FOOTPRINT OF SCHOOL BUILDINGS

SCALE

0 100 200 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: H. FARIELLO	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	GROUNDWATER CONTOUR MAP
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B46-SMP	13

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

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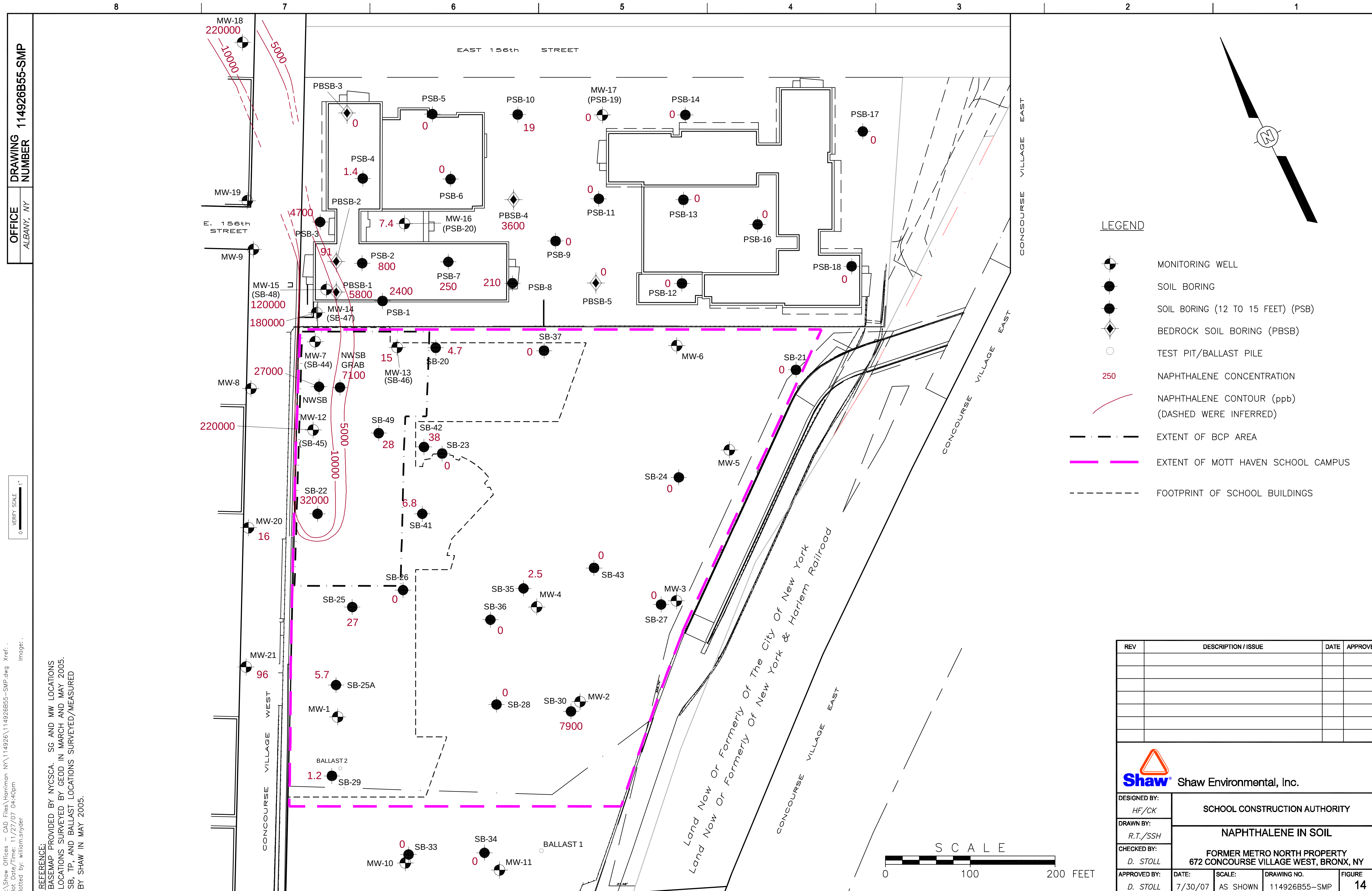
Plot Date/Time: 11/27/07 04:34pm
Plotted by: william.snyder


OFFICE
ALBANY, NY
DRAWING NUMBER
114926B55-SMP
EAST 156th STREET
E. 156th STREET
CONCOURSE VILLAGE EAST
CONCOURSE VILLAGE WEST
Land Now Or Formerly Of The City Of New York
Land Now Or Formerly Of New York & Harlem Railroad
MW-18
220000
10000
5000
MW-19
MW-9
MW-15 (SB-48)
120000
MW-14 (SB-47)
180000
MW-7 (SB-44)
NWSB GRAB
7100
27000
MW-8
NWSB
MW-12 (SB-45)
220000
SB-22
32000
MW-20
16
MW-21
96
PBSB-3
0
PSB-5
0
PSB-10
19
MW-17 (PSB-19)
0
PSB-14
0
PSB-17
0
PSB-4
1.4
PSB-6
0
PBSB-2
4700
PSB-3
91
7.4
MW-16 (PSB-20)
PBSB-4
3600
PSB-9
0
PSB-11
0
PSB-13
0
PSB-16
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PSB-18
0
PSB-2
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PSB-7
250
210
PSB-8
PBSB-5
0
PSB-12
0
PBSB-1
5800
2400
PSB-1
SB-37
0
MW-6
SB-21
0
15
MW-13 (SB-46)
4.7
SB-20
SB-49
28
SB-42
38
SB-23
0
MW-5
SB-24
0
6.8
SB-41
SB-26
0
SB-25
27
2.5
SB-35
MW-4
SB-36
0
0
SB-43
0
MW-3
SB-27
5.7
SB-25A
MW-1
0
SB-28
SB-30
MW-2
7900
BALLAST 2
1.2
SB-29
0
SB-33
MW-10
SB-34
0
MW-11
BALLAST 1
LEGEND
MONITORING WELL
SOIL BORING
SOIL BORING (12 TO 15 FEET) (PSB)
BEDROCK SOIL BORING (PBSB)
TEST PIT/BALLAST PILE
250 NAPHTHALENE CONCENTRATION
NAPHTHALENE CONTOUR (ppb) (DASHED WERE INFERRED)
EXTENT OF BCP AREA
EXTENT OF MOTT HAVEN SCHOOL CAMPUS
FOOTPRINT OF SCHOOL BUILDINGS
N
SCALE
0 100 200 FEET
VERIFY SCALE
REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.
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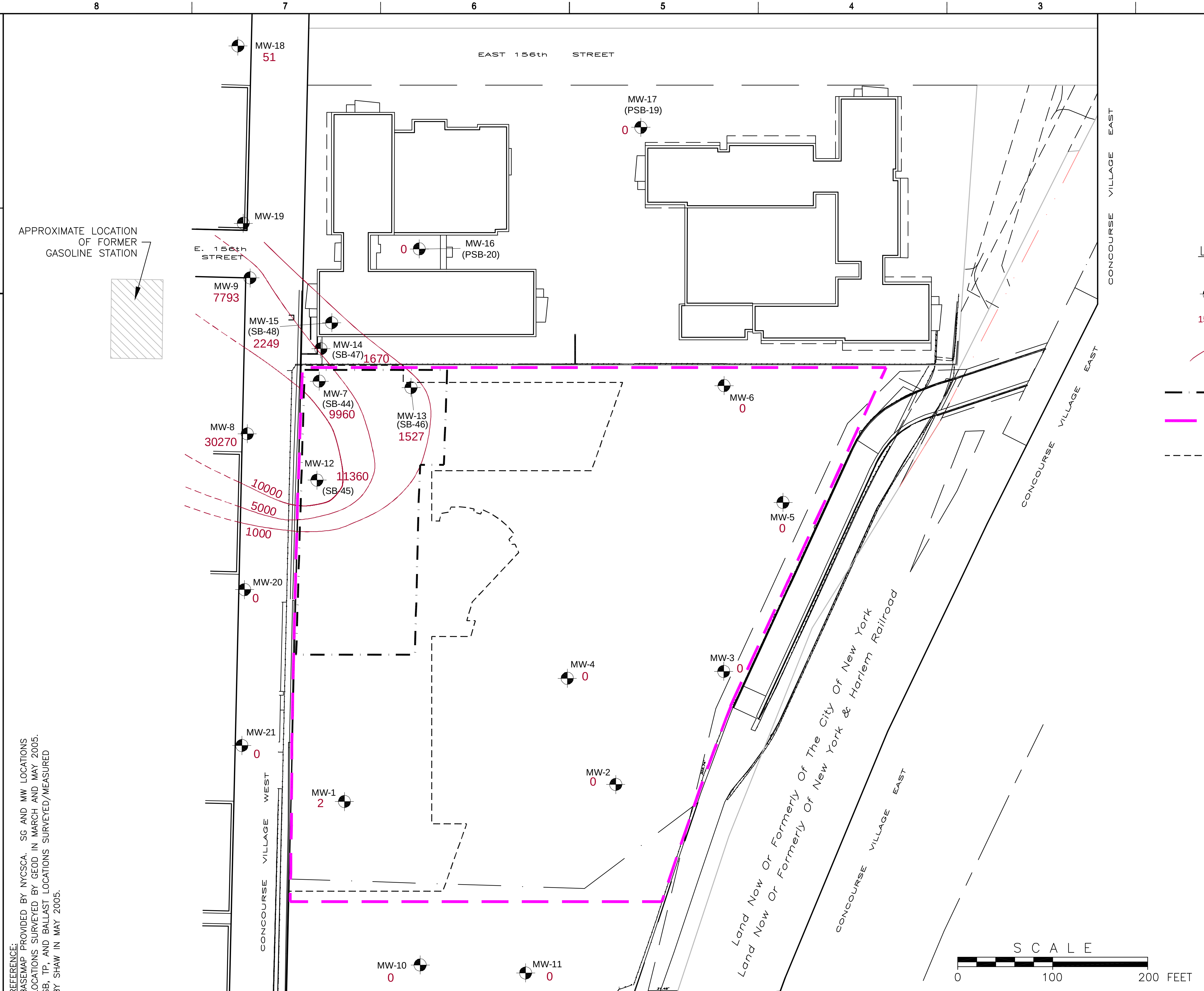
Plot Date/Time: 11/27/07 04:40pm Image: .
Plotted by: william.snyder
REV
DESCRIPTION / ISSUE
DATE
APPROVED
Shaw Shaw Environmental, Inc.
DESIGNED BY: HF/CK
DRAWN BY: R.T./SSH
CHECKED BY: D. STOLL
APPROVED BY: D. STOLL
SCHOOL CONSTRUCTION AUTHORITY
NAPHTHALENE IN SOIL
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY
DATE: 7/30/07
SCALE: AS SHOWN
DRAWING NO. 114926B55-SMP
FIGURE 14



LEGEND

- MONITORING WELL
- 1527 — BTEX CONCENTRATION
- BTEX CONTOUR (ppb) (DASHED WERE INFERRED)
- EXTENT OF BCP AREA
- EXTENT OF MOTT HAVEN SCHOOL CAMPUS
- FOOTPRINT OF SCHOOL BUILDINGS

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

OFFICE: ALBANY, NY
DRAWING NUMBER: 114926B53-SMP

VERIFY SCALE 0 1"

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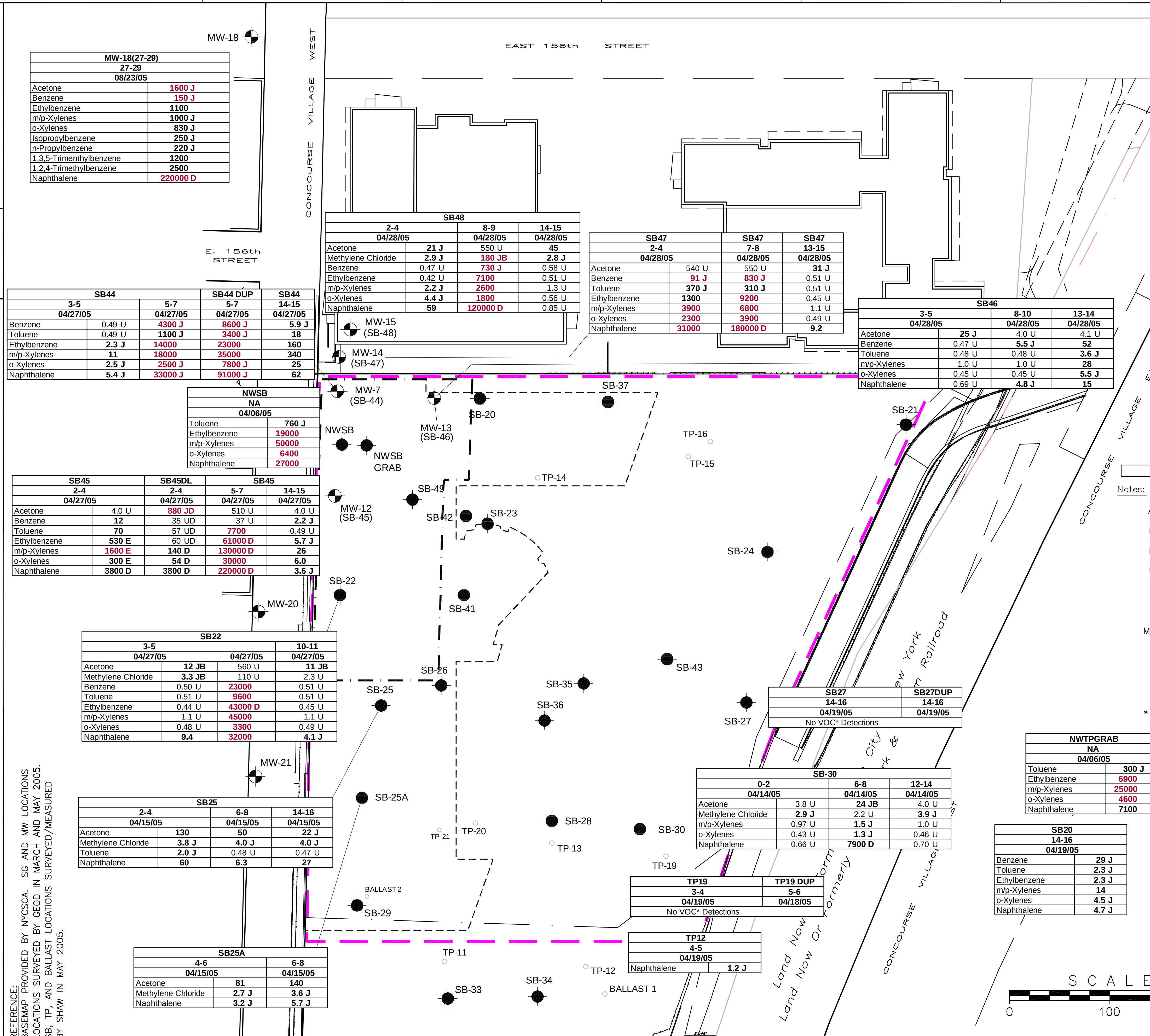
Plot Date/Time: 11/27/07 04:38pm
Plotted by: william.snyder

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/CK	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	BTEX IN GROUNDWATER
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B53-SMP	15



MW-18(27-29)	
27-29	
08/23/05	
Acetone	1600 J
Benzene	150 J
Ethylbenzene	1100
m/p-Xylenes	1000 J
o-Xylenes	830 J
Isopropylbenzene	250 J
n-Propylbenzene	220 J
1,3,5-Trimenthylbenzene	1200
1,2,4-Trimethylbenzene	2500
Naphthalene	220000 D

SB48			
	2-4	8-9	14-15
	04/28/05	04/28/05	04/28/05
Acetone	21 J	550 U	45
Methylene Chloride	2.9 J	180 JB	2.8 J
Benzene	0.47 U	730 J	0.58 U
Ethylbenzene	0.42 U	7100	0.51 U
m/p-Xylenes	2.2 J	2600	1.3 U
o-Xylenes	4.4 J	1800	0.56 U
Naphthalene	59	120000 D	0.85 U

	SB47	SB47	SB47
	2-4	7-8	13-15
	04/28/05	04/28/05	04/28/05
Acetone	540 U	550 U	31 J
Benzene	91 J	830 J	0.51 U
Toluene	370 J	310 J	0.51 U
Ethylbenzene	1300	9200	0.45 U
m/p-Xylenes	3900	6800	1.1 U
o-Xylenes	2300	3900	0.49 U
Naphthalene	31000	180000 D	9.2

SB46			
	3-5	8-10	13-14
	04/28/05	04/28/05	04/28/05
Acetone	25 J	4.0 U	4.1 U
Benzene	0.47 U	5.5 J	52
Toluene	0.48 U	0.48 U	3.6 J
m/p-Xylenes	1.0 U	1.0 U	28
o-Xylenes	0.45 U	0.45 U	5.5 J
Naphthalene	0.69 U	4.8 J	15

	SB44		SB44 DUP	SB44
	3-5	5-7	5-7	14-15
	04/27/05	04/27/05	04/27/05	04/27/05
Benzene	0.49 U	4300 J	8600 J	5.9 J
Toluene	0.49 U	1100 J	3400 J	18
Ethylbenzene	2.3 J	14000	23000	160
m/p-Xylenes	11	18000	35000	340
o-Xylenes	2.5 J	2500 J	7800 J	25
Naphthalene	5.4 J	33000 J	91000 J	62

NWSB	
NA	
04/06/05	
Toluene	760 J
Ethylbenzene	19000
m/p-Xylenes	50000
o-Xylenes	6400
Naphthalene	27000

	SB45	SB45DL	SB45	
	2-4	2-4	5-7	14-15
	04/27/05	04/27/05	04/27/05	04/27/05
Acetone	4.0 U	880 JD	510 U	4.0 U
Benzene	12	35 UD	37 U	2.2 J
Toluene	70	57 UD	7700	0.49 U
Ethylbenzene	530 E	60 UD	61000 D	5.7 J
m/p-Xylenes	1600 E	140 D	130000 D	26
o-Xylenes	300 E	54 D	30000	6.0
Naphthalene	3800 D	3800 D	220000 D	3.6 J

SB22			
	3-5		10-11
	04/27/05	04/27/05	04/27/05
Acetone	12 JB	560 U	11 JB
Methylene Chloride	3.3 JB	110 U	2.3 U
Benzene	0.50 U	23000	0.51 U
Toluene	0.51 U	9600	0.51 U
Ethylbenzene	0.44 U	43000 D	0.45 U
m/p-Xylenes	1.1 U	45000	1.1 U
o-Xylenes	0.48 U	3300	0.49 U
Naphthalene	9.4	32000	4.1 J

SB25			
	2-4	6-8	14-16
	04/15/05	04/15/05	04/15/05
Acetone	130	50	22 J
Methylene Chloride	3.8 J	4.0 J	4.0 J
Toluene	2.0 J	0.48 U	0.47 U
Naphthalene	60	6.3	27

SB25A		
	4-6	6-8
	04/15/05	04/15/05
Acetone	81	140
Methylene Chloride	2.7 J	3.6 J
Naphthalene	3.2 J	5.7 J

SB27	SB27DUP
14-16	14-16
04/19/05	04/19/05
No VOC* Detections	

SB-30			
	0-2	6-8	12-14
	04/14/05	04/14/05	04/14/05
Acetone	3.8 U	24 JB	4.0 U
Methylene Chloride	2.9 J	2.2 U	3.9 J
m/p-Xylenes	0.97 U	1.5 J	1.0 U
o-Xylenes	0.43 U	1.3 J	0.46 U
Naphthalene	0.66 U	7900 D	0.70 U

TP19	TP19 DUP
3-4	5-6
04/19/05	04/18/05
No VOC* Detections	

TP12	
4-5	
04/19/05	
Naphthalene	1.2 J

NWTPGRAB	
NA	
04/06/05	
Toluene	300 J
Ethylbenzene	6900
m/p-Xylenes	25000
o-Xylenes	4600
Naphthalene	7100

SB20	
14-16	
04/19/05	
Benzene	29 J
Toluene	2.3 J
Ethylbenzene	2.3 J
m/p-Xylenes	14
o-Xylenes	4.5 J
Naphthalene	4.7 J

LEGEND

- MONITORING WELL
- SOIL BORING
- TEST PIT/BALLAST PILE
- EXTENT OF BCP AREA
- EXTENT OF MOTT HAVEN SCHOOL CAMPUS
- FOOTPRINT OF SCHOOL BUILDINGS

TP12		
4-5		SAMPLE IDENTIFICATION
04/19/05		DEPTH IN FEET
		SAMPLE DATE
Naphthalene	1.2 J	ANALYTICAL RESULT

SB27 | SB27DUP — SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per billion (ppb) or microgram per kilogram (ug/kg)

B – Analyte was found in the blank as well as the sample.

D – Analysis at a secondary dilution factor.

U – Analyte not detected

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

MW–8, MW–9 and MW–19 not shown because they were not sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

SCALE 0 100 200 FEET

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

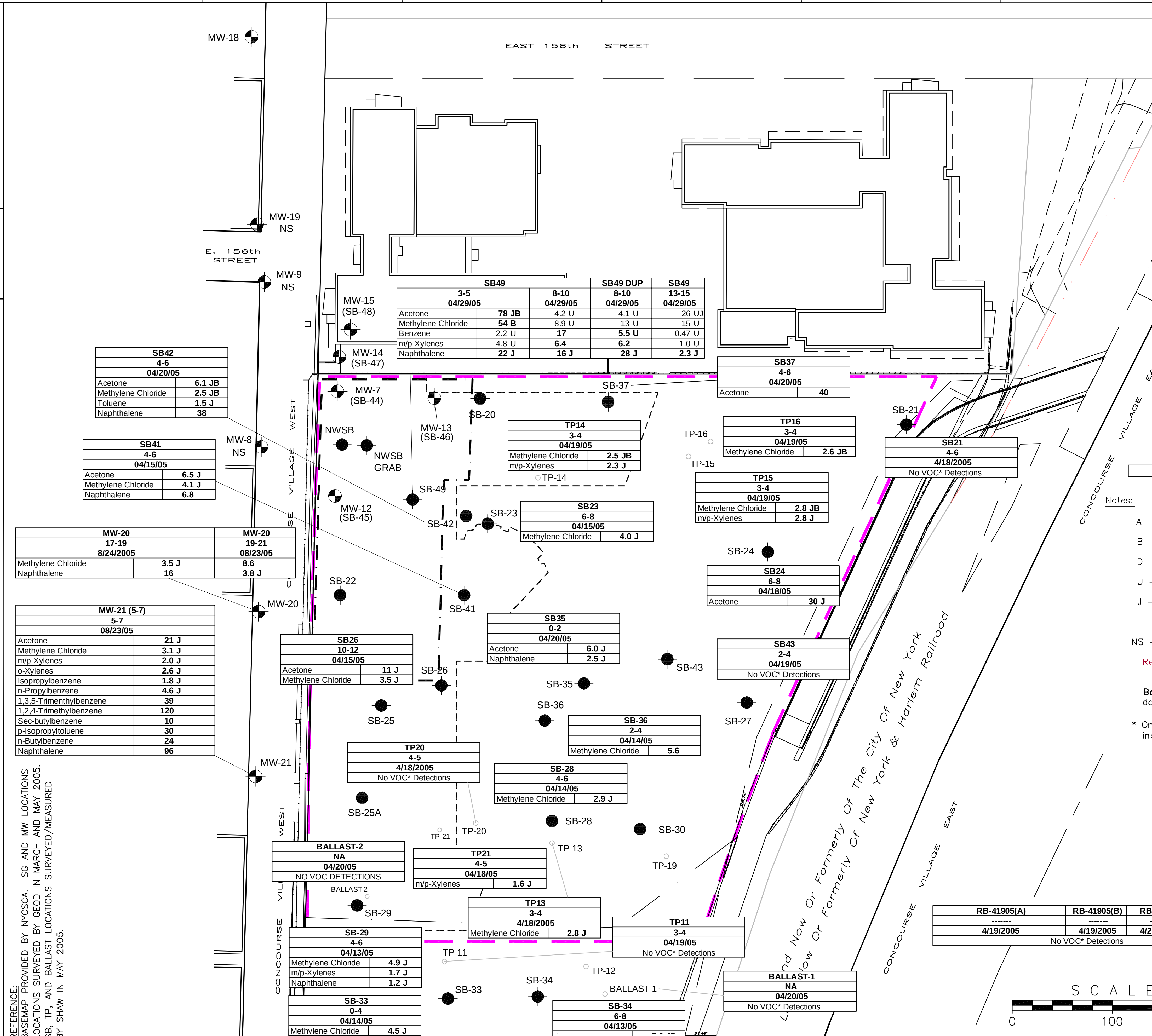
VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	VOC COMPOUNDS DETECTED IN SOIL (FIGURE 1 OF 2) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	
APPROVED BY: D. STOLL	DATE: 8/6/07 · SCALE: AS SHOWN · DRAWING NO. 114926B62–SMP_V2 · FIGURE 16A

OFFICE ALBANY, NY | DRAWING NUMBER 114926B63-SMP_V2



SB49		SB49	SB49 DUP	SB49
	3-5	8-10	8-10	13-15
	04/29/05	04/29/05	04/29/05	04/29/05
Acetone	78 JB	4.2 U	4.1 U	26 UJ
Methylene Chloride	54 B	8.9 U	13 U	15 U
Benzene	2.2 U	17	5.5 U	0.47 U
m/p-Xylenes	4.8 U	6.4	6.2	1.0 U
Naphthalene	22 J	16 J	28 J	2.3 J

SB42	
4-6	
04/20/05	
Acetone	6.1 JB
Methylene Chloride	2.5 JB
Toluene	1.5 J
Naphthalene	38

SB41	
4-6	
04/15/05	
Acetone	6.5 J
Methylene Chloride	4.1 J
Naphthalene	6.8

	MW-20	MW-20
	17-19	19-21
	8/24/2005	08/23/05
Methylene Chloride	3.5 J	8.6
Naphthalene	16	3.8 J

MW-21 (5-7)	
5-7	
08/23/05	
Acetone	21 J
Methylene Chloride	3.1 J
m/p-Xylenes	2.0 J
o-Xylenes	2.6 J
Isopropylbenzene	1.8 J
n-Propylbenzene	4.6 J
1,3,5-Trimenthylbenzene	39
1,2,4-Trimethylbenzene	120
Sec-butylbenzene	10
p-Isopropyltoluene	30
n-Butylbenzene	24
Naphthalene	96

SB37	
4-6	
04/20/05	
Acetone	40

TP14	
3-4	
04/19/05	
Methylene Chloride	2.5 JB
m/p-Xylenes	2.3 J

TP16	
3-4	
04/19/05	
Methylene Chloride	2.6 JB

SB21
4-6
4/18/2005
No VOC* Detections

TP15	
3-4	
04/19/05	
Methylene Chloride	2.8 JB
m/p-Xylenes	2.8 J

SB23	
6-8	
04/15/05	
Methylene Chloride	4.0 J

SB24	
6-8	
04/18/05	
Acetone	30 J

SB35	
0-2	
04/20/05	
Acetone	6.0 J
Naphthalene	2.5 J

SB26	
10-12	
04/15/05	
Acetone	11 J
Methylene Chloride	3.5 J

SB43
2-4
04/19/05
No VOC* Detections

SB-36	
2-4	
04/14/05	
Methylene Chloride	5.6

TP20
4-5
4/18/2005
No VOC* Detections

SB-28	
4-6	
04/14/05	
Methylene Chloride	2.9 J

BALLAST-2
NA
04/20/05
NO VOC DETECTIONS

TP21	
4-5	
04/18/05	
m/p-Xylenes	1.6 J

TP13	
3-4	
4/18/2005	
Methylene Chloride	2.8 J

TP11
3-4
04/19/05
No VOC* Detections

SB-29	
4-6	
04/13/05	
Methylene Chloride	4.9 J
m/p-Xylenes	1.7 J
Naphthalene	1.2 J

BALLAST-1
NA
04/20/05
No VOC* Detections

SB-33	
0-4	
04/14/05	
Methylene Chloride	4.5 J

SB-34
6-8
04/13/05

RB-41905(A)	RB-41905(B)	RB-42005	TB-42005
-------	-------	-------	-------
4/19/2005	4/19/2005	4/20/2005	4/20/2005
No VOC* Detections			

LEGEND

MONITORING WELL
SOIL BORING
TEST PIT/BALLAST PILE
EXTENT OF BCP AREA
EXTENT OF MOTT HAVEN SCHOOL CAMPUS
FOOTPRINT OF SCHOOL BUILDINGS

TP13		
3-4		SAMPLE IDENTIFICATION
4/18/2005		DEPTH IN FEET
		SAMPLE DATE
Methylene Chloride	2.8 J	ANALYTICAL RESULT

TP-19	TP-19DUP	SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per billion (ppb) or microgram per kilogram (ug/kg)

B – Analyte was found in the blank as well as the sample.

D – Analysis at a secondary dilution factor.

U – Analyte not detected

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

NS – Not Sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

SCALE 0 100 200 FEET

VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	VOC COMPOUNDS DETECTED IN SOIL (FIGURE 2 OF 2) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	8/6/07	AS SHOWN	114926B63–SMP_V2	16B

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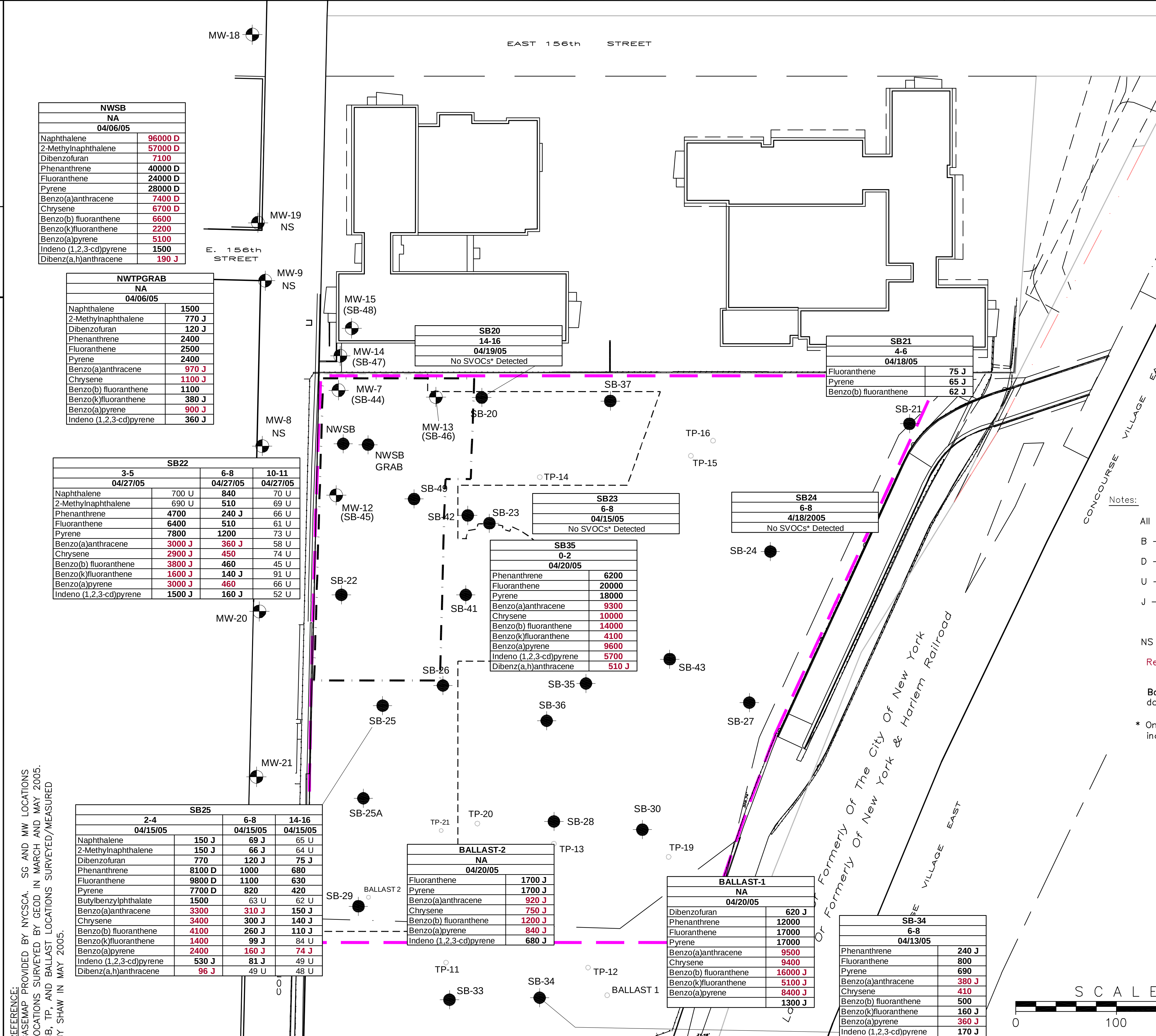

NWSB	
NA	
04/06/05	
Naphthalene	**96000 D**
2-Methylnaphthalene	**57000 D**
Dibenzofuran	**7100**
Phenanthrene	**40000 D**
Fluoranthene	**24000 D**
Pyrene	**28000 D**
Benzo(a)anthracene	**7400 D**
Chrysene	**6700 D**
Benzo(b) fluoranthene	**6600**
Benzo(k)fluoranthene	**2200**
Benzo(a)pyrene	**5100**
Indeno (1,2,3-cd)pyrene	**1500**
Dibenz(a,h)anthracene	**190 J**

NWTPGRAB	
NA	
04/06/05	
Naphthalene	**1500**
2-Methylnaphthalene	**770 J**
Dibenzofuran	**120 J**
Phenanthrene	**2400**
Fluoranthene	**2500**
Pyrene	**2400**
Benzo(a)anthracene	**970 J**
Chrysene	**1100 J**
Benzo(b) fluoranthene	**1100**
Benzo(k)fluoranthene	**380 J**
Benzo(a)pyrene	**900 J**
Indeno (1,2,3-cd)pyrene	**360 J**

SB22			
	3-5	6-8	10-11
	04/27/05	04/27/05	04/27/05
Naphthalene	700 U	**840**	70 U
2-Methylnaphthalene	690 U	**510**	69 U
Phenanthrene	**4700**	**240 J**	66 U
Fluoranthene	**6400**	**510**	61 U
Pyrene	**7800**	**1200**	73 U
Benzo(a)anthracene	**3000 J**	**360 J**	58 U
Chrysene	**2900 J**	**450**	74 U
Benzo(b) fluoranthene	**3800 J**	**460**	45 U
Benzo(k)fluoranthene	**1600 J**	**140 J**	91 U
Benzo(a)pyrene	**3000 J**	**460**	66 U
Indeno (1,2,3-cd)pyrene	**1500 J**	**160 J**	52 U

SB20
14-16
04/19/05
No SVOCs* Detected

SB21	
4-6	
04/18/05	
Fluoranthene	**75 J**
Pyrene	**65 J**
Benzo(b) fluoranthene	**62 J**

SB23
6-8
04/15/05
No SVOCs* Detected

SB24
6-8
4/18/2005
No SVOCs* Detected

SB35	
0-2	
04/20/05	
Phenanthrene	**6200**
Fluoranthene	**20000**
Pyrene	**18000**
Benzo(a)anthracene	**9300**
Chrysene	**10000**
Benzo(b) fluoranthene	**14000**
Benzo(k)fluoranthene	**4100**
Benzo(a)pyrene	**9600**
Indeno (1,2,3-cd)pyrene	**5700**
Dibenz(a,h)anthracene	**510 J**

SB25			
	2-4	6-8	14-16
	04/15/05	04/15/05	04/15/05
Naphthalene	**150 J**	**69 J**	65 U
2-Methylnaphthalene	**150 J**	**66 J**	64 U
Dibenzofuran	**770**	**120 J**	**75 J**
Phenanthrene	**8100 D**	**1000**	**680**
Fluoranthene	**9800 D**	**1100**	**630**
Pyrene	**7700 D**	**820**	**420**
Butylbenzylphthalate	**1500**	63 U	62 U
Benzo(a)anthracene	**3300**	**310 J**	**150 J**
Chrysene	**3400**	**300 J**	**140 J**
Benzo(b) fluoranthene	**4100**	**260 J**	**110 J**
Benzo(k)fluoranthene	**1400**	**99 J**	84 U
Benzo(a)pyrene	**2400**	**160 J**	**74 J**
Indeno (1,2,3-cd)pyrene	**530 J**	**81 J**	49 U
Dibenz(a,h)anthracene	**96 J**	49 U	48 U

BALLAST-2	
NA	
04/20/05	
Fluoranthene	**1700 J**
Pyrene	**1700 J**
Benzo(a)anthracene	**920 J**
Chrysene	**750 J**
Benzo(b) fluoranthene	**1200 J**
Benzo(a)pyrene	**840 J**
Indeno (1,2,3-cd)pyrene	**680 J**

BALLAST-1	
NA	
04/20/05	
Dibenzofuran	**620 J**
Phenanthrene	**12000**
Fluoranthene	**17000**
Pyrene	**17000**
Benzo(a)anthracene	**9500**
Chrysene	**9400**
Benzo(b) fluoranthene	**16000 J**
Benzo(k)fluoranthene	**5100 J**
Benzo(a)pyrene	**8400 J**
	1300 J

SB-34	
6-8	
04/13/05	
Phenanthrene	**240 J**
Fluoranthene	**800**
Pyrene	**690**
Benzo(a)anthracene	**380 J**
Chrysene	**410**
Benzo(b) fluoranthene	**500**
Benzo(k)fluoranthene	**160 J**
Benzo(a)pyrene	**360 J**
Indeno (1,2,3-cd)pyrene	**170 J**

LEGEND

MONITORING WELL

SOIL BORING

TEST PIT/BALLAST PILE

EXTENT OF BCP AREA

EXTENT OF MOTT HAVEN SCHOOL CAMPUS

FOOTPRINT OF SCHOOL BUILDINGS

SB24	
6-8	DEPTH IN FEET
4/18/2005	SAMPLE DATE
No SVOCs* Detected	ANALYTICAL RESULT

(SB24 = SAMPLE IDENTIFICATION)

Notes:

All results are in parts per billion (ppb) or microgram per kilogram (ug/kg)

B – Analyte was found in the blank as well as the sample.

D – Analysis at a secondary dilution factor.

U – Analyte not detected

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

NS – Not Sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

SCALE

0 100 200 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SVOC COMPOUNDS DETECTED IN SOIL (FIGURE 1 OF 4) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	
APPROVED BY: D. STOLL	DATE: 8/6/07 · SCALE: AS SHOWN · DRAWING NO. 114926B66–SMP_V2 · FIGURE 17A

OFFICE ALBANY, NY
DRAWING NUMBER 114926B66-SMP_V2

VERIFY SCALE 0 1"

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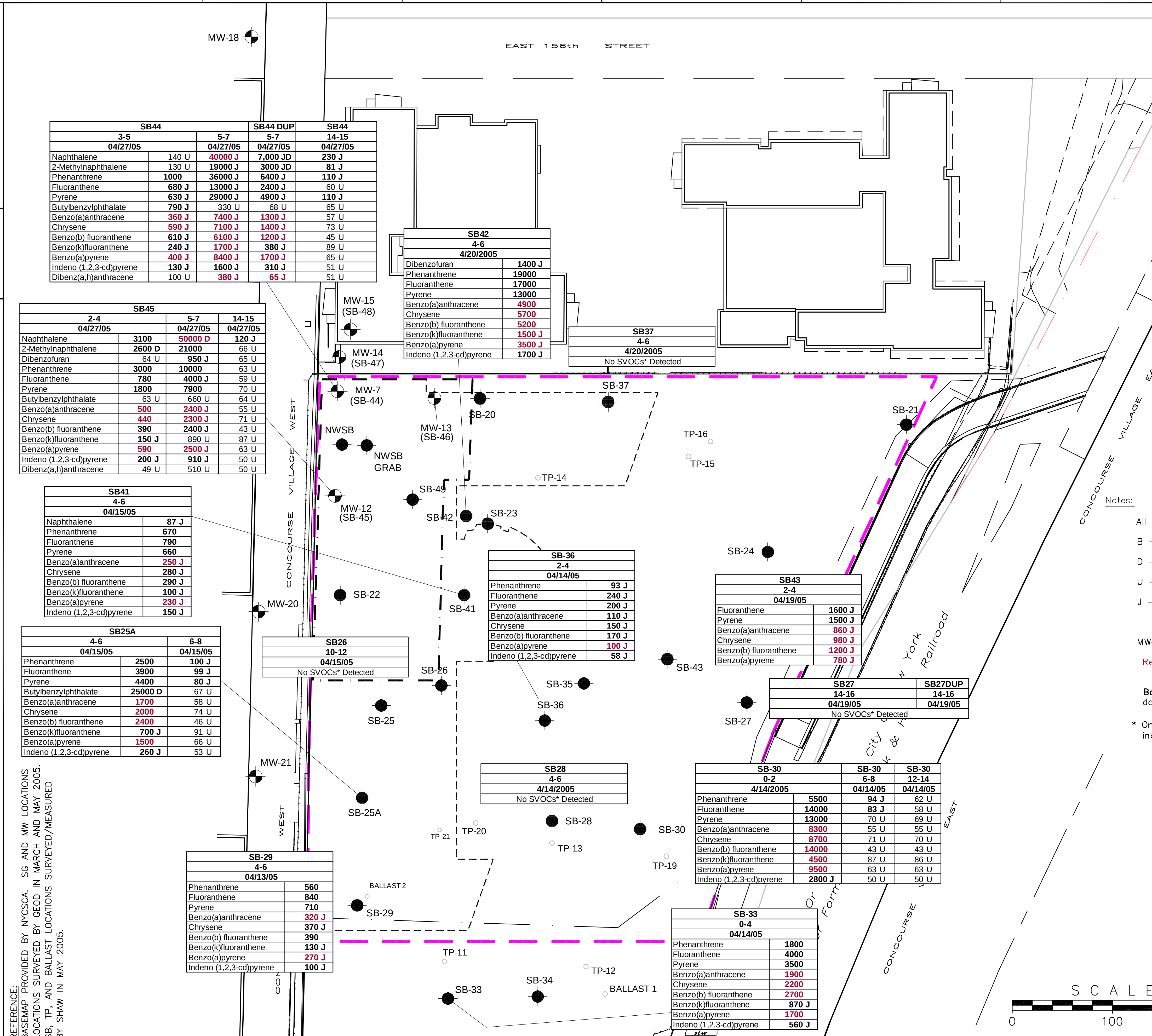
OFFICE ALBANY, NY

DRAWING NUMBER 114926B67-SMP_V2



SB44		SB44	SB44 DUP	SB44
3-5		5-7	5-7	14-15
04/27/05		04/27/05	04/27/05	04/27/05
Naphthalene	140 U	**40000 J**	**7,000 JD**	**230 J**
2-Methylnaphthalene	130 U	**19000 J**	**3000 JD**	**81 J**
Phenanthrene	**1000**	**36000 J**	**6400 J**	**110 J**
Fluoranthene	**680 J**	**13000 J**	**2400 J**	60 U
Pyrene	**630 J**	**29000 J**	**4900 J**	**110 J**
Butylbenzylphthalate	**790 J**	330 U	68 U	65 U
Benzo(a)anthracene	**360 J**	**7400 J**	**1300 J**	57 U
Chrysene	**590 J**	**7100 J**	**1400 J**	73 U
Benzo(b) fluoranthene	**610 J**	**6100 J**	**1200 J**	45 U
Benzo(k)fluoranthene	**240 J**	**1700 J**	**380 J**	89 U
Benzo(a)pyrene	**400 J**	**8400 J**	**1700 J**	65 U
Indeno (1,2,3-cd)pyrene	**130 J**	**1600 J**	**310 J**	51 U
Dibenz(a,h)anthracene	100 U	**380 J**	**65 J**	51 U

SB45		SB45	SB45
2-4		5-7	14-15
04/27/05		04/27/05	04/27/05
Naphthalene	**3100**	**50000 D**	**120 J**
2-Methylnaphthalene	**2600 D**	**21000**	66 U
Dibenzofuran	64 U	**950 J**	65 U
Phenanthrene	**3000**	**10000**	63 U
Fluoranthene	**780**	**4000 J**	59 U
Pyrene	**1800**	**7900**	70 U
Butylbenzylphthalate	63 U	660 U	64 U
Benzo(a)anthracene	**500**	**2400 J**	55 U
Chrysene	**440**	**2300 J**	71 U
Benzo(b) fluoranthene	**390**	**2400 J**	43 U
Benzo(k)fluoranthene	**150 J**	890 U	87 U
Benzo(a)pyrene	**590**	**2500 J**	63 U
Indeno (1,2,3-cd)pyrene	**200 J**	**910 J**	50 U
Dibenz(a,h)anthracene	49 U	510 U	50 U

SB42	
4-6	
4/20/2005	
Dibenzofuran	**1400 J**
Phenanthrene	**19000**
Fluoranthene	**17000**
Pyrene	**13000**
Benzo(a)anthracene	**4900**
Chrysene	**5700**
Benzo(b) fluoranthene	**5200**
Benzo(k)fluoranthene	**1500 J**
Benzo(a)pyrene	**3500 J**
Indeno (1,2,3-cd)pyrene	**1700 J**

SB37
4-6
4/20/2005
No SVOCs* Detected

SB41	
4-6	
04/15/05	
Naphthalene	**87 J**
Phenanthrene	**670**
Fluoranthene	**790**
Pyrene	**660**
Benzo(a)anthracene	**250 J**
Chrysene	**280 J**
Benzo(b) fluoranthene	**290 J**
Benzo(k)fluoranthene	**100 J**
Benzo(a)pyrene	**230 J**
Indeno (1,2,3-cd)pyrene	**150 J**

SB-36	
2-4	
04/14/05	
Phenanthrene	**93 J**
Fluoranthene	**240 J**
Pyrene	**200 J**
Benzo(a)anthracene	**110 J**
Chrysene	**150 J**
Benzo(b) fluoranthene	**170 J**
Benzo(a)pyrene	**100 J**
Indeno (1,2,3-cd)pyrene	**58 J**

SB43	
2-4	
04/19/05	
Fluoranthene	**1600 J**
Pyrene	**1500 J**
Benzo(a)anthracene	**860 J**
Chrysene	**980 J**
Benzo(b) fluoranthene	**1200 J**
Benzo(a)pyrene	**780 J**

SB25A		SB25A
4-6		6-8
04/15/05		04/15/05
Phenanthrene	**2500**	**100 J**
Fluoranthene	**3900**	**99 J**
Pyrene	**4400**	**80 J**
Butylbenzylphthalate	**25000 D**	67 U
Benzo(a)anthracene	**1700**	58 U
Chrysene	**2000**	74 U
Benzo(b) fluoranthene	**2400**	46 U
Benzo(k)fluoranthene	**700 J**	91 U
Benzo(a)pyrene	**1500**	66 U
Indeno (1,2,3-cd)pyrene	**260 J**	53 U

SB26
10-12
04/15/05
No SVOCs* Detected

SB27	SB27DUP
14-16	14-16
04/19/05	04/19/05
No SVOCs* Detected	

SB28
4-6
4/14/2005
No SVOCs* Detected

SB-30		SB-30	SB-30
0-2		6-8	12-14
4/14/2005		04/14/05	04/14/05
Phenanthrene	**5500**	**94 J**	62 U
Fluoranthene	**14000**	**83 J**	58 U
Pyrene	**13000**	70 U	69 U
Benzo(a)anthracene	**8300**	55 U	55 U
Chrysene	**8700**	71 U	70 U
Benzo(b) fluoranthene	**14000**	43 U	43 U
Benzo(k)fluoranthene	**4500**	87 U	86 U
Benzo(a)pyrene	**9500**	63 U	63 U
Indeno (1,2,3-cd)pyrene	**2800 J**	50 U	50 U

SB-29	
4-6	
04/13/05	
Phenanthrene	**560**
Fluoranthene	**840**
Pyrene	**710**
Benzo(a)anthracene	**320 J**
Chrysene	**370 J**
Benzo(b) fluoranthene	**390**
Benzo(k)fluoranthene	**130 J**
Benzo(a)pyrene	**270 J**
Indeno (1,2,3-cd)pyrene	**100 J**

SB-33	
0-4	
04/14/05	
Phenanthrene	**1800**
Fluoranthene	**4000**
Pyrene	**3500**
Benzo(a)anthracene	**1900**
Chrysene	**2200**
Benzo(b) fluoranthene	**2700**
Benzo(k)fluoranthene	**870 J**
Benzo(a)pyrene	**1700**
Indeno (1,2,3-cd)pyrene	**560 J**

LEGEND

MONITORING WELL

SOIL BORING

TEST PIT/BALLAST PILE

EXTENT OF BCP AREA

EXTENT OF MOTT HAVEN SCHOOL CAMPUS

FOOTPRINT OF SCHOOL BUILDINGS

SB28	SAMPLE IDENTIFICATION
4-6	DEPTH IN FEET
4/14/2005	SAMPLE DATE
No SVOCs* Detected	ANALYTICAL RESULT

Notes:

All results are in parts per billion (ppb) or microgram per kilogram (ug/kg)

B – Analyte was found in the blank as well as the sample.

D – Analysis at a secondary dilution factor.

U – Analyte not detected

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

MW–8, MW–9 and MW–19 not shown because they were not sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

VERIFY SCALE 0 1"

SCALE 0 100 200 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SVOC COMPOUNDS DETECTED IN SOIL (FIGURE 2 OF 4) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	8/6/07	AS SHOWN	114926B67–SMP_V2	17B

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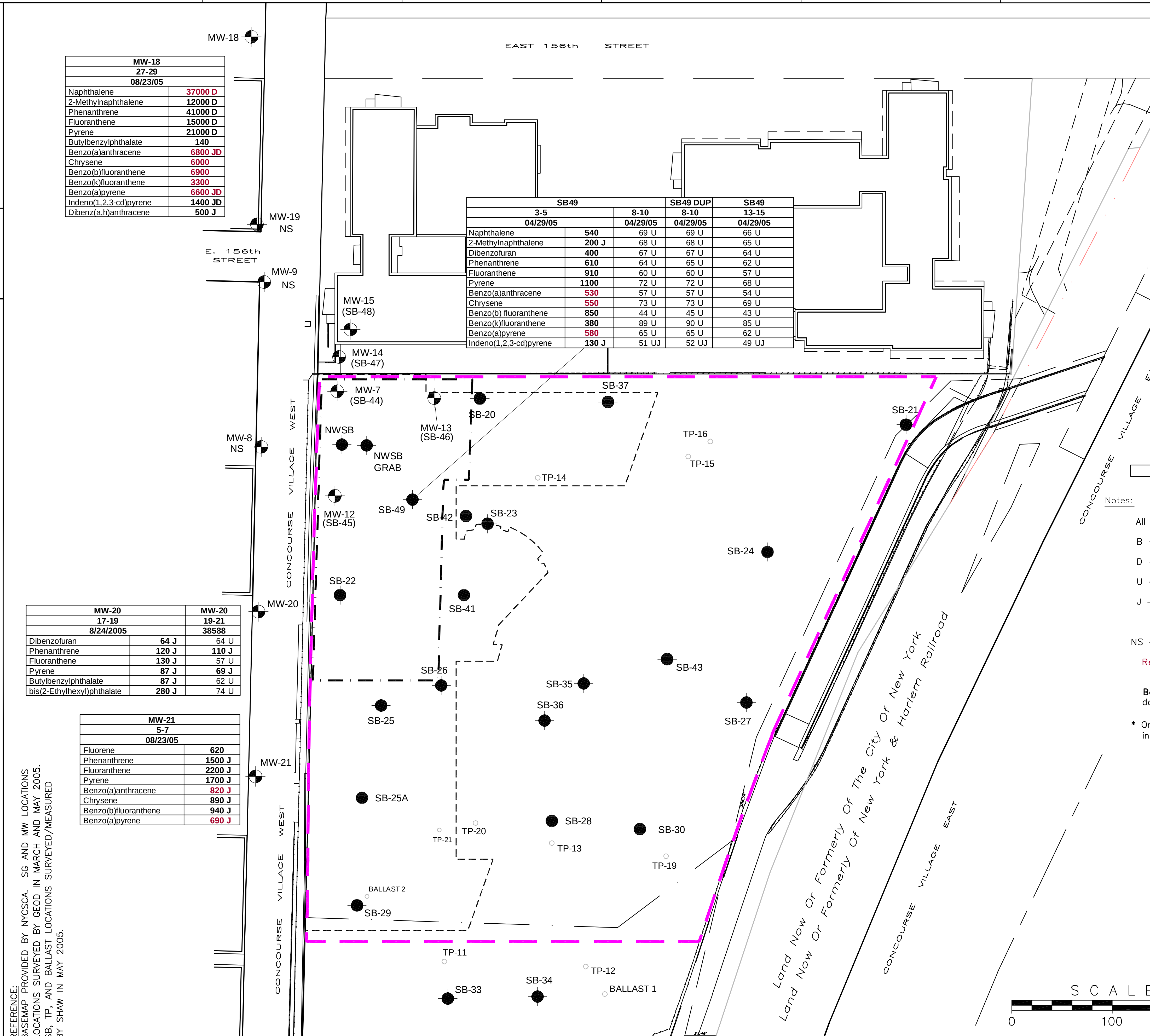
Plot Date/Time: 11/27/07 04:54pm
Plotted by: william.snyder
Xref: . Image: .



MW-18	
27-29	
08/23/05	
Naphthalene	**37000 D**
2-Methylnaphthalene	**12000 D**
Phenanthrene	**41000 D**
Fluoranthene	**15000 D**
Pyrene	**21000 D**
Butylbenzylphthalate	**140**
Benzo(a)anthracene	**6800 JD**
Chrysene	**6000**
Benzo(b)fluoranthene	**6900**
Benzo(k)fluoranthene	**3300**
Benzo(a)pyrene	**6600 JD**
Indeno(1,2,3-cd)pyrene	**1400 JD**
Dibenz(a,h)anthracene	**500 J**

SB49			SB49 DUP	SB49
3-5		8-10	8-10	13-15
04/29/05		04/29/05	04/29/05	04/29/05
Naphthalene	**540**	69 U	69 U	66 U
2-Methylnaphthalene	**200 J**	68 U	68 U	65 U
Dibenzofuran	**400**	67 U	67 U	64 U
Phenanthrene	**610**	64 U	65 U	62 U
Fluoranthene	**910**	60 U	60 U	57 U
Pyrene	**1100**	72 U	72 U	68 U
Benzo(a)anthracene	**530**	57 U	57 U	54 U
Chrysene	**550**	73 U	73 U	69 U
Benzo(b) fluoranthene	**850**	44 U	45 U	43 U
Benzo(k)fluoranthene	**380**	89 U	90 U	85 U
Benzo(a)pyrene	**580**	65 U	65 U	62 U
Indeno(1,2,3-cd)pyrene	**130 J**	51 UJ	52 UJ	49 UJ

MW-20		MW-20
17-19		19-21
8/24/2005		38588
Dibenzofuran	**64 J**	64 U
Phenanthrene	**120 J**	**110 J**
Fluoranthene	**130 J**	57 U
Pyrene	**87 J**	**69 J**
Butylbenzylphthalate	**87 J**	62 U
bis(2-Ethylhexyl)phthalate	**280 J**	74 U

MW-21	
5-7	
08/23/05	
Fluorene	**620**
Phenanthrene	**1500 J**
Fluoranthene	**2200 J**
Pyrene	**1700 J**
Benzo(a)anthracene	**820 J**
Chrysene	**890 J**
Benzo(b)fluoranthene	**940 J**
Benzo(a)pyrene	**690 J**

LEGEND

MONITORING WELL
SOIL BORING
TEST PIT/BALLAST PILE
EXTENT OF BCP AREA
EXTENT OF MOTT HAVEN SCHOOL CAMPUS
FOOTPRINT OF SCHOOL BUILDINGS

MW-21		
5-7		DEPTH IN FEET
08/23/05		SAMPLE DATE
Fluorene	620	ANALYTICAL RESULT

SAMPLE IDENTIFICATION (MW-21)

SB49	SB49 DUP	
		SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per billion (ppb) or microgram per kilogram (ug/kg)

B – Analyte was found in the blank as well as the sample.

D – Analysis at a secondary dilution factor.

U – Analyte not detected

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

NS – Not Sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

SCALE
0 100 200 FEET

VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SVOC COMPOUNDS DETECTED IN SOIL (FIGURE 3 OF 4) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	8/6/07	AS SHOWN	114926B68-SMP_V2	17C

OFFICE ALBANY, NY
DRAWING NUMBER 114926B68-SMP_V2

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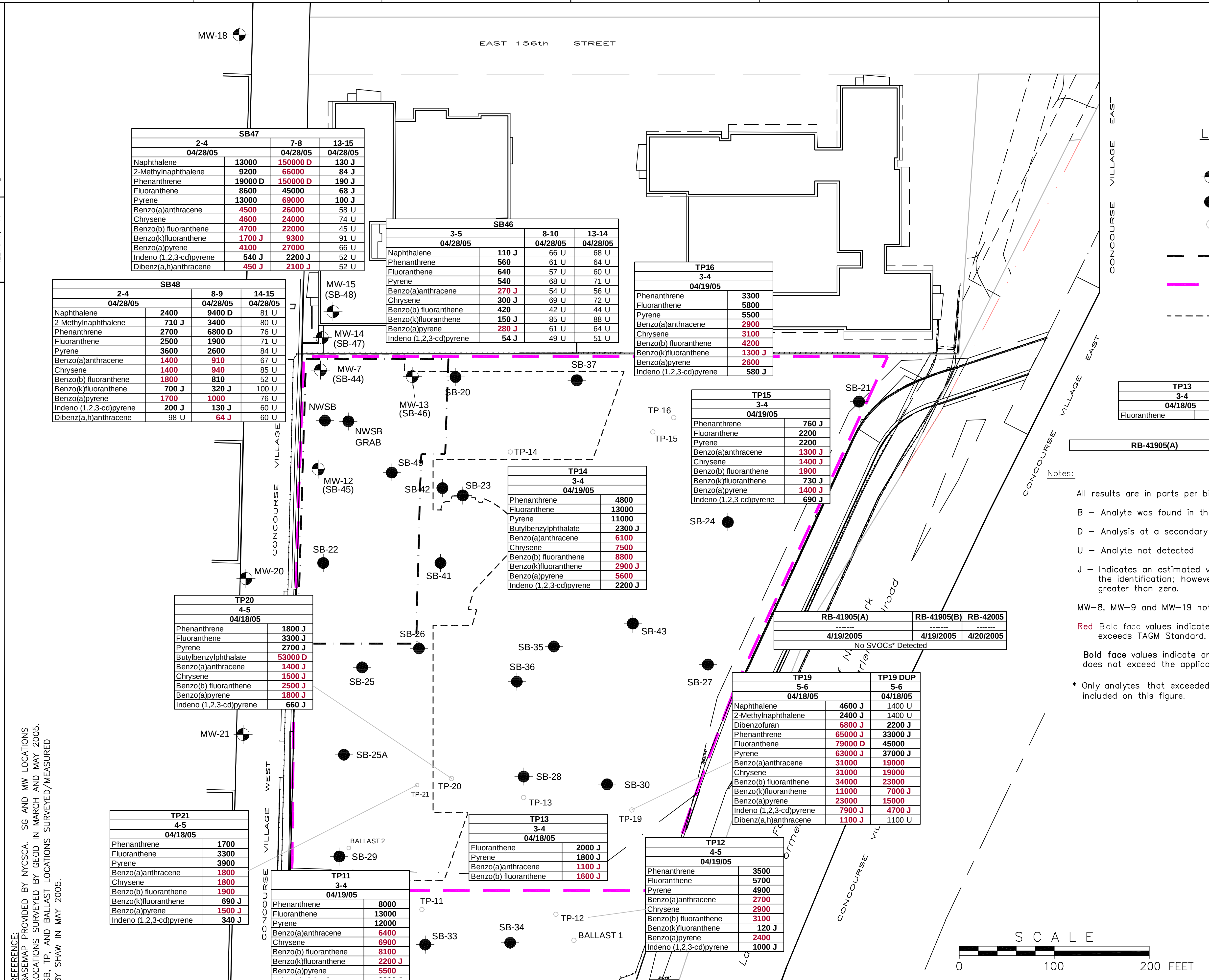
Plot Date/Time: 11/28/07 06:46am
Plotted by: william.snyder
Xref: .
Image: .

OFFICE ALBANY, NY

DRAWING NUMBER 114926B69-SMP_V2



SB47			
	2-4	7-8	13-15
	04/28/05	04/28/05	04/28/05
Naphthalene	13000	150000 D	130 J
2-Methylnaphthalene	9200	66000	84 J
Phenanthrene	19000 D	150000 D	190 J
Fluoranthene	8600	45000	68 J
Pyrene	13000	69000	100 J
Benzo(a)anthracene	4500	26000	58 U
Chrysene	4600	24000	74 U
Benzo(b) fluoranthene	4700	22000	45 U
Benzo(k)fluoranthene	1700 J	9300	91 U
Benzo(a)pyrene	4100	27000	66 U
Indeno (1,2,3-cd)pyrene	540 J	2200 J	52 U
Dibenz(a,h)anthracene	450 J	2100 J	52 U

SB48			
	2-4	8-9	14-15
	04/28/05	04/28/05	04/28/05
Naphthalene	2400	9400 D	81 U
2-Methylnaphthalene	710 J	3400	80 U
Phenanthrene	2700	6800 D	76 U
Fluoranthene	2500	1900	71 U
Pyrene	3600	2600	84 U
Benzo(a)anthracene	1400	910	67 U
Chrysene	1400	940	85 U
Benzo(b) fluoranthene	1800	810	52 U
Benzo(k)fluoranthene	700 J	320 J	100 U
Benzo(a)pyrene	1700	1000	76 U
Indeno (1,2,3-cd)pyrene	200 J	130 J	60 U
Dibenz(a,h)anthracene	98 U	64 J	60 U

SB46			
	3-5	8-10	13-14
	04/28/05	04/28/05	04/28/05
Naphthalene	110 J	66 U	68 U
Phenanthrene	560	61 U	64 U
Fluoranthene	640	57 U	60 U
Pyrene	540	68 U	71 U
Benzo(a)anthracene	270 J	54 U	56 U
Chrysene	300 J	69 U	72 U
Benzo(b) fluoranthene	420	42 U	44 U
Benzo(k)fluoranthene	150 J	85 U	88 U
Benzo(a)pyrene	280 J	61 U	64 U
Indeno (1,2,3-cd)pyrene	54 J	49 U	51 U

TP16	
3-4	
04/19/05	
Phenanthrene	3300
Fluoranthene	5800
Pyrene	5500
Benzo(a)anthracene	2900
Chrysene	3100
Benzo(b) fluoranthene	4200
Benzo(k)fluoranthene	1300 J
Benzo(a)pyrene	2600
Indeno (1,2,3-cd)pyrene	580 J

TP15	
3-4	
04/19/05	
Phenanthrene	760 J
Fluoranthene	2200
Pyrene	2200
Benzo(a)anthracene	1300 J
Chrysene	1400 J
Benzo(b) fluoranthene	1900
Benzo(k)fluoranthene	730 J
Benzo(a)pyrene	1400 J
Indeno (1,2,3-cd)pyrene	690 J

TP14	
3-4	
04/19/05	
Phenanthrene	4800
Fluoranthene	13000
Pyrene	11000
Butylbenzylphthalate	2300 J
Benzo(a)anthracene	6100
Chrysene	7500
Benzo(b) fluoranthene	8800
Benzo(k)fluoranthene	2900 J
Benzo(a)pyrene	5600
Indeno (1,2,3-cd)pyrene	2200 J

TP20	
4-5	
04/18/05	
Phenanthrene	1800 J
Fluoranthene	3300 J
Pyrene	2700 J
Butylbenzylphthalate	53000 D
Benzo(a)anthracene	1400 J
Chrysene	1500 J
Benzo(b) fluoranthene	2500 J
Benzo(a)pyrene	1800 J
Indeno (1,2,3-cd)pyrene	660 J

RB-41905(A)	RB-41905(B)	RB-42005
-------	-------	-------
4/19/2005	4/19/2005	4/20/2005
No SVOCs* Detected		

TP19		TP19 DUP
5-6		5-6
04/18/05		04/18/05
Naphthalene	4600 J	1400 U
2-Methylnaphthalene	2400 J	1400 U
Dibenzofuran	6800 J	2200 J
Phenanthrene	65000 J	33000 J
Fluoranthene	79000 D	45000
Pyrene	63000 J	37000 J
Benzo(a)anthracene	31000	19000
Chrysene	31000	19000
Benzo(b) fluoranthene	34000	23000
Benzo(k)fluoranthene	11000	7000 J
Benzo(a)pyrene	23000	15000
Indeno (1,2,3-cd)pyrene	7900 J	4700 J
Dibenz(a,h)anthracene	1100 J	1100 U

TP21	
4-5	
04/18/05	
Phenanthrene	1700
Fluoranthene	3300
Pyrene	3900
Benzo(a)anthracene	1800
Chrysene	1800
Benzo(b) fluoranthene	1900
Benzo(k)fluoranthene	690 J
Benzo(a)pyrene	1500 J
Indeno (1,2,3-cd)pyrene	340 J

TP13	
3-4	
04/18/05	
Fluoranthene	2000 J
Pyrene	1800 J
Benzo(a)anthracene	1100 J
Benzo(b) fluoranthene	1600 J

TP11	
3-4	
04/19/05	
Phenanthrene	8000
Fluoranthene	13000
Pyrene	12000
Benzo(a)anthracene	6400
Chrysene	6900
Benzo(b) fluoranthene	8100
Benzo(k)fluoranthene	2200 J
Benzo(a)pyrene	5500
[illegible]	[illegible]

TP12	
4-5	
04/19/05	
Phenanthrene	3500
Fluoranthene	5700
Pyrene	4900
Benzo(a)anthracene	2700
Chrysene	2900
Benzo(b) fluoranthene	3100
Benzo(k)fluoranthene	120 J
Benzo(a)pyrene	2400
Indeno (1,2,3-cd)pyrene	1000 J

SCALE 0 100 200 FEET

LEGEND

MONITORING WELL

SOIL BORING

TEST PIT/BALLAST PILE

EXTENT OF BCP AREA

EXTENT OF MOTT HAVEN SCHOOL CAMPUS

FOOTPRINT OF SCHOOL BUILDINGS

TP13	
3-4	
04/18/05	
Fluoranthene	2000 J

SAMPLE IDENTIFICATION
DEPTH IN FEET
SAMPLE DATE
ANALYTICAL RESULT

RB-41905(A)	RB-41905(B)

SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per billion (ppb) or microgram per kilogram (ug/kg)

B – Analyte was found in the blank as well as the sample.

D – Analysis at a secondary dilution factor.

U – Analyte not detected

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

MW–8, MW–9 and MW–19 not shown because they were not sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY		
DRAWN BY: R.T./SSH	SVOC COMPOUNDS DETECTED IN SOIL (FIGURE 4 OF 4) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY		
CHECKED BY: D. STOLL			
APPROVED BY: D. STOLL	DATE: 8/6/07	SCALE: AS SHOWN	DRAWING NO. 114926B69–SMP_V2	FIGURE 17D

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

VERIFY SCALE 0 1"

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Plot Date/Time: 11/27/07 04:59pm
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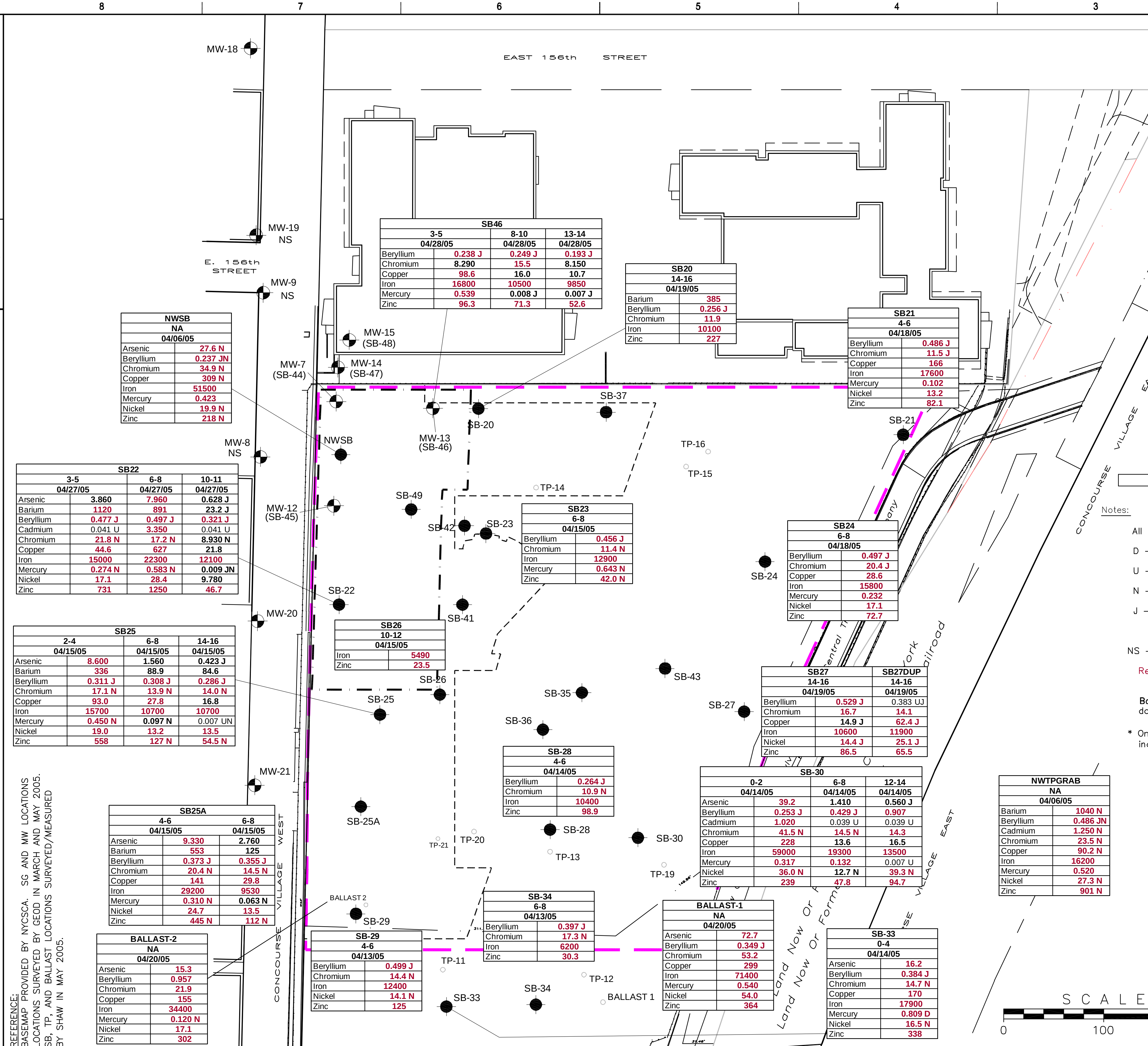

SB46			
	3-5	8-10	13-14
	04/28/05	04/28/05	04/28/05
Beryllium	0.238 J	0.249 J	0.193 J
Chromium	8.290	15.5	8.150
Copper	98.6	16.0	10.7
Iron	16800	10500	9850
Mercury	0.539	0.008 J	0.007 J
Zinc	96.3	71.3	52.6

SB20	
14-16	
04/19/05	
Barium	385
Beryllium	0.256 J
Chromium	11.9
Iron	10100
Zinc	227

SB21	
4-6	
04/18/05	
Beryllium	0.486 J
Chromium	11.5 J
Copper	166
Iron	17600
Mercury	0.102
Nickel	13.2
Zinc	82.1

NWSB	
NA	
04/06/05	
Arsenic	27.6 N
Beryllium	0.237 JN
Chromium	34.9 N
Copper	309 N
Iron	51500
Mercury	0.423
Nickel	19.9 N
Zinc	218 N

SB22			
	3-5	6-8	10-11
	04/27/05	04/27/05	04/27/05
Arsenic	3.860	7.960	0.628 J
Barium	1120	891	23.2 J
Beryllium	0.477 J	0.497 J	0.321 J
Cadmium	0.041 U	3.350	0.041 U
Chromium	21.8 N	17.2 N	8.930 N
Copper	44.6	627	21.8
Iron	15000	22300	12100
Mercury	0.274 N	0.583 N	0.009 JN
Nickel	17.1	28.4	9.780
Zinc	731	1250	46.7

SB23	
6-8	
04/15/05	
Beryllium	0.456 J
Chromium	11.4 N
Iron	12900
Mercury	0.643 N
Zinc	42.0 N

SB24	
6-8	
04/18/05	
Beryllium	0.497 J
Chromium	20.4 J
Copper	28.6
Iron	15800
Mercury	0.232
Nickel	17.1
Zinc	72.7

SB26	
10-12	
04/15/05	
Iron	5490
Zinc	23.5

SB25			
	2-4	6-8	14-16
	04/15/05	04/15/05	04/15/05
Arsenic	8.600	1.560	0.423 J
Barium	336	88.9	84.6
Beryllium	0.311 J	0.308 J	0.286 J
Chromium	17.1 N	13.9 N	14.0 N
Copper	93.0	27.8	16.8
Iron	15700	10700	10700
Mercury	0.450 N	0.097 N	0.007 UN
Nickel	19.0	13.2	13.5
Zinc	558	127 N	54.5 N

	SB27	SB27DUP
	14-16	14-16
	04/19/05	04/19/05
Beryllium	0.529 J	0.383 UJ
Chromium	16.7	14.1
Copper	14.9 J	62.4 J
Iron	10600	11900
Nickel	14.4 J	25.1 J
Zinc	86.5	65.5

SB-28	
4-6	
04/14/05	
Beryllium	0.264 J
Chromium	10.9 N
Iron	10400
Zinc	98.9

SB-30			
	0-2	6-8	12-14
	04/14/05	04/14/05	04/14/05
Arsenic	39.2	1.410	0.560 J
Beryllium	0.253 J	0.429 J	0.907
Cadmium	1.020	0.039 U	0.039 U
Chromium	41.5 N	14.5 N	14.3
Copper	228	13.6	16.5
Iron	59000	19300	13500
Mercury	0.317	0.132	0.007 U
Nickel	36.0 N	12.7 N	39.3 N
Zinc	239	47.8	94.7

NWTPGRAB	
NA	
04/06/05	
Barium	1040 N
Beryllium	0.486 JN
Cadmium	1.250 N
Chromium	23.5 N
Copper	90.2 N
Iron	16200
Mercury	0.520
Nickel	27.3 N
Zinc	901 N

SB25A		
	4-6	6-8
	04/15/05	04/15/05
Arsenic	9.330	2.760
Barium	553	125
Beryllium	0.373 J	0.355 J
Chromium	20.4 N	14.5 N
Copper	141	29.8
Iron	29200	9530
Mercury	0.310 N	0.063 N
Nickel	24.7	13.5
Zinc	445 N	112 N

BALLAST-2	
NA	
04/20/05	
Arsenic	15.3
Beryllium	0.957
Chromium	21.9
Copper	155
Iron	34400
Mercury	0.120 N
Nickel	17.1
Zinc	302

SB-29	
4-6	
04/13/05	
Beryllium	0.499 J
Chromium	14.4 N
Iron	12400
Nickel	14.1 N
Zinc	125

SB-34	
6-8	
04/13/05	
Beryllium	0.397 J
Chromium	17.3 N
Iron	6200
Zinc	30.3

BALLAST-1	
NA	
04/20/05	
Arsenic	72.7
Beryllium	0.349 J
Chromium	53.2
Copper	299
Iron	71400
Mercury	0.540
Nickel	54.0
Zinc	364

SB-33	
0-4	
04/14/05	
Arsenic	16.2
Beryllium	0.384 J
Chromium	14.7 N
Copper	170
Iron	17900
Mercury	0.809 D
Nickel	16.5 N
Zinc	338

LEGEND

MONITORING WELL

SOIL BORING

TEST PIT/BALLAST PILE

EXTENT OF BCP AREA

EXTENT OF MOTT HAVEN SCHOOL CAMPUS

FOOTPRINT OF SCHOOL BUILDINGS

SB26		
10-12		SAMPLE IDENTIFICATION
		DEPTH IN FEET
04/15/05		SAMPLE DATE
Iron	5490	ANALYTICAL RESULT

SB-27	SB-27DUP	SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per million (ppm) or milligram per kilogram (mg/kg)

D – Analysis at a secondary dilution factor.

U – Analyte not detected

N – Spiked sample recovery was not within control limits.

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

NS – Not Sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM GA Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

SCALE

0 100 200 FEET

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

SCHOOL CONSTRUCTION AUTHORITY

INORGANICS
DETECTED IN SOIL (FIGURE 1 OF 3)
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
HF/SG	R.T./SSH	D. STOLL	D. STOLL	8/6/07	AS SHOWN	114926B72–SMP_V2	18A

OFFICE ALBANY, NY

DRAWING NUMBER 114926B72-SMP_V2

VERIFY SCALE 0 1"

Image: .

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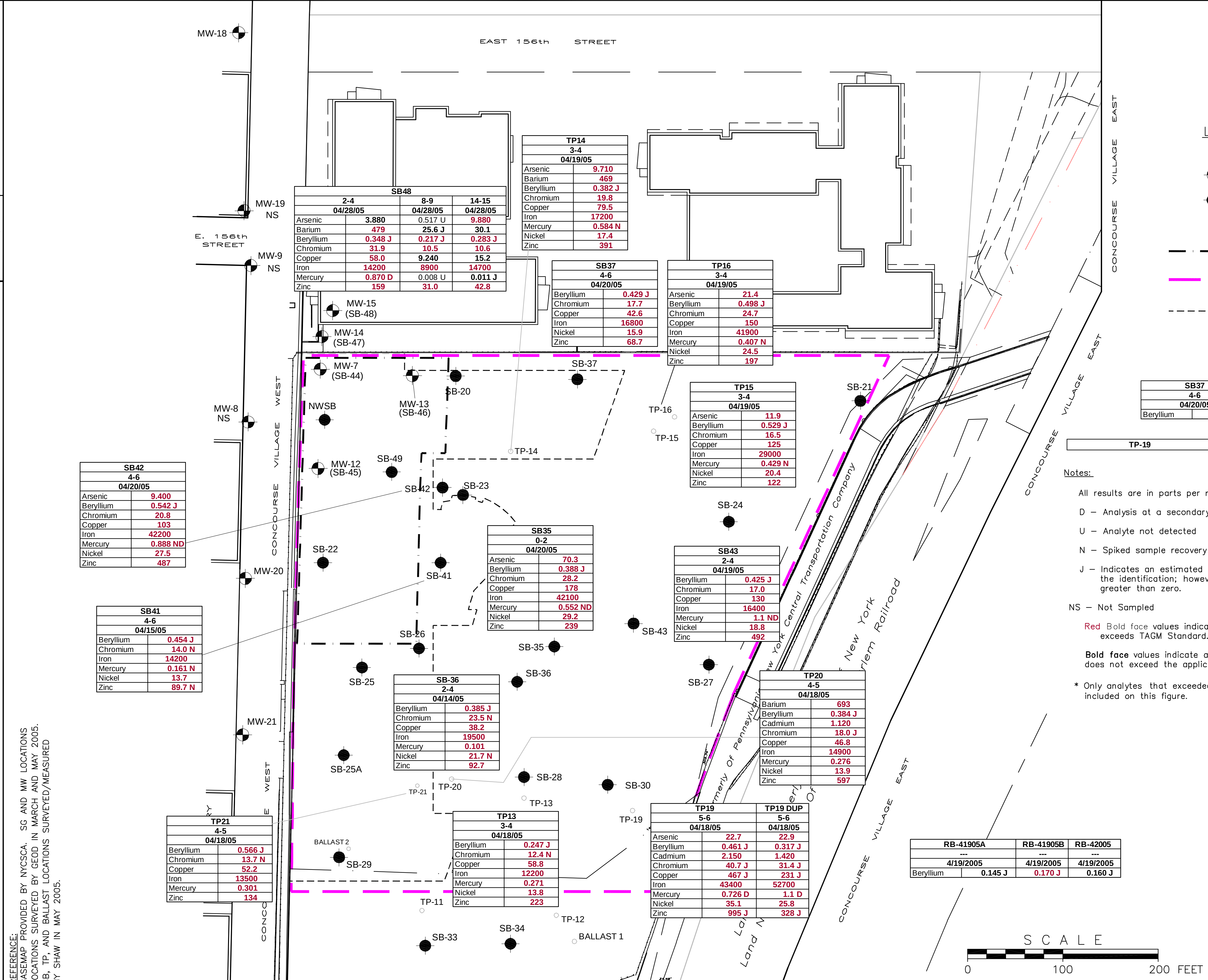
Plotted by: william.snyder



SB48			
	2-4	8-9	14-15
	04/28/05	04/28/05	04/28/05
Arsenic	**3.880**	0.517 U	**9.880**
Barium	**479**	**25.6 J**	**30.1**
Beryllium	**0.348 J**	**0.217 J**	**0.283 J**
Chromium	**31.9**	**10.5**	**10.6**
Copper	**58.0**	**9.240**	**15.2**
Iron	**14200**	**8900**	**14700**
Mercury	**0.870 D**	0.008 U	**0.011 J**
Zinc	**159**	**31.0**	**42.8**

TP14	
3-4	
04/19/05	
Arsenic	**9.710**
Barium	**469**
Beryllium	**0.382 J**
Chromium	**19.8**
Copper	**79.5**
Iron	**17200**
Mercury	**0.584 N**
Nickel	**17.4**
Zinc	**391**

SB37	
4-6	
04/20/05	
Beryllium	**0.429 J**
Chromium	**17.7**
Copper	**42.6**
Iron	**16800**
Nickel	**15.9**
Zinc	**68.7**

TP16	
3-4	
04/19/05	
Arsenic	**21.4**
Beryllium	**0.498 J**
Chromium	**24.7**
Copper	**150**
Iron	**41900**
Mercury	**0.407 N**
Nickel	**24.5**
Zinc	**197**

TP15	
3-4	
04/19/05	
Arsenic	**11.9**
Beryllium	**0.529 J**
Chromium	**16.5**
Copper	**125**
Iron	**29000**
Mercury	**0.429 N**
Nickel	**20.4**
Zinc	**122**

SB42	
4-6	
04/20/05	
Arsenic	**9.400**
Beryllium	**0.542 J**
Chromium	**20.8**
Copper	**103**
Iron	**42200**
Mercury	**0.888 ND**
Nickel	**27.5**
Zinc	**487**

SB35	
0-2	
04/20/05	
Arsenic	**70.3**
Beryllium	**0.388 J**
Chromium	**28.2**
Copper	**178**
Iron	**42100**
Mercury	**0.552 ND**
Nickel	**29.2**
Zinc	**239**

SB43	
2-4	
04/19/05	
Beryllium	**0.425 J**
Chromium	**17.0**
Copper	**130**
Iron	**16400**
Mercury	**1.1 ND**
Nickel	**18.8**
Zinc	**492**

SB41	
4-6	
04/15/05	
Beryllium	**0.454 J**
Chromium	**14.0 N**
Iron	**14200**
Mercury	**0.161 N**
Nickel	**13.7**
Zinc	**89.7 N**

SB-36	
2-4	
04/14/05	
Beryllium	**0.385 J**
Chromium	**23.5 N**
Copper	**38.2**
Iron	**19500**
Mercury	**0.101**
Nickel	**21.7 N**
Zinc	**92.7**

TP20	
4-5	
04/18/05	
Barium	**693**
Beryllium	**0.384 J**
Cadmium	**1.120**
Chromium	**18.0 J**
Copper	**46.8**
Iron	**14900**
Mercury	**0.276**
Nickel	**13.9**
Zinc	**597**

TP21	
4-5	
04/18/05	
Beryllium	**0.566 J**
Chromium	**13.7 N**
Copper	**52.2**
Iron	**13500**
Mercury	**0.301**
Zinc	**134**

TP13	
3-4	
04/18/05	
Beryllium	**0.247 J**
Chromium	**12.4 N**
Copper	**58.8**
Iron	**12200**
Mercury	**0.271**
Nickel	**13.8**
Zinc	**223**

	TP19	TP19 DUP
	5-6	5-6
	04/18/05	04/18/05
Arsenic	**22.7**	**22.9**
Beryllium	**0.461 J**	**0.317 J**
Cadmium	**2.150**	**1.420**
Chromium	**40.7 J**	**31.4 J**
Copper	**467 J**	**231 J**
Iron	**43400**	**52700**
Mercury	**0.726 D**	**1.1 D**
Nickel	**35.1**	**25.8**
Zinc	**995 J**	**328 J**

	RB-41905A	RB-41905B	RB-42005
	---	---	---
	4/19/2005	4/19/2005	4/19/2005
Beryllium	**0.145 J**	**0.170 J**	**0.160 J**

LEGEND

MONITORING WELL

SOIL BORING

TEST PIT/BALLAST PILE

EXTENT OF BCP AREA

EXTENT OF MOTT HAVEN SCHOOL CAMPUS

FOOTPRINT OF SCHOOL BUILDINGS

SB37	
4-6	
04/20/05	
Beryllium	**0.429 J**

SAMPLE IDENTIFICATION
DEPTH IN FEET
SAMPLE DATE
ANALYTICAL RESULT

TP-19	TP-19DUP

SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per million (ppm) or milligram per kilogram (mg/kg)

D – Analysis at a secondary dilution factor.

U – Analyte not detected

N – Spiked sample recovery was not within control limits.

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

NS – Not Sampled

Red Bold face values indicate analyte detected above laboratory detection limit and result exceeds TAGM Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	INORGANICS DETECTED IN SOIL (FIGURE 2 OF 3) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	
APPROVED BY: D. STOLL	DATE: 8/6/07 · SCALE: AS SHOWN · DRAWING NO. 114926B73–SMP_V2 · FIGURE 18B

OFFICE ALBANY, NY
DRAWING NUMBER 114926B73-SMP_V2

VERIFY SCALE 0 1"

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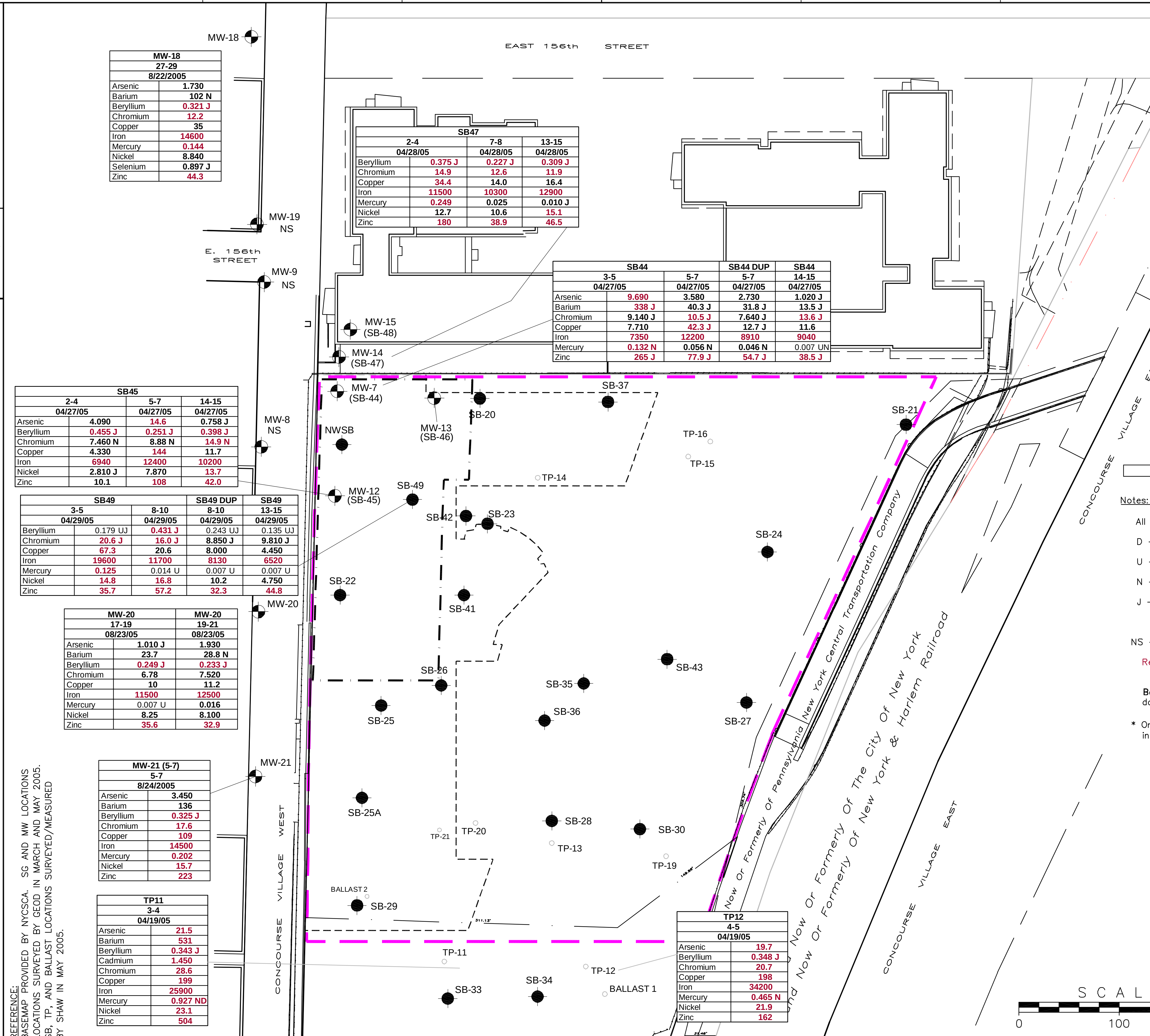
Plotted by: william.snyder

DRAWING NUMBER 114926B74-SMP_V2

OFFICE ALBANY, NY



MW-18	
27-29	
8/22/2005	
Arsenic	1.730
Barium	102 N
Beryllium	0.321 J
Chromium	12.2
Copper	35
Iron	14600
Mercury	0.144
Nickel	8.840
Selenium	0.897 J
Zinc	44.3

SB47			
	2-4	7-8	13-15
	04/28/05	04/28/05	04/28/05
Beryllium	0.375 J	0.227 J	0.309 J
Chromium	14.9	12.6	11.9
Copper	34.4	14.0	16.4
Iron	11500	10300	12900
Mercury	0.249	0.025	0.010 J
Nickel	12.7	10.6	15.1
Zinc	180	38.9	46.5

	SB44	SB44	SB44 DUP	SB44
	3-5	5-7	5-7	14-15
	04/27/05	04/27/05	04/27/05	04/27/05
Arsenic	9.690	3.580	2.730	1.020 J
Barium	338 J	40.3 J	31.8 J	13.5 J
Chromium	9.140 J	10.5 J	7.640 J	13.6 J
Copper	7.710	42.3 J	12.7 J	11.6
Iron	7350	12200	8910	9040
Mercury	0.132 N	0.056 N	0.046 N	0.007 UN
Zinc	265 J	77.9 J	54.7 J	38.5 J

SB45			
	2-4	5-7	14-15
	04/27/05	04/27/05	04/27/05
Arsenic	4.090	14.6	0.758 J
Beryllium	0.455 J	0.251 J	0.398 J
Chromium	7.460 N	8.88 N	14.9 N
Copper	4.330	144	11.7
Iron	6940	12400	10200
Nickel	2.810 J	7.870	13.7
Zinc	10.1	108	42.0

	SB49	SB49	SB49 DUP	SB49
	3-5	8-10	8-10	13-15
	04/29/05	04/29/05	04/29/05	04/29/05
Beryllium	0.179 UJ	0.431 J	0.243 UJ	0.135 UJ
Chromium	20.6 J	16.0 J	8.850 J	9.810 J
Copper	67.3	20.6	8.000	4.450
Iron	19600	11700	8130	6520
Mercury	0.125	0.014 U	0.007 U	0.007 U
Nickel	14.8	16.8	10.2	4.750
Zinc	35.7	57.2	32.3	44.8

	MW-20	MW-20
	17-19	19-21
	08/23/05	08/23/05
Arsenic	1.010 J	1.930
Barium	23.7	28.8 N
Beryllium	0.249 J	0.233 J
Chromium	6.78	7.520
Copper	10	11.2
Iron	11500	12500
Mercury	0.007 U	0.016
Nickel	8.25	8.100
Zinc	35.6	32.9

MW-21 (5-7)	
5-7	
8/24/2005	
Arsenic	3.450
Barium	136
Beryllium	0.325 J
Chromium	17.6
Copper	109
Iron	14500
Mercury	0.202
Nickel	15.7
Zinc	223

TP11	
3-4	
04/19/05	
Arsenic	21.5
Barium	531
Beryllium	0.343 J
Cadmium	1.450
Chromium	28.6
Copper	199
Iron	25900
Mercury	0.927 ND
Nickel	23.1
Zinc	504

TP12	
4-5	
04/19/05	
Arsenic	19.7
Beryllium	0.348 J
Chromium	20.7
Copper	198
Iron	34200
Mercury	0.465 N
Nickel	21.9
Zinc	162

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

LEGEND

- MONITORING WELL
- SOIL BORING
- TEST PIT/BALLAST PILE
- EXTENT OF BCP AREA
- EXTENT OF MOTT HAVEN SCHOOL CAMPUS
- FOOTPRINT OF SCHOOL BUILDINGS

tp12		
4-6		SAMPLE IDENTIFICATION
04/19/05		DEPTH IN FEET
		SAMPLE DATE
Arsenic	19.7	ANALYTICAL RESULT

SB44	SB44DUP	SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per million (ppm) or milligram per kilogram (mg/kg)

D – Analysis at a secondary dilution factor.

U – Analyte not detected

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J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

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Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable TAGM Standard.

* Only analytes that exceeded their TAGM Standards in at least one well are included on this figure.

SCALE 0 100 200 FEET

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	INORGANICS DETECTED IN SOIL (FIGURE 3 OF 3) FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY
CHECKED BY: D. STOLL	

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	8/6/07	AS SHOWN	114926B74-SMP_V2	18C

VERIFY SCALE 0 1"

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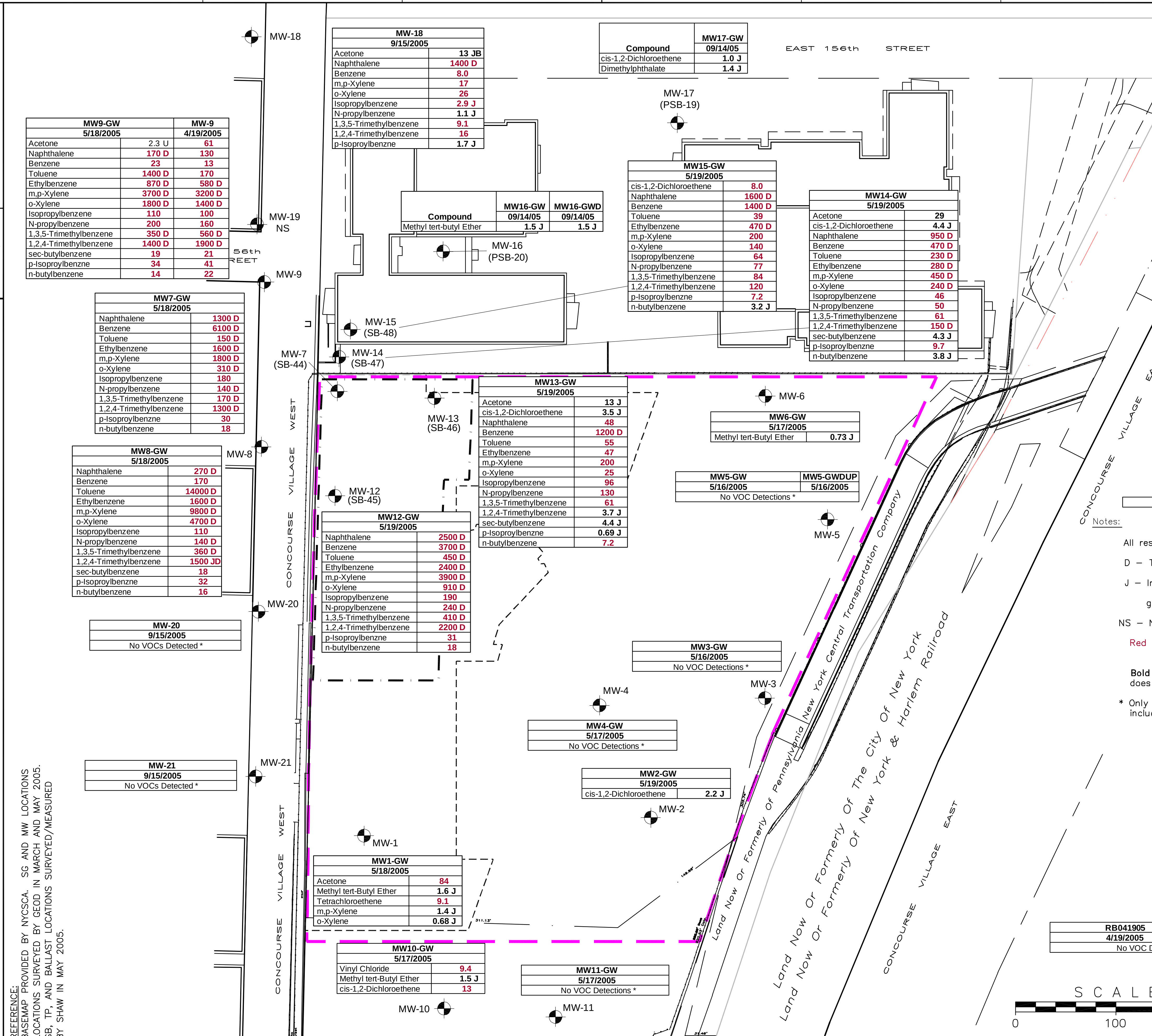

Compound	MW9-GW 5/18/2005	MW-9 4/19/2005
Acetone	2.3 U	61
Naphthalene	170 D	130
Benzene	23	13
Toluene	1400 D	170
Ethylbenzene	870 D	580 D
m,p-Xylene	3700 D	3200 D
o-Xylene	1800 D	1400 D
Isopropylbenzene	110	100
N-propylbenzene	200	160
1,3,5-Trimethylbenzene	350 D	560 D
1,2,4-Trimethylbenzene	1400 D	1900 D
sec-butylbenzene	19	21
p-Isoproylbenzne	34	41
n-butylbenzene	14	22

Compound	MW-18 9/15/2005
Acetone	13 JB
Naphthalene	1400 D
Benzene	8.0
m,p-Xylene	17
o-Xylene	26
Isopropylbenzene	2.9 J
N-propylbenzene	1.1 J
1,3,5-Trimethylbenzene	9.1
1,2,4-Trimethylbenzene	16
p-Isoproylbenzne	1.7 J

Compound	MW17-GW 09/14/05
cis-1,2-Dichloroethene	1.0 J
Dimethylphthalate	1.4 J

Compound	MW16-GW 09/14/05	MW16-GWD 09/14/05
Methyl tert-butyl Ether	1.5 J	1.5 J

Compound	MW15-GW 5/19/2005
cis-1,2-Dichloroethene	8.0
Naphthalene	1600 D
Benzene	1400 D
Toluene	39
Ethylbenzene	470 D
m,p-Xylene	200
o-Xylene	140
Isopropylbenzene	64
N-propylbenzene	77
1,3,5-Trimethylbenzene	84
1,2,4-Trimethylbenzene	120
p-Isoproylbenzne	7.2
n-butylbenzene	3.2 J

Compound	MW14-GW 5/19/2005
Acetone	29
cis-1,2-Dichloroethene	4.4 J
Naphthalene	950 D
Benzene	470 D
Toluene	230 D
Ethylbenzene	280 D
m,p-Xylene	450 D
o-Xylene	240 D
Isopropylbenzene	46
N-propylbenzene	50
1,3,5-Trimethylbenzene	61
1,2,4-Trimethylbenzene	150 D
sec-butylbenzene	4.3 J
p-Isoproylbenzne	9.7
n-butylbenzene	3.8 J

Compound	MW7-GW 5/18/2005
Naphthalene	1300 D
Benzene	6100 D
Toluene	150 D
Ethylbenzene	1600 D
m,p-Xylene	1800 D
o-Xylene	310 D
Isopropylbenzene	180
N-propylbenzene	140 D
1,3,5-Trimethylbenzene	170 D
1,2,4-Trimethylbenzene	1300 D
p-Isoproylbenzne	30
n-butylbenzene	18

Compound	MW8-GW 5/18/2005
Naphthalene	270 D
Benzene	170
Toluene	14000 D
Ethylbenzene	1600 D
m,p-Xylene	9800 D
o-Xylene	4700 D
Isopropylbenzene	110
N-propylbenzene	140 D
1,3,5-Trimethylbenzene	360 D
1,2,4-Trimethylbenzene	1500 JD
sec-butylbenzene	18
p-Isoproylbenzne	32
n-butylbenzene	16

Compound	MW13-GW 5/19/2005
Acetone	13 J
cis-1,2-Dichloroethene	3.5 J
Naphthalene	48
Benzene	1200 D
Toluene	55
Ethylbenzene	47
m,p-Xylene	200
o-Xylene	25
Isopropylbenzene	96
N-propylbenzene	130
1,3,5-Trimethylbenzene	61
1,2,4-Trimethylbenzene	3.7 J
sec-butylbenzene	4.4 J
p-Isoproylbenzne	0.69 J
n-butylbenzene	7.2

Compound	MW12-GW 5/19/2005
Naphthalene	2500 D
Benzene	3700 D
Toluene	450 D
Ethylbenzene	2400 D
m,p-Xylene	3900 D
o-Xylene	910 D
Isopropylbenzene	190
N-propylbenzene	240 D
1,3,5-Trimethylbenzene	410 D
1,2,4-Trimethylbenzene	2200 D
p-Isoproylbenzne	31
n-butylbenzene	18

Compound	MW6-GW 5/17/2005
Methyl tert-Butyl Ether	0.73 J

MW5-GW 5/16/2005	MW5-GWDUP 5/16/2005
No VOC Detections *	

MW3-GW 5/16/2005
No VOC Detections *

MW-20 9/15/2005
No VOCs Detected *

MW-21 9/15/2005
No VOCs Detected *

MW4-GW 5/17/2005
No VOC Detections *

Compound	MW2-GW 5/19/2005
cis-1,2-Dichloroethene	2.2 J

Compound	MW1-GW 5/18/2005
Acetone	84
Methyl tert-Butyl Ether	1.6 J
Tetrachloroethene	9.1
m,p-Xylene	1.4 J
o-Xylene	0.68 J

Compound	MW10-GW 5/17/2005
Vinyl Chloride	9.4
Methyl tert-Butyl Ether	1.5 J
cis-1,2-Dichloroethene	13

MW11-GW 5/17/2005
No VOC Detections *

RB041905 4/19/2005	RB051805 5/18/2005
No VOC Detections	

LEGEND

MONITORING WELL

EXTENT OF BCP AREA

EXTENT OF MOTT HAVEN SCHOOL CAMPUS

FOOTPRINT OF SCHOOL BUILDINGS

MW3-GW 5/16/2005 No VOC Detections *	SAMPLE IDENTIFICATION SAMPLE DATE ANALYTICAL RESULT
MW5-GW / MW5-GWDUP	SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per billion (ppb) or micrograms per liter (ug/L)

D – This flag identifies all compounds identified in an analysis at a secondary dilution factor.

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

NS – Not sampled

Red **Bold face** values indicate analyte detected above laboratory detection limit and result exceeds TOGS class GA Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable GA groundwater standard.

* Only analytes that exceeded their class GA Groundwater Standards in at least one well are included on this figure.

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

SCHOOL CONSTRUCTION AUTHORITY

VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
HF/SG	R.T./SSH	D. STOLL	D. STOLL	7/30/07	AS SHOWN	114926B77-SMP	19

OFFICE ALBANY, NY

DRAWING NUMBER 114926B77-SMP

VERIFY SCALE 0 1"

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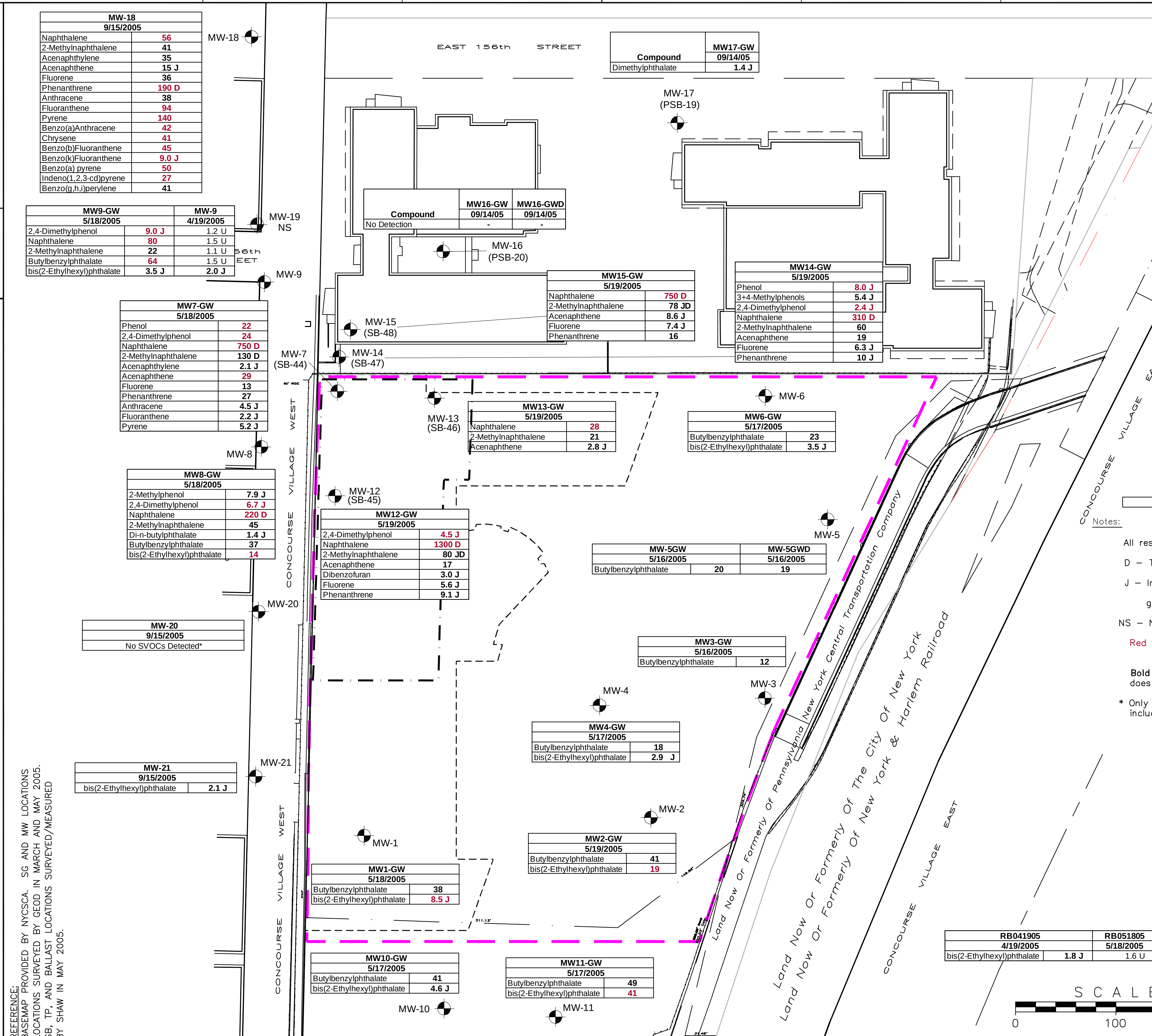
Plotted by: william.snyder



MW-18

9/15/2005	
Naphthalene	56
2-Methylnaphthalene	41
Acenaphthylene	35
Acenaphthene	15 J
Fluorene	36
Phenanthrene	190 D
Anthracene	38
Fluoranthene	94
Pyrene	140
Benzo(a)Anthracene	42
Chrysene	41
Benzo(b)Fluoranthene	45
Benzo(k)Fluoranthene	9.0 J
Benzo(a) pyrene	50
Indeno(1,2,3-cd)pyrene	27
Benzo(g,h,i)perylene	41

	MW9-GW	MW-9
	5/18/2005	4/19/2005
2,4-Dimethylphenol	9.0 J	1.2 U
Naphthalene	80	1.5 U
2-Methylnaphthalene	22	1.1 U
Butylbenzylphthalate	64	1.5 U
bis(2-Ethylhexyl)phthalate	3.5 J	2.0 J

Compound	MW17-GW
	09/14/05
Dimethylphthalate	1.4 J

Compound	MW16-GW	MW16-GWD
	09/14/05	09/14/05
No Detection	-	-

MW15-GW

5/19/2005	
Naphthalene	750 D
2-Methylnaphthalene	78 JD
Acenaphthene	8.6 J
Fluorene	7.4 J
Phenanthrene	16

MW14-GW

5/19/2005	
Phenol	8.0 J
3+4-Methylphenols	5.4 J
2,4-Dimethylphenol	2.4 J
Naphthalene	310 D
2-Methylnaphthalene	60
Acenaphthene	19
Fluorene	6.3 J
Phenanthrene	10 J

MW7-GW

5/18/2005	
Phenol	22
2,4-Dimethylphenol	24
Naphthalene	750 D
2-Methylnaphthalene	130 D
Acenaphthylene	2.1 J
Acenaphthene	29
Fluorene	13
Phenanthrene	27
Anthracene	4.5 J
Fluoranthene	2.2 J
Pyrene	5.2 J

MW13-GW

5/19/2005	
Naphthalene	28
2-Methylnaphthalene	21
Acenaphthene	2.8 J

MW6-GW

5/17/2005	
Butylbenzylphthalate	23
bis(2-Ethylhexyl)phthalate	3.5 J

MW8-GW

5/18/2005	
2-Methylphenol	7.9 J
2,4-Dimethylphenol	6.7 J
Naphthalene	220 D
2-Methylnaphthalene	45
Di-n-butylphthalate	1.4 J
Butylbenzylphthalate	37
bis(2-Ethylhexyl)phthalate	14

MW12-GW

5/19/2005	
2,4-Dimethylphenol	4.5 J
Naphthalene	1300 D
2-Methylnaphthalene	80 JD
Acenaphthene	17
Dibenzofuran	3.0 J
Fluorene	5.6 J
Phenanthrene	9.1 J

	MW-5GW	MW-5GWD
	5/16/2005	5/16/2005
Butylbenzylphthalate	20	19

MW-20

9/15/2005
No SVOCs Detected*

MW3-GW

5/16/2005	
Butylbenzylphthalate	12

MW4-GW

5/17/2005	
Butylbenzylphthalate	18
bis(2-Ethylhexyl)phthalate	2.9 J

MW-21

9/15/2005	
bis(2-Ethylhexyl)phthalate	2.1 J

MW2-GW

5/19/2005	
Butylbenzylphthalate	41
bis(2-Ethylhexyl)phthalate	19

MW1-GW

5/18/2005	
Butylbenzylphthalate	38
bis(2-Ethylhexyl)phthalate	8.5 J

MW10-GW

5/17/2005	
Butylbenzylphthalate	41
bis(2-Ethylhexyl)phthalate	4.6 J

MW11-GW

5/17/2005	
Butylbenzylphthalate	49
bis(2-Ethylhexyl)phthalate	41

	RB041905	RB051805
	4/19/2005	5/18/2005
bis(2-Ethylhexyl)phthalate	1.8 J	1.6 U

LEGEND

- MONITORING WELL
- EXTENT OF BCP AREA
- EXTENT OF MOTT HAVEN SCHOOL CAMPUS
- FOOTPRINT OF SCHOOL BUILDINGS

MW3-GW		
5/16/2005		SAMPLE IDENTIFICATION SAMPLE DATE ANALYTICAL RESULT
Butylbenzylphthalate	12	

MW5-GW	MW5-GWD	SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per billion (ppb) or micrograms per liter (ug/L)

D – This flag identifies all compounds identified in an analysis at a secondary dilution factor.

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

NS – Not sampled

Red **Bold face** values indicate analyte detected above laboratory detection limit and result exceeds TOGS class GA Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable GA groundwater standard.

* Only analytes that exceeded their class GA Groundwater Standards in at least one well are included on this figure.

SCALE

0 100 200 FEET

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

O:\Shaw Offices – CAD Files\Harriman NY\114926\114926B78-SMP.dwg Xref: . Image: .
Plot Date/Time: 11/27/07 05:09pm
Plotted by: william.snyder

OFFICE ALBANY, NY
DRAWING NUMBER 114926B78-SMP

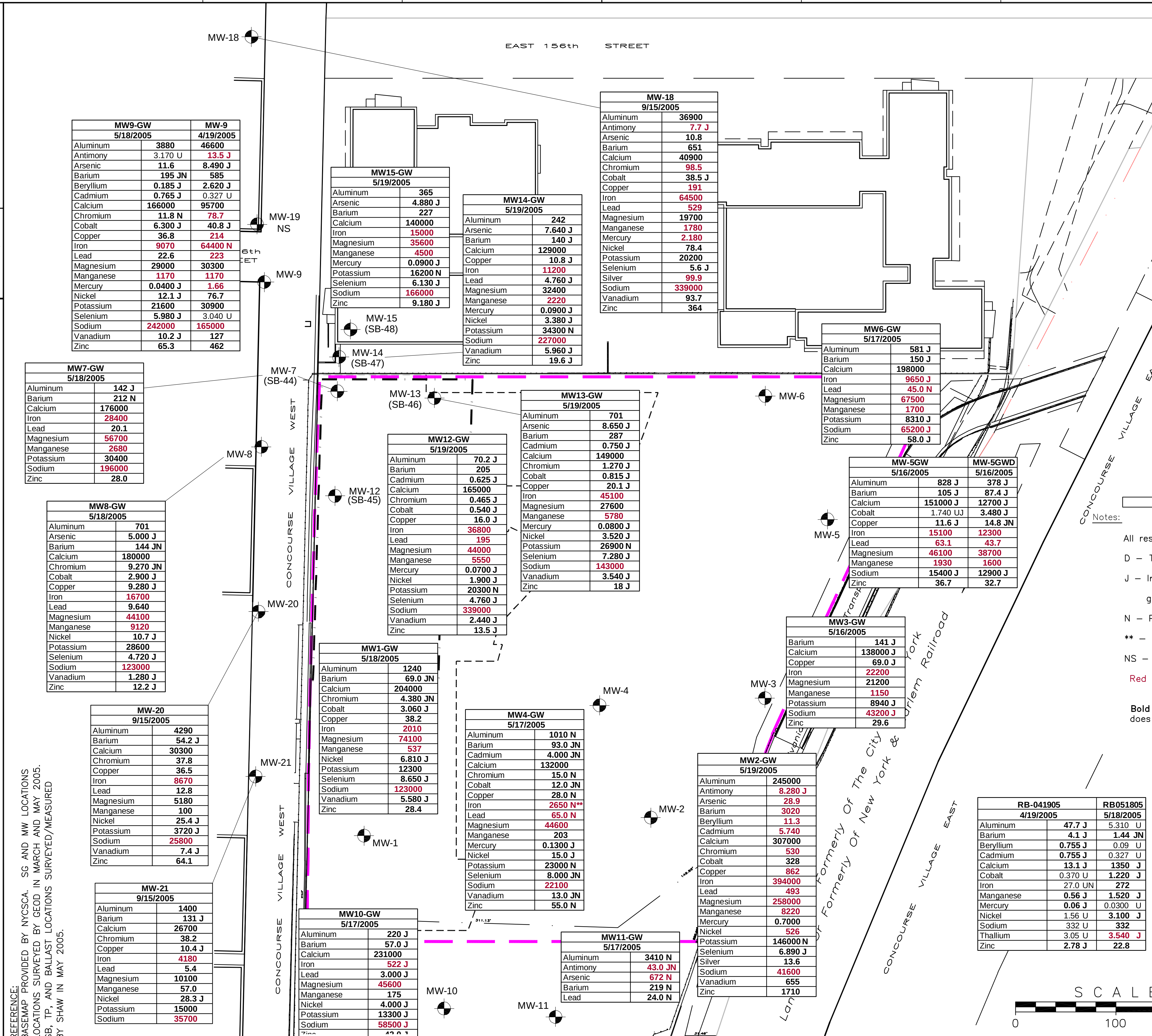
REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

SCHOOL CONSTRUCTION AUTHORITY

SEMI VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
HF/SG	R.T./SSH	D. STOLL	D. STOLL	7/30/07	AS SHOWN	114926B78-SMP	20



DRAWING NUMBER 114926B79-SMP_V2

OFFICE ALBANY, NY

MW9-GW	5/18/2005	MW-9 4/19/2005
Aluminum	3880	46600
Antimony	3.170 U	13.5 J
Arsenic	11.6	8.490 J
Barium	195 JN	585
Beryllium	0.185 J	2.620 J
Cadmium	0.765 J	0.327 U
Calcium	166000	95700
Chromium	11.8 N	78.7
Cobalt	6.300 J	40.8 J
Copper	36.8	214
Iron	9070	64400 N
Lead	22.6	223
Magnesium	29000	30300
Manganese	1170	1170
Mercury	0.0400 J	1.66
Nickel	12.1 J	76.7
Potassium	21600	30900
Selenium	5.980 J	3.040 U
Sodium	242000	165000
Vanadium	10.2 J	127
Zinc	65.3	462

MW7-GW	5/18/2005
Aluminum	142 J
Barium	212 N
Calcium	176000
Iron	28400
Lead	20.1
Magnesium	56700
Manganese	2680
Potassium	30400
Sodium	196000
Zinc	28.0

MW8-GW	5/18/2005
Aluminum	701
Arsenic	5.000 J
Barium	144 JN
Calcium	180000
Chromium	9.270 JN
Cobalt	2.900 J
Copper	9.280 J
Iron	16700
Lead	9.640
Magnesium	44100
Manganese	9120
Nickel	10.7 J
Potassium	28600
Selenium	4.720 J
Sodium	123000
Vanadium	1.280 J
Zinc	12.2 J

MW-20	9/15/2005
Aluminum	4290
Barium	54.2 J
Calcium	30300
Chromium	37.8
Copper	36.5
Iron	8670
Lead	12.8
Magnesium	5180
Manganese	100
Nickel	25.4 J
Potassium	3720 J
Sodium	25800
Vanadium	7.4 J
Zinc	64.1

MW-21	9/15/2005
Aluminum	1400
Barium	131 J
Calcium	26700
Chromium	38.2
Copper	10.4 J
Iron	4180
Lead	5.4
Magnesium	10100
Manganese	57.0
Nickel	28.3 J
Potassium	15000
Sodium	35700

MW15-GW	5/19/2005
Aluminum	365
Arsenic	4.880 J
Barium	227
Calcium	140000
Iron	15000
Magnesium	35600
Manganese	4500
Mercury	0.0900 J
Potassium	16200 N
Selenium	6.130 J
Sodium	166000
Zinc	9.180 J

MW14-GW	5/19/2005
Aluminum	242
Arsenic	7.640 J
Barium	140 J
Calcium	129000
Copper	10.8 J
Iron	11200
Lead	4.760 J
Magnesium	32400
Manganese	2220
Mercury	0.0900 J
Nickel	3.380 J
Potassium	34300 N
Sodium	227000
Vanadium	5.960 J
Zinc	19.6 J

MW-18	9/15/2005
Aluminum	36900
Antimony	7.7 J
Arsenic	10.8
Barium	651
Calcium	40900
Chromium	98.5
Cobalt	38.5 J
Copper	191
Iron	64500
Lead	529
Magnesium	19700
Manganese	1780
Mercury	2.180
Nickel	78.4
Potassium	20200
Selenium	5.6 J
Silver	99.9
Sodium	339000
Vanadium	93.7
Zinc	364

MW6-GW	5/17/2005
Aluminum	581 J
Barium	150 J
Calcium	198000
Iron	9650 J
Lead	45.0 N
Magnesium	67500
Manganese	1700
Potassium	8310 J
Sodium	65200 J
Zinc	58.0 J

MW13-GW	5/19/2005
Aluminum	701
Arsenic	8.650 J
Barium	287
Cadmium	0.750 J
Calcium	149000
Chromium	1.270 J
Cobalt	0.815 J
Copper	20.1 J
Iron	45100
Magnesium	27600
Manganese	5780
Mercury	0.0800 J
Nickel	3.520 J
Potassium	26900 N
Selenium	7.280 J
Sodium	143000
Vanadium	3.540 J
Zinc	18 J

MW12-GW	5/19/2005
Aluminum	70.2 J
Barium	205
Cadmium	0.625 J
Calcium	165000
Chromium	0.465 J
Cobalt	0.540 J
Copper	16.0 J
Iron	36800
Lead	195
Magnesium	44000
Manganese	5550
Mercury	0.0700 J
Nickel	1.900 J
Potassium	20300 N
Selenium	4.760 J
Sodium	339000
Vanadium	2.440 J
Zinc	13.5 J

MW-5GW	5/16/2005	MW-5GWD 5/16/2005
Aluminum	828 J	378 J
Barium	105 J	87.4 J
Calcium	151000 J	12700 J
Cobalt	1.740 UJ	3.480 J
Copper	11.6 J	14.8 JN
Iron	15100	12300
Lead	63.1	43.7
Magnesium	46100	38700
Manganese	1930	1600
Sodium	15400 J	12900 J
Zinc	36.7	32.7

MW1-GW	5/18/2005
Aluminum	1240
Barium	69.0 JN
Calcium	204000
Chromium	4.380 JN
Cobalt	3.060 J
Copper	38.2
Iron	2010
Magnesium	74100
Manganese	537
Nickel	6.810 J
Potassium	12300
Selenium	8.650 J
Sodium	123000
Vanadium	5.580 J
Zinc	28.4

MW3-GW	5/16/2005
Barium	141 J
Calcium	138000 J
Copper	69.0 J
Iron	22200
Magnesium	21200
Manganese	1150
Potassium	8940 J
Sodium	43200 J
Zinc	29.6

MW4-GW	5/17/2005
Aluminum	1010 N
Barium	93.0 JN
Cadmium	4.000 JN
Calcium	132000
Chromium	15.0 N
Cobalt	12.0 JN
Copper	28.0 N
Iron	2650 N**
Lead	65.0 N
Magnesium	44600
Manganese	203
Mercury	0.1300 J
Nickel	15.0 J
Potassium	23000 N
Selenium	8.000 JN
Sodium	22100
Vanadium	13.0 JN
Zinc	55.0 N

MW2-GW	5/19/2005
Aluminum	245000
Antimony	8.280 J
Arsenic	28.9
Barium	3020
Beryllium	11.3
Cadmium	5.740
Calcium	307000
Chromium	530
Cobalt	328
Copper	862
Iron	394000
Lead	493
Magnesium	258000
Manganese	8220
Mercury	0.7000
Nickel	526
Potassium	146000 N
Selenium	6.890 J
Silver	13.6
Sodium	41600
Vanadium	655
Zinc	1710

RB-041905	4/19/2005	RB051805 5/18/2005
Aluminum	47.7 J	5.310 U
Barium	4.1 J	1.44 JN
Beryllium	0.755 J	0.09 U
Cadmium	0.755 J	0.327 U
Calcium	13.1 J	1350 J
Cobalt	0.370 U	1.220 J
Iron	27.0 UN	272
Manganese	0.56 J	1.520 J
Mercury	0.06 J	0.0300 U
Nickel	1.56 U	3.100 J
Sodium	332 U	332
Thallium	3.05 U	3.540 J
Zinc	2.78 J	22.8

MW10-GW	5/17/2005
Aluminum	220 J
Barium	57.0 J
Calcium	231000
Iron	522 J
Lead	3.000 J
Magnesium	45600
Manganese	175
Nickel	4.000 J
Potassium	13300 J
Sodium	58500 J
Zinc	42.0 J

MW11-GW	5/17/2005
Aluminum	3410 N
Antimony	43.0 JN
Arsenic	672 N
Barium	219 N
Lead	24.0 N

LEGEND

MONITORING WELL

EXTENT OF BCP AREA

EXTENT OF MOTT HAVEN SCHOOL CAMPUS

FOOTPRINT OF SCHOOL BUILDINGS

MW11-GW		SAMPLE IDENTIFICATION
5/17/2005		SAMPLE DATE
Aluminum	3410 N	ANALYTICAL RESULT

MW5GW	MW-5GWD	SAMPLE IDENTIFICATION, DUPLICATE SAMPLE

Notes:

All results are in parts per billion (ppb) or micrograms per liter (ug/L)

D – This flag identifies all compounds identified in an analysis at a secondary dilution factor.

J – Indicates an estimated value. This flag is used when the mass spectral data indicated the identification; however, the result was less than the specified detection limit but greater than zero.

N – Presumptive evidence of a compound.

** – Duplicate analysis was not within control limits.

NS – Not sampled

Red **Bold face** values indicate analyte detected above laboratory detection limit and result exceeds TOGS class GA Standard.

Bold face values indicate analyte was detected above laboratory limit but result does not exceed the applicable ga groundwater standard.

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

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Plot Date/Time: 11/27/07 05:13pm
Plotted by: william.snyder
Xref: .
Image: .

VERIFY SCALE 0 1"

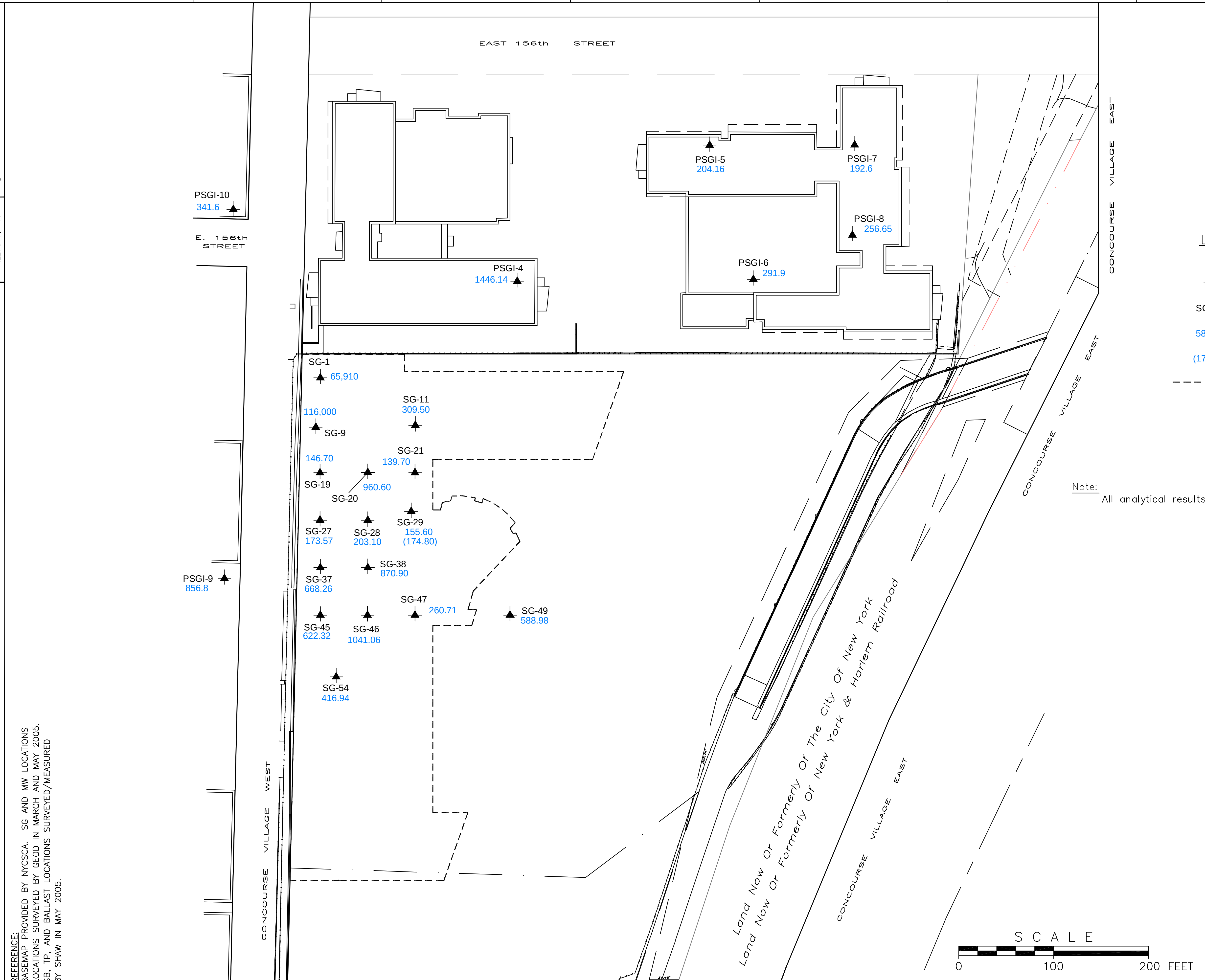
REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY		
DRAWN BY: R.T./SSH	INORGANICS DETECTED IN GROUNDWATER		
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY		
APPROVED BY: D. STOLL	DATE: 8/6/07	SCALE: AS SHOWN	DRAWING NO. 114926B79-SMP_V2
			FIGURE 21

OFFICE ALBANY, NY

DRAWING NUMBER 114926B81-SMP



LEGEND

(soil gas point symbol)	SOIL GAS POINT
SG-49	SAMPLE IDENTIFICATION
588.98	ANALYTICAL RESULT
(174.80)	DUPLICATE SAMPLE ANALYTICAL RESULT
------	PROPOSED FOOTPRINT OF SCHOOL

Note: All analytical results expressed in micrograms per cubic meter (ug/m^3)

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.

\\seihorfs01\Common\PROJ\NYC-SCA\Matt Haven\114926\SIR & RIR\114926B81-SMP.dwg
Plot Date/Time: 07/30/07 11:05am
Plotted by: william.snyder
Image: .

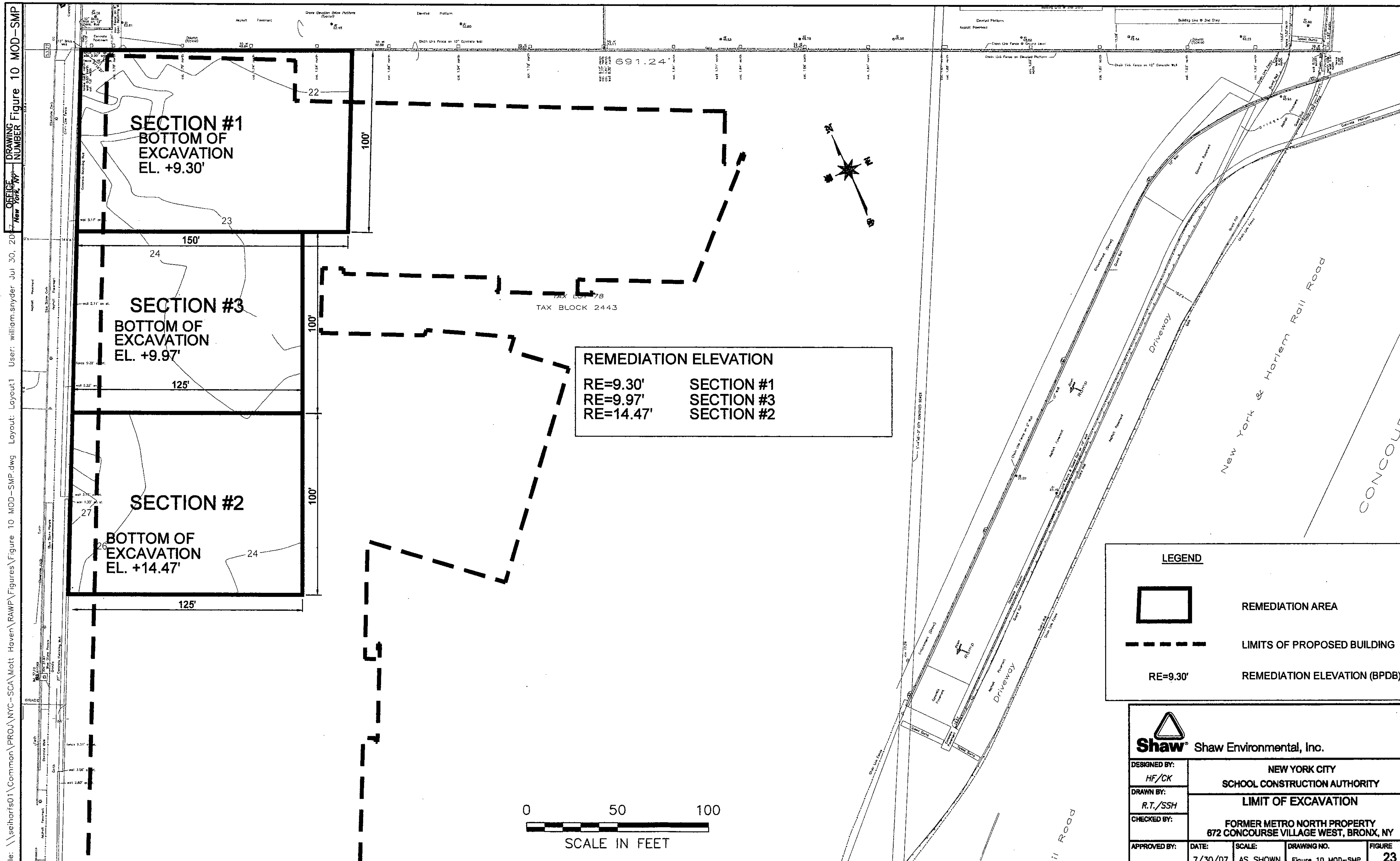
VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

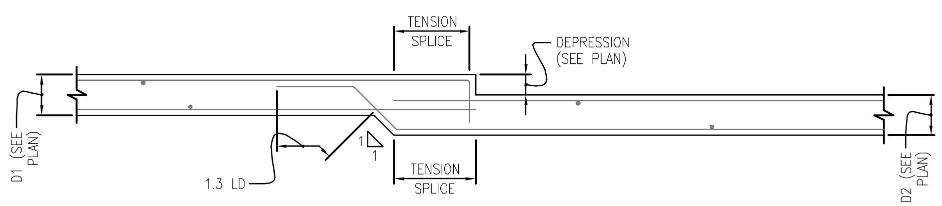
Shaw Environmental, Inc.

DESIGNED BY: HF/SG	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	TOTAL VOC CONCENTRATIONS IN SOIL GAS
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	7/30/07	AS SHOWN	114926B81-SMP	22

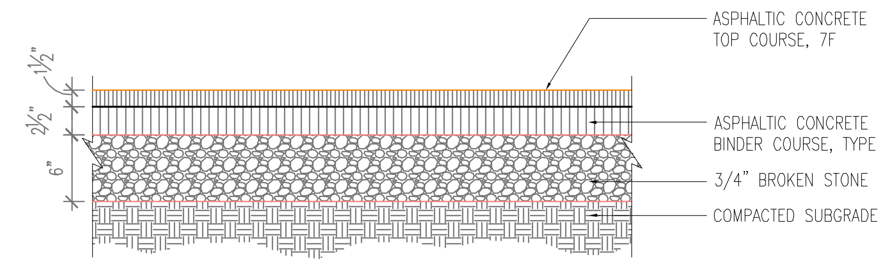


SECTION #1
BOTTOM OF EXCAVATION
EL. +9.30'
SECTION #3
BOTTOM OF EXCAVATION
EL. +9.97'
SECTION #2
BOTTOM OF EXCAVATION
EL. +14.47'
150'
125'
125'
100'
100'
100'
691.24'
TAX LOT 78
TAX BLOCK 2443
REMEDIATION ELEVATION
RE=9.30' SECTION #1
RE=9.97' SECTION #3
RE=14.47' SECTION #2
New York & Harlem Rail Road
Driveway
CONCOURS
0 50 100
SCALE IN FEET
LEGEND
REMEDIATION AREA
LIMITS OF PROPOSED BUILDING
RE=9.30' REMEDIATION ELEVATION (BPDB)
Shaw Environmental, Inc.
DESIGNED BY: HF/CK
DRAWN BY: R.T./SSH
CHECKED BY:
APPROVED BY:
NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
LIMIT OF EXCAVATION
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY
DATE: 7/30/07
SCALE: AS SHOWN
DRAWING NO. Figure 10 MOD-SMP
FIGURE 23
OFFICE New York, NY
DRAWING NUMBER Figure 10 MOD-SMP
File: \\seihorfs01\Common\PROJ\NYC-SCA\Mott Haven\RAWP\Figures\Figure 10 MOD-SMP.dwg Layout: Layout1 User: william.snyder Jul 30, 2007



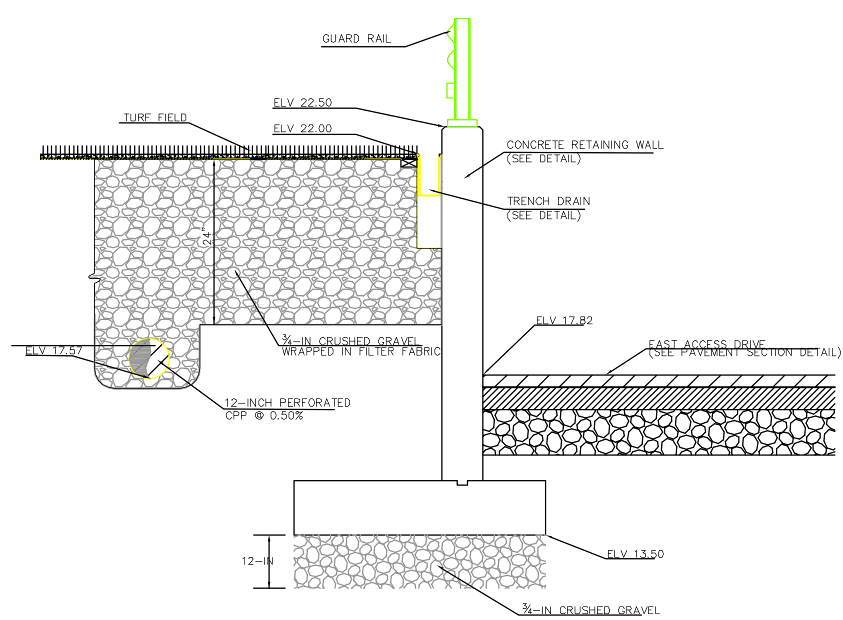
STEP IN SLAB

DETAIL 1



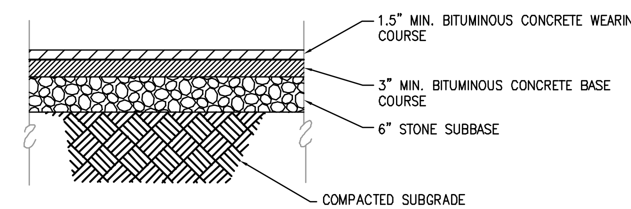
ASPHALT PAVEMENT AT RECREATION AREA

DETAIL 3



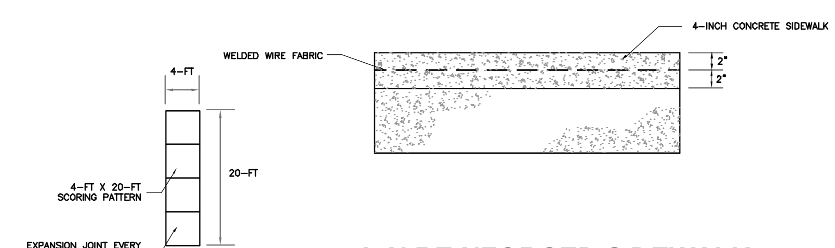
ATHLETIC FIELD

DETAIL 2



NEW BITUMINOUS PAVEMENT SECTION

DETAIL 4



4-IN REINFORCED SIDEWALK SECTION WITH SCORING PATTERN

DETAIL 5

Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	DETAILS
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	1/16/08	AS SHOWN	Figure 24-SMP	24

OFFICE New York, NY | DRAWING NUMBER | Figure 24-SMP

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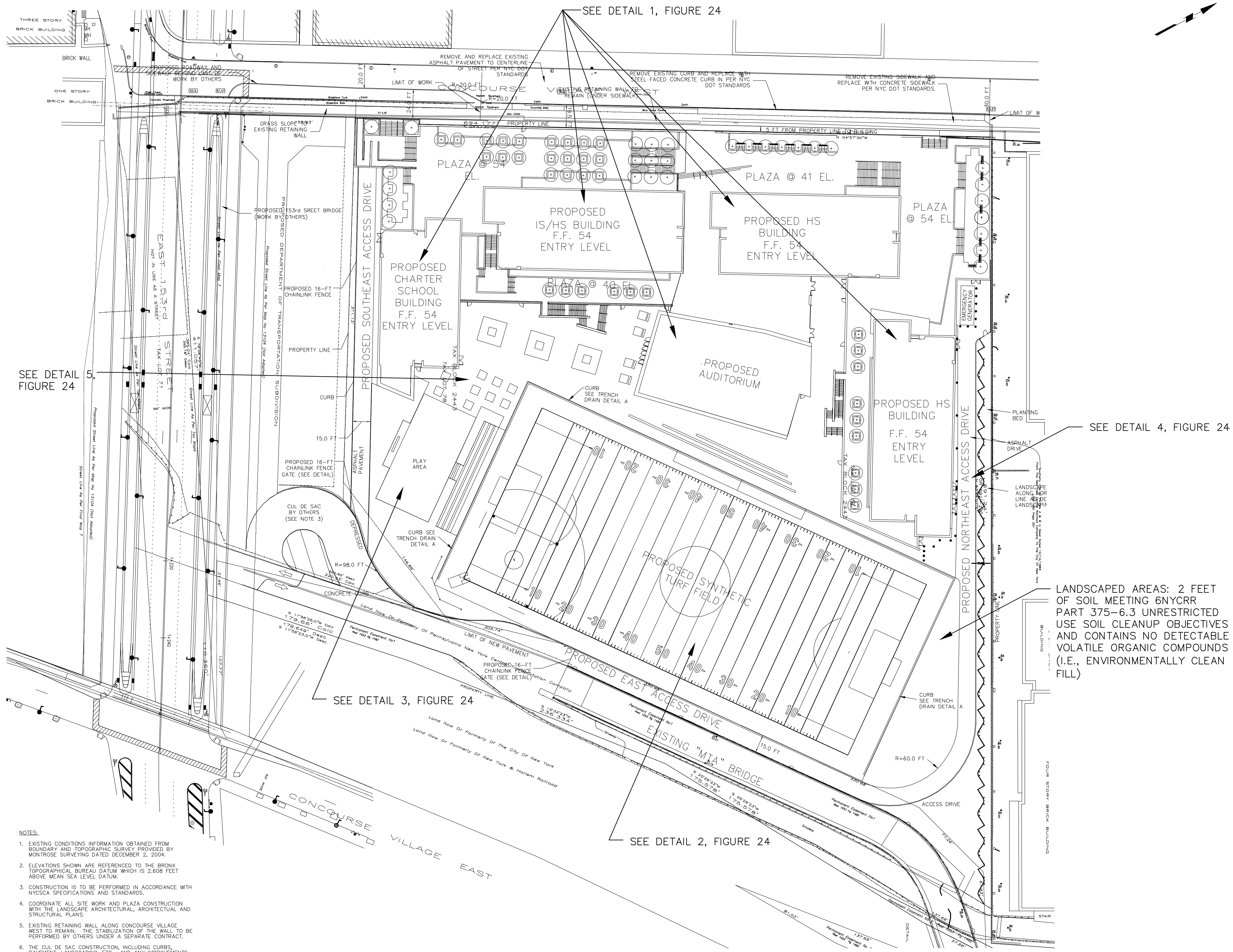

NOTES:

1. EXISTING CONDITIONS INFORMATION OBTAINED FROM BOUNDARY AND TOPOGRAPHIC SURVEY PROVIDED BY MONTROSE SURVEYING DATED DECEMBER 2, 2004.
2. ELEVATIONS SHOWN ARE REFERENCED TO THE BRONX TOPOGRAPHICAL BUREAU DATUM WHICH IS 2.608 FEET ABOVE MEAN SEA LEVEL DATUM.
3. CONSTRUCTION IS TO BE PERFORMED IN ACCORDANCE WITH NYCSCA SPECIFICATIONS AND STANDARDS.
4. COORDINATE ALL SITE WORK AND PLAZA CONSTRUCTION WITH THE LANDSCAPE ARCHITECTURAL, ARCHITECTUAL AND STRUCTURAL PLANS.
5. EXISTING RETAINING WALL ALONG CONCOURSE VILLAGE WEST TO REMAIN. THE STABILIZATION OF THE WALL TO BE PERFORMED BY OTHERS UNDER A SEPARATE CONTRACT.
6. THE CUL DE SAC CONSTRUCTION, INCLUDING CURBS, PAVEMENT, LANDSCAPING, ETC, AND ANY IMPROVEMENTS TO THE EXISTING MTA BRIDGE OR OTHER FEATURES TO BE PERFORMED BY OTHERS UNDER A SEPARATE CONTRACT.
7. REFERENCE DRAWING C410 FOR LARGE SCALE DRAWING OF FIELD AND RETAINING WALL.
8. REFERENCE LANDSCAPE ARCHITECTURAL PLANS FOR SITE FENCING INFORMATION.

REFERENCE:
BASEMAP FROM PERKINS EASTMAN, 115 FIFTH AVENUE, NEW YORK, NY 10003

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

Sharon L. Greenberger, MCP, President & CEO

Architecture & Engineering
E. Bruce Barrett, R.A., Vice President

Elan R. Abneri, P.E., Director of Design Studio 1
Timothy F. Ng, R.A., PP., Director of Design Studio 2
George D. Roussey, P.E., Director of Design Studio 3
Gary Deane, Director of Operations, Special Projects

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
115 FIFTH AVENUE
NEW YORK, NY 10003

CONSULTING ARCHITECT: ALEXANDER GORLIN ARCHITECT LLC
137 VARICK STREET
NEW YORK, NY 10013

STRUCTURAL ENGINEER: LESLIE E. ROBERTSON ASSOCIATES, RLLP
30 BROAD STREET
NEW YORK, NY 10004

MECHANICAL ENGINEER: FLACK + KURTZ ENGINEERS
475 FIFTH AVENUE
NEW YORK, NY 10017

CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA
360 WEST 31ST STREET, 8TH FLOOR
NEW YORK, NY 10001

FOOD SERVICE CONSULTANT: ROMANO GATLAND
99 WEST HOFFMAN AVENUE
LINDENHURST, NY 11757

ACOUSTIC AND THEATER CONSULTANT: HARVEY MARSHALL BERLING ASSOCIATES, LLC.
173 WEST 81ST STREET
SUITE 2, LOWER LEVEL
NEW YORK, NY 10024

LANDSCAPE ARCHITECT: RGR LANDSCAPE
115 FIFTH AVENUE
NEW YORK, NY 10003

BID SET

NOTE: Drawing may be printed at reduced scale

NO.	REVISION	DATE
1	ISSUED FOR ADDENDUM No. 1	JULY 31, 2006

KEY PLAN:

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Christine Schlendorf
Designer:	Ernesto Vela
Drawn by:	Christine Schlendorf
Checked by:	Perry Nuñez

LLW No.:	Facility Code:	Date:
033485	1215-05	1/16/08

Project:
MOTT HAVEN CAMPUS
-

Address: 730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

Drawing Title:
FIGURE 25
PRINCIPAL SITE COVERS

Drawing No.:
Figure 25 SMP

Sheets in Contract:
of 1072

PFA No. 21200.00

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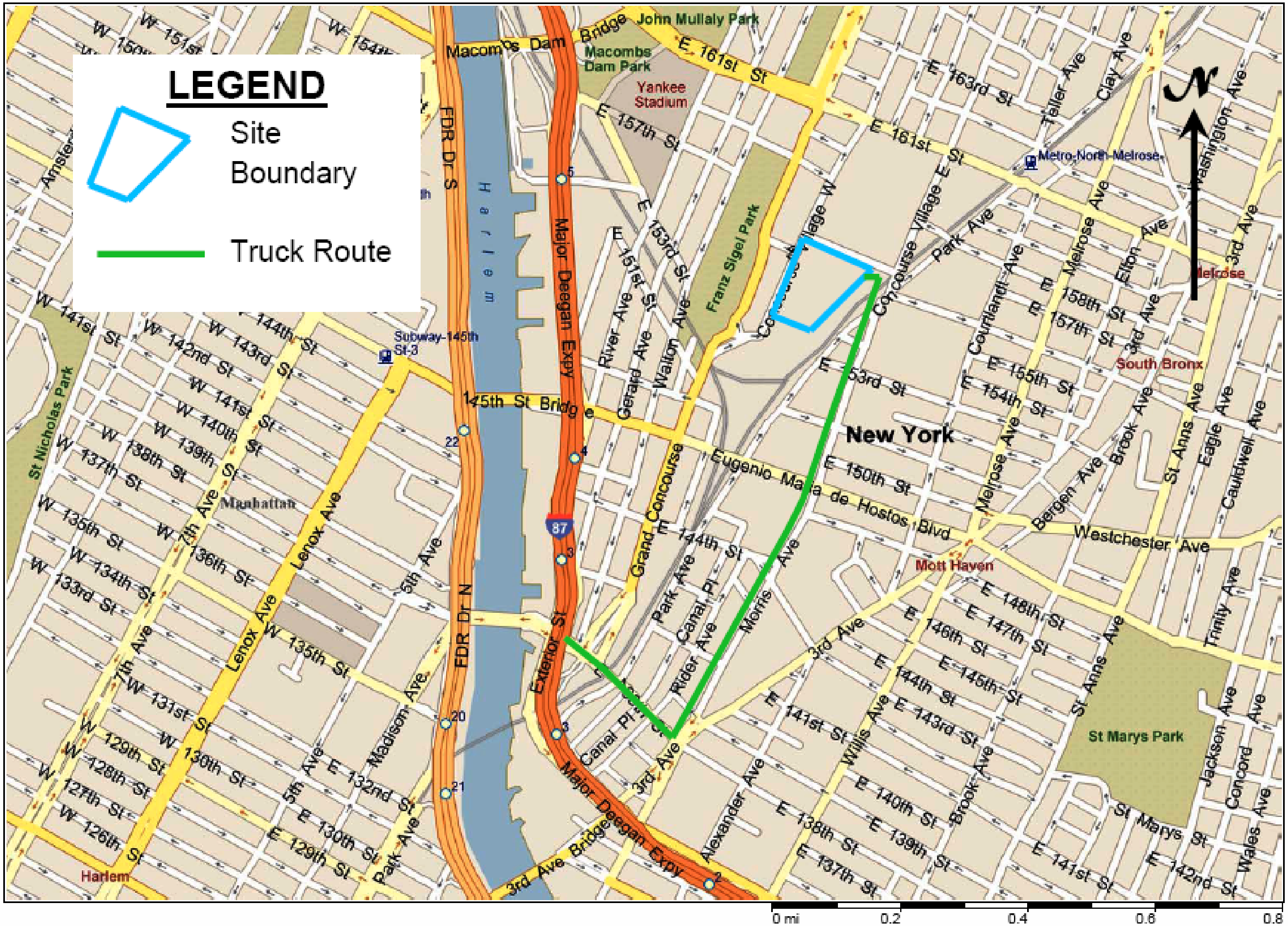
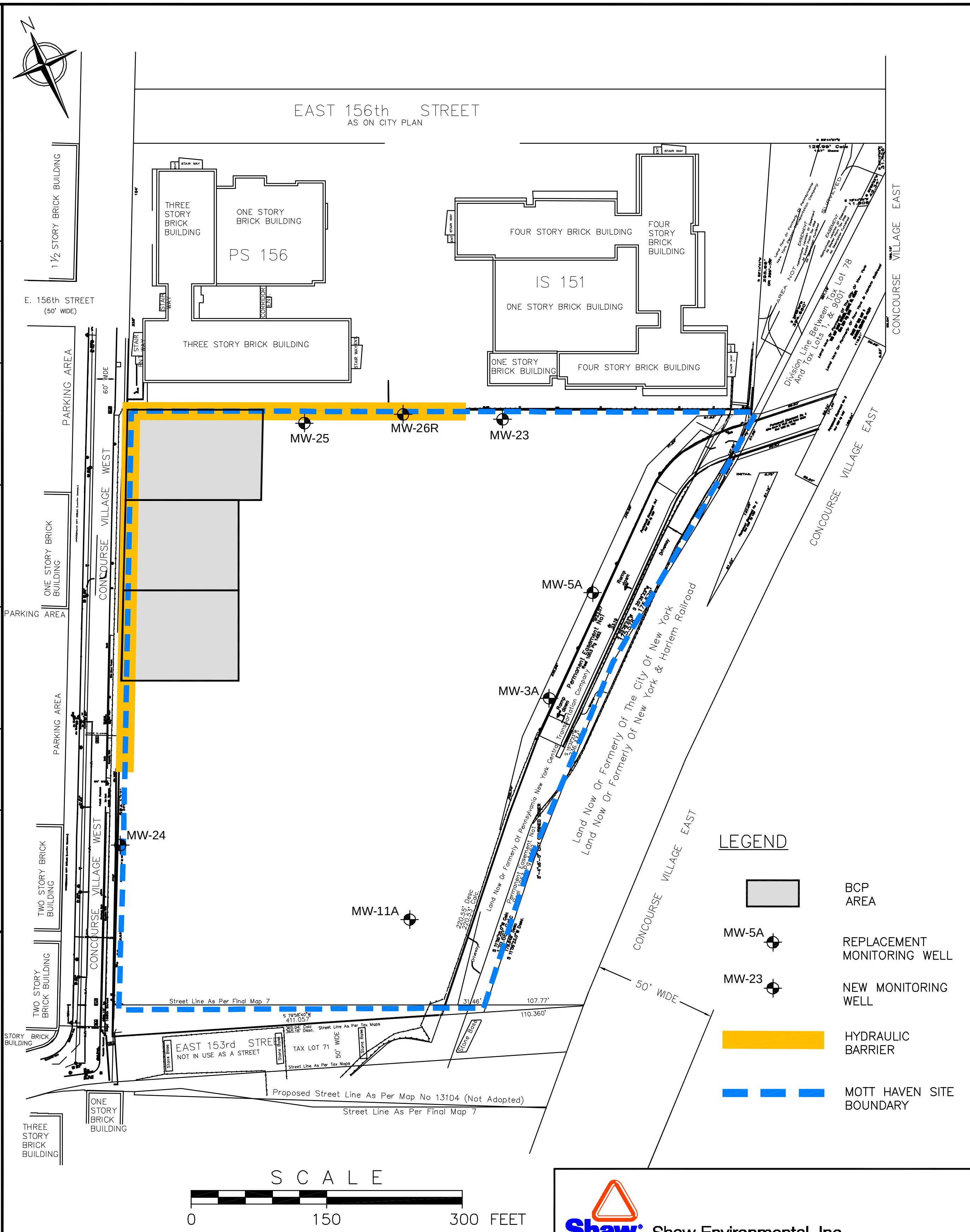
FIGURE 26

TRUCK ROUTE FOR OFF-SITE MATERIAL REMOVAL





NOTES:

1. HORIZONTAL DATUM: COORDINATE SYSTEM BASED UPON PUBLISHED COORDINATES OF EXISTING WELLS AND MH AT CP 802

2. VERTICAL DATUM: QUEENS BOROUGH PRESIDENT'S DATUM WHICH IS 2.725 FT ABOVE U.S. COAST AND GEODETIC SURVEY DATUM, SANDY HOOK, NJ (NGVD 29)

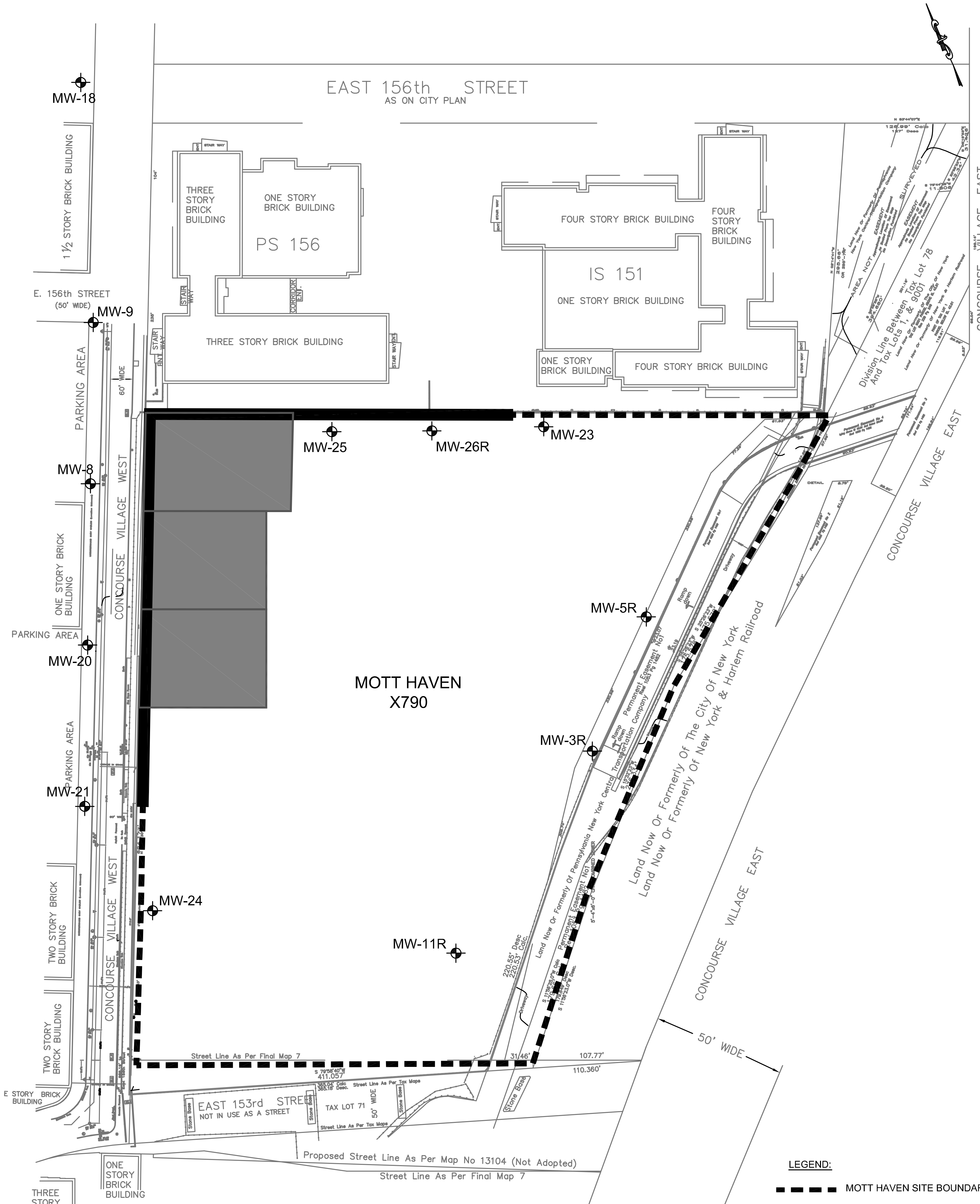
Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	MONITORING WELL LOCATION PLAN
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	1/22/08	AS SHOWN	FIGURE 27-SMP	27

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	1/22/08	--	B. Snyder	C. Kraemer	--	Figure 27-SMP

File: O:\Shaw Offices – CAD Files\Harriman NY\114926\SMP – DEC 2007\Figure 27 – SMP.dwg
Plot Date/Time: Aug 13, 2008 – 11:01am Xref:
Plotted By: william.snyder Image:



LEGEND:

- MOTT HAVEN SITE BOUNDARY
- HYDRAULIC BARRIER
- BCP AREA
- BUILDING FOOTPRINT
- MW-XX EXISTING GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION NUMBER ("R" DESIGNATES REPLACEMENT MONITORING WELL)

0 100 200 FT.

APPROXIMATE SCALE: 1"=100'

STV 100 Years
225 PARK AVENUE SOUTH, N.Y., N.Y. 10003

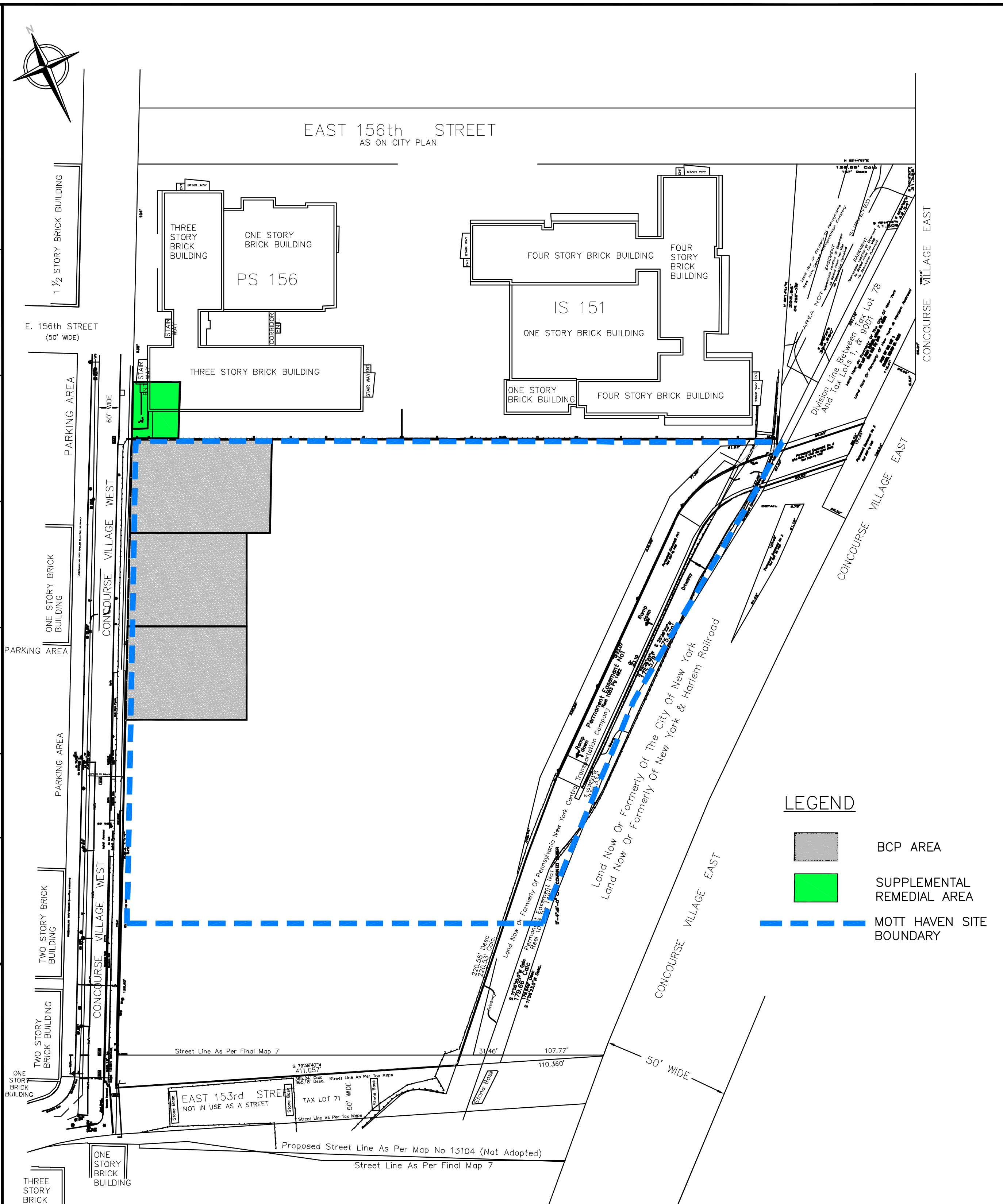
X790 - MOTT HAVEN
730 CONCOURSE VILLAGE EAST
BRONX, NY 10023

SCHOOL CONSTRUCTION AUTHORITY

FIGURE 27A
MONITORING WELL SAMPLE LOCATION PLAN

DATE: JUNE 2013
SCALE: AS SHOWN
SHEET NO: 1

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	12/12/07	--	B. Snyder	C. Kraemer	--	Figure 28 - SMP



0 150 300

SCALE IN FEET

NOTES:

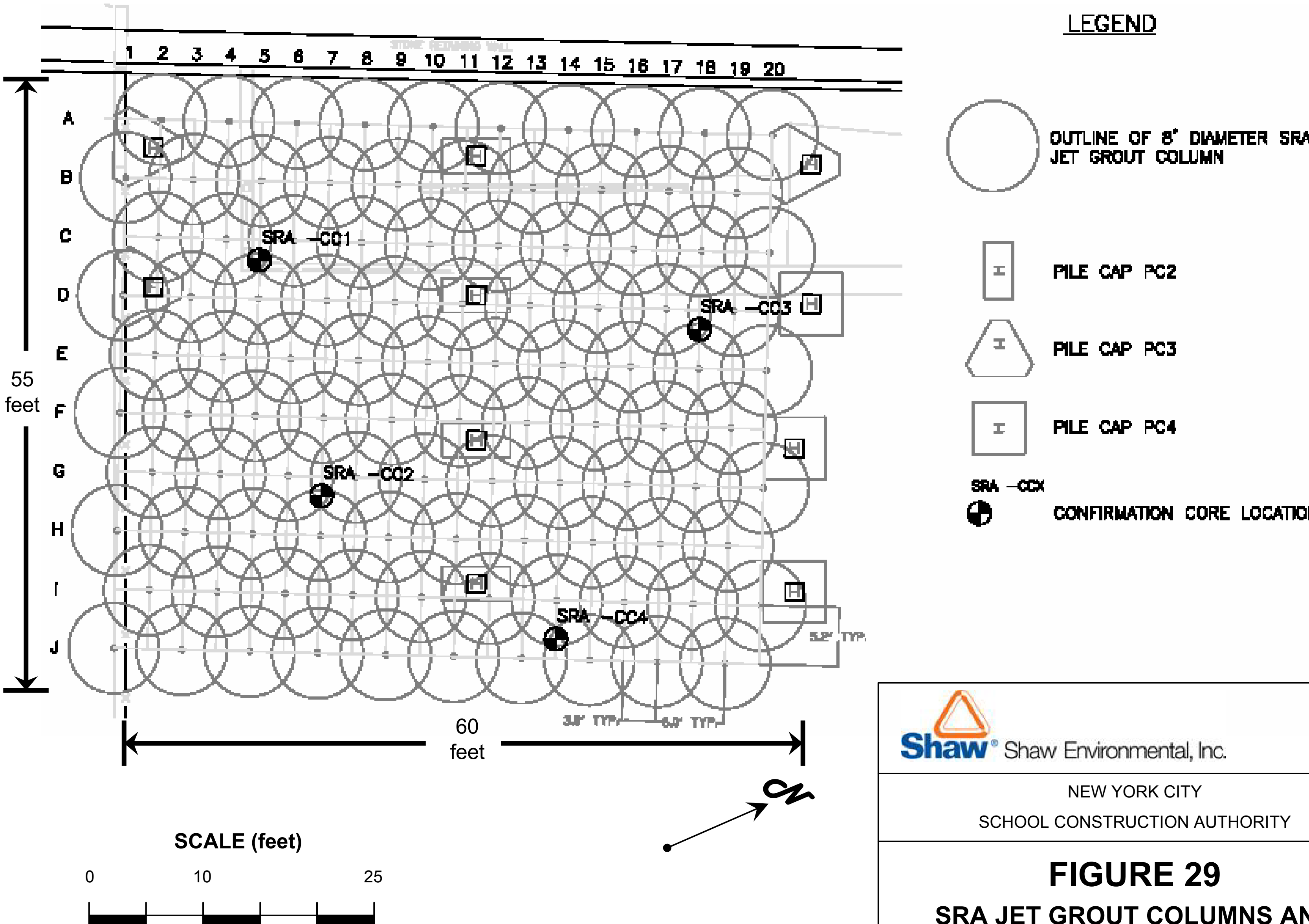
1. HORIZONTAL DATUM: COORDINATE SYSTEM BASED UPON PUBLISHED COORDINATES OF EXISTING WELLS AND MH AT CP 802

2. VERTICAL DATUM: QUEENS BOROUGH PRESIDENT'S DATUM WHICH IS 2.725 FT ABOVE U.S. COAST AND GEODETIC SURVEY DATUM, SANDY HOOK, NJ (NGVD 29)

Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY			
DRAWN BY: R.T./SSH	SUPPLEMENTAL REMEDIAL AREA (SRA)			
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY			
APPROVED BY:	DATE: 1/16/08	SCALE: AS SHOWN	DRAWING NO. FIGURE 28-SMP	FIGURE 28

File: O:\Shaw Offices - CAD Files\Harriman NY\114926\SMP - DEC 2007\Figure 28 - SMP.dwg
Plot Date/Time: Jan 16, 2008 - 1:41pm
Plotted By: william.snyder
Xref :
Image :



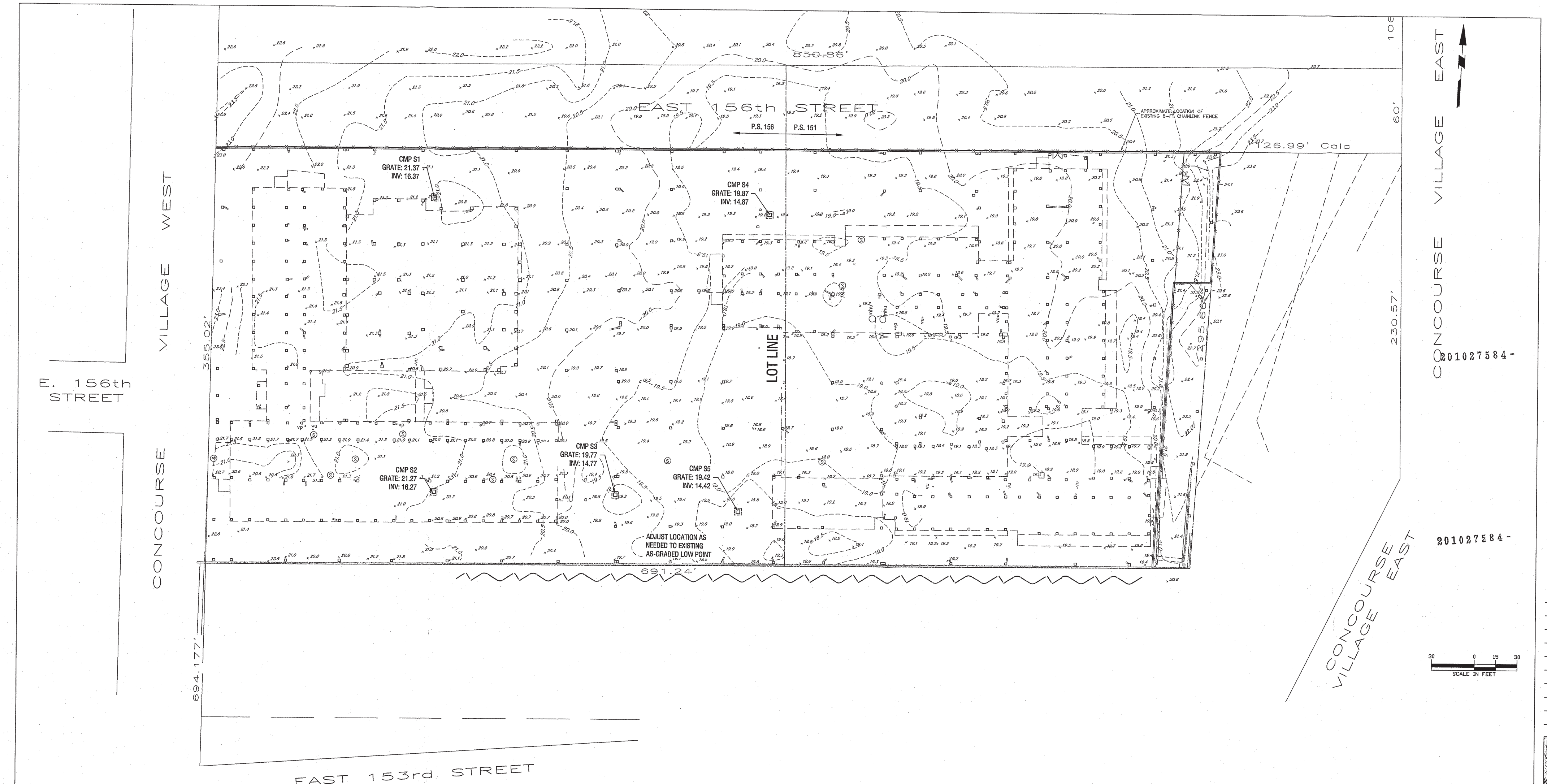
Shaw® Shaw Environmental, Inc.

NEW YORK CITY

SCHOOL CONSTRUCTION AUTHORITY

FIGURE 29

SRA JET GROUT COLUMNS AND CONFIRMATION CORE LOCATION PLAN



LEGEND

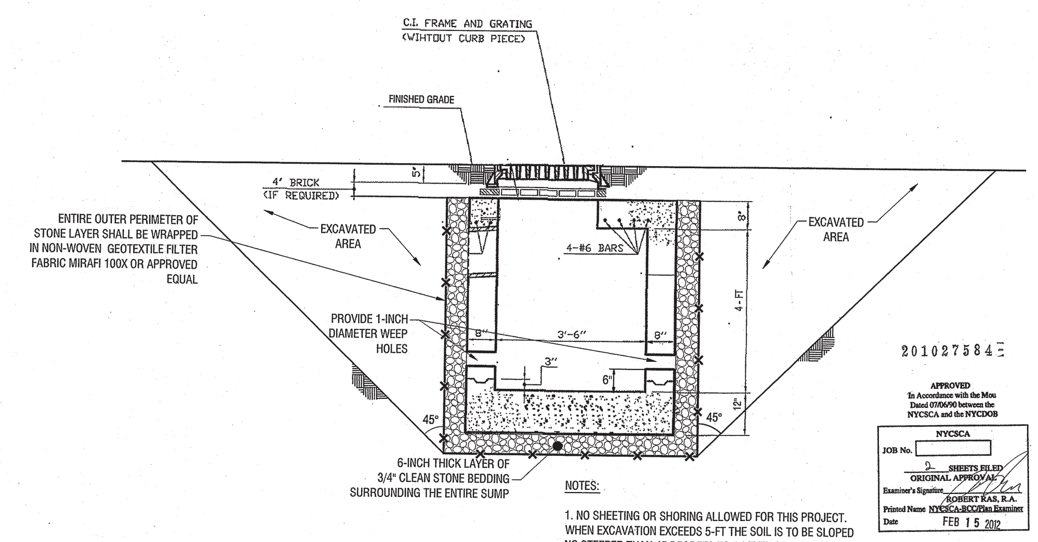
- EXISTING COLUMN
- EXISTING COLUMN WITH UTILITY
- EXISTING SANITARY MANHOLE
- EXISTING MANHOLE
- EXISTING UTILITY
- EXISTING UTILITY
- PRECAST CONCRETE MONITORING POINT (CMP)

NOTE:

1. THE PROPOSED WORK FOR THIS PROJECT IS COMPLETELY COVERED. NO DIRECT STORMWATER RUNOFF REACHES THE PROPOSED PRECAST CONCRETE MONITORING POINTS.

2. TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, ALL WORK UNDER THIS APPLICATION IS EXEMPT FROM THE NYCECC BASED ON THE FACT THAT THE SCOPE OF WORK DOES NOT AFFECT THE ENERGY USE OF THE EXISTING BUILDING.

3. NO PLUMBING WORK HAS BEEN PERFORMED AS PART OF THIS FILING BASED ON THE NYC BUILDING CODE 27-124, 125 & 126. THERE ARE NO MINOR ALTERATIONS, BUILDING, ORDINARY REPAIRS, PLUMBING, WALLS, FLOORS, ROOF CONSTRUCTION, REMOVAL, CUTTING, OR MODIFICATION OF ANY BEAMS OR STRUCTURAL SUPPORTS; THERE ARE NO REMOVAL, CHANGE, OR CLOSING OF ANY REQUIRED MEANS OF EGRESS; THERE ARE NO REARRANGEMENT OR RELOCATION OF ANY PARTS OF THE BUILDING AFFECTING LOADING OR EXIT REQUIREMENTS, OR LIGHT, HEAT, VENTILATION, OR ELEVATOR REQUIREMENTS; THERE ARE NO MINOR ALTERATIONS OR ORDINARY REPAIRS INCLUDING ADDITIONS TO, ALTERATIONS OF, OR REARRANGEMENT, RELOCATION, REPLACEMENT, REPAIR OR REMOVAL OF ANY PORTION OF A STANDPIPE OR SPRINKLER SYSTEM, WATER DISTRIBUTION SYSTEM, HOUSE SEWER, PRIVATE SEWER, OR DRAINAGE SYSTEM, INCLUDING LEADERS, OR ANY SOIL, WASTE OR VENT PIPE, OR ANY GAS DISTRIBUTION SYSTEM, OR ANY OTHER WORK AFFECTING HEALTH OR THE FIRE OR STRUCTURAL SAFETY OF THE BUILDING. THERE IS NO REPAIR OR REPLACEMENT OF ANY FIXTURE, PIPING OR FAUCETS FROM THE INLET SIDE OF A TRAP TO ANY EXPOSED STOP VALVE.



NOTES:

1. NO SHEETING OR SHORING ALLOWED FOR THIS PROJECT. WHEN EXCAVATION EXCEEDS 5-FT THE SOIL IS TO BE SLOPED NO STEEPER THAN 45 DEGREES TO A LEVEL GROUND AREA AS PER 27-1032.

PRECAST CONCRETE MONITORING POINT (CMP)

N.T.S.

201027584-

APPROVED
In Accordance with the Mou Dated 07/06/90 between the NYCSCA and the NYCDOB

NYCSCA
JOB No.
2 SHEETS FILED
ORIGINAL APPROVAL
Examiner's Signature
ROBERT RAS, R.A.
Printed Name NYCSCA-BCC Plan Examiner
Date FEB 15 2012

NOTE: Drawing may be printed at reduced scale

No. | Date | Revision

President & CEO
Sharon L. Greenberger, MCP

NYC School Construction Authority

Architecture & Engineering

E. Bruce Barrett, R.A., Vice President
Elan R. Abneri, P.E., Director of Design Studio 1
Stanley Dahir, R.A., Director of Design Studio 2
María A. Gómez, P.E., Director of Design Studio 3
George D. Roussey, P.E., Director of Technical Standards & Suppport Studio
Stacey Spann-Thom, Director of Operations Support

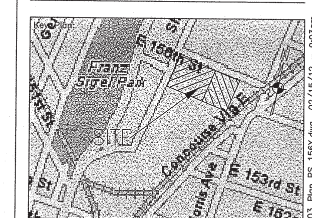
Consultants:

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
115 FIFTH AVENUE
NEW YORK, NY 10003

CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA
360 WEST 31ST STREET, 8TH FLOOR
NEW YORK, NY 10001

201027584-



Block # 2443 Lot # 79

SCA Program Design Manager:	D. BOSS
Project Architect/Engineer:	D. LEAD
Discipline Lead:	DJ HODSON
Designer:	SR
Drawn by:	KM
Checked by:	SR

LLW No.:	Facility Code:	Date:
054376	0790X	02/10/2012

Project:
P.S. 156X, BRONX

Address:
250 EAST 156TH STREET
BRONX, NEW YORK 10451

Drawing Title:
SITE PLAN

STATE OF NEW YORK · ALAN POEPPEL · 080220 · LICENSED PROFESSIONAL ENGINEER

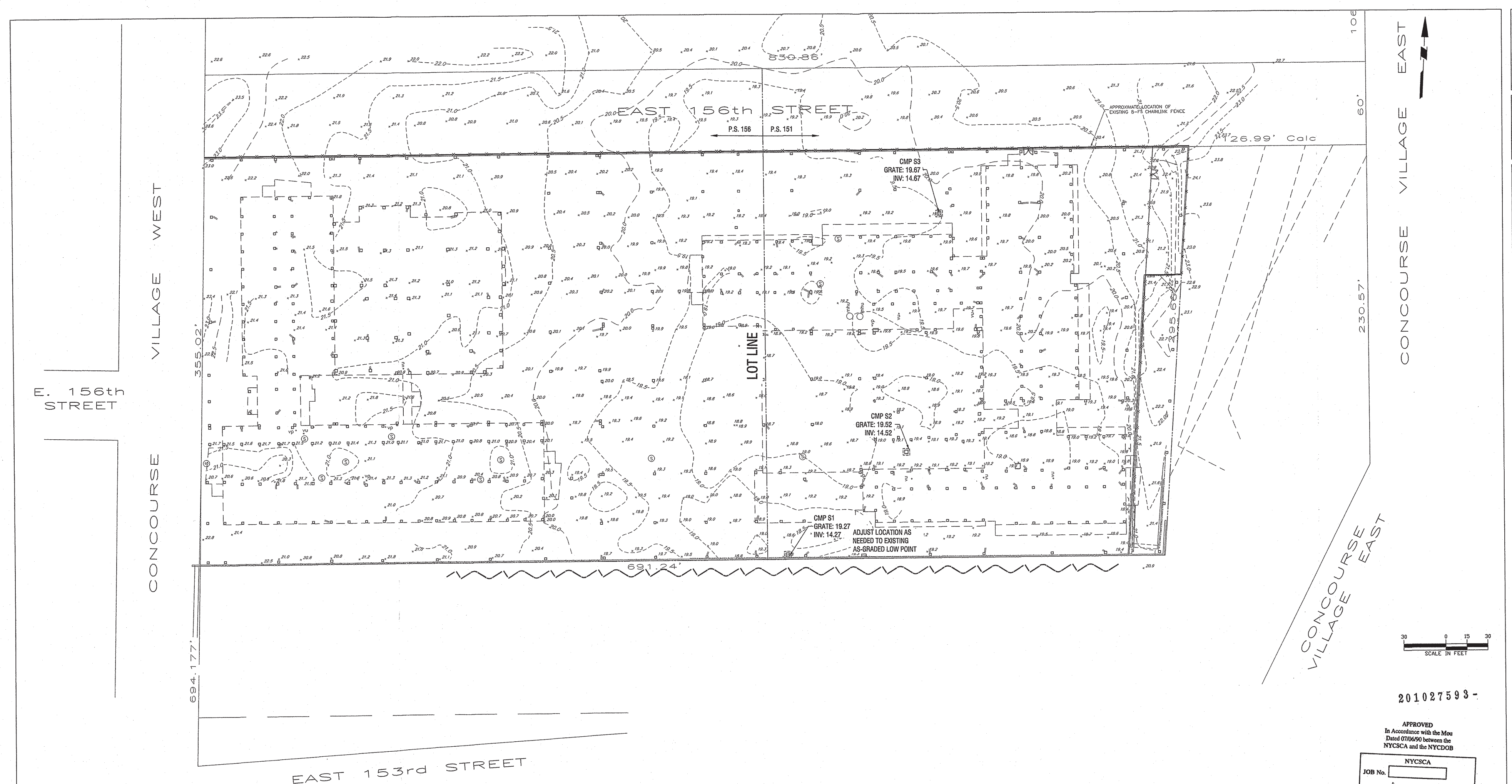
Drawing No.: 2

Sheets in Contract: 2 of 2

PEA No. 21200.00

\\langan.com\data\NY\data5\5633501\Cadd Data - 5633501\Dwg\IS-152 PS 156\Sheets - PS 156X\5633503_Plan PS 156X.dwg

Figure 30



201027593-

NOTE: Drawing may be printed at reduced scale

201027593-

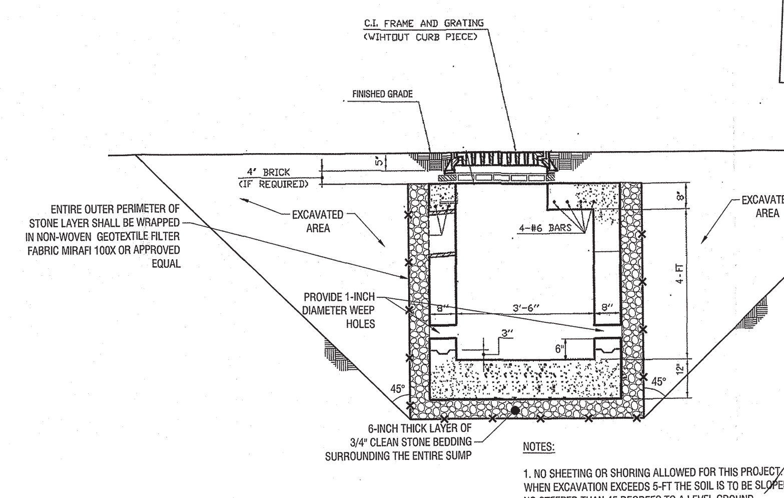
201027593-

LEGEND

- EXISTING COLUMN
- EXISTING COLUMN WITH UTILITY
- EXISTING SANITARY MANHOLE
- mhu EXISTING MANHOLE
- vp EXISTING UTILITY
- vu EXISTING UTILITY
- PRECAST CONCRETE MONITORING POINT (CMP)

NOTE:

1. THE PROPOSED WORK FOR THIS PROJECT IS COMPLETELY COVERED. NO DIRECT STORMWATER RUNOFF REACHES THE PROPOSED PRECAST CONCRETE MONITORING POINTS.
2. TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, ALL WORK UNDER THIS APPLICATION IS EXEMPT FROM THE NYCECC BASED ON THE FACT THAT THE SCOPE OF WORK DOES NOT AFFECT THE ENERGY USE OF THE EXISTING BUILDING.
3. NO PLUMBING WORK HAS BEEN PERFORMED AS PART OF THIS FILING BASED ON THE NYC BUILDING CODE 27-124, 125 & 126. THERE ARE NO MINOR ALTERATIONS, BUILDING, ORDINARY REPAIRS, PLUMBING, WALLS, FLOORS, ROOF CONSTRUCTION, REMOVAL, CUTTING, OR MODIFICATION OF ANY BEAMS OR STRUCTURAL SUPPORTS; THERE ARE NO REMOVAL, CHANGE, OR CLOSING OF ANY REQUIRED MEANS OF EGRESS; THERE ARE NO REARRANGEMENT OR RELOCATION OF ANY PARTS OF THE BUILDING AFFECTING LOADING OR EXIT REQUIREMENTS, OR LIGHT, HEAT, VENTILATION, OR ELEVATOR REQUIREMENTS; THERE ARE NO MINOR ALTERATIONS OR ORDINARY REPAIRS INCLUDING ADDITIONS TO, ALTERATIONS OF, OR REARRANGEMENT, RELOCATION, REPLACEMENT, REPAIR OR REMOVAL OF ANY PORTION OF A STANDPIPE OR SPRINKLER SYSTEM, WATER DISTRIBUTION SYSTEM, HOUSE SEWER, PRIVATE SEWER, OR DRAINAGE SYSTEM, INCLUDING LEADERS, OR ANY SOIL, WASTE OR VENT PIPE, OR ANY GAS DISTRIBUTION SYSTEM, OR ANY OTHER WORK AFFECTING HEALTH OR THE FIRE OR STRUCTURAL SAFETY OF THE BUILDING. THERE IS NO REPAIR OR REPLACEMENT OF ANY FIXTURE, PIPING OR FAUCETS FROM THE INLET SIDE OF A TRAP TO ANY EXPOSED STOP VALVE.



NOTES:

1. NO SHEETING OR SHORING ALLOWED FOR THIS PROJECT. WHEN EXCAVATION EXCEEDS 5-FT THE SOIL IS TO BE SLOPED NO STEEPER THAN 45 DEGREES TO A LEVEL GROUND AREA AS PER 27-1032.

PRECAST CONCRETE MONITORING POINT (CMP)

N.T.S

APPROVED
In Accordance with the Mou Dated 07/06/90 between the NYCSCA and the NYCDOB

NYCSCA
JOB No.
2 SHEETS FILED
ORIGINAL APPROVAL
Examiner's Signature
Printed Name ROBERT RAS, R.A. NYCSCA-BCC/Plan Examiner
Date FEB 15 2012

201027593

APPROVED
In Accordance with the Mou ~~Dated 07/06/90 between the~~ NYCSCA and the NYCDOB

NYCSCA
JOB No.
SHEETS FILED
INSPECTORS OFFICIAL COPY
THIS IS A TRUE COPY OF THE PLANS APPROVED BY THE NYCSCA-BCC. THESE PLANS MUST REMAIN PERMANENTLY ON THE PREMISES UNTIL THE WORK IS COMPLETED.
ROBERT RAS, R.A.
NYCSCA-BCC / Plan Examiner

APPROVED
In Accordance with the Mou Dated 07/06/90 between the NYCSCA and the NYCDOB

NYCSCA
JOB No.
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Printed Name ROBERT RAS, R.A. NYCSCA-BCC/Plan Examiner
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ARCHITECT: PERKINS EASTMAN
115 FIFTH AVENUE
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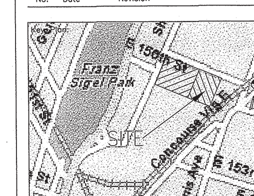
CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA
360 WEST 31ST STREET, 8TH FLOOR
NEW YORK, NY 10001

No.	Date	Revision



Block # 2443	Lot # 79
SCA Program Design Manager:	D. BOSS
Project Architect/Engineer:	D. LEAD
Discipline Lead:	DJ HODSON
Designer:	SR
Drawn by:	KM
Checked by:	SR

LLW No.:	Facility Code:	Date:
054376	0790X	02/10/2012

Project:
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STATE OF NEW YORK · ALAN POEPPEL · 080220 · LICENSED PROFESSIONAL ENGINEER

Drawing No.: 2

Sheets in Contract: 2 of 2

PEA No. 21200.00

\\langan.com\data\NY\data5\5633501\Cadd Data - 5633501\Dwg\IS-152 PS 156\Sheets - PS 151X\5633503_Plan PS 151X.dwg

Figure 31

Appendix A

Metes and Bounds

BCP Area
Legal Description

ENVIRONMENTAL EASEMENT PARCEL DESCRIPTION
Tax Block 2443, Part of Tax Lot 78

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

BEGINNING at a point on the easterly side of Concourse Village West (60 feet wide), distant 394.18 feet northerly from the corner formed by the intersection of the easterly side of Concourse Village West with the northerly side of East 153rd Street (50 feet wide), as said street is shown on the Tax Maps of the City of New York;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 125.00 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 200.00 feet to a point;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 25.00 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 100.00 feet to the southerly line of that parcel of land described and designated as Parcel B in deed dated December 14, 1966 from The New York Central Railroad Company to The City of New York recorded in the Office of the Register of The City of New York in Bronx County in Record Liber 180 Page 251;

RUNNING THENCE South 83 degrees 44 minutes 07 seconds West, along the southerly line of those parcels of land designated as Parcel B in the aforementioned deed, 150.00 feet to the easterly side of Concourse Village West;

RUNNING THENCE South 04 degrees 57 minutes 30 seconds East along the easterly side of Concourse Village West, 300.00 feet to the point or place of BEGINNING.

The above described Parcel having an Area of 39,990 sq.ft. or 0.9180 Acres.

Non-BCP Area A
Legal Description

AREA SUBJECT TO DECLARATION OF COVENANTS & RESTRICTIONS (NON–BCP AREA A)
Tax Block 2443, Part of Tax Lot 78

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

BEGINNING at a point the following three courses and distances from the corner formed by the intersection of the southerly side of East 156th Street with the westerly side of Concourse Village East;

THENCE South 83 degrees 44 minutes 07.0 seconds West, along the southerly side of East 156th street 126.99 feet to a point;

THENCE South 02 degrees 14 minutes 41.0 seconds East, 295.66 feet to a point;

THENCE South 83 degrees 44 minutes 07 seconds West, 29.52 feet to the point or place of BEGINNING.

RUNNING THENCE South 24 degrees 55 minutes 32 seconds West, 32.65 feet to a point;

RUNNING THENCE North 69 degrees 26 minutes 22 seconds West, 11.95 feet to a point;

RUNNING THENCE South 37 degrees 37 minutes 23 seconds West, 45.67 feet to a point of intersection;

RUNNING THENCE Southerly, along a curve bearing to the left having a radius of 110.56 feet subtended by a chord of South 28 degrees 49 minutes 22 seconds West, an arc length 40.32 feet to a point of tangency;

RUNNING THENCE South 18 degrees 22 minutes 33 seconds West, 159.07 feet to a point;

RUNNING THENCE South 18 degrees 29 minutes 50 seconds West, 140.44 feet to a point;

RUNNING THENCE North 71 degrees 30 minutes 10 seconds West, 14.93 feet to a point;

RUNNING THENCE South 18 degrees 27 minutes 46 seconds West, 15.42 feet to a point;

RUNNING THENCE South 15 degrees 55 minutes 44 seconds West, 36.17 feet to a point of intersection;

RUNNING THENCE southeasterly, along a curve bearing to the left having a radius of 83.83 feet subtended by a chord of South 02 degrees 29 minutes 02 seconds West, an arc length of 30.82 feet to a point of reverse curvature;

RUNNING THENCE southwesterly, along a curve bearing to the right having a radius of 133.77 feet subtended by a chord of South 00 degrees 58 minutes 20 seconds East, an arc length of 33.04 feet to a point;

RUNNING THENCE South 46 degrees 35 minutes 09 seconds West, 143.40 feet to a point;

RUNNING THENCE South 85 degrees 35 minutes 46 seconds West, 311.13 feet to the easterly side of Concourse Village West;

RUNNING THENCE along the easterly side of Concourse Village West, North 04 degrees 57 minutes 30 seconds West, 241.35 feet to a point;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 125.00 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 200.00 feet to a point;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 25 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 100 feet to a point;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 511.72 feet to the point or place of BEGINNING.

The above described Parcel having an Area of 231,776 sq.ft. or 5.3208 Acres.

Non BCP Area B
Legal Description

LEGAL DESCRIPTION

AREA SUBJECT TO DECLARATION OF COVENANTS AND RESTRICTIONS (NON–BCP AREA B)

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

BEGINNING at a point on the easterly side of Concourse Village West, distant 694.177 feet northerly from the corner formed by the intersection of the northerly side 153rd Street as shown on the tax map with the easterly side of Concourse Village West;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, along the easterly side of Concourse Village West, 355.02 feet to the northerly line of East 156th Street, as shown on the City Plan;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, along the northerly line of East 156th Street and along the southerly line of property conveyed by the New York Central Railroad Company to Concourse Village Inc., by deed dated 11/14/1962, Liber 2508 page 414, 830.86 feet to the westerly side of Concourse Village East;

RUNNING THENCE southerly along the westerly side of Concourse Village East, 60 feet to the southerly line of East 156th Street as shown on the City Plan;

RUNNING THENCE South 83 degrees 44 minutes 07 seconds West along the southerly side of East 156th Street, 126.99 feet (calculated, 127 feet description) to a point;

RUNNING THENCE South 02 degrees 14 minutes 41 seconds East, 295.66 feet to the southerly line of Parcels A & B in deed dated 12/14/1966 from the New York Central Railroad Company to the City of New York in Liber 180 Page 251;

RUNNING THENCE South 83 degrees 44 minutes 07 seconds West along the aforementioned southerly line of Parcels A & B, 691.24 feet to the easterly side of Concourse Village West, the point or place of BEGINNING.

Appendix B

Sanborn Maps

EDR®: Environmental Data Resources, Inc.

"Linking Technology with Tradition"

Sanborn® Map Report

Ship to: Cathy Bryant
URS Corporation
201 Willowbrook Boulevard
Wayne, NJ 07470

3001179BEK 973-785-0700

Order Date: 7/11/2001 **Completion Date:** 07/12/2001
Inquiry #: 654957.7S
P.O. #: na
Site Name: Formerly Metro North
Address: Block 2443/Lot 78
City/State: Bronx, NY 10451
Cross Streets:

Based on client-supplied information, fire insurance maps for the following years were identified

1891 - 2 - maps	1980 - 1 - map	1995 - 1 - map
1908 - 1 - map	1984 - 1 - map	1996 - 1 - map
1935 - 1 - map	1986 - 1 - map	
1946 - 1 - map	1989 - 1 - map	
1947 - 1 - map	1991 - 1 - map	
1951 - 1 - map	1992 - 1 - map	
1977 - 1 - map	1993 - 1 - map	
1978 - 1 - map	1994 - 1 - map	

Total Maps: 19

Limited Permission to Photocopy

URS Corporation (the client) is permitted to make up to THREE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Electronic Sanborn Map Images
USER'S GUIDE

Thank you for your interest in electronic Sanborn Map images. The following are guidelines for accessing the images and for transferring them to your system. If you have any questions about the use of electronic Sanborn Map images, contact your EDR Account Executive at 1-800-352-0050.

Organization of Electronic Sanborn Image File

- First Page — Sanborn Map Report, listing years of coverage
- Second Page — Electronic Sanborn Map Images USER'S GUIDE
- Third Page — Oldest Sanborn Map Image
- Last Page — Most recent Sanborn Map Image

Navigating the Electronic Sanborn Image File

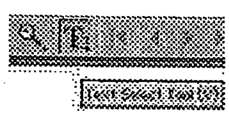
- Open file on screen.
- Identify TP (Target Property) on the most recent map.
- Find TP on older printed images.
- To view the image more clearly, zoom to 250%.
    - 200-250% is the approximate equivalent scale of hardcopy Sanborn Maps.
    - Viewing above 400% will tend to pixelate the display.
- Zooming in on an image:
    - Click on the % in the lower left hand corner and type in ____%.
    - Use the magnifying tool and drag a box around the TP area.

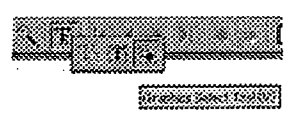
Printing a Sanborn Map from the Electronic File

- EDR recommends printing all images at 300 dpi (300 dpi prints faster than 600 dpi).
- To print only the TP area, cut and paste the area from Adobe Acrobat to your word processor.

  <u>For Adobe Acrobat Version 3</u>
    - Go to the Menu Bar.
    - Highlight 'Tools'.
    - Highlight 'Select Graphics'.
    - Draw a box around the area of interest.
    - Go to the Menu Bar.
    - Highlight 'Edit'.
    - Highlight 'Copy'.
    - Go to a word processor such as Microsoft Word and paste. Print from the word processor.

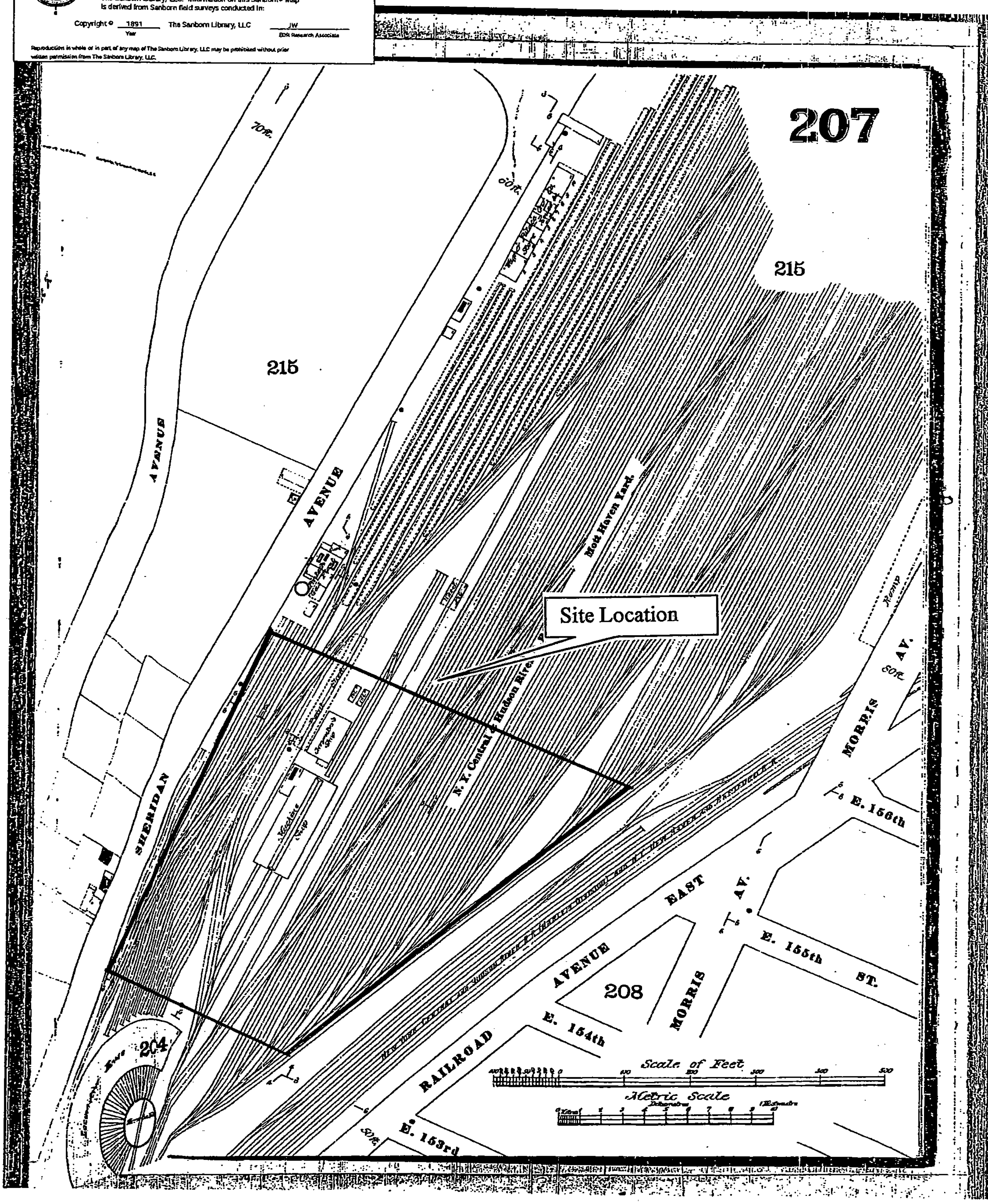
  <u>For Adobe Acrobat Version 4</u>
    - Go to the Menu Bar.
    - Press and hold the 'T' button.
    - Choose the Graphics Select Tool.
    - Draw a box around the area of interest.
    - Go to the Menu Bar.
    - Highlight 'Edit'.
    - Highlight 'Copy'.
    - Go to a word processor such as Microsoft Word and paste. Print from the word processor.



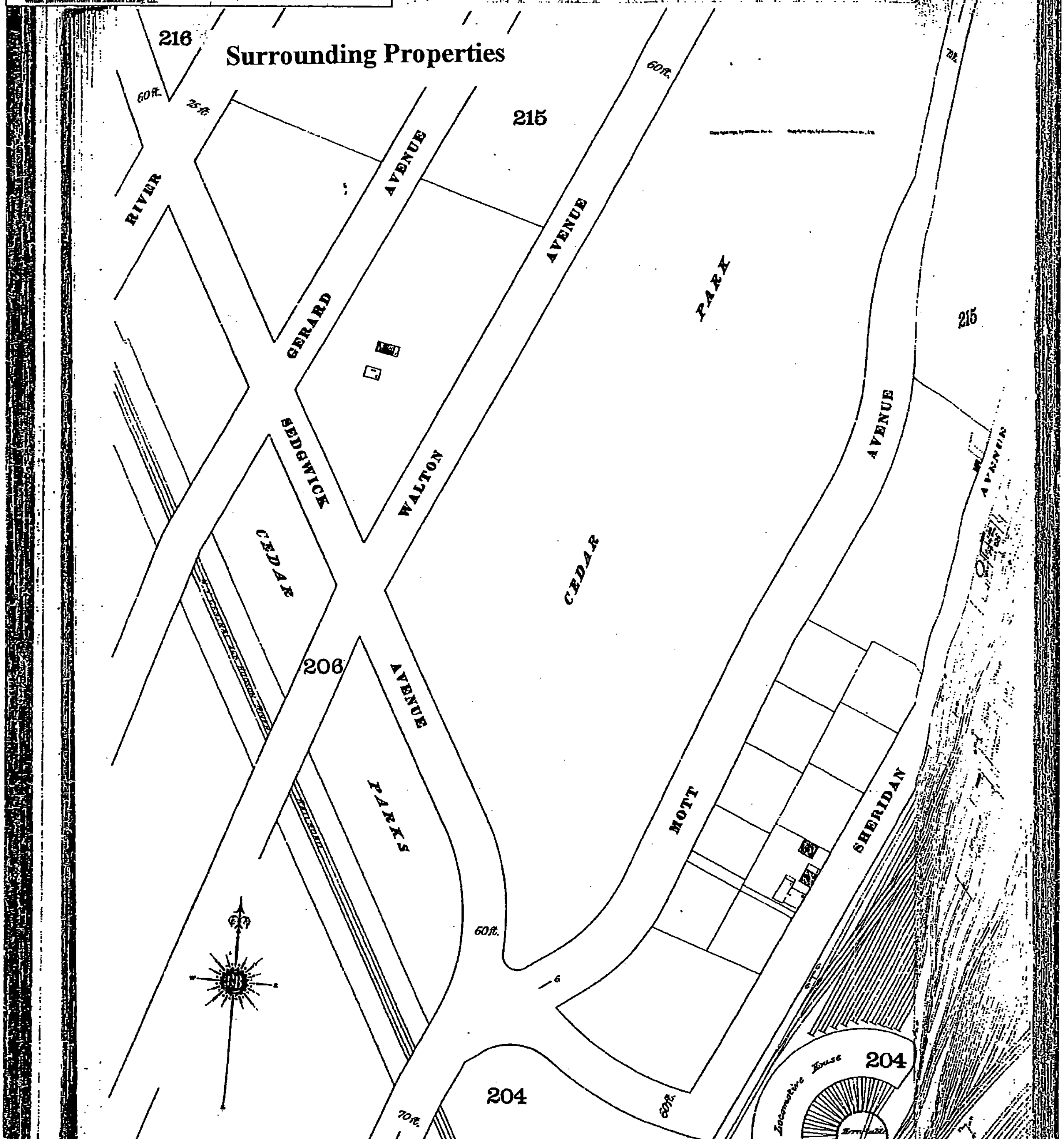


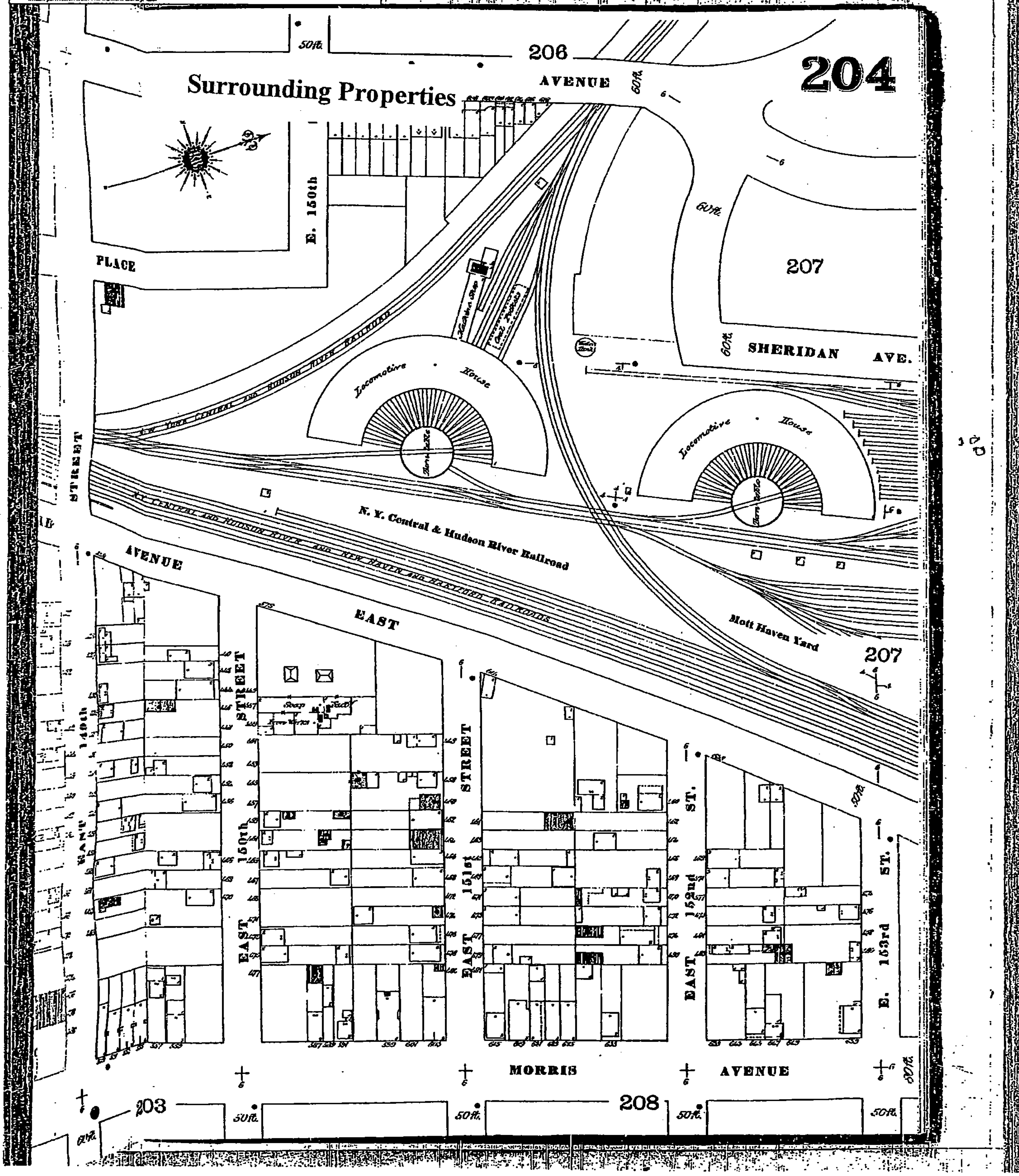
Important Information about Email Delivery of Electronic Sanborn Map Images

- Images are grouped into one file, up to 2MB.
- In cases where in excess of 6-7 map years are available, the file size typically exceeds 2MB. In these cases, you will receive multiple files, labeled as 1 of 3, 2 of 3, etc. including all available map years.
- Due to file size limitations, certain ISPs, including AOL, may occasionally delay or decline to deliver files. Please contact your ISP to identify their specific file size limitations.


207
215
215
70ft.
60ft.
AVENUE
SHERIDAN
AVENUE
Mott Haven Yard.
N. Y. Central & Hudson Rive.
Site Location
Machine Shop
MORRIS
AV.
80ft.
E. 156th
EAST
AV.
E. 155th
ST.
AVENUE
208
MORRIS
E. 154th
RAILROAD
E. 153rd
204
Scale of Feet
Metric Scale

Surrounding Properties

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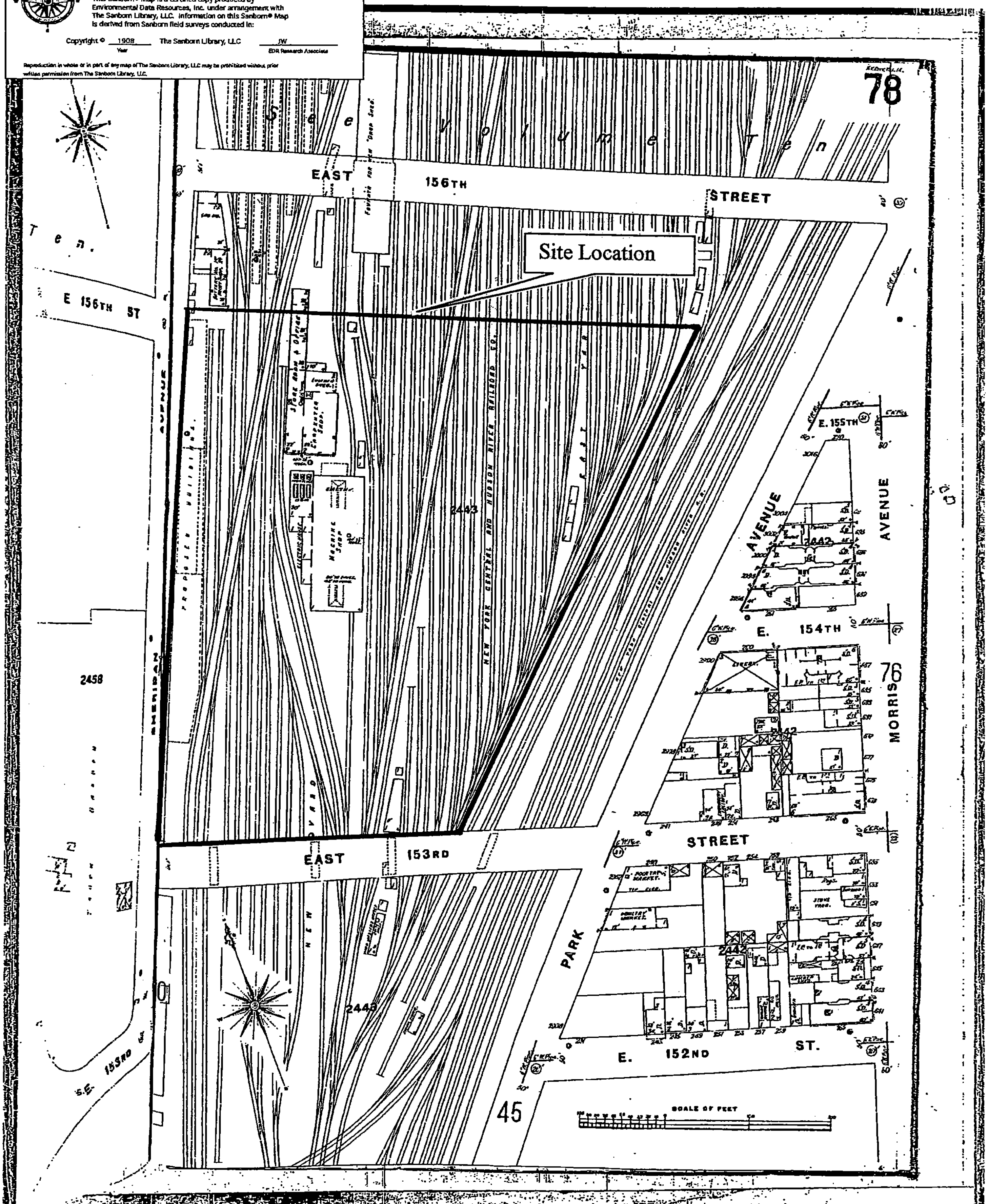
AVENUE
E. 150th
PLACE
207
SHERIDAN AVE.
Locomotive House
Locomotive House
New York Central and Hudson River Railroad
N. Y. Central & Hudson River Railroad
N. Y. Central and Hudson River and New Haven and Hartford Railroads
Mott Haven Yard
207
STREET
AVENUE
EAST
EAST 150th STREET
EAST 151st STREET
EAST 152nd ST.
E. 153rd ST.
MORRIS AVENUE
203
208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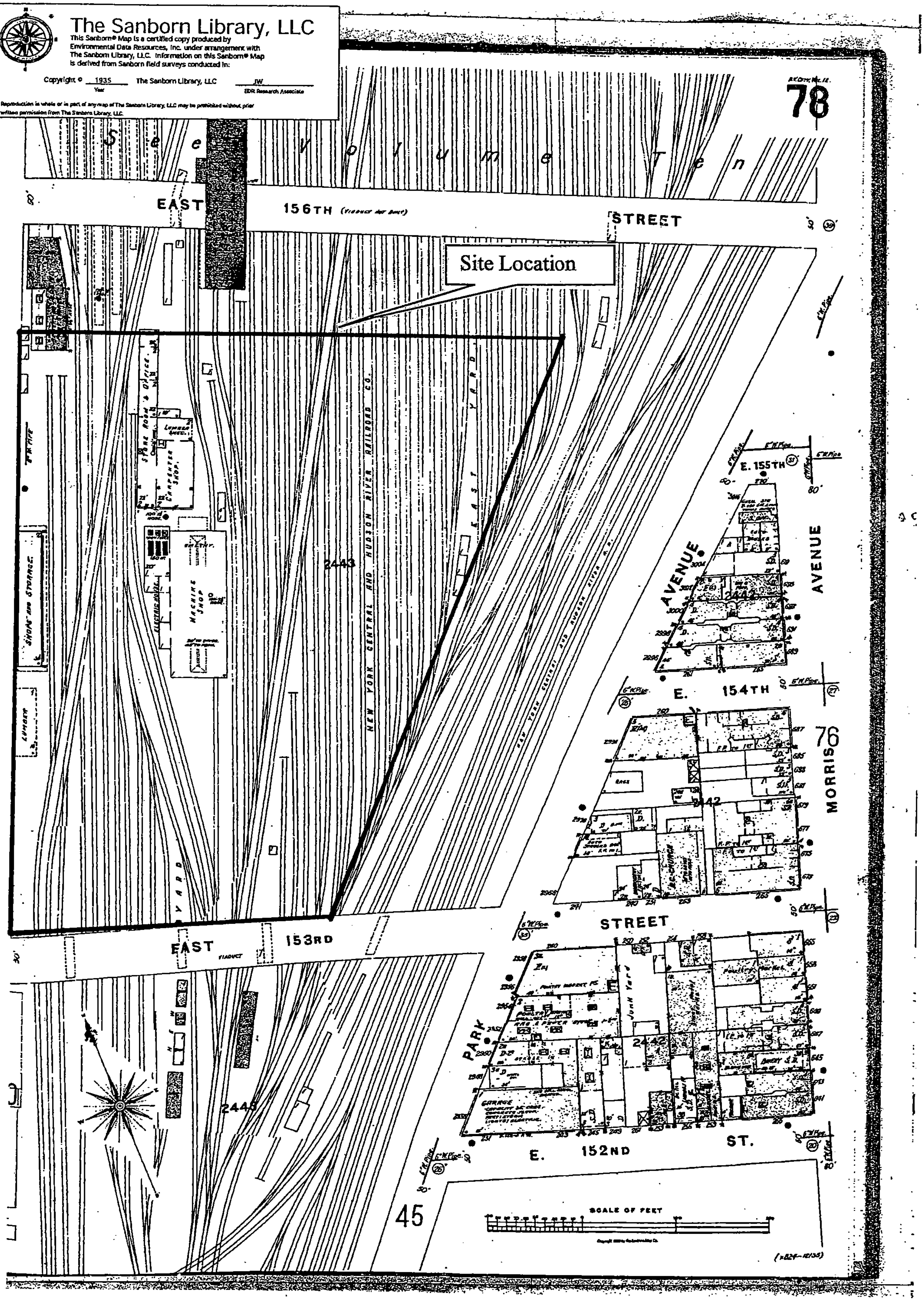
See Volume Ten
EAST 156TH STREET
E 156TH ST
Site Location
SHERIDAN AVENUE
NEW YORK CENTRAL AND HUDSON RIVER RAILROAD CO.
EAST YARD
CARPENTER SHOP
MACHINE SHOP
2443
2458
E. 155TH
AVENUE
MORRIS AVENUE
E. 154TH
76
2442
STREET
EAST 153RD
PARK
NEW YARD
E. 152ND ST.
45
SCALE OF FEET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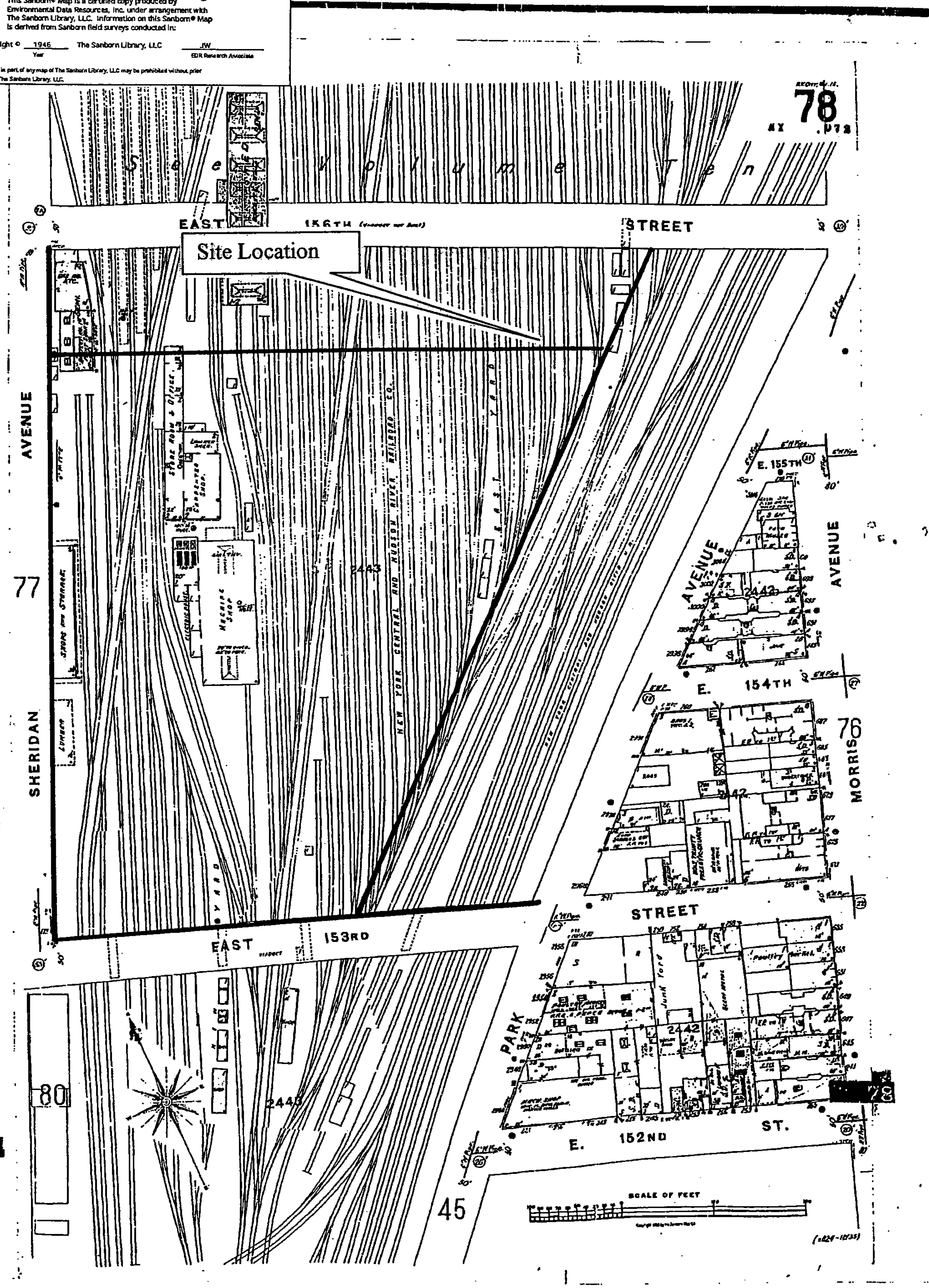
EAST 156TH STREET
Site Location
STORE ROOM & OFFICE
CARPENTER SHOP
MACHINE SHOP
SHOPS AND STORAGE
LUMBER
2443
NEW YORK CENTRAL AND HUDSON RIVER RAILROAD CO.
EAST YARD
YARD
E. 155TH
AVENUE
AVENUE
E. 154TH
2442
76
MORRIS
EAST 153RD STREET
PARK
GARAGE
Junk Yard
2445
E. 152ND ST.
45
SCALE OF FEET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See Volume Ten
EAST 156TH STREET
Site Location
SHERIDAN AVENUE
77
2443
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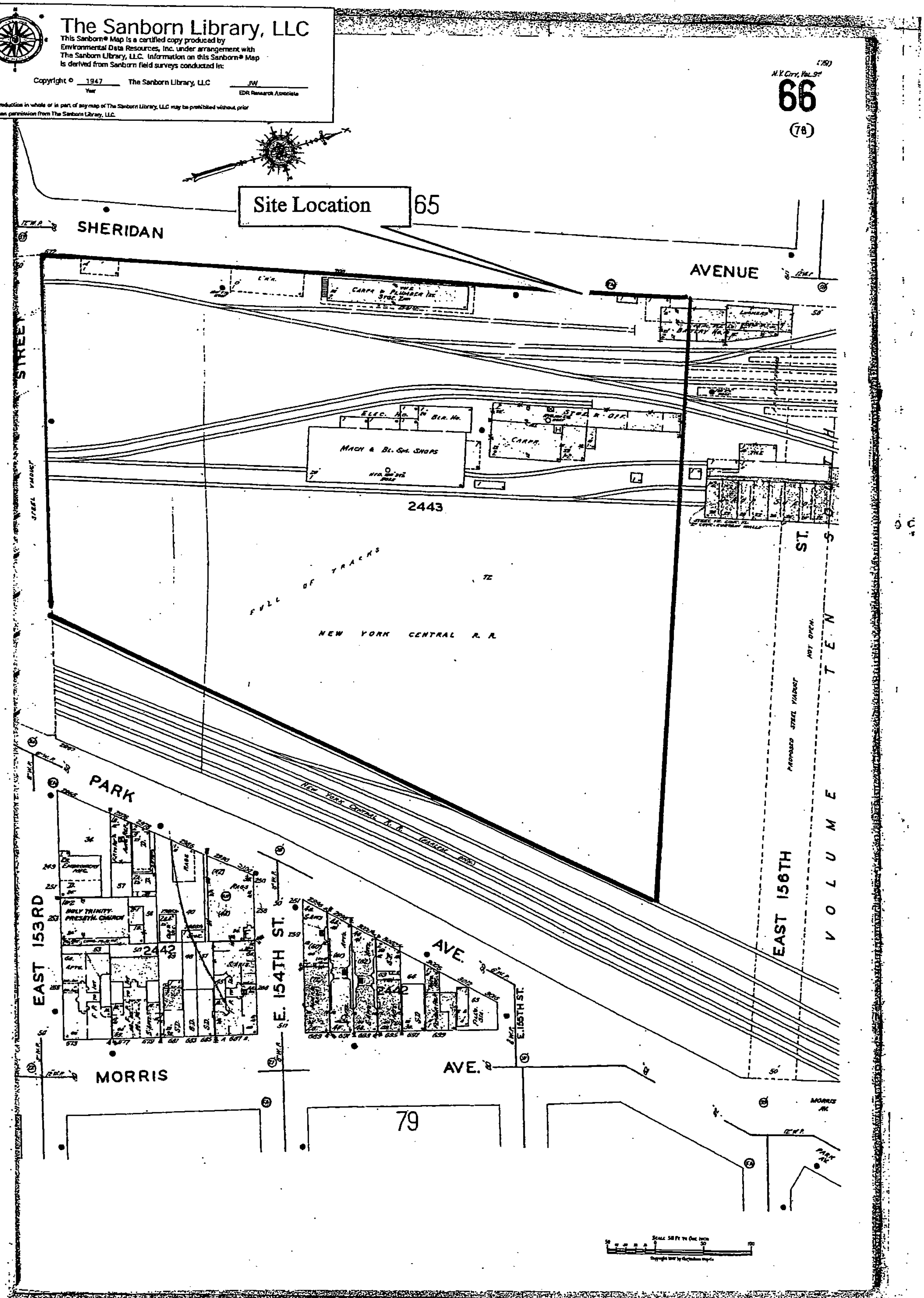
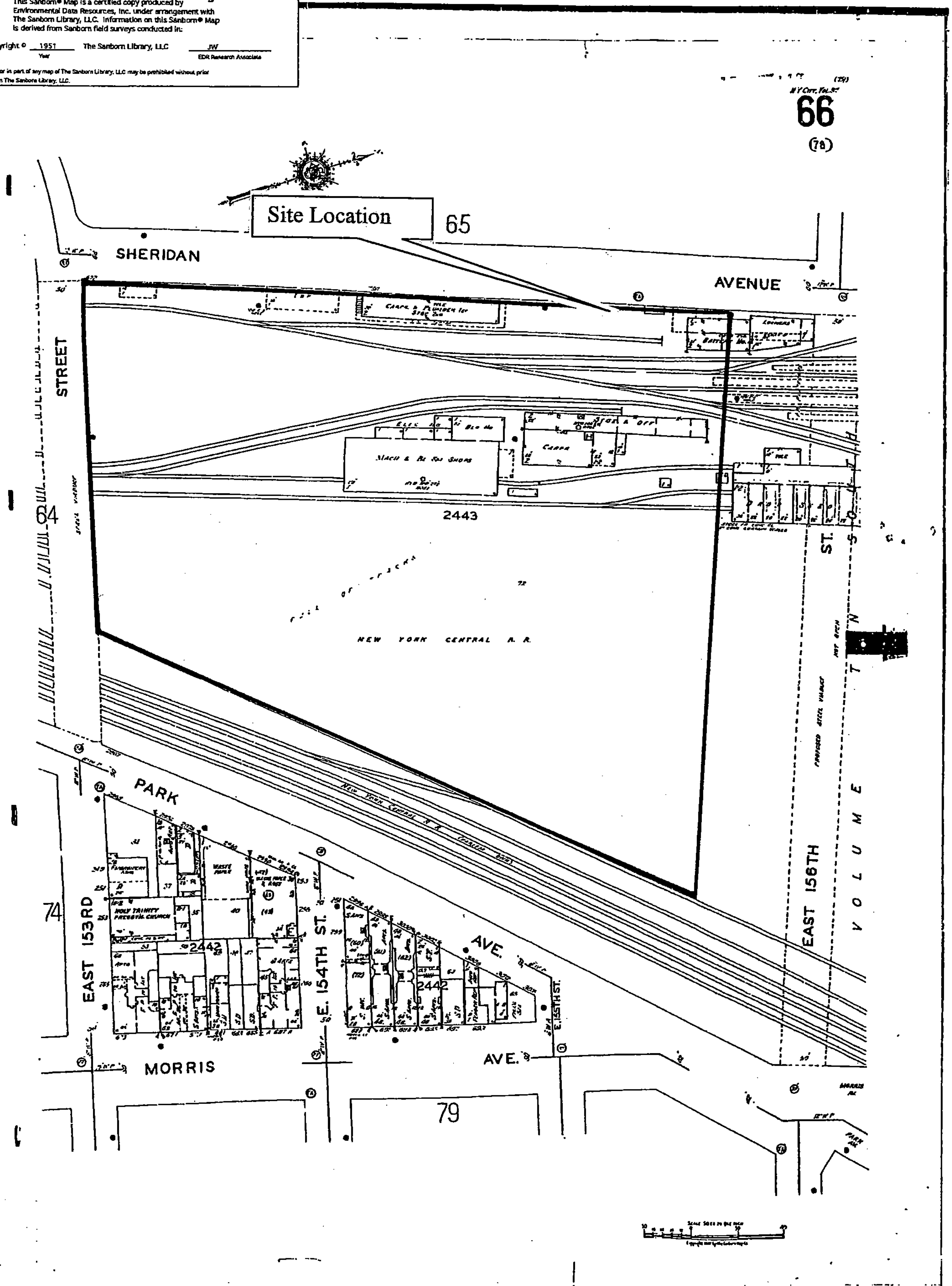
Machine Shop
E. 155TH
AVENUE
2442
E. 154TH
76
MORRIS
STREET
EAST 153RD
PARK
Junk Yard
Poultry
80
2440
E. 152ND ST.
45
79
SCALE OF FEET


66
(78)
Site Location
65
SHERIDAN
AVENUE
STREET
2443
NEW YORK CENTRAL R. R.
FULL OF TRACKS
MACH & BL. SM. SHOPS
CARPS.
ELEC. HO.
PARK
AVE.
EAST 153RD
E. 154TH ST.
E. 155TH ST.
EAST 156TH ST.
HOLY TRINITY PRESBYTN. CHURCH
2442
MORRIS
AVE.
79
VOLUME TEN
PROPOSED STEEL VIADUCT
NOT OPEN.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AVENUE
STREET
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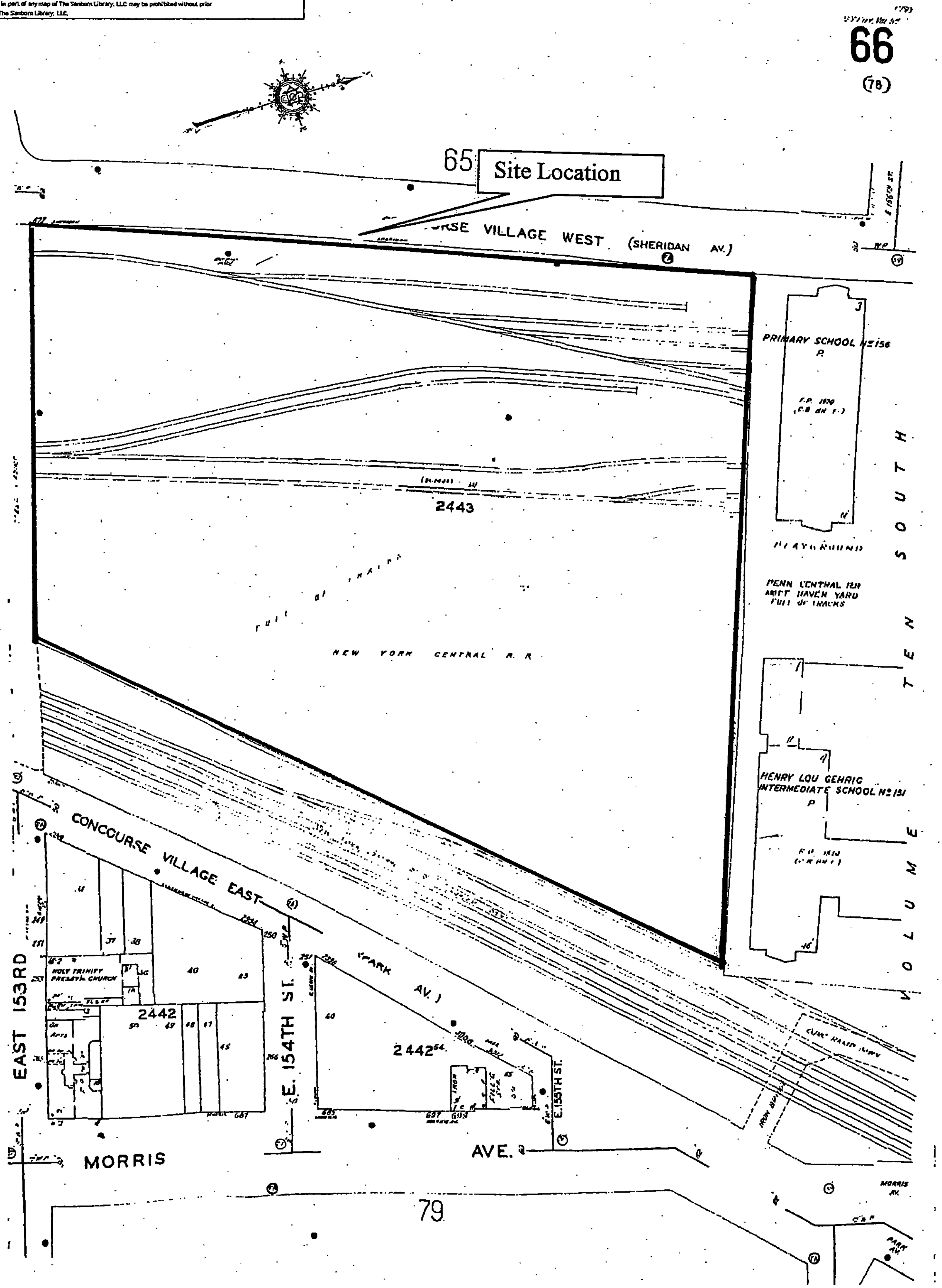
PARK
74
HOLY TRINITY PRESBYT'N CHURCH
2442
EAST 153RD
E. 154TH ST.
AVE.
MORRIS
AVE.
E. 155TH ST.
79
EAST 156TH
ST.
VOLUME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Site Location
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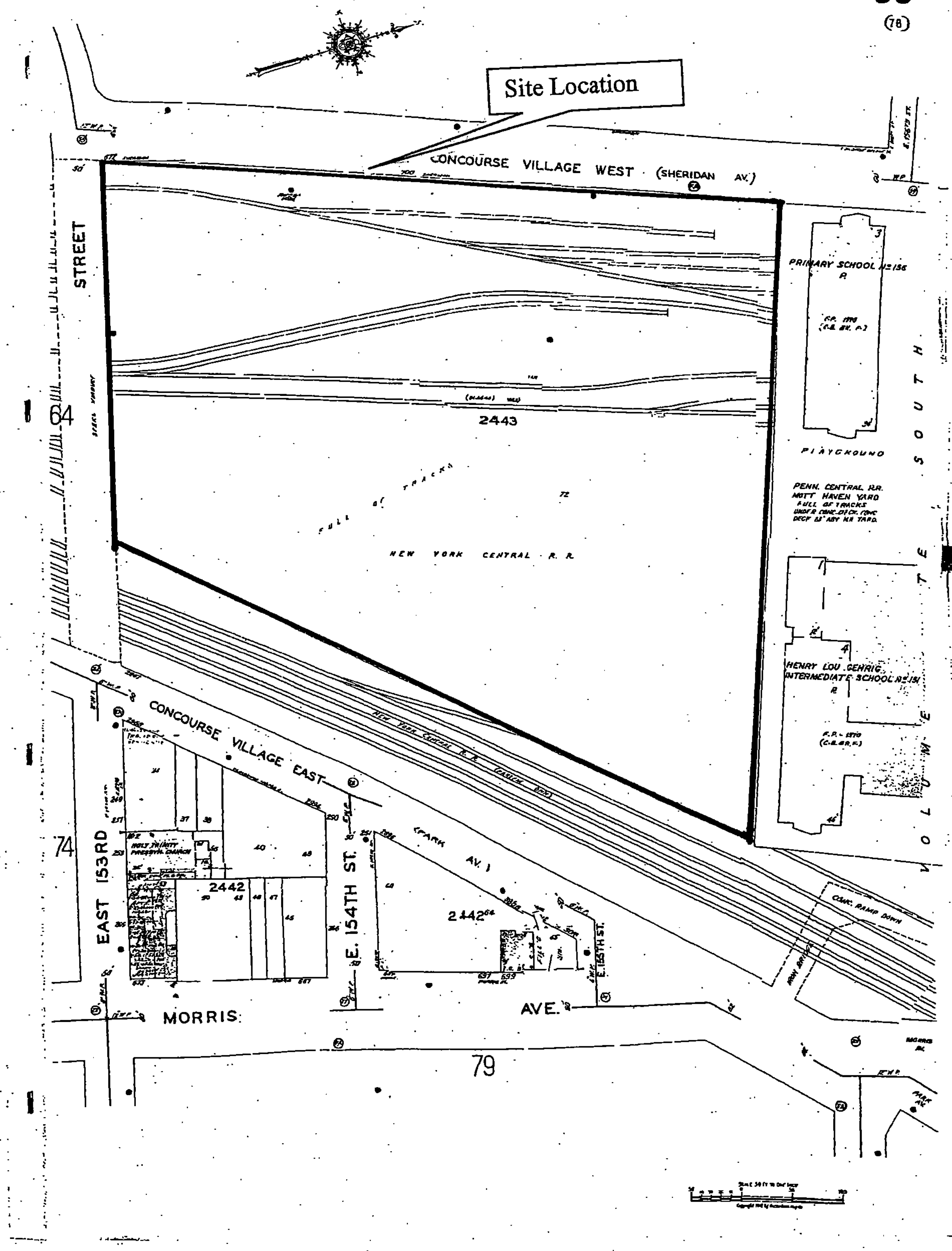
PRIMARY SCHOOL No 156
PLAYGROUND
PENN CENTRAL RR
MOTT HAVEN YARD
FULL OF TRACKS
2443
FULL OF TRACKS
NEW YORK CENTRAL R. R.
SOUTH
HENRY LOU GEHRIG
INTERMEDIATE SCHOOL No 151
TEN
VOLUME
CONCOURSE VILLAGE EAST
HOLY TRINITY PRESBYN. CHURCH
2442
EAST 153RD
E. 154TH ST.
(PARK AV.)
2442
E. 155TH ST.
MORRIS
AVE.
79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STREET
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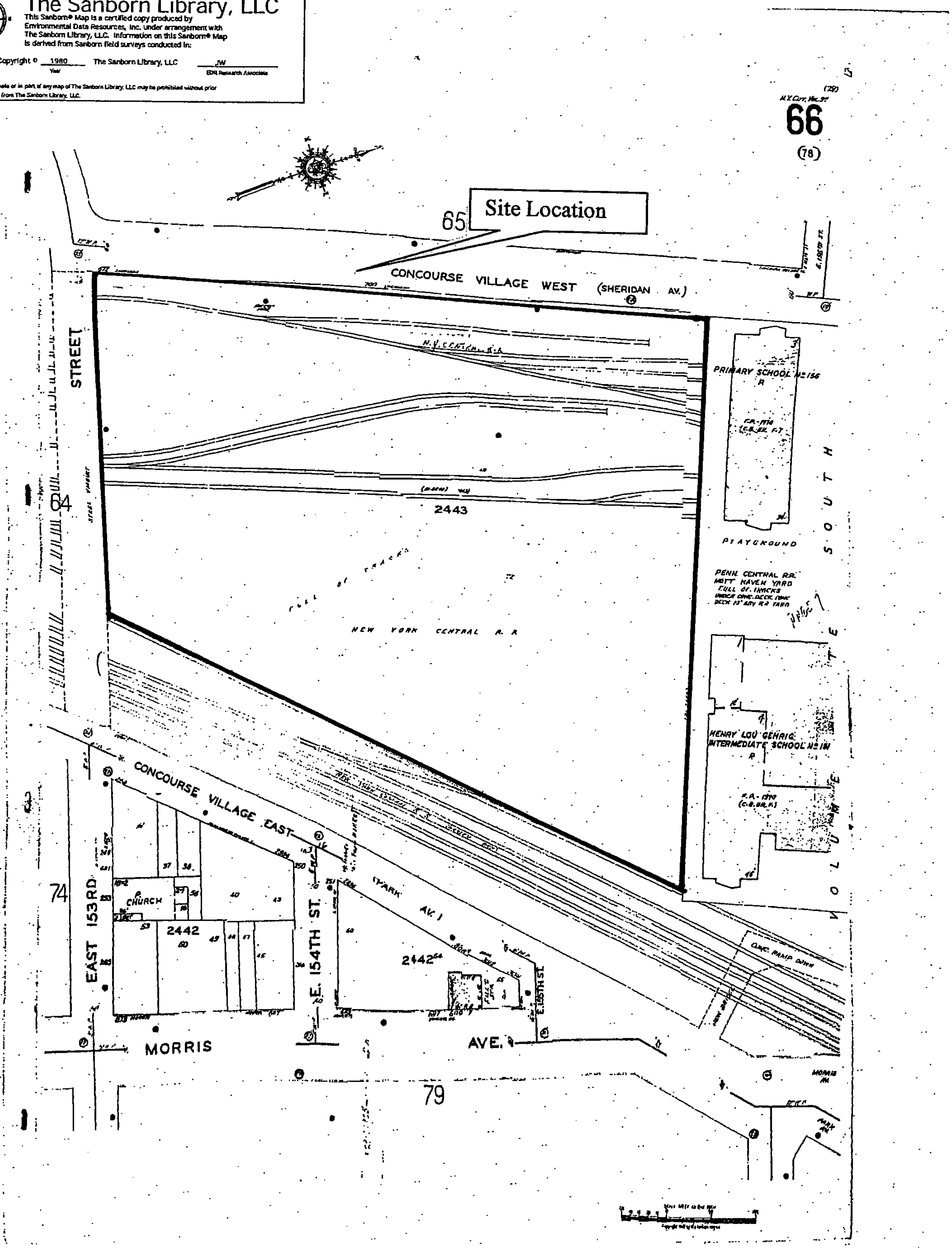
PENN. CENTRAL RR.
MOTT HAVEN YARD
FULL OF TRACKS
HENRY LOU GEHRIG INTERMEDIATE SCHOOL No 151
SOUTH
CONCOURSE VILLAGE EAST
NEW YORK CENTRAL R.R.
(PARK AV.)
74
EAST 153RD
HOLY TRINITY PRESBYN. CHURCH
2442
E. 154TH ST.
2442
E. 155TH ST.
MORRIS
AVE.
79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STREET
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MOTT HAVEN YARD
FULL OF TRACKS
NEW YORK CENTRAL R.R.
HENRY LOU GEHRIG INTERMEDIATE SCHOOL No 151
SOUTH
CONCOURSE VILLAGE EAST
(PARK AV.)
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EAST 153RD
CHURCH
2442
E. 154TH ST.
MORRIS
AVE.
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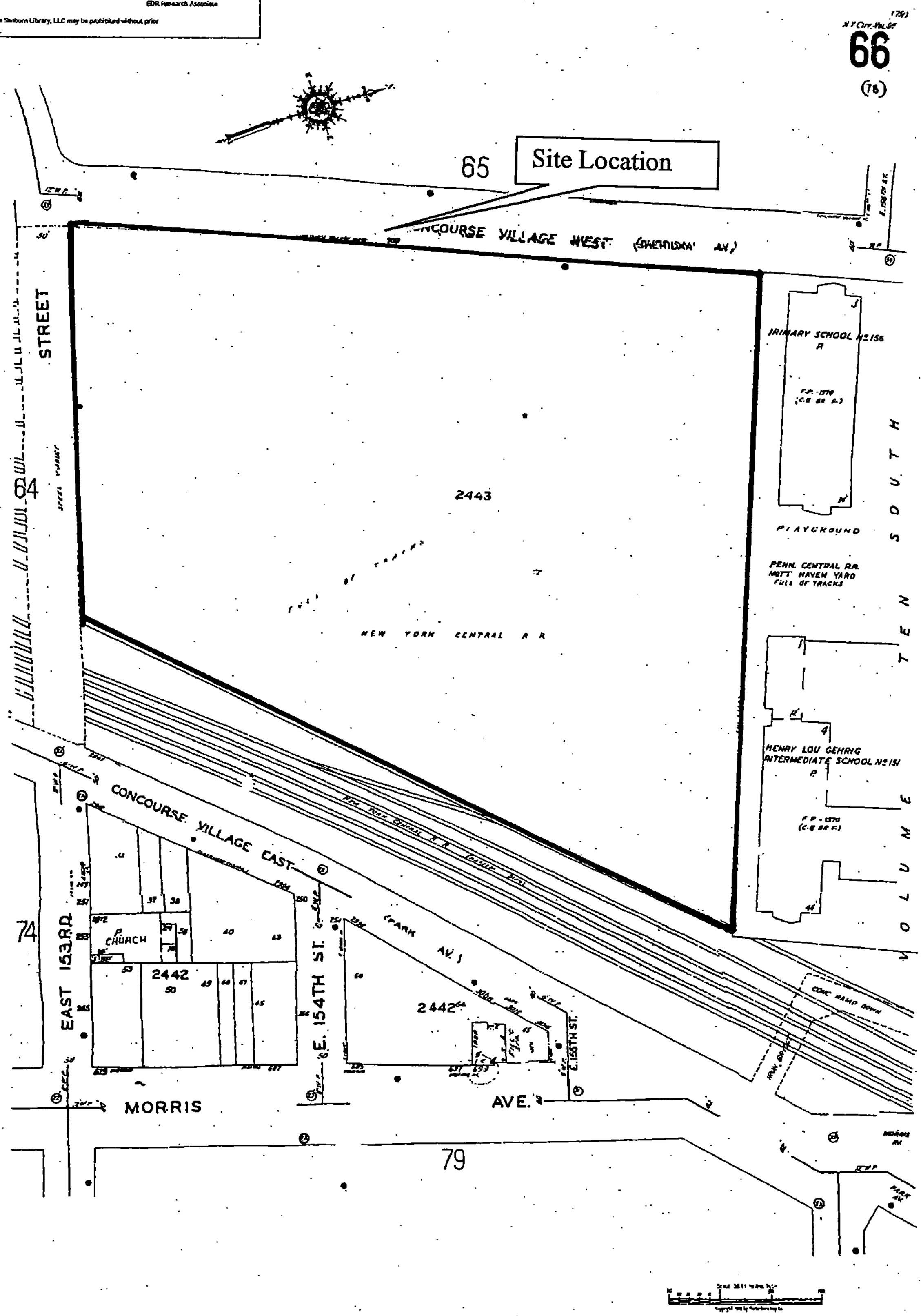
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Site Location
CONCOURSE VILLAGE WEST (SHERIDAN AV.)
STREET
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2443
PRIMARY SCHOOL No 156
PLAYGROUND
PENN. CENTRAL RR. MOTT HAVEN YARD FULL OF TRACKS
FULL OF TRACKS
NEW YORK CENTRAL R.R.
HENRY LOU GEHRIG INTERMEDIATE SCHOOL No 151
SOUTH
TENTH
VOLUME
CONCOURSE VILLAGE EAST
(PARK AV.)
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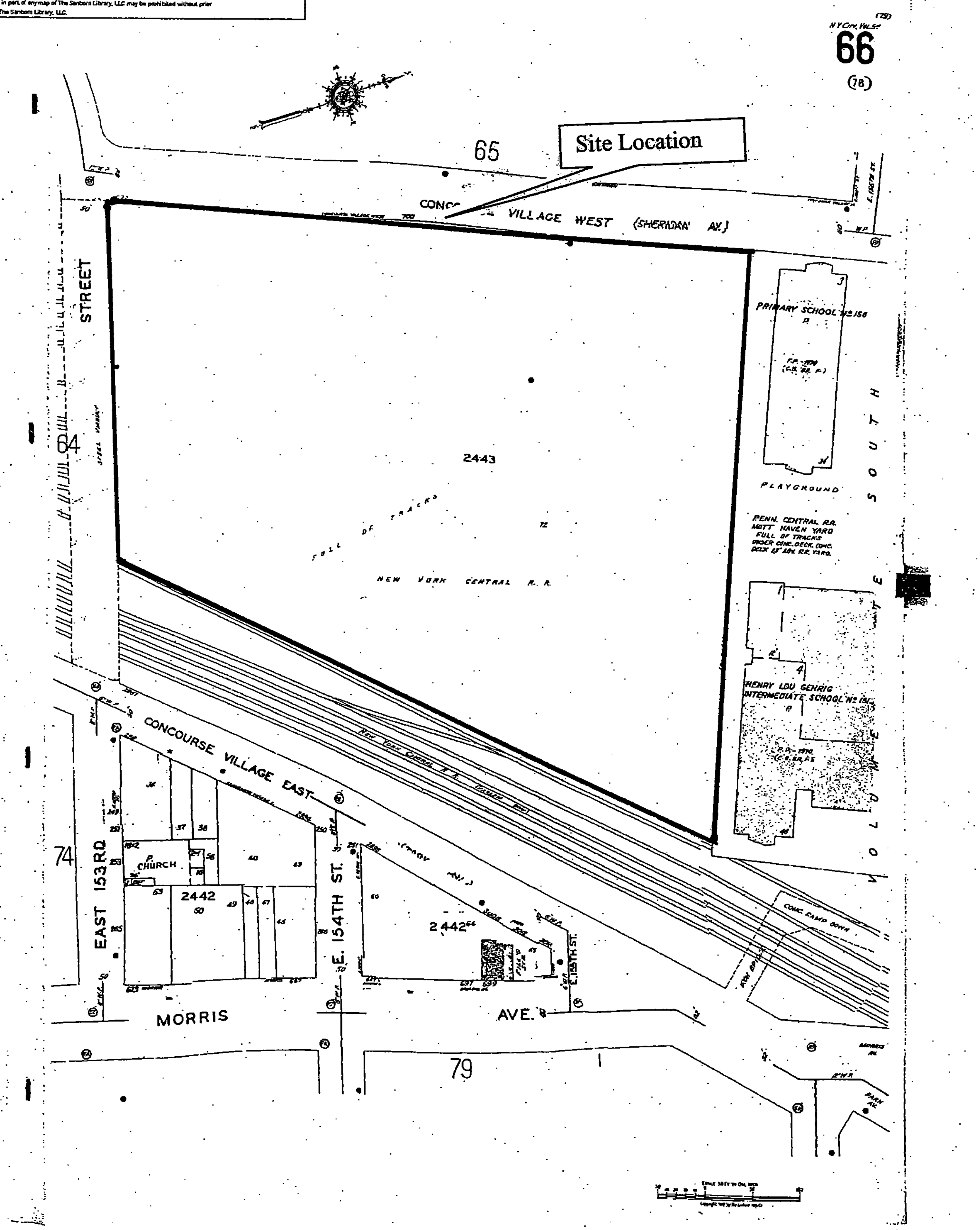
EAST 153RD
E. 154TH ST.
E. 155TH ST.
MORRIS
AVE.
79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PRIMARY SCHOOL No. 156
PLAYGROUND
PENN. CENTRAL R.R. MOTT HAVEN YARD FULL OF TRACKS
HENRY LOU GEHRIG INTERMEDIATE SCHOOL No. 151
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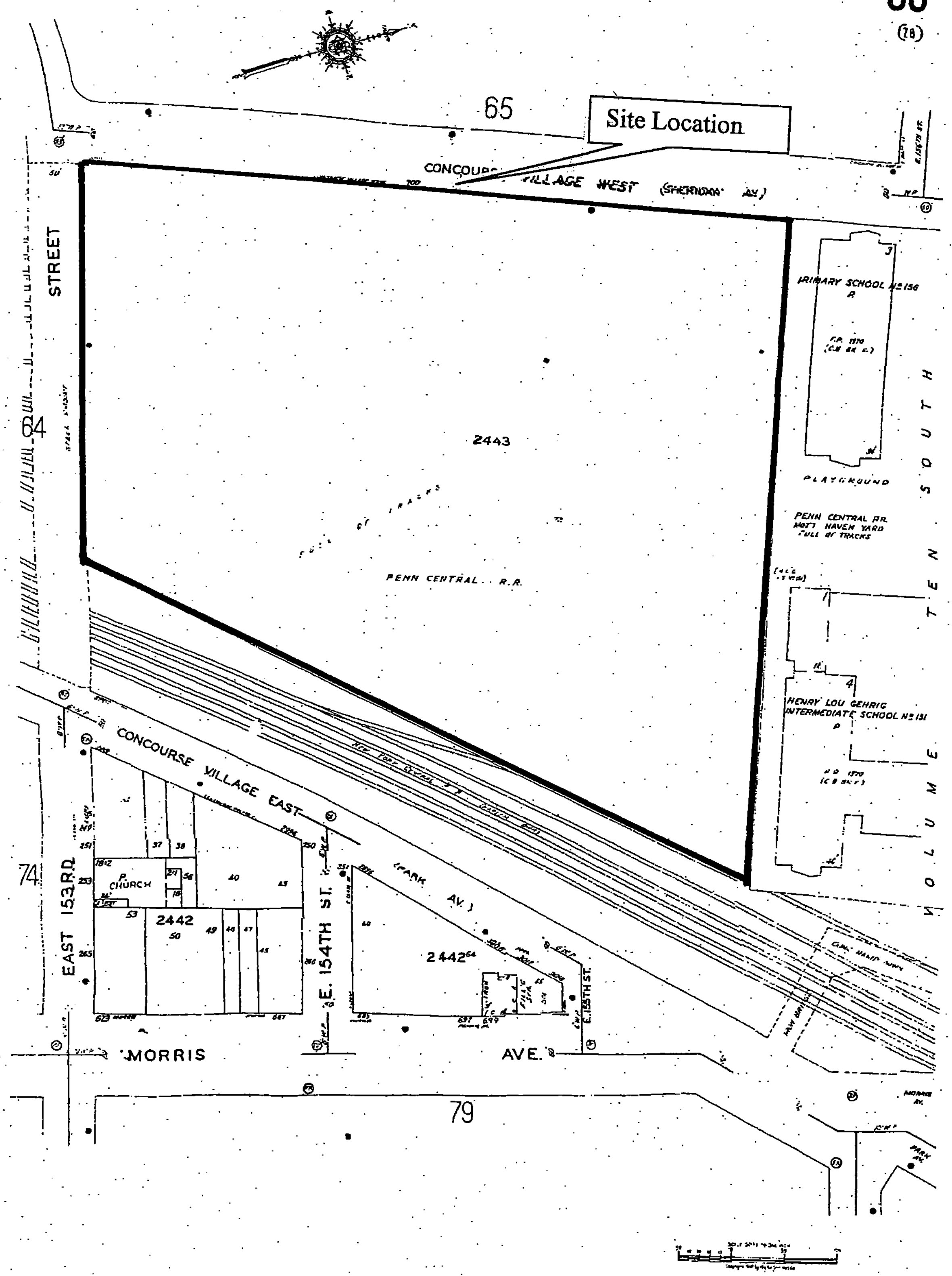
EAST 153RD
CHURCH
2442
E. 154TH ST.
2442
E. 155TH ST.
MORRIS AVE.
79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STREET
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2443
PENN CENTRAL R.R.
PRIMARY SCHOOL No 156
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HENRY LOU GEHRIG INTERMEDIATE SCHOOL No 131
VOLUME TEN SOUTH
CONCOURSE VILLAGE EAST
(PARK AV.)
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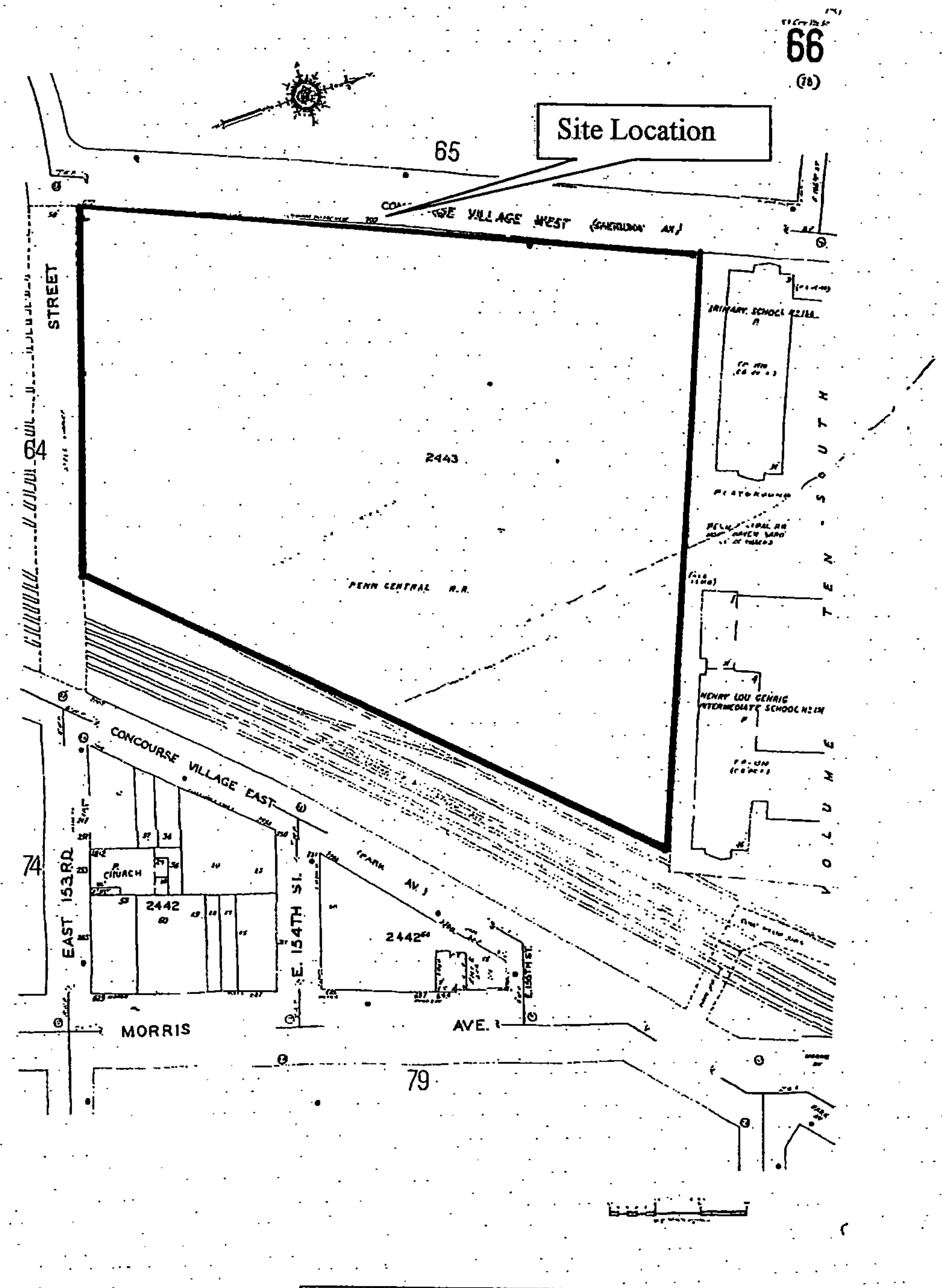
EAST 153RD
CHURCH
2442
E. 154TH ST.
E. 155TH ST.
MORRIS
AVE.
79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STREET
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EAST 153RD.
CHURCH
2442
E. 154TH ST.
MORRIS
AVE.
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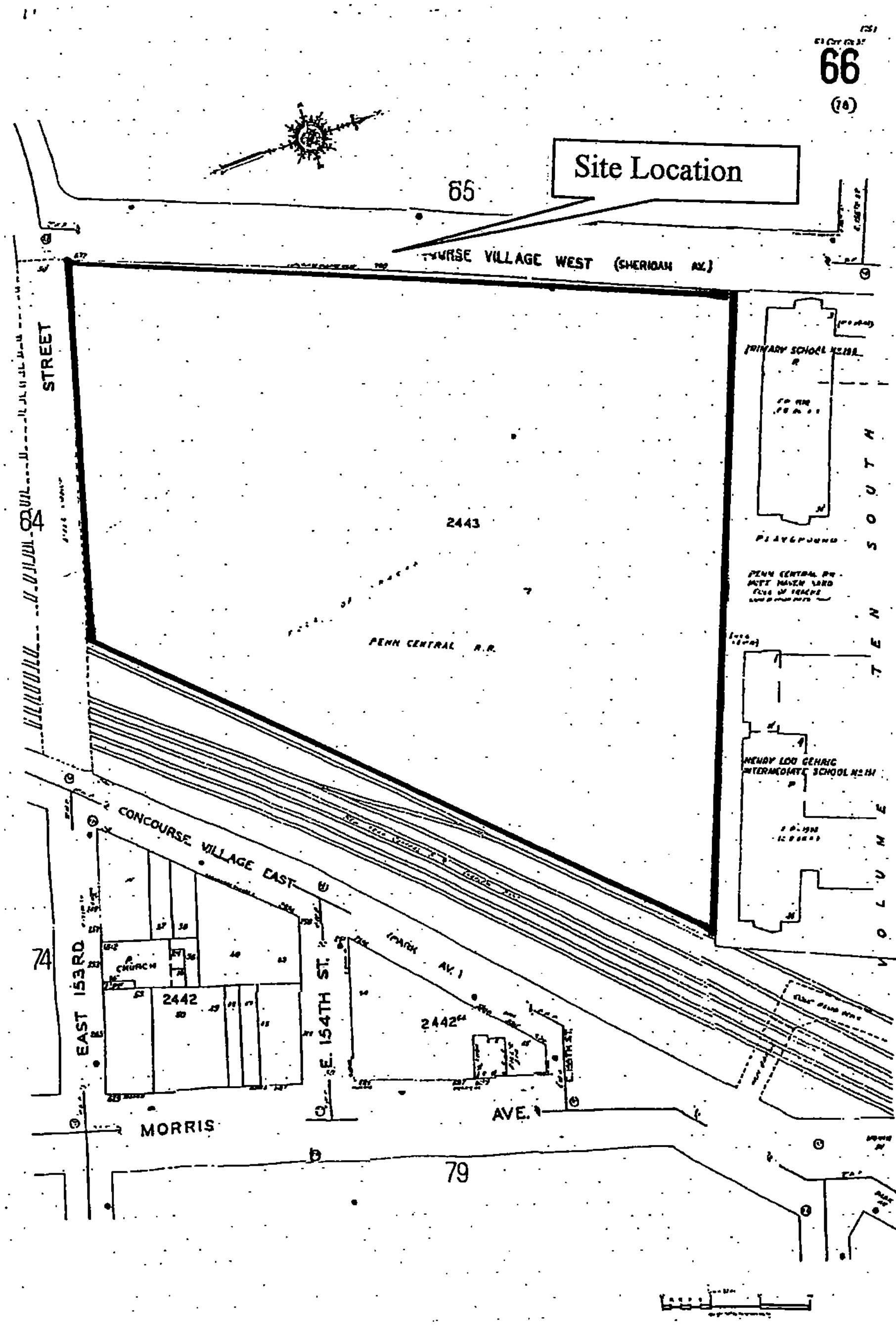
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STREET
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2443
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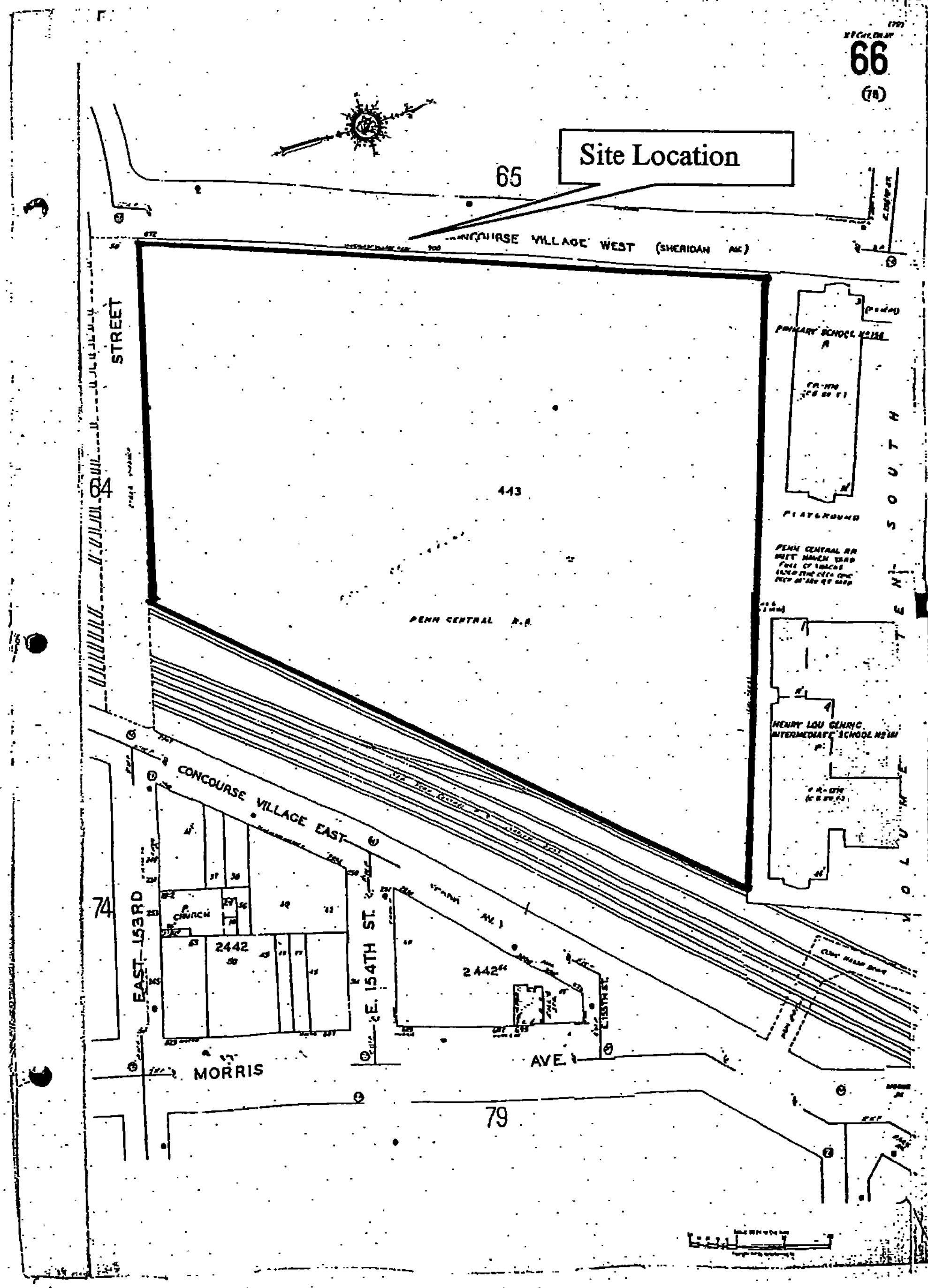
PRIMARY SCHOOL
PLAYGROUND
HENRY LOU GEHRIG INTERMEDIATE SCHOOL
CONCOURSE VILLAGE EAST
PARK AV.
74
EAST 153RD
CHURCH
2442
E. 154TH ST.
MORRIS
AVE.
79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Site Location
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STREET
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PRIMARY SCHOOL
PLAYGROUND
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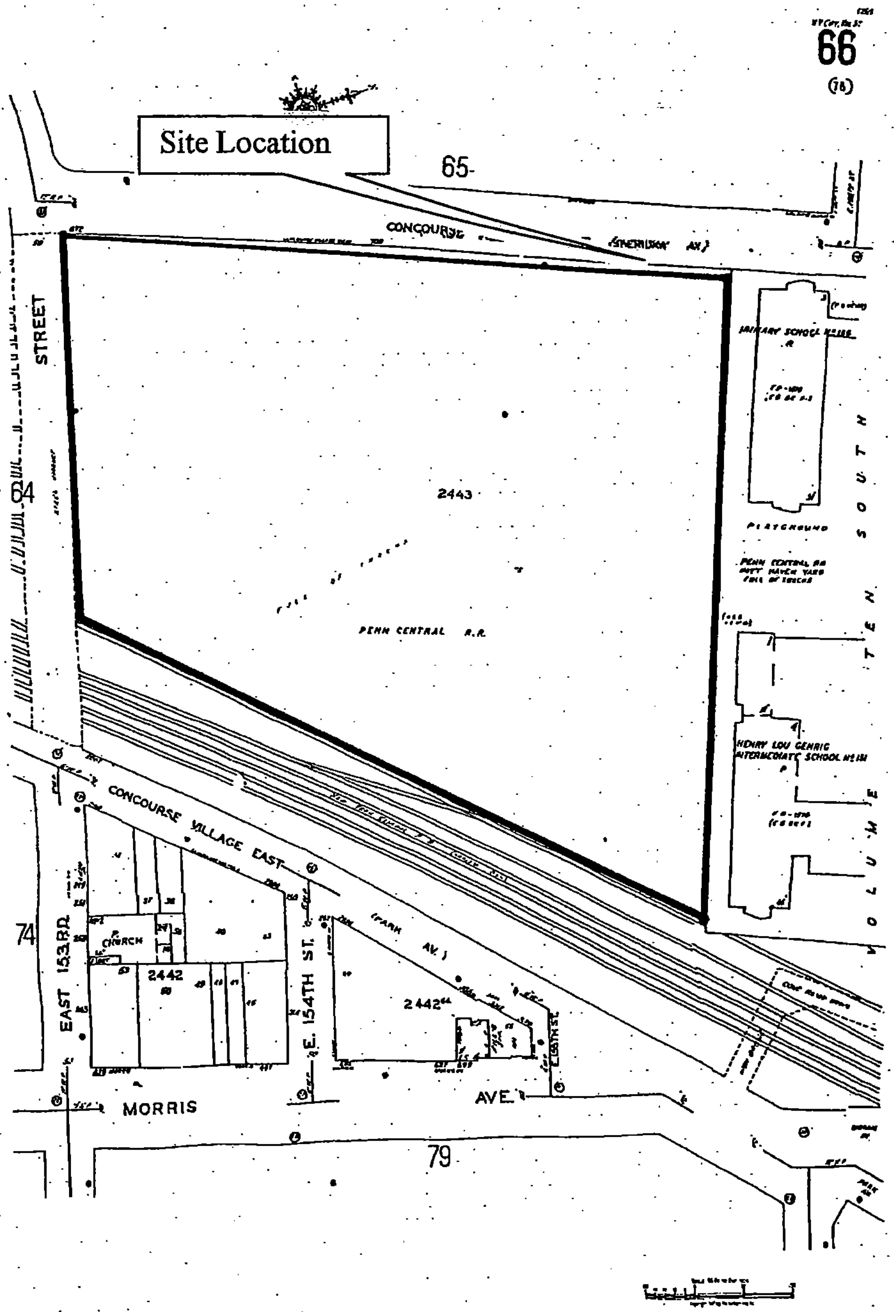
CHURCH
2442
E. 154TH ST.
2442
MORRIS
AVE.
79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Site Location
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CONCOURSE
STREET
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2443
PENN CENTRAL R.R.
PLAYGROUND
HENRY LOU GEHRIG INTERMEDIATE SCHOOL
CONCOURSE VILLAGE EAST
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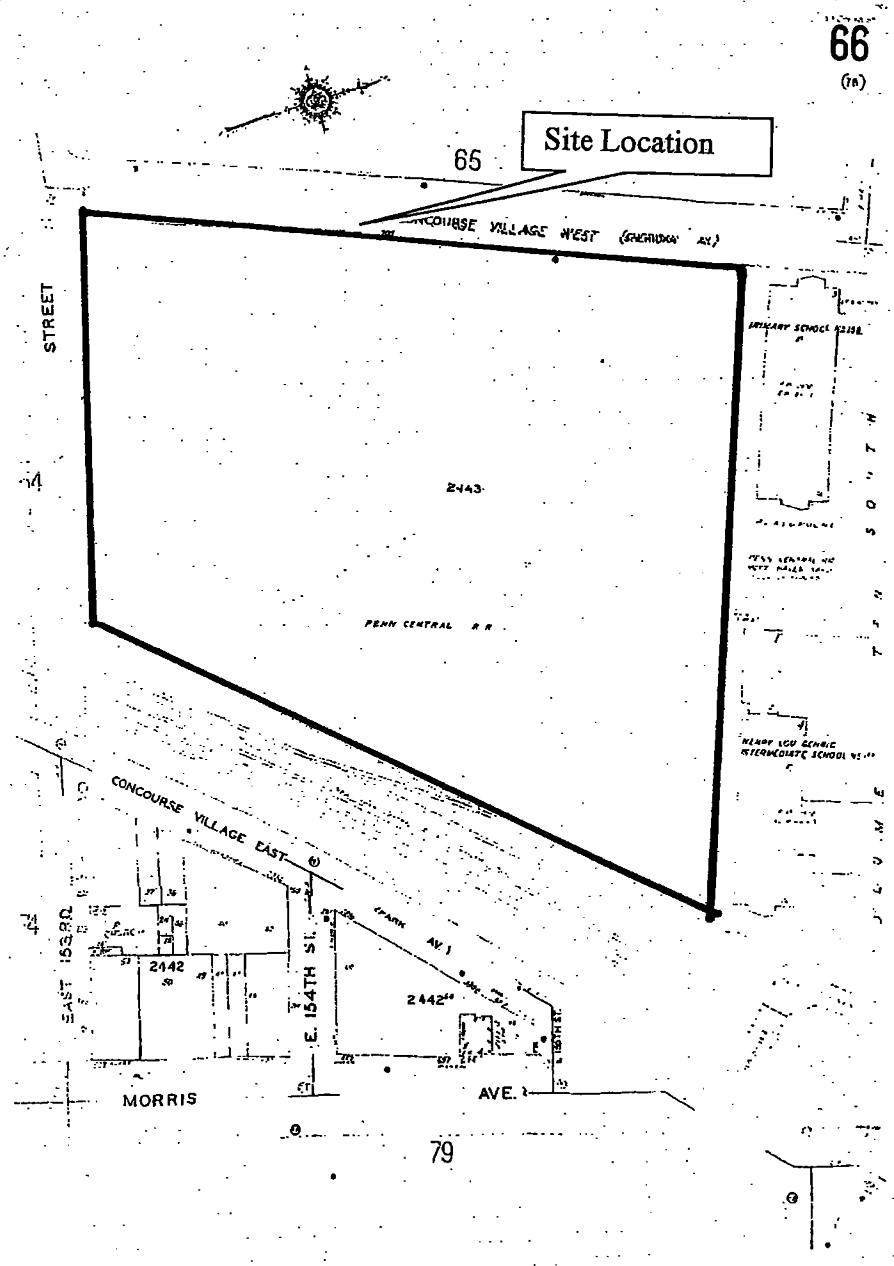
EAST 153RD.
CHURCH
2442
E. 154TH ST.
2442
MORRIS
AVE.
79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STREET
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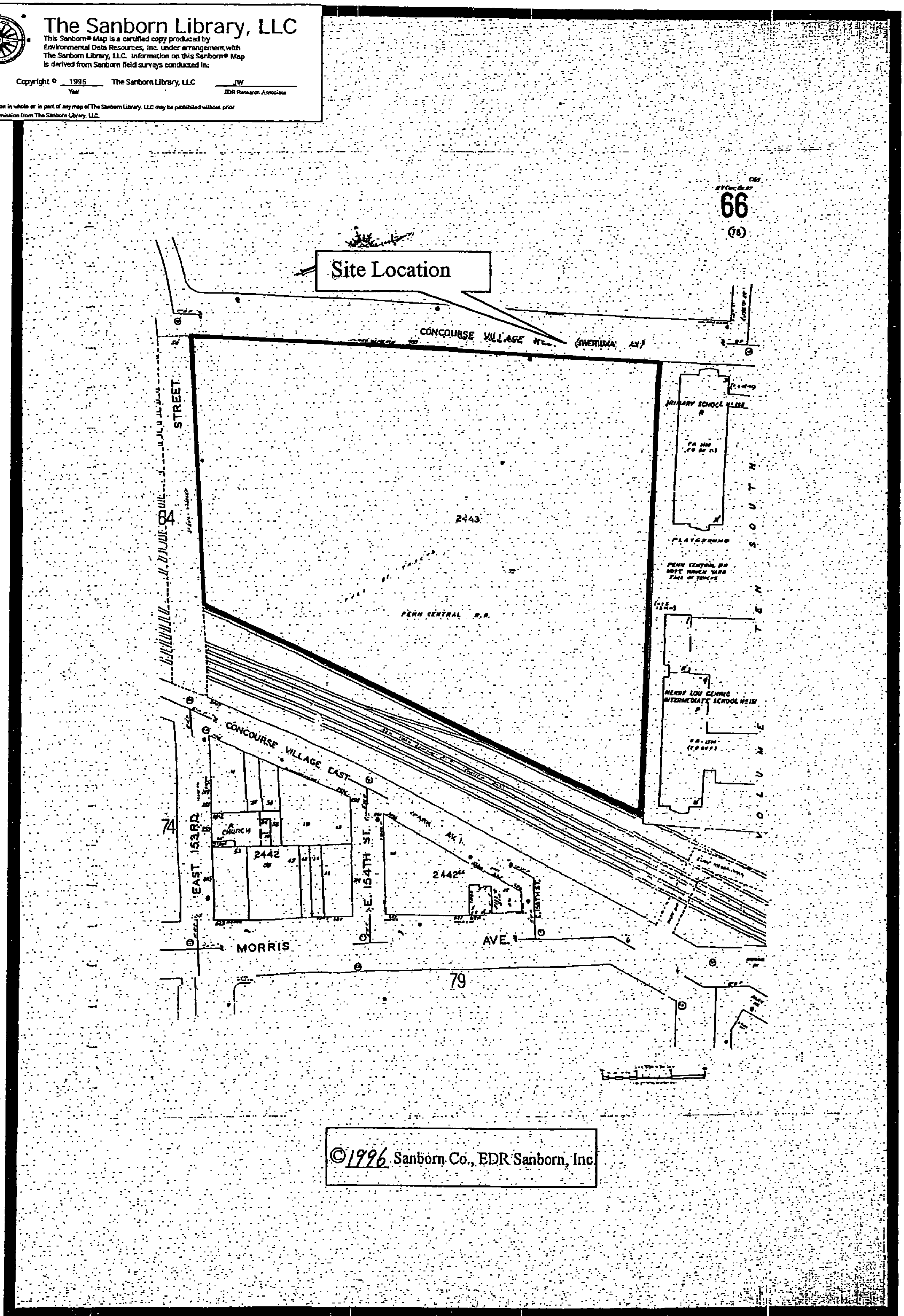
CONCOURSE VILLAGE EAST
EAST 153RD
2442
E. 154TH ST.
2442
MORRIS
AVE.
79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Site Location
CONCOURSE VILLAGE W.
STREET
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2443
PENN CENTRAL R.R.
PLAYGROUND
CONCOURSE VILLAGE EAST
EAST 153RD
74
CHURCH
2442
E. 154TH ST.
MORRIS
AVE.
79

Appendix C

Environmental Easement and Declaration of Covenants and Restrictions

BCP Area
Environmental Easement

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument. The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2010080500419001002E039F

RECORDING AND ENDORSEMENT COVER PAGE

Document ID: 2010080500419001 Document Date: 08-04-2010 Preparation Date: 08-05-2010
Document Type: EASEMENT
Document Page Count: 9

PRESENTER:
LEX TERRAE, LTD / PICK UP/ELTON
331 MADISON AVENUE-9TH FLOOR
NEW YORK, NY 10017
212-599-1300

RETURN TO:
LEX TERRAE, LTD / PICK UP/ELTON
331 MADISON AVENUE-9TH FLOOR
NEW YORK, NY 10017
212-599-1300

PROPERTY DATA

Borough	Block	Lot		Unit	Address
BRONX	2443	78	Partial Lot		730 CONCOURSE VILLAGE W

Property Type: COMMERCIAL REAL ESTATE

CROSS REFERENCE DATA

CRFN_______ *or* Document ID__________ *or* ______ Year_____ Reel ___ Page _____ *or* File Number_________

PARTIES

GRANTOR/SELLER:
THE CITY OF NEW YORK
730 CONCORD VILLAGE WEST
BRONX, NY 10005

GRANTEE/BUYER:
THE NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CON
625 BROADWAY
ALBANY, NY 12233-1500

FEES AND TAXES

Mortgage

Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	EXEMPT
Affidavit Fee:	$	0.00

Filing Fee:	$	0.00
NYC Real Property Transfer Tax:	$	0.00
NYS Real Estate Transfer Tax:	$	0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 08-06-2010 15:26
City Register File No.(CRFN):
2010000265110

City Register Official Signature

Record and Return by Mail

to: Gregory P. Shaw, Principal
New York City School
Construction Authority
30-30 Thomson Avenue
Long Island City, NY 11101

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 30th day of July, 2010, between Owner(s) The City of New York, acting through its Department of Education, having an office at 52 Chamber Street, New York, New York, 10007, County of New York, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 730 Concourse Village West in the Borough of the Bronx, City of New York, and State of New York, known and designated on the tax map of the County Clerk of Bronx as tax map parcel numbers: Section 9 Block 2443 Lot part of 78, being the same as that property conveyed to Grantor by deed dated March 12, 1968 and recorded in the City Register of the City of New York in Liber 339 at Page 859 comprising approximately 0.9180 ± acres, and hereinafter more fully described in the Land Title Survey Drawing No.: 57239-10, dated November 11, 2004, revised on March 3, 2010 and July 15, 2010 prepared by Montrose Surveying Co., LLP, City and Land Surveyors, which will be attached to the Site Management Plan. The property description (the "Controlled Property") is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of human health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of BCA Index NoNumber: W2–1074–05-08, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP.

(4) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(5) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(6) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(7) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP.

(8) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP.

(9) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for raising livestock or producing animal products for human consumption, and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Regional Remediation Engineer
NYSDEC – Region 2
Division of Environmental Remediation
One Hunter's Point Plaza, 47- 40 21st Street
Long Island City, NY 11101-5407,
Phone: (718) 482 - 4900

or

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall annually, or such time as NYSDEC may allow, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved b the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5 the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C 203030
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the

recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

The City of New York

By: Kathleen Grimm

Print Name: Kathleen Grimm

Title: Deputy Chancellor- Operations, NYC Department of Education

Date: ______________________

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF NY)

On the 28 day of July, in the year 20 10 before me, the undersigned, personally appeared Kathleen Grimm personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Notary Public - State of New York

SUSIE L. DRAYTON
Notary Public, State of New York
No. 31-4641434
Qualified in New York County
Commission Expires Sept. 10, 20 11

SEAL

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: ______________________
Dale A. Desnoyers, Director
Division of Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Albany)

On the 30th day of July, in the year 2010, before me, the undersigned, personally appeared Dale Desnoyers, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2014

SEAL

SCHEDULE "A" PROPERTY DESCRIPTION

730 Concourse Village West
New York, NY
Section 9 Block 2443 Lot Part of 78

Legal Description
MSC NO. 57239-10
Tax Block 2443 Tax Lot 78
Environmental Easement Area
Acreage: 0.9180 ±

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

BEGINNING at a point on the easterly side of Concourse Village West (60 feet wide), distant 394.18 feet northerly from the corner formed by the intersection of the easterly side of Concourse Village West with the northerly side of East 153rd Street (50 feet wide), as said street is shown on the Tax Maps of New York City.

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 125.00 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 200.00 feet to a point;

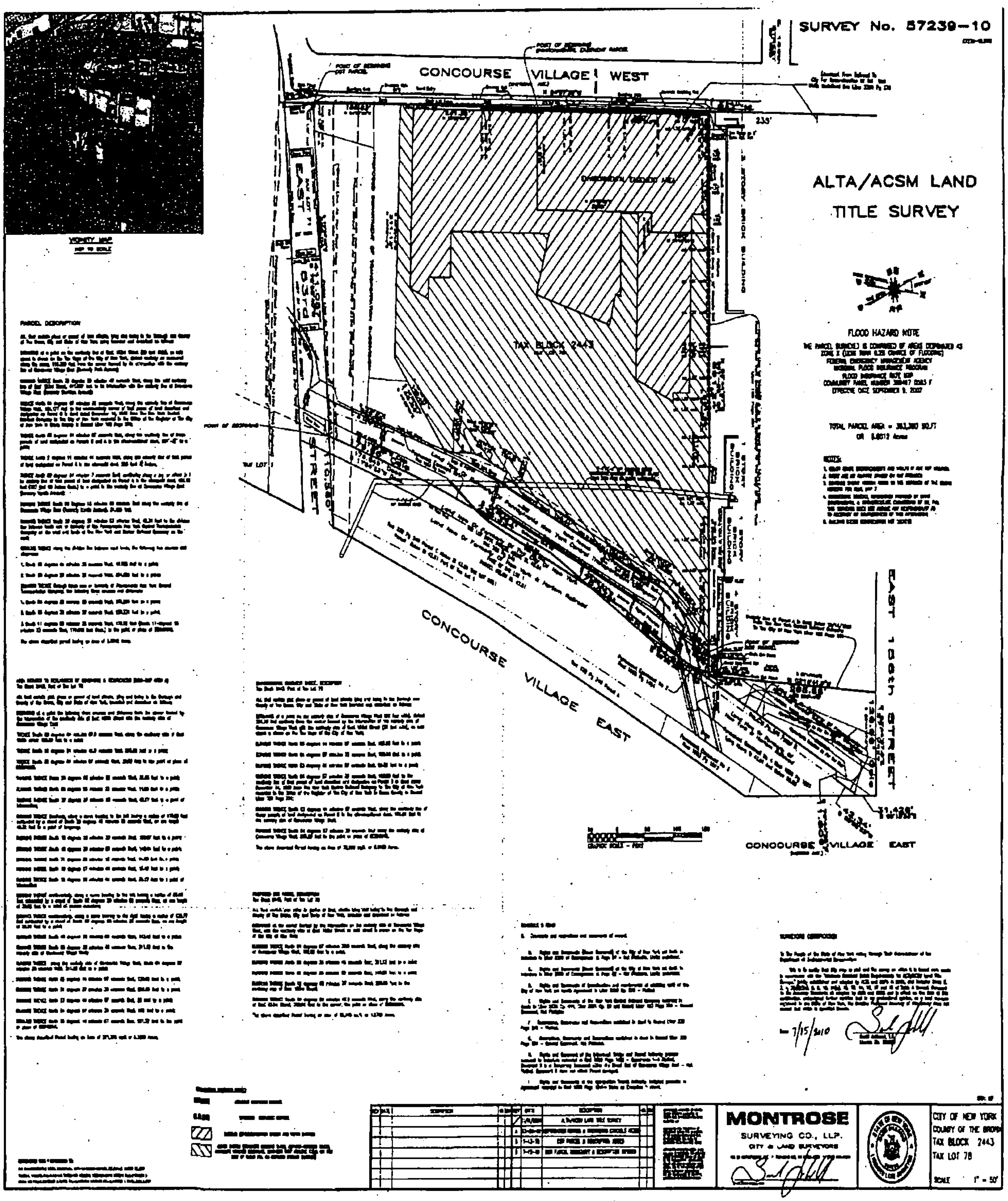
RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 25.00 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 100.00 feet to the southerly line of that parcel of land described and designated as Parcel B in deed dated December 14, 1966 from the New York Central Railroad Company to the City of New York recorded in the Office of the Register of the City of New York in Bronx County in Record Liber 180 Page 251;

RUNNING THENCE South 83 degrees 44 minutes 07 seconds West, along the southerly line of those parcels of land designated as Parcel B in the aforementioned deed, 150.00 feet to the easterly side of Concourse Village West;

RUNNING THENCE South 04 degrees 57 minutes 30 seconds East along the easterly side of Concourse Village West, 300.00 feet to the point or place of BEGINNING.

SURVEY


SURVEY No. 57239-10
CONCOURSE VILLAGE WEST
ALTA/ACSM LAND
TITLE SURVEY
TAX BLOCK 2443
CONCOURSE VILLAGE EAST
EAST 153rd STREET
EAST 156th STREET
FLOOD HAZARD NOTE
MONTROSE
SURVEYING CO., LLP.
CITY & LAND SURVEYORS
CONCOURSE VILLAGE EAST

Non-BCP Area A & Non BCP Area B
Declaration of Covenants and Restrictions

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument. The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2010080500462001002E80F8

RECORDING AND ENDORSEMENT COVER PAGE

Document ID: 2010080500462001 Document Date: 07-28-2010 Preparation Date: 08-06-2010
Document Type: SUNDRY AGREEMENT
Document Page Count: 11

PRESENTER:	**RETURN TO:**
LEX TERRAE, LTD / PICK UP/ELTON 331 MADISON AVENUE-9TH NEW YORK, NY 10017 212-599-1300	LEX TERRAE, LTD / PICK UP/ELTON 331 MADISON AVENUE-9TH NEW YORK, NY 10017 212-599-1300

PROPERTY DATA

Borough	**Block**	**Lot**		**Unit**	**Address**
BRONX	2443	78	Entire Lot		730 CONCOURSE VILLAGE W
	Property Type:	COMMERCIAL REAL ESTATE			
Borough	**Block**	**Lot**		**Unit**	**Address**
BRONX	2443	79	Entire Lot		750 CONCOURSE VILLAGE W
	Property Type:	COMMERCIAL REAL ESTATE			

x Additional Properties on Continuation Page

CROSS REFERENCE DATA

CRFN_______ *or* Document ID__________ *or* ______ Year_____ Reel ___ Page _____ *or* File Number_________

PARTIES

PARTY 1:
THE CITY OF NEW YORK
CITY HALL
NEW YORK, NY 10007

FEES AND TAXES

Mortgage

Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	EXEMPT
Affidavit Fee:	$	0.00

Filing Fee:	$	0.00
NYC Real Property Transfer Tax:	$	0.00
NYS Real Estate Transfer Tax:	$	0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK

Recorded/Filed 08-06-2010 15:07
City Register File No.(CRFN):
2010000265077

City Register Official Signature

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

2010080500462001002C8278

Document ID: 2010080500462001 Document Date: 07-28-2010 Preparation Date: 08-06-2010
Document Type: SUNDRY AGREEMENT

PROPERTY DATA

Borough	Block	Lot		Unit	Address
BRONX	2443	190	Entire Lot		250 EAST 156 STREET

Property Type: COMMERCIAL REAL ESTATE

Record and Return by Mail

to: Gregory P. Shaw, Principal
New York City School
Construction Authority
30-30 Thomson Avenue
Long Island City, NY 11101

DECLARATION of COVENANTS and RESTRICTIONS

THIS DECLARATION OF COVENANTS AND RESTRICTIONS is made as of the 28th day of July, 2010, on behalf of the City of New York, a municipality existing under New York State law, by the New York City Department of Education having an office at 52 Chambers Street, New York, NY 10007.

WITNESSETH

WHEREAS, the City of New York is the owner of a parcel of real property located at 730 Concourse Village West in the Borough and County of The Bronx, City of New York, Tax Map Section 9, Block 2443, Part of Lot 78 on the Bronx Borough Tax Assessor's Map, which is part of the lands conveyed by Pennsylvania New York Central Transportation Company, as successor by merger to New York Central Railroad Company, to the City of New York by deed dated March 12, 1968 and recorded in the Office of the New York City Register for The Bronx in Book 339 of Deeds at Page 859, comprising approximately 5.3± acres, hereinafter more fully described in the Land Title Survey No. 57239-10 dated November 11, 2004, revised on March 3, 2010 and July 15, 2010 prepared by Montrose Surveying Co., LLP, City and Land Surveyors; and

WHEREAS, the City of New York is the owner of a parcel of real property located at 750 Concourse Village West in the Borough and County of The Bronx, City of New York, Tax Map Section 9, Block 2443, Lot 79 on the Bronx Borough Tax Assessor's Map, which is part of the lands conveyed by New York Central Railroad Company to the City of New York by deed dated December 14, 1966 and recorded in the Office of the New York City Register for The Bronx in Book 180 of Deeds at Page 251 and by Pennsylvania New York Central Transportation Company, as successor by merger to New York Central Railroad Company, to the City of New York by deed dated March 12, 1968 and recorded in the Office of the New York City Register for The Bronx in Book 339 of Deeds at Page 259, comprising approximately 3.28± acres, hereinafter more fully described in the Land Title Survey No. 57239-9 dated November 11, 2004, revised on March 3, 2010 and July 15, 2010 prepared by Montrose Surveying Co., LLP, City and Land Surveyors; and

WHEREAS, the City of New York is the owner of a parcel of real property located at 250 East 156th Street in the Borough and County of The Bronx, City of New York, Tax Map Section 9, Block 2443, Lot190 on the Bronx Borough Tax Assessor's Map, which is part of the lands conveyed by New York Central Railroad Company to the City of New York by deed dated December 14, 1966 and recorded in the Office of the New York City Register for The Bronx in Book 180 of Deeds at Page 251, comprising approximately 2.58± acres, and hereinafter more fully described in the Land Title Survey No. 57239-9 dated November 11, 2004, revised on March 3, 2010 and July 15, 2010 prepared by Montrose Surveying Co., LLP, City and Land Surveyors; and

WHEREAS, the Land Title Surveys described above will be attached to the Site Management Plan; and

WHEREAS, the New York City School Construction Authority (NYCSCA) remediated a portion of Lot 78 known as "**Former Metro-North Property (Mott Haven), Bronx County**" under the Brownfield Cleanup Program ("BCP") pursuant to Brownfield Cleanup Agreement (BCA), Index # W2-1074-05-08, Site # C203030 issued on February 17, 2006 by New York State Department of Environmental Conservation (NYSDEC); and

WHEREAS, NYSDEC approved the *Former Metro-North Property (Mott Haven), Bronx, New York, Site Management Plan, Final* dated November 2008, prepared by Shaw Environmental, Inc. ("Site Management Plan" or "SMP"), which may be modified in accordance with the Department's statutory and regulatory authority; and

WHEREAS, in response to public comments, the SCA agreed to include the off-Site areas consisting of property formerly part of the Mott Haven rail-yard, part of Lot 78 ("Non-BCP Area A") and Lots 79 and 190 ("Non-BCP Area B"), defined as the "Property" in the Site Management Plan and to this Declaration of Covenants and Restrictions. The Metes and Bounds description of the Property is set forth in and attached hereto as Appendix "A"; and

WHEREAS, the implementation of the SMP relative to BCP Site # C203030 is governed by an Environmental Easement; and

WHEREAS, this Declaration of Covenants and Restrictions sets forth those required restrictive covenants necessary to ensure implementation of the Site Management Plan relative to the Property.

NOW, THEREFORE, the City of New York acting through the New York City Department of Education, for itself and its successors and assigns, covenants and agrees as follows:

First, the Property subject to this Declaration of Covenants and Restrictions is as shown on the survey maps attached to this declaration as Appendix "B" an made part hereof.

Second, unless the prior written approval of the Department or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred as the "Relevant Agency" is first obtained, where contamination remains at the Property subject to the provisions of the SMP, there shall be no construction, use or occupancy of the Property that results in the disturbance or excavation of the Property which threatens the integrity of the engineering controls or which results in unacceptable human exposure to contaminated soils.

Third, this Declaration of Covenants and Restrictions runs with the Property and is enforceable in perpetuity until amended or terminated. Such amendment or termination shall only be effectuated by a written amendment or release from the Department or Relevant Agency which is filed with the Office of the New York City Register for The Bronx in a manner prescribed by article nine of the real property law.

Fourth, the owner of the Property shall not disturb, remove, or otherwise interfere with the installation, use, operation, and maintenance of engineering controls required for the Remedy for the BCP site, which are described in the SMP, unless in each instance they the owner first obtain a written waiver of such prohibition from the Department or Relevant Agency.

Fifth, the Property may only be used for a school campus provided that the long-term engineering controls specified in the Site Management Plan are employed. These long-term engineering controls include a cover system, vapor barrier, jet grout hydraulic barrier, waterloo hydraulic barrier and sub-slab depressurization system. The location of the engineering controls on the Property is shown on the survey maps in Appendix "B."

Sixth, the Property may not be used for purposes other than a school campus without an amendment or the extinguishment of this Declaration of Covenants and Restrictions.

Seventh, the owner of the Property shall prohibit the use of the groundwater underlying the Property without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Department or Relevant Agency.

Eight, the engineering controls must be operated and maintained as specified in the SMP and may not be discontinued or modified without an amendment of the Site Management Plan (approved by the Relevant Agency) or the termination of this Declaration of Covenants and Restrictions. A copy of the up-to-date SMP must be kept in the custodian's office for each school located within the school campus.

Ninth, the owner of the Property shall provide a periodic certification, prepared and submitted by a professional engineer or environmental professional acceptable to the Department or Relevant Agency, which will certify that the institutional and engineering controls put in place are unchanged from the previous certification, comply with the SMP, and have not been impaired.

Tenth, the owner of the Property, for itself and its successors and assigns grant to the Department or Relevant Agency, its agents, employees, or other representatives of the State to the right to enter and inspect the Property in a reasonable manner and at reasonable times to assure compliance with the SMP and this Declaration of Covenants and Restrictions.

Eleventh, any deed of conveyance of the Property, or any portion thereof, shall recite that, unless the Department or Relevant Agency has consented to the termination of such covenants and restrictions, said conveyance is subject to this Declaration of Covenants and Restrictions. Any deed conveying all or a portion of the Property shall recite that the said conveyance is subject to this Declaration of Covenants and Restrictions.

IN WITNESS WHEREOF, the City of New York acting through the New York City Department of Education has executed this instrument as of the day first set forth above.

The City of New York

By: ____________________

Print Name: Kathleen Grimm

Title: Deputy Chancellor, Operations, NYC Dept. of Education

STATE OF NEW YORK)
)
COUNTY OF NY)

On the 28 day of July, in the year 2010, before me, the undersigned, personally appeared Kathleen Grimm, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacit(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

____
Signature and Office of Individual Taking Acknowledgment

SUSIE L. DRAYTON
Notary Public, State of New York
No. 31-4641434
Qualified in New York County
Commission Expires Sept. 10, 20 11

SEAL

Appendix A

Metes and Bounds Description of the Property

Legal Description
MSC NO. 57239-10
Tax Block 2443 Part of Tax Lot 78
Non-BCP Area A

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

BEGINNING at a point the following three courses and distances from the corner formed by the intersection of the southerly side of East 156th Street with the westerly side of Concourse Village East;

THENCE South 83 degrees 44 minutes 07.0 seconds West, along the southerly side of East 156th Street, 126.99 feet to a point;

THENCE South 02 degrees 14 minutes 41.0 seconds East, 295.66 feet to a point;

THENCE South 83 degrees 44 minutes 07 seconds West, 29.52 feet to the point or place of BEGINNING.

RUNNING THENCE South 24 degrees 55 minutes 32 seconds West, 32.65 feet to a point;

RUNNING THENCE North 69 degrees 26 minutes 22 seconds West, 11.95 feet to a point;

RUNNING THENCE South 37 degrees 37 minutes 23 seconds West, 45.67 feet to a point of intersection;

RUNNING THENCE southerly, along a curve bearing to the left having a radius of 110.56 feet subtended by a chord of South 28 degrees 49 minutes 22 seconds West, an arc length 40.32 feet to a point of tangency;

RUNNING THENCE South 18 degrees 22 minutes 33 seconds West, 159.07 feet to a point;

RUNNING THENCE South 18 degrees 29 minutes 50 seconds West, 140.44 feet to a point;

RUNNING THENCE North 71 degrees 30 minutes 10 seconds West, 14.93 feet to a point;

RUNNING THENCE South 18 degrees 27 minutes 46 seconds West, 15.42 feet to a point;

RUNNING THENCE South 15 degrees 55 minutes 44 seconds West, 36.17 feet to a point of intersection;

RUNNING THENCE southeasterly, along a curve bearing to the left having a radius of 83.83 feet subtended by a chord of South 02 degrees 29 minutes 02 seconds West, an arc length of 30.82 feet to a point of reverse curvature;

RUNNING THENCE southeasterly, along a curve bearing to the right having a radius of 133.77 feet subtended by a chord of South 00 degrees 58 minutes 20 seconds East, an arc length of 33.04 feet to a point;

RUNNING THENCE South 46 degrees 35 minutes 09 seconds West, 143.40 feet to a point;

RUNNING THENCE South 85 degrees 35 minutes 46 seconds West, 311.13 feet to the easterly side of Concourse Village West;

RUNNING THENCE along the easterly side of Concourse Village West, North 04 degrees 57 minutes 30 seconds West, 241.35 feet to a point;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 125.00 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 200.00 feet to a point;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 25.00 feet to a point;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, 100.00 feet to a point;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, 511.72 feet to the point or place of BEGINNING.

The above described Parcel having an Area of 231,776 sq. ft. or 5.3208 Acres.

Legal Description
MSC NO. 57239-9
Tax Block 2443 Tax Lots 79 & 190
Non-BCP Area B

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

BEGINNING at a point on the easterly side of Concourse Village West, distant 694.177 feet northerly from the corner formed by the intersection of the northerly side of East 153rd Street as shown on the tax map with the easterly side of Concourse Village West;

RUNNING THENCE North 04 degrees 57 minutes 30 seconds West, along the easterly side of Concourse Village West, 355.02 feet to the northerly line of East 156th Street, as shown on the City Plan;

RUNNING THENCE North 83 degrees 44 minutes 07 seconds East, along the northerly line of East 156th Street and along the southerly line of property conveyed by the New York Central Railroad Company to Concourse Village Inc., by deed dated 11/14/1962, Liber 2508 page 414, 830.86 feet to the westerly side of Concourse Village East;

RUNNING THENCE southerly along the westerly side of Concourse Village East, 60 feet to the southerly line of East 156th Street as shown on the City Plan;

RUNNING THENCE South 83 degrees 44 minutes 07 seconds West along the southerly side of East 156th Street, 126.99 feet (calculated, 127 feet description) to a point;

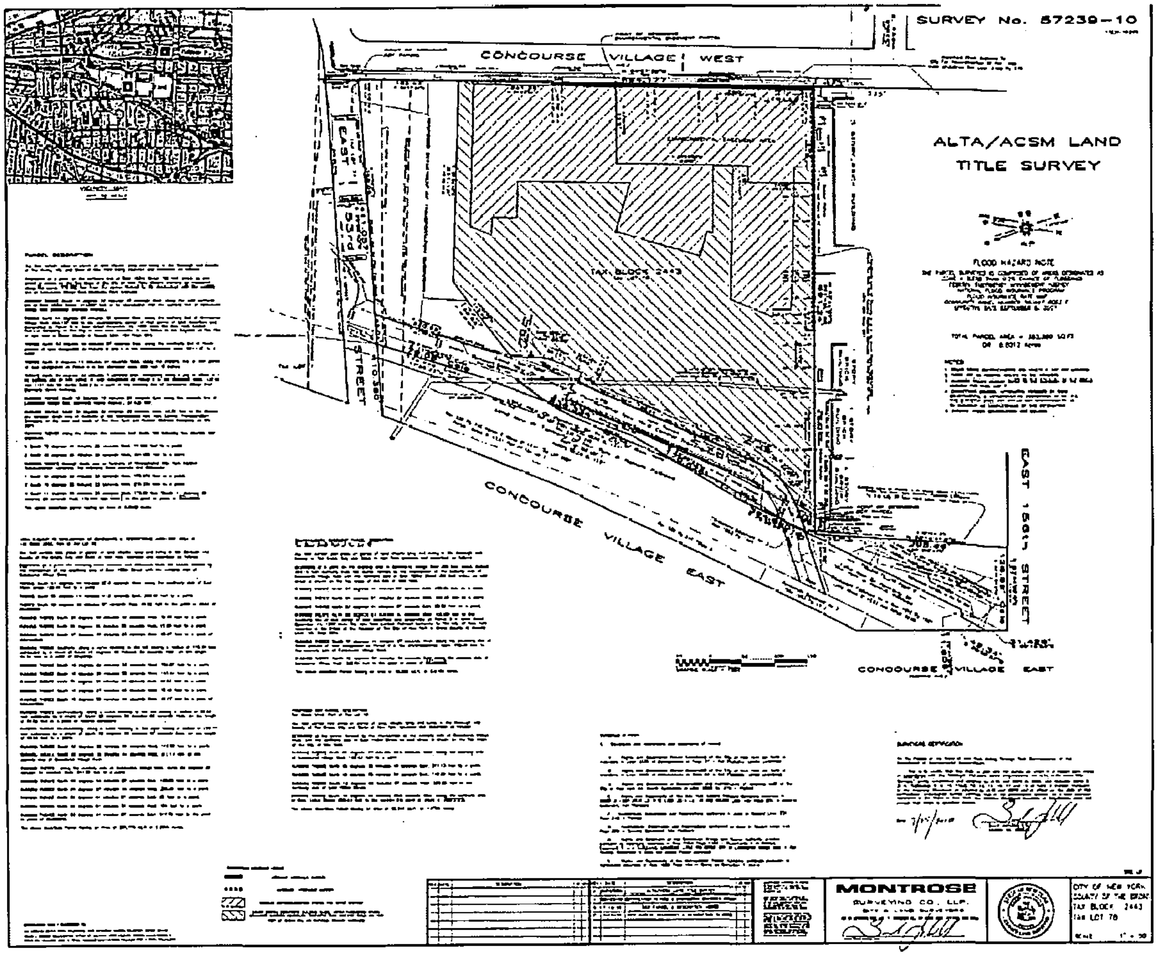
RUNNING THENCE South 02 degrees 14 minutes 41 seconds East, 295.66 feet to the southerly line of Parcels A & B in deed dated 12/14/1966 from the New York Central Railroad Company to the City of New York in Liber 180 Page 251;

RUNNING THENCE South 83 degrees 44 minutes 07 seconds West along the aforementioned southerly line of Parcels A & B, 691.24 feet to the easterly side of Concourse Village West, the point or place of BEGINNING.

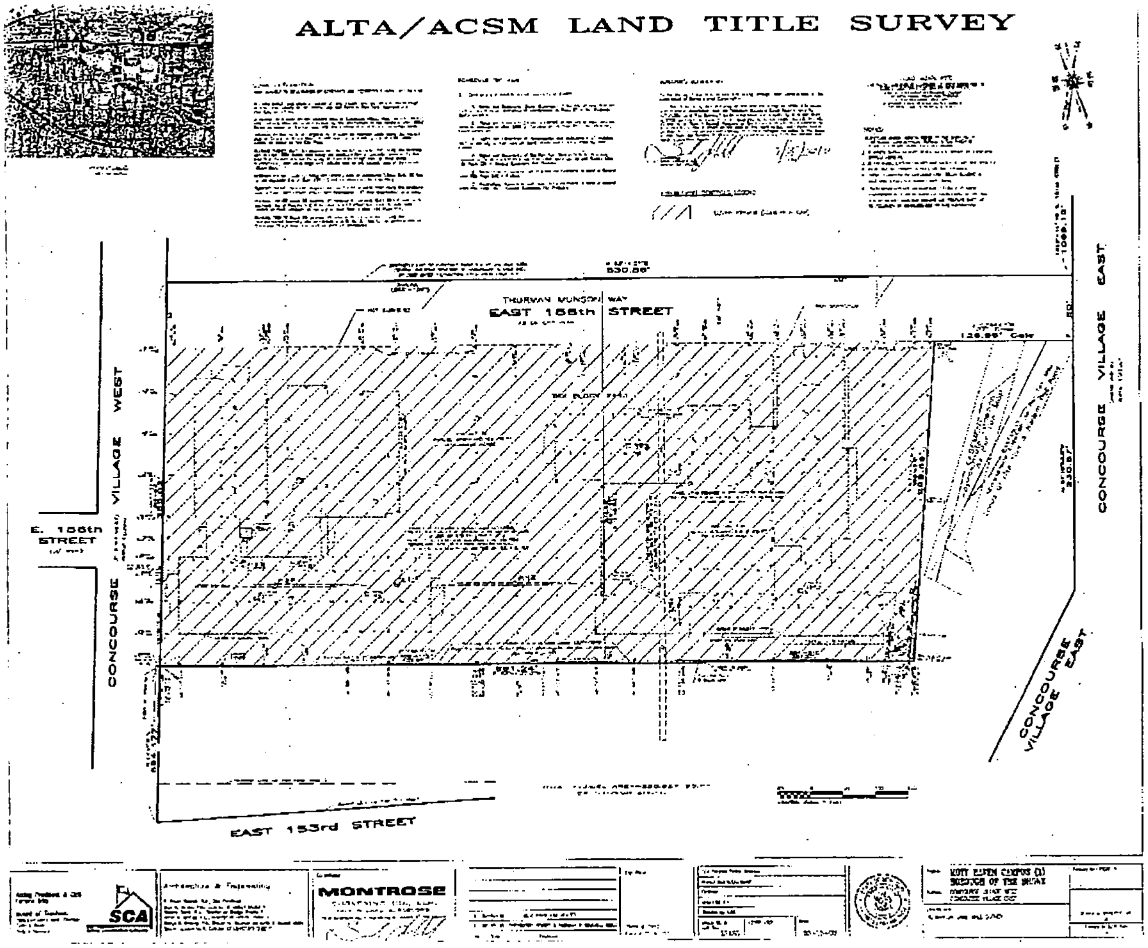
The above described Parcel having an Area of 255,827 sq. ft. or 5.77297 Acres.

Appendix "B"

Survey Maps of the Property



SURVEY No. 57239-10
CONCOURSE VILLAGE WEST
ALTA/ACSM LAND TITLE SURVEY
FLOOD HAZARD NOTE
TAX BLOCK 2443
EAST 153rd STREET
CONCOURSE VILLAGE EAST
EAST 156th STREET
MONTROSE
SURVEYING CO., LLP.


ALTA/ACSM LAND TITLE SURVEY
THURMAN MUNSON WAY
EAST 156th STREET
530.86'
CONCOURSE VILLAGE WEST
E. 156th STREET
CONCOURSE VILLAGE EAST
CONCOURSE VILLAGE EAST
EAST 153rd STREET
SCA
MONTROSE

Appendix D

RAWP Digital File

REMEDIAL ACTION WORK PLAN
FOR
FORMER METRO NORTH PROPERTY (MOTT HAVEN)
at
672 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

SCA LLW NO.: 033485
SCA CONTRACT NO.: C000009228
SCHOOL DISTRICT: 78
SCA JOB NO.: 19730

CONSULTANT PROJECT NO.: 114926

November 15, 2005

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

Prepared by:	**Prepared for:**
Shaw Environmental & Infrastructure, Inc.	

Shaw Environmental & Infrastructure	New York City School Construction Authority
Engineering of New York, P.C.	
4 Commerce Drive South	30-30 Thomson Avenue
Harriman, New York 10926	Long Island City, NY 11101-3045
Phone: 845-492-3100	Phone: 718-472-8602
Fax: 845-492-3101	Fax: 718-472-8500
August Arrigo, P.E.	Attn: Lee Guterman

STATE OF NEW YORK
AUGUST ANTHONY ARRIGO
No. 070843
LICENSED PROFESSIONAL ENGINEER

Shaw Environmental & Infrastructure, Inc.

4 Commerce Drive South
Harriman, New York 10926
845.492.3100
FAX 845.492.3101

Shaw The Shaw Group Inc.™

August 9, 2007

Ms. Sarah Carlson
New York State Department of Environmental Conservation
Region 2
47-40 21st Street
Long Island City, New York 11101

Re: Remedial Action Work Plan Addendum 2- Mott Haven Site
672 Concourse Village West, Bronx, New York
SCA LLW #33485

Dear Ms Carlson:

On behalf of the New York City School Construction Authority (NYCSCA), this correspondence is being submitted as Addendum No. 2 to the November 15, 2005 Remedial Action Work Plan (RAWP) for the Mott Haven Site at 672 Concourse Village West, Bronx, NY.

The RAWP for the site describes the site specific remedial actions to be performed at the Mott Haven site, including installation of hydraulic barriers, excavation of contaminated soil, backfilling the excavations with clean fill, as well as incorporation of a vapor barrier and sub slab depressurization system into the final design of the school. NYCSCA standard policy always includes capping of the site either with the concrete foundation, asphalt, artificial turf, or with two feet of clean fill on all exposed ground surfaces including landscaped areas. Clean fill means soil meeting TAGM RSCOs and that contains no detectable volatile organic compounds as defined in Section 2.3.2.6 of the Site Management Plan (SMP). Please refer to the attached Figure 25, Principal Site Covers, from the SMP for a depiction of the proposed cover materials.

One of the comments received from the community was that this detail be included by addendum in the RAWP. Therefore this letter serves as Addendum No.2 to the RAWP that two feet of clean fill will be used as a cap on all exposed ground surfaces including landscaped areas on the school property. Your incorporation of Addendum No. 2 into the RAWP documentation is appreciated.

If you have any questions, please do not hesitate to contact me.

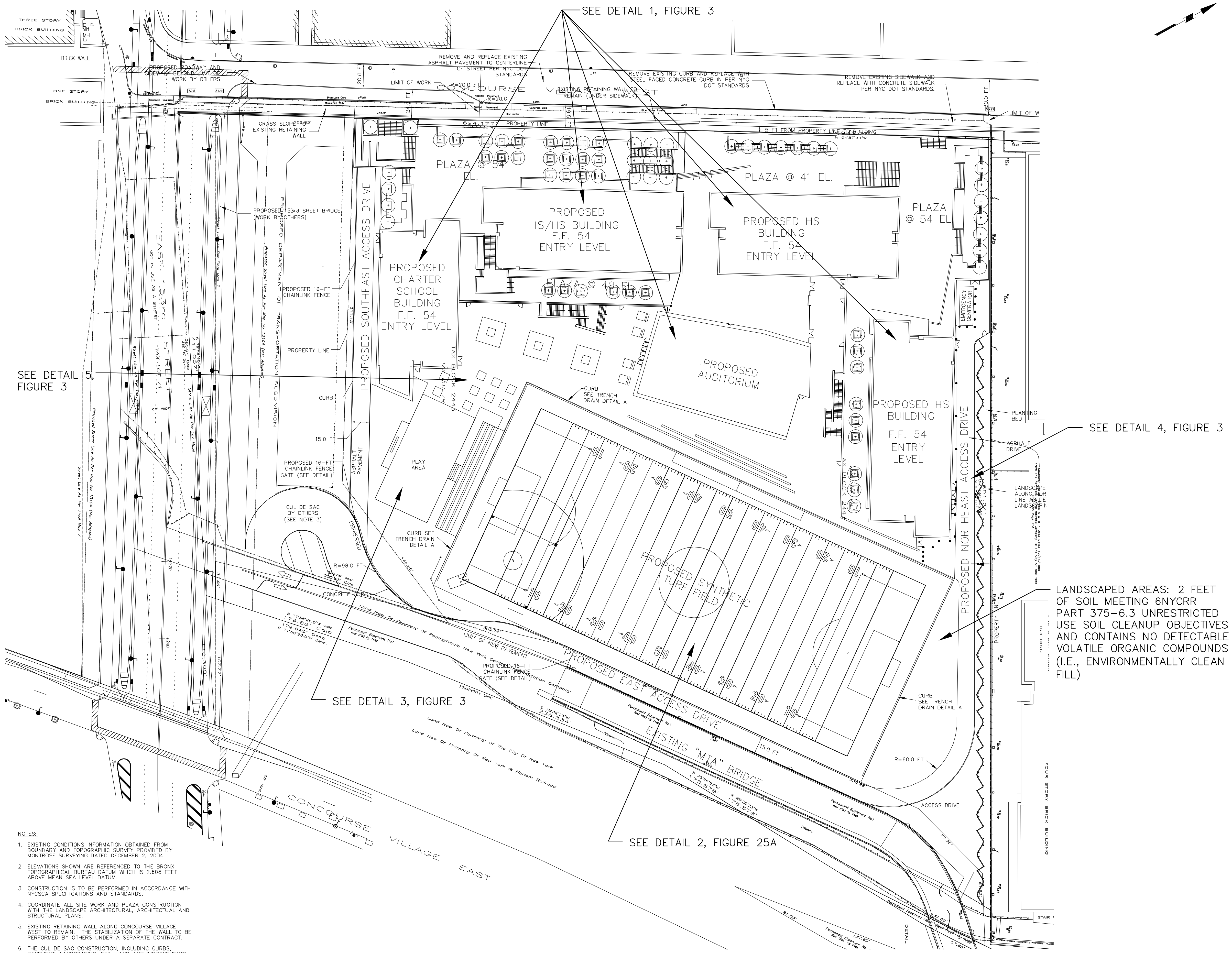
Sincerely,

SHAW ENVIRONMENTAL AND INFRASTRUCTURE

Michael R. Sherwood

Michael R. Sherwood
Project Manager

cc: V. Brevdo – NYSDEC; A. Lempert - NYCSCA; L. Guterman - NYCSCA; T. Slauson - NYCSCA



NOTES:

1. EXISTING CONDITIONS INFORMATION OBTAINED FROM BOUNDARY AND TOPOGRAPHIC SURVEY PROVIDED BY MONTROSE SURVEYING DATED DECEMBER 2, 2004.
2. ELEVATIONS SHOWN ARE REFERENCED TO THE BRONX TOPOGRAPHICAL BUREAU DATUM WHICH IS 2.608 FEET ABOVE MEAN SEA LEVEL DATUM.
3. CONSTRUCTION IS TO BE PERFORMED IN ACCORDANCE WITH NYCSCA SPECIFICATIONS AND STANDARDS.
4. COORDINATE ALL SITE WORK AND PLAZA CONSTRUCTION WITH THE LANDSCAPE ARCHITECTURAL, ARCHITECTUAL AND STRUCTURAL PLANS.
5. EXISTING RETAINING WALL ALONG CONCOURSE VILLAGE WEST TO REMAIN. THE STABILIZATION OF THE WALL TO BE PERFORMED BY OTHERS UNDER A SEPARATE CONTRACT.
6. THE CUL DE SAC CONSTRUCTION, INCLUDING CURBS, PAVEMENT, LANDSCAPING, ETC, AND ANY IMPROVEMENTS TO THE EXISTING MTA BRIDGE OR OTHER FEATURES TO BE PERFORMED BY OTHERS UNDER A SEPARATE CONTRACT.
7. REFERENCE DRAWING C410 FOR LARGE SCALE DRAWING OF FIELD AND RETAINING WALL.
8. REFERENCE LANDSCAPE ARCHITECTURAL PLANS FOR SITE FENCING INFORMATION.

REFERENCE:
BASEMAP FROM PERKINS EASTMAN, 115 FIFTH AVENUE, NEW YORK, NY 10003

30 0 15 30
SCALE IN FEET

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
115 FIFTH AVENUE
NEW YORK, NY 10003

CONSULTING ARCHITECT: ALEXANDER GORLIN ARCHITECT LLC
137 VARICK STREET
NEW YORK, NY 10013

STRUCTURAL ENGINEER: LESLIE E. ROBERTSON ASSOCIATES, RLLP
30 BROAD STREET
NEW YORK, NY 10004

MECHANICAL ENGINEER: FLACK + KURTZ ENGINEERS
475 FIFTH AVENUE
NEW YORK, NY 10017

CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA
360 WEST 31ST STREET, 8TH FLOOR
NEW YORK, NY 10001

FOOD SERVICE CONSULTANT: ROMANO GATLAND
99 WEST HOFFMAN AVENUE
LINDENHURST, NY 11757

ACOUSTIC AND THEATER CONSULTANT: HARVEY MARSHALL BERLING ASSOCIATES, LLC.
173 WEST 81ST STREET
SUITE 2, LOWER LEVEL
NEW YORK, NY 10024

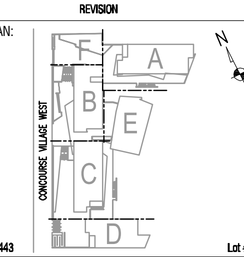
LANDSCAPE ARCHITECT: RGR LANDSCAPE
115 FIFTH AVENUE
NEW YORK, NY 10003

BID SET

NOTE: Drawing may be printed at reduced scale

NO.	REVISION	DATE
1	ISSUED FOR ADDENDUM No. 1	JULY 31, 2006

KEY PLAN:



Block # 2443 Lot # 78

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Christine Schlendorf
Designer:	Ernesto Vela
Drawn by:	Christine Schlendorf
Checked by:	Perry Nuñez

LLW No.:	Facility Code:	Date:
033485	1215-05	06/30/06

Project:
MOTT HAVEN CAMPUS
-

Address: 730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

Drawing Title:
FIGURE 25
PRINCIPAL SITE COVERS

Drawing No.:

Sheets in Contract:
of 1072

PFA No. 21200.00

O:\Shaw Offices - CAD Files\Harriman NY\Mott Haven Campus\FIGURE 25 new.dwg 08/08/07 - 11:23am

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21ST Street, Long Island City, NY 11101-5407
Phone: (718) 482-4898 • **FAX:** (718) 482-6358
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

August 13, 2007

Michael Sherwood
Project Manager
Shaw Environmental and Infrastructure
4 Commerce Drive South
Harriman, New York 10926

Re: Remedial Action Work Plan Addendum 2
672 Concourse Village West, Bronx, NY
BCP C203030

Dear Mr. Sherwood,

The New York State Department of Environmental Conservation (the Department) has reviewed the Remedial Action Work Plan (RAWP) Addendum 2, dated August 9, 2007, submitted by Shaw Environmental, BCP C203030, located at 672 Concourse Village West, in Bronx, NY. RAWP Addendum 2 notes that, following remediation, the property will be capped with concrete foundation, asphalt, artificial turf, or with two feet of clean fill on all exposed ground surfaces. The Department finds this method acceptable, and will incorporate this Addendum into the November 15, 2005 Remedial Action Work Plan. The Department would like to note that BCP C203030 only includes the approximately 300ft by 125ft area in the northwestern corner of the property, and that the remainder of the property is not included in the Brownfields Cleanup Agreement for this site.

If you have any questions concerning this matter, please call my office at (718) 482-4898, or email me at skcarlso@gw.dec.state.ny.us.

Sincerely,

Sarah Carlson

Sarah Carlson
Environmental Engineer
NYSDEC- Region 2
Division of Environmental Remediation

cc: Vadim Brevdo, NYSDEC
Amar Nagi, NYSDEC
Tim Slauson, SCA
Lee Guterman, SCA

Shaw Environmental & Infrastructure, Inc.

4 Commerce Drive South
Harriman, New York 10926
845-492-3100
FAX: 845-492-3101

Shaw® Shaw Environmental & Infrastructure, Inc.

June 14, 2006

Mr. Koon Tang, P.E.
Environmental Engineer III
New York State Department of Environmental Conservation
Division of Environmental Remediation
Hunters Point Plaza
47-40 21st Street
Long Island City, New York 11101

Re: Final Remedial Action Work Plan Addenda-Mott Haven Site, 672 Concourse Village West, Bronx, New York

Dear Mr. Tang:

On behalf of the NYC School Construction Authority, please find responses to comments raised by both NYSDEC and NYSDOH during our meeting of May 3, 2006. This document shall serve as addenda to the Draft RAWP, submitted on November 15, 2005. These modifications are noted below and address the following issues:

- Groundwater monitoring frequency
- Truck cleaning and proposed traffic routes
- Community Air Monitoring Plan- CAMP (Appendix A)
- Active SSDS
- Remediation Oversight

Section 3.2.1 Hydraulic Barrier Wall
Replace the last paragraph in this section with the following paragraph:

> Groundwater quality will be monitored quarterly downgradient of the hydraulic barriers and at the downgradient property line for one year following installation of the barrier walls, and semi-annually during the remainder of the Mott Haven Campus construction, to confirm that there are no changes in the existing groundwater quality. Two new monitoring wells will be installed at the downgradient ends of the two (northern and western) hydraulic barriers. In addition, the monitoring wells MW-5, MW-3, and MW-11 will be protected or re-installed to assess groundwater quality at the downgradient property line. All groundwater samples will be analyzed for VOCs utilizing EPA Method 8260.

Section 5.1.1 Soil and Material Removal
Add the following paragraph to the end of this section:

All trucks transporting soil off of the Site will be thoroughly cleaned prior to exiting the Site as follows:

1. Each loaded truck will be driven onto a wash pad (of sufficient size for the vehicle) for inspection and cleaning;
2. All soil, debris and other miscellaneous materials will be removed using a high-pressure low volume steam cleaner while on the decontamination pad. Special attention will be made to the removal of soils and materials from the undercarriages and tires/wheels of the trucks;
3. Physical/mechanical agitation (scraping with hand tools or brushes) of soil will be utilized as necessary to help minimize wastewater generation;
4. Following cleaning, each truck will be inspected prior to leaving the Site.

All trucks transporting soil off of the Site will travel the following route (See **Figure 1A**):

1. Turn right onto Morris Avenue from the Site;
2. Head south on Morris Avenue to 138th Street;
3. Turn right onto 138th Street;
4. Head west on 138th Street and enter either Interstate 87 northbound or southbound, depending upon the quickest route to the disposal facility.

Periodic monitoring will be conducted to ensure that the trucks are following the prescribed route.

Section 5.2.3 Air and Dust Control
Replace all of the section with the following paragraphs:

During all remedial activities, air and dust emissions will be monitored and controlled to protect the surrounding environment from exposure to airborne contaminants. Temporary tent-like structures will be installed over any excavation activities prior to work being started. The temporary tent-like structures are constructed of metal beams and trusses and a strong reinforced fabric. The structures are secured to the ground surface and a negative air pressure system will be installed and operated to prevent the release of vapors and dust. The air system will include a filtration system to insure air emissions meet federal, state and local standards.

Outside the structures, a Community Air Monitoring Program (CAMP) will be conducted to verify compliance with the applicable regulatory criteria. The CAMP is presented in **Appendix A**. Continuous monitoring will be required for all ground intrusive remedial activities. Ground intrusive remedial activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Monitoring will be conducted at four stationary locations as well as within a zone along the north (P.S. 156 and I.S. 151), west (Concourse Village West) and southeast areas of the remediation area (**Figure 2A**). The four stationary air monitoring stations will be located at PS 156 and IS 151 playgrounds, along Concourse Village West (in the immediate area of the remediation), and at a downwind location from the excavation area. The downwind direction is predominantly to the southeast, but this location will be modified based on actual wind conditions. Besides the four stationary locations, there will be a roving air quality monitor, utilizing handheld units, moving continuously along the northern and western perimeters of the Site. Air quality monitoring will include measurements of VOCs as well as air particulates (dust).

Within the tent-like structures, vapor and dust will be monitored for worker protection. A site-specific HASP will be developed and implemented. The HASP will address worker protection by establishing the monitoring criteria, action levels and protective equipment. The air quality inside the tent-like structures will be similarly monitored.

Section 5.4 Vapor Barrier and Sub Slab Depressurization System
Add the following paragraph to the end of this section:

As an added safeguard, all of the buildings on the Mott Haven Campus have been designed to operate under positive pressure utilizing the heating, ventilation, and air conditioning (HVAC) system, and the sub slab depressurization system (SSDS) will be installed to serve in the active mode. However, the SCA will perform sub-slab sampling subsequent to remediation and before school occupancy to demonstrate to the satisfaction of NYSDOH that we can eliminate the need for the SSDS all together.

Site Remediation Engineer

The NYC School Construction Authority will provide a Site Remediation Engineer to perform continuous oversight of the environmental remedial activities presented in the RAWP. The Site Remediation Engineer will be the NYCSCA's Industrial and Environmental Hygiene (IEH) Department on-site representative that will ensure that the site remediation is implemented as presented in the Contract Specifications, in accordance with all applicable environmental regulations. The Site Remediation Engineer will act as the liasson with the NYCSCA, NYSDEC, and NYSDOH and will have the authority, acting through NYCSCA Project Mangement, to halt the remedial activities if the Contractor is not in compliance with the Contract Specifications, or if the remedial activites are creating a health hazard to the public. In addition, the Site Remediation Engineer will have the responsibility to periodically monitor the traffic routes used by the trucks removing contaminated soils from the Site to ensure the trucks are utilizing the prearranged route.

We anticipate that these RAWP addenda are acceptable to the New York State Department of Environmental Conservation and New York State Department of Health, and that the Work Plan can be approved immediately. If you have any questions or comments, please do not hesitate to contact me or Michael Sherwood.

Sincerely,

SHAW ENVIRONMENTAL AND INFRASTRUCTURE

August Arrigo, P.E.
Senior Engineer
License No. 070843

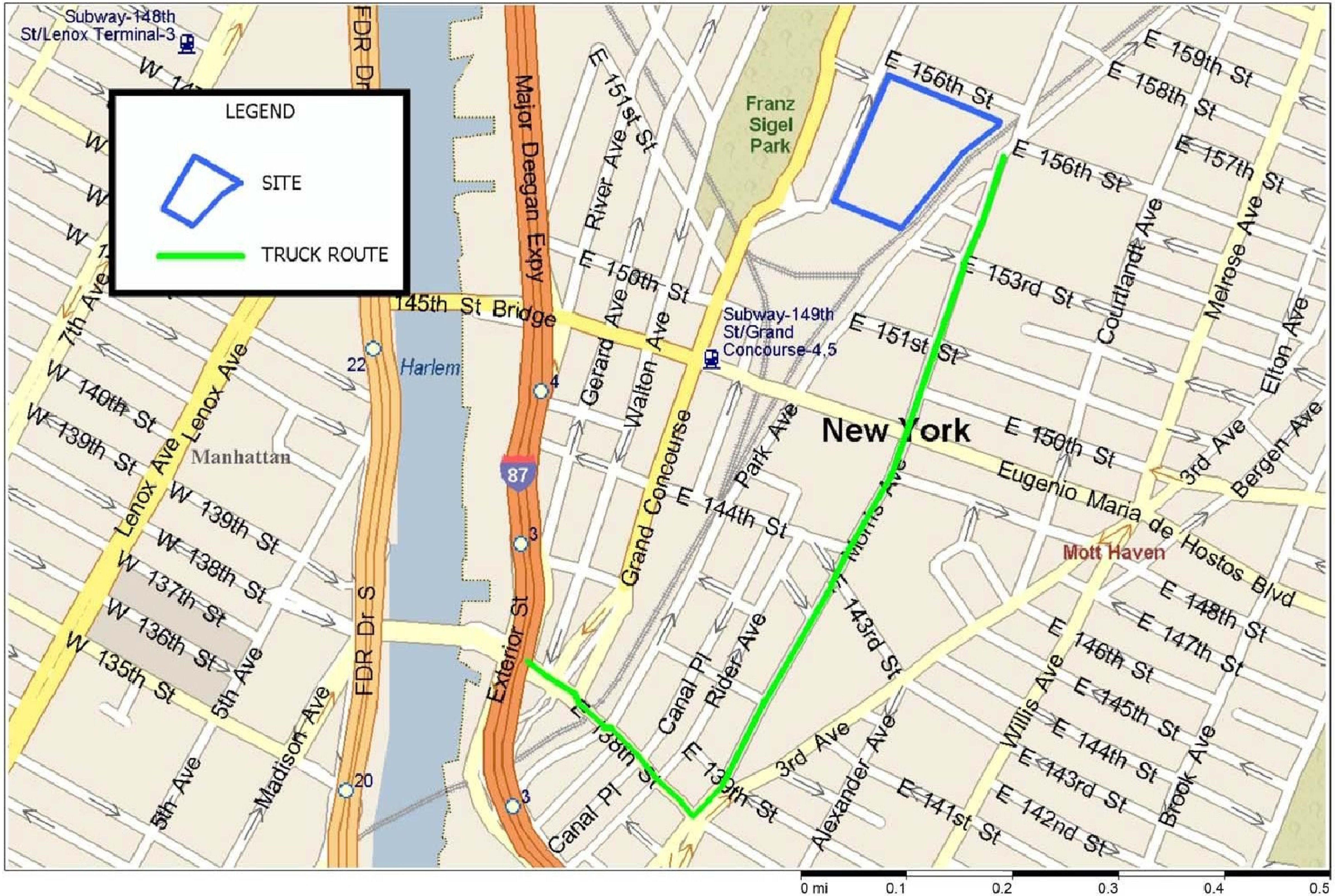
Attachments: Figure 1A, Figure 2A, Appendix A (CAMP)

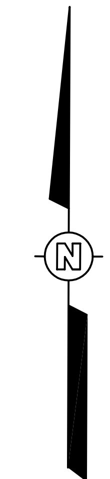
cc: Vinicius Castagnola, NYCSCA
Alex Lempert, NYCSCA
Lee Guterman, NYCSCA
Julia Guastella, New York State Department of Health

FIGURES

OFFICE Harriman, NY | DRAWING NUMBER 114926-FIG1A

File: H:\NYCSCA\METRO NORTH MOTT HAVEN\Kurt\114926-FIG1A.dwg Layout: 11 x 17 construction User: randy.tagoff May 17, 2006 – 11:47am





Shaw Environmental, Inc.

DESIGNED BY: C. Kraemer	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R. Tagoff	REMEDIATION TRUCK ROUTE
CHECKED BY: C. Kraemer	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

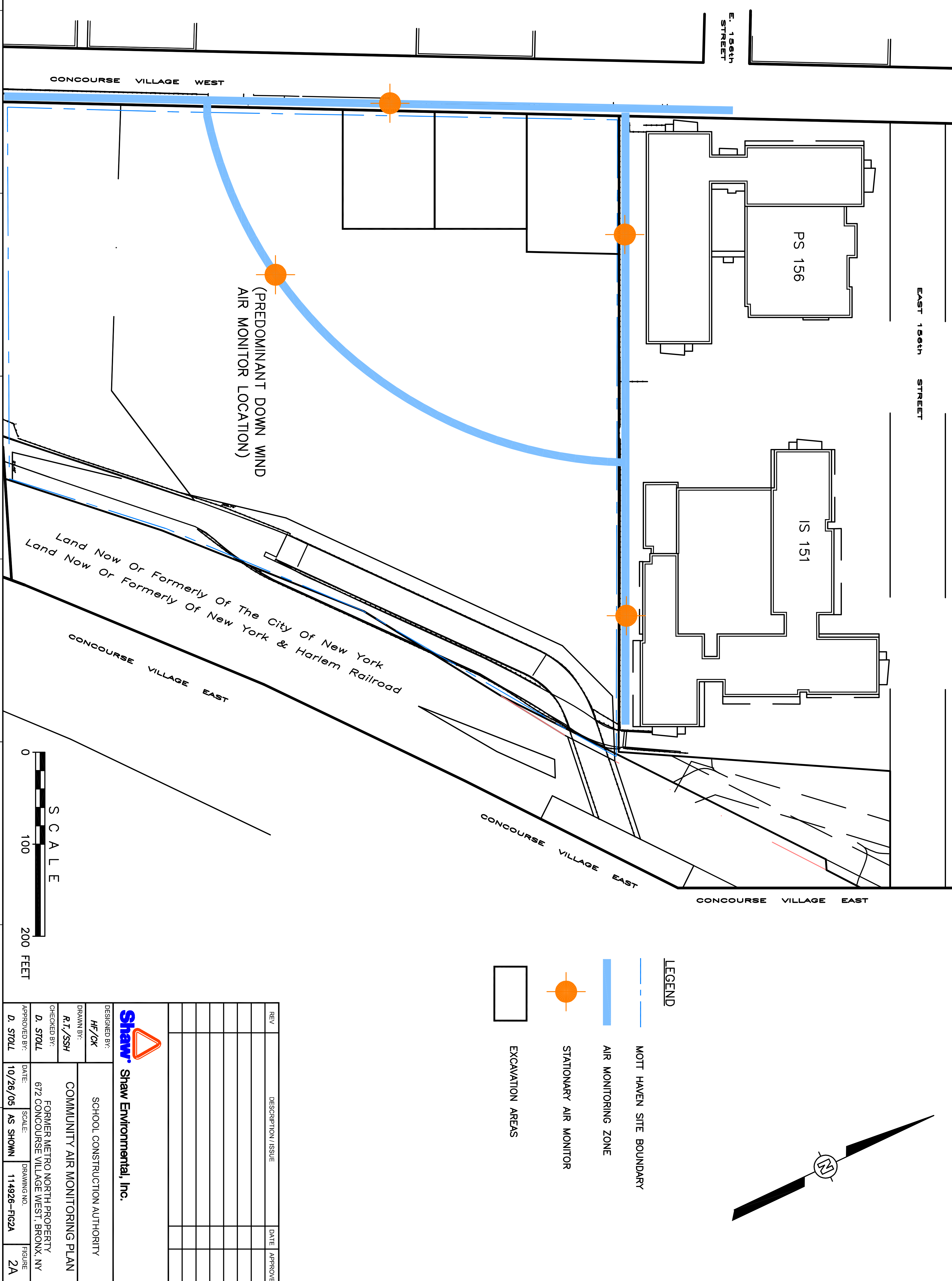
APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
C. Kraemer	5/17/06	AS SHOWN	114926-FIG1A	1A

VERIFY SCALE 0 1"

File: N:\Cad\Projects\NYCSCA - Metro\Project Drawings\114926-FIGA2.dwg Layout: PDF User: dave.tice May 17, 2006 - 7:26am

OFFICE	DRAWING NUMBER
HARRIMAN, NY	

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.



REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

SCHOOL CONSTRUCTION AUTHORITY

COMMUNITY AIR MONITORING PLAN

FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:
HF/CK	R.T./SSH	D. STOLL	D. STOLL

DATE:	SCALE:	DRAWING NO.	FIGURE
10/26/05	AS SHOWN	114926-FIG2A	2A

APPENDIX A

COMMUNITY AIR MONITORING PLAN

CONFIDENTIAL AND PRIVILEGED

COMMUNITY AIR MONITORING PLAN (CAMP)

For

FORMER METRO NORTH PROPERTY (MOTT HAVEN)

AT

672 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

SCA LLW NO.: 033485
SCA CONTRACT NO.: C000009228
SCHOOL DISTRICT: 78
SCA IEH JOB NO.: 19730

CONSULTANT PROJECT NO.: 114926

JUNE 14, 2006

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

Prepared by:

Shaw Environmental & Infrastructure
Engineering of New York, P.C.
4 Commerce Drive South
Harriman, New York 10926
Phone: (845) 492-3100
Fax: (845) 492-3101
Michael Sherwood

Prepared for:

NYC SCA

30-30 Thomson Avenue
Long Island City, NY 11101-3045
Phone: (718) 472-8502
Fax: (718) 472-8500
Attn: Lee Guterman

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Project Background

On behalf of the New York City School Construction Authority (SCA), a Remedial Action Work Plan (RAWP) was prepared by Shaw Environmental and Infrastructure Engineering of New York, P.C. (Shaw) to address contamination present at the former Metro North Site located at 672 Concourse Village West, Bronx, New York (hereafter referred to as the "Mott Haven Site"). **Figure 1** is a site vicinity map. Administratively, the Mott Haven Site is being addressed under the Brownfield Cleanup Program Act (BCP) Agreement between the New York State Department of Environmental Conservation (NYSDEC) and SCA. The RAWP describes the remedial actions that will be implemented on the portion of the Mott Haven Site governed by the BCP Agreement (BCP area).

During the remedial activities, air and dust emissions will be monitored and controlled to protect the surrounding environment from exposure to potential airborne contaminants. Temporary tent-like structures will be erected over all excavation areas before any remedial activities are undertaken. The temporary tent-like structures are constructed of metal beams and trusses and a strong reinforced fabric. The structures are secured to the ground surface and a negative air pressure system will be installed and operated to prevent the release of vapors and dust. The air pressure system will include a carbon filtration system to lower air emissions to meet all regulatory agency emission standards and criteria. Outside of the structures, air monitoring of the perimeter of the BCP area and haul roads will be conducted to verify compliance with all applicable emissions standards.

On behalf of the SCA, Shaw performed a Remedial Investigation of the Site between March and September 2005. The Remedial Investigation activities were completed pursuant to the NYSDEC approved Remedial Investigation Work Plan (RIWP) dated July 2005. A Supplemental Investigation was performed to the north and west of the Site to identify off-site contamination which may be impacting the Mott Haven Site. These Supplemental Investigation activities were based on a Scope of Work (SOW) presented to NYSDEC and the New York State Department of Health (NYSDOH) on July 14, 2005.

Pursuant to the RIWP and the Supplemental Investigation SOW, the following activities were conducted: geophysical investigations; installation of twenty-three (23) soil gas points / implants and collection of soil vapor samples; installation of forty-seven (47) soil borings; excavation of nine (9) test pits; installation of twenty (20) groundwater monitoring wells; installation of eight (8) bedrock soil borings; site reconnaissance on surrounding properties; laboratory analysis of soil gas, soil and groundwater samples; and permeability tests to assess hydraulic characteristics of the shallow aquifer beneath the Site.

The results of the Remedial and Supplemental Investigations indicated that semi volatile organic compounds (SVOCs) and volatile organic compounds associated with discharges of manufactured gas plant (MGP) waste and gasoline have impacted soil and groundwater in the BCP area. Based on the contamination identified by the Remedial and Supplemental Investigations, soil disturbance activities may generate VOCs and nuisance particulates (dust). It is expected that the temporary tent-like structures erected over the excavation areas, coupled with a negative air pressure system utilizing carbon filtration to eliminate VOC emissions, will prevent the release of vapors and dust from the BCP area. To document compliance with all applicable emission standards, air monitoring of the perimeter of the BCP area and haul roads will be conducted.

This Community Air Monitoring Program (CAMP) has been developed to address potential dust and subsurface VOCs that may be released during remedial activities. This CAMP was written in accordance with the NYSDEC requirements presented in Appendix 1A of the Draft DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC 2002). The CAMP requires real-time monitoring for both dust and VOCs at adjoining properties that contain sensitive receptors (e.g., P.S. 156, I.S. 151, residences and Cardinal Hayes High School) and the downwind perimeter of the BCP area and haul roads. The measures included in the CAMP will provide a level of protection for the occupants of the adjacent schools and residences, as well as the downwind community, from potential airborne releases. The CAMP sets forth specific action levels for determining the monitoring frequency and the appropriate corrective actions, including work shut-down.

1.2 Project Purpose and Objectives

The principal purpose of the CAMP is to monitor air quality in the vicinity of the BCP area and haul roads during the remedial actions. The CAMP consists of monitoring of dusts and vapors on both a real-time and continuous basis. Monitoring of this project will include all standard monitoring functions for environmental remediation projects including real-time air monitoring for particulate matter/dust and VOCs, observations for visible emissions and odors, inspection and monitoring of the contractor’s work practices, and reporting to the NYSDEC and the NYSDOH. Continuous monitoring will be performed during all ground intrusive activities.

Principal objectives of the program are as follows:

- Monitor dust as PM_{10} on a real-time or continuous basis such that dust associated with the remedial actions are maintained below action levels.
- Monitor VOC vapors on a real-time or continuous basis such that vapors associated with the remedial actions are maintained below action levels.
- Monitor VOCs and visible emissions so that vapors and dust from the BCP area and haul roads do not leave the Mott Haven Site.
- In the event that dust or VOC levels exceed action levels, construction personnel will be immediately notified so that all necessary corrective actions can be taken.

1.3 Operations to be Monitored

The remedial actions to be performed at the Mott Haven Site consist of:

- A hydraulic barrier will be constructed along the northern and western boundaries of the BCP area to prevent contaminated groundwater from entering the Mott Haven Site.
- Temporary sheet piling will be installed in the BCP area to facilitate soil removal and dewatering operations.
- Contaminated soil (approximately 300 ft by 125 ft by 12 ft deep) will be excavated and removed from the BCP area.
- The excavated BCP area will be restored with clean backfill.

2.0 AIR MONITORING PROCEDURES

Air monitoring stations will be established in four (4) stationary locations and a roving air monitor utilizing hand-held instruments to monitor the air will walk the northern and western perimeters of the BCP area. **Figure 2** is an air monitoring station map. Three (3) of the stationary air monitoring stations will be located adjacent to sensitive receptors that are generally upwind of the BCP area. (The sensitive receptors include P.S. 156 and P.S. 151 on the platform located north of the BCP area and a residential building and Cardinal Hayes High School located to the west of the BCP area.) The fourth location will be located in the predominantly downwind direction of the BCP area and its location will vary depending on daily conditions (e.g., wind direction). A wind sock will be used to determine and monitor wind direction throughout the work day.

These air-monitoring activities include real-time monitoring for VOCs and particulates based on the New York State CAMP requirements. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. **Table 1** summarizes dust and VOC action levels and appropriate actions. As a supplement to **Table 1**, a flow chart summarizing action levels/action is provided on **Figure 3**.

2.1 VOC Direct Reading Monitoring

VOC monitoring equipment will consist of a photo ionization detector (PID) capable of detecting the VOCs found in the soil and groundwater. The monitoring equipment will be calibrated on a daily basis and documented in a dedicated field log book. The instrument will be capable of calculating 15-minute running average concentrations, which will be compared to the prescribed action levels.

Upwind 15 minute average background concentrations will be subtracted from the downwind 15 minute average concentrations to establish concentrations reflective of work activities during the periods between collection of background readings.

The 15-minute running average concentrations will be compared to the following:

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

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

- If the organic vapor level is above 25 ppm at the downwind perimeter of the BCP area, activities must be shutdown and the engineering controls and the site work plan re-evaluated.

As an extra precautionary measure, when the downwind perimeter of the BCP area is within 20 feet of the nearest potential receptor (i.e. the existing schools or residences), then the perimeter organic vapor level must not exceed VOC background concentrations. If VOC background concentrations are exceeded at any time at any perimeter location within 20 feet of the nearest receptor, then activities must be shutdown and the engineering controls and the site work plan re-evaluated.

2.2 Particulate (Dust) Direct Reading Monitoring

Particulate (dust) concentrations will be monitored continuously at the upwind and downwind perimeters of the BCP area and haul roads. The particulate monitoring will be performed using real-time aerosol or particulate monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM_{10}) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level established below. The equipment will be equipped with an audible alarm to indicate exceedance of the action level, and will be calibrated in accordance with the manufacturer's operating instructions and documented in a dedicated logbook. In addition, fugitive dust migration will be visually assessed during all work activities.

The primary standards for PM_{10} are 150 micrograms per cubic meter ($\mu g/m^3$) over a 24 hour averaging time and 50 $\mu g/m^3$ over an annual averaging time. Both of these standards are averaged arithmetically. The action level will be established at 150 $\mu g/m^3$ over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If downwind particulate levels are detected in excess of 150 $\mu g/m^3$, the upwind background level must be measured immediately. If the downwind site particulate measurement is greater than 100 $\mu g/m^3$, but less than 150 $\mu g/m^3$ above the background level, additional dust suppression techniques will be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. If the dust suppression measures being utilized at the site do not lower particulates to an acceptable level (e.g., below 150 $\mu g/m^3$ and no visible dust from the BCP area and haul roads), work will be suspended until appropriate corrective measures are implemented to remedy the situation.

3.0 AIR MONITORING RECORDKEEPING AND OBSERVATIONS

The qualified safety officer or technician will ensure that all air-monitoring data is logged in a dedicated log book. Documentation shall be made clear, concise, and provide the data, time of entry, location, personnel, weather conditions, and background concentrations for each monitoring station. Documentation will also include all observational data that has potential for impacting results, such as potential off-site interferences, on-site public interferences, damage to instruments, site equipment problems, or weather related interferences.

All pages must be numbered; no lines shall be left blank (or put a line through it), and must be initialed on each page in ink. The last entry page for the shift or day that has blank space left at the bottom shall have a line drawn diagonally across it and signed at the bottom of the page. All corrections must be made with a single line, initialed, and dated.

Monthly and daily wind rose data will be available for use on the Mott Haven Site as a reference for assessing the frequency of available wind directions. Instrumentation shall also be used at the Mott Haven Site to determine the wind speed (anemometer), wind direction (wind sock), barometric pressure (barometer), and relative humidity (psychrometer). These weather data shall be obtained on an hourly basis while work is progressing and documented in the dedicated field log book.

Real time data (e.g., PM_{10} and VOCs) will be downloaded from the data loggers at the end of each day. The downloaded data will be electronically transmitted to the NYSDEC and NYSDOH at the end of each day. Fifteen-minute averages from each station and instantaneous readings, if any, used for decision purposes will be recorded. Daily plots of real-time data will be generated.

The NYSDEC and NYSDOH will be notified promptly via phone and electronic mail of any exceedance of an Action Level and of the corrective actions taken in connection with the exceedance. If an exceedance occurs, the SCA will prepare an Exceedance Summary Letter, following completion of the exceedance assessment, for submission to the NYSDEC within five working days of the exceedance. This will be a 1-2 page letter stating the nature of the exceedance, cause(s) of the exceedance and the corrective actions taken.

CAMP air monitoring results and records will be maintained by the contractor for a minimum period of 6 years following completion of the project and made available to officials of the SCA, upon request.

3.1 Equipment Operational Requirements

The air monitoring equipment must be operated by trained and qualified personnel. Personnel who perform air-monitoring functions described in this section shall be experienced in the use of field air monitoring equipment, as well as the air monitoring procedures described above. There must also be appropriate staff (chemist, industrial hygienist or environmental scientist) for assessing the results of air monitoring and advising field personnel and the construction manager of air quality considerations.

All monitoring equipment must be calibrated on a daily basis in accordance with the manufacturer's operating instructions. A dedicated log book for each monitoring unit will be maintained that details the date, time, calibration gas, or other standard, and name of person performing the calibration.

4.0 DUST AND VOC CONTROLS

The information and procedures presented in this section will be used for dust and VOC control during activities summarized in Section 1.3. The construction manager for the project will be responsible for implementing these procedures based on the air monitoring results and required Action Levels described in **Table 1** and **Figure 3**. The information and procedures that are to be used for dust and VOC control are presented in the following sub-sections.

The remedial work will be performed in temporary tent-like structures that will be erected over the excavation areas. The structures are secured to the ground surface and a negative air pressure system with carbon filtration will be installed and operated to prevent the release of vapors and dust. With this engineering control in place, dust and vapor emissions outside of the test-like structures are not anticipated; however, measures will be implemented within the tent-like structures and on haul roads to prevent the generation of dust and vapors.

4.1 Dust Controls

The primary measure of preventing exposure to dust during excavation or other soil disturbance activities will be wetting techniques and the use of tent-like structures with a negative air system. The construction manager will provide for engineering controls (wet techniques) or other techniques to control dust during work tasks that have the potential for generating dust. Dust controls involving the use of water (wetting or water spraying) will be employed at potential dust generating activity areas as follows.

- Before each task is initiated
- During the tasks to keep the soils damp
- When air monitoring results dictate the need for dust control

4.2 VOC Controls

Control of VOCs during excavation work or other soil disturbance activities will consist of the construction manager implementing one or more of the following methods or measures:

- Covering stockpile areas
- Wetting excavation material
- Backfilling the excavation
- Vapor suppression, such as foaming agents
- Total containment of the work area through use of tent structures with negative air system

5.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Shaw Environmental and Infrastructure Engineering of New York, P.C. has completed the Community Air Monitoring Plan for the former Metro North Site located at 672 Concourse Village West, Bronx, New York.

SHAW ENVIRONMENTAL AND INFRASTRUCTURE OF NEW YORK, P.C.

Curtis A. Kraemer

Curtis A. Kraemer, P.G.
Senior Geologist

Michael R. Sherwood

Michael Sherwood
Project Manager

Approved:

August Arrigo

August Arrigo, P.E.

Senior Engineer
License No. 070843

6.0 REFERENCES

New York State Department of Environmental Conservation Division of Environmental Remediation. *Draft DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 1A*, December 2002.

Shaw Environmental and Infrastructure Engineering of New York, P.C. *Remedial Investigation Work Plan*, July 2005.

Shaw Environmental and Infrastructure Engineering of New York, P.C. *Supplemental Investigation Scope of Work*, July 14, 2005.

Shaw Environmental and Infrastructure Engineering of New York, P.C. *Draft Remedial Action Work Plan*, November 15, 2005.

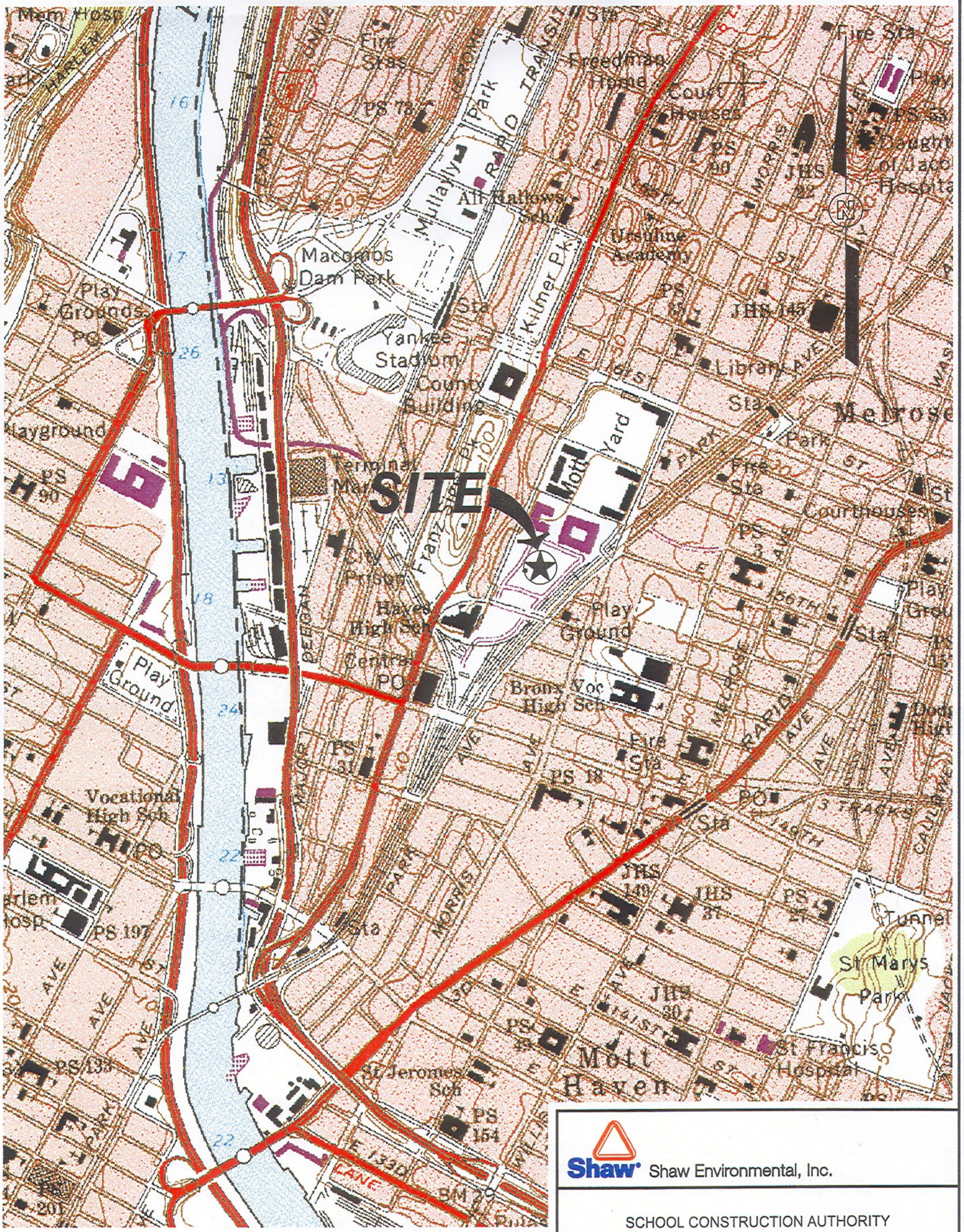
TABLE

Table 1
Air Monitoring Summary Table for
Former Metro North Property

Monitoring Device	Monitoring Location/ Personnel	Monitoring Frequency	Action Level	Action
PM-10 Aerosol/ Particulate Air Monitoring Unit with Audible Alarm	Upwind and Downwind of BCP Area	Continuous during all excavation or dust producing activities for 15 minute average readings Background is the most recent upwind 15 minute average reading	<100 µg /m^3 (15 min TWA) above background at the downwind perimeter of BCP Area	Continue normal operations
			> 100 µg /m^3 (15 min TWA) above background at the downwind perimeter of BCP Area for any 15 min average, or visible dust leaving the BCP Area	Implement dust control measures*
			> 150 µg/m^3 (15 min TWA) above upwind background level downwind perimeter of BCP Area	Halt all dust disturbance work until downwind perimeter of BCP Area reading is < 150 µg/m^3 above upwind perimeter.
PID	Upwind and Downwind of BCP Area	Continuous during all excavation or dust producing activities for 15 minute average readings Background is the most recent upwind 15 minute average reading	< 5 ppm (above background)	Continue normal operations
			>5 ppm above background but < 25 ppm (15-minute TWA)	Suspend operations until readings indicate < 5.0 ppm for 15-minute TWA Take steps to abate emissions*
			> background within 20 feet of nearest receptor	Shutdown operations and re-evaluate work and controls

**See VOC and Dust Control Section*
TWA - Time Weighted Average
PID - Photo Ionization Detector
µg/m^3 – Microgram per Cubic Meter
ppm – Parts per Million

FIGURES



NOT TO SCALE

REFERENCE:

BASE MAP SOURCR: www.nysgis.state.ny.us

Shaw Shaw Environmental, Inc.

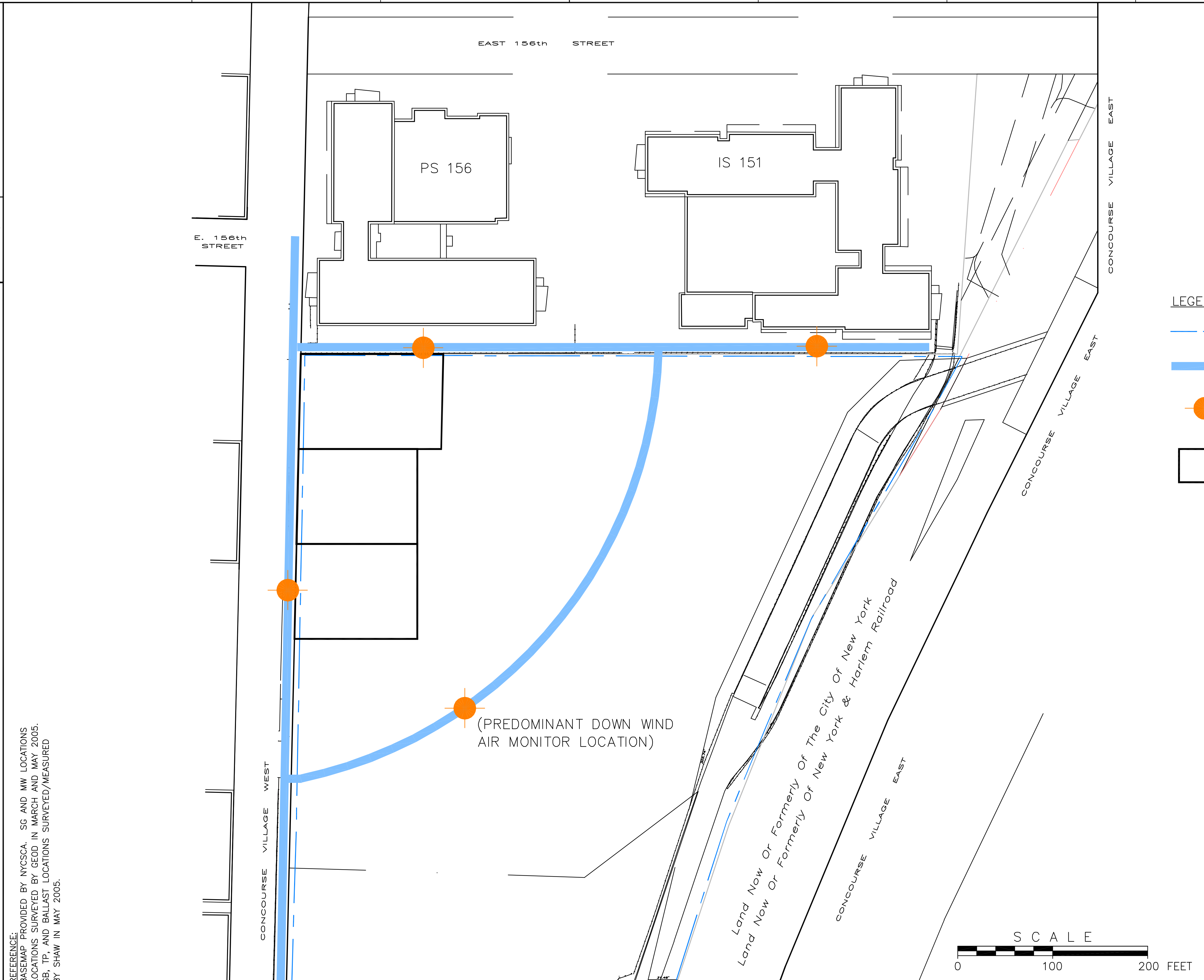
SCHOOL CONSTRUCTION AUTHORITY

FIGURE 1
SITE VICINITY MAP

FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
ALBANY, NY	10/13/05	H. FARIELLO	S. SHKOLNIK			114926A3

L:\project\114926\114926A3.dwg
Plot Date/Time: 10/13/05 11:57am
Plotted by: Samuil.Shkolnik
Xref: .
Image: 04007368



REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
LOCATIONS SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

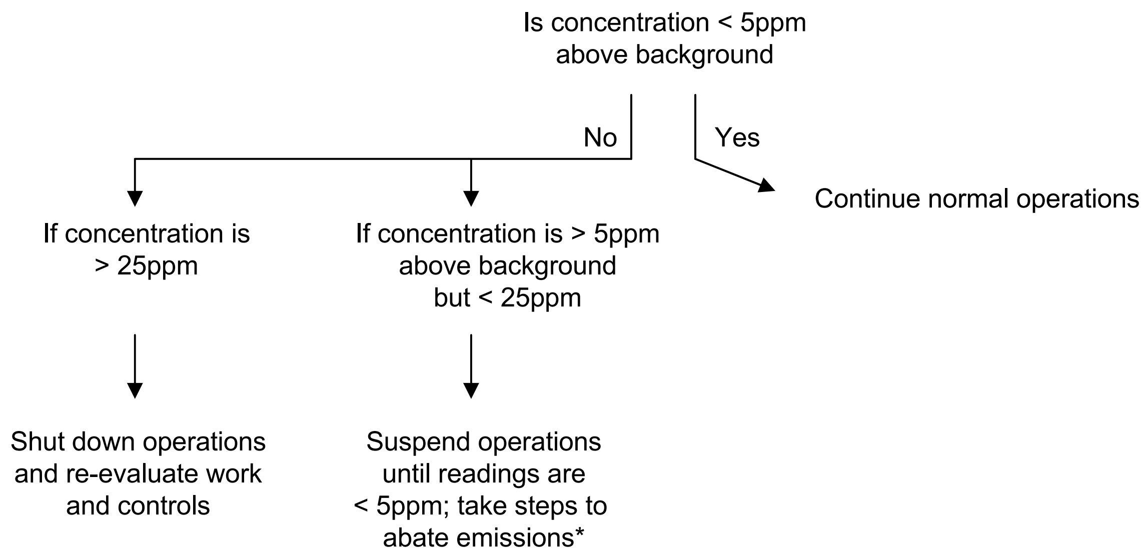
DESIGNED BY: HF/CK	SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	AIR MONITORING STATION PLAN
CHECKED BY: D. STOLL	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
D. STOLL	05/31/06	AS SHOWN	114926-FIG2A	2

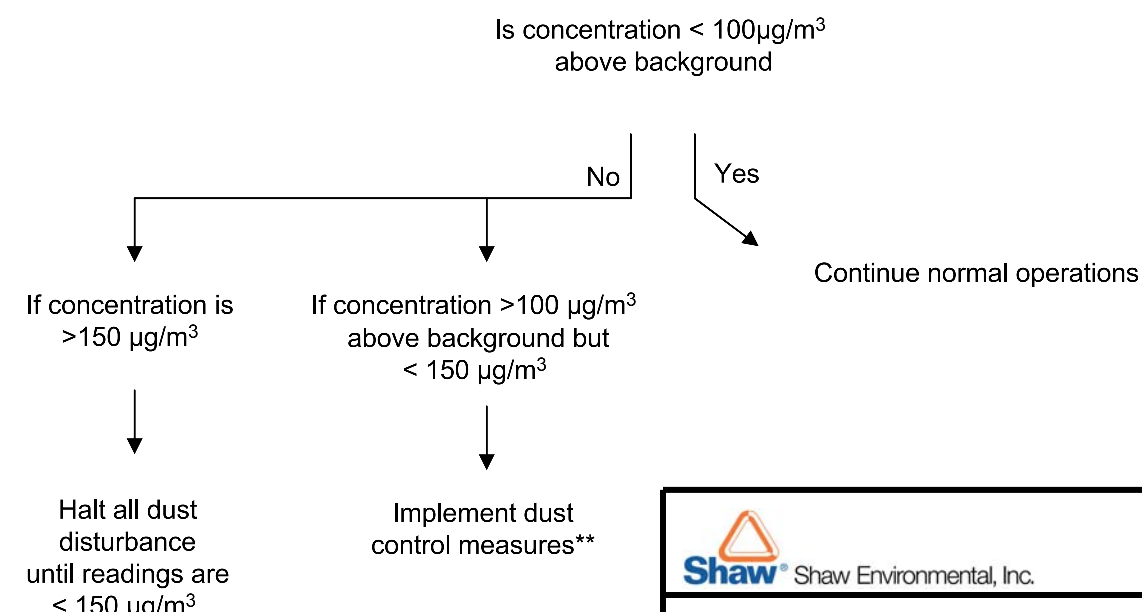
OFFICE: HARRIMAN, NY
DRAWING NUMBER

File: \\seiharfs01\Common\Cad\Projects\NYCSCA - Metro\Project Drawings\114926-FIG2A.dwg Layout: PDF User: william.snyder May 31, 2006 - 8:45am

Volatile Organic Monitoring
Downwind of BCP Area



Particulate Monitoring
Downwind of BCP Area



*See VOC control section (Section 4.2)
**See dust control section (Section 4.1)
VOC and particulate readings based on 15 minute time weighted average

Shaw® Shaw Environmental, Inc.

SCHOOL CONSTRUCTION AUTHORITY

FIGURE 3

FLOW CHART FOR VOC AND PARTICUALTE MONITORING ACTION LEVELS

FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21ST Street, Long Island City, NY 11101-5407
Phone: (718) 482-4995 • **FAX:** (718) 482-6358
Website: www.dec.state.ny.us

Denise M. Sheehan
Commissioner

July 5, 2006

Ms. Lee Guterman
New York City School Construction Authority
30-30 Thomson Avenue
Long Island City, NY 11101

Re: Former Metro North Property (AKA Mott haven Site), BCP# 203030
Remedial Investigation Report, dated November 15, 2005; and
Remedial Action Work Plan, dated November 15, 2005

Dear Ms. Guterman:

The Department of Environmental Conservation (Department), in consultation with the New York State Department of Health (NYSDOH), has completed its review of the subject documents referenced above. The documents were released for public comments for 45 days as required by the Brownfield Cleanup Program (BCP). The comment period ended on May 30, 2006.

The Remedial Investigation Report is hereby approved. The Remedial Action Work Plan as amended by the Remedial Action Work Plan Addenda dated June 14, 2006, and the Subslab Depressurization System Letter to NYSDOH dated June 16, 2006, is hereby approved with the following conditions:

1. Locations and number of end point soil samples in the excavated area must be approved by the Department project manager.

2. New York City School Construction Authority must develop a site management plan for Department approval to: (a) identify any use restrictions of the site; and (b) provide for the operation and maintenance of the components of the remedy, and if applicable, any vapor intrusion mitigation system.

The goal of the remedy is to excavate and dispose of all soil within the BCP area with contaminants level exceeding TAGM 4046 recommended soil cleanup objectives. Groundwater remediation will include localized dewatering of the excavated area and on-site natural attenuation.

The approved plan, including the plan addenda and the letter to NYSDOH, must be placed in all publicly accessible repositories for the project within five business days of this letter. A certification that the documents are in the project repositories, and that the repositories are complete with all project documents, must be submitted to the Department project manager within ten business days of this letter.

Once the Department has reviewed and approved the Pre-Construction Fact Sheet, it must be transmitted to the parties on the Brownfield Site Contact List, at least 10 days prior to the start of the construction. A certification of mailing of the Fact Sheet must be provided to the Department project manager. The certification must also include the date of release, a list of recipients, a copy of the Fact Sheet released, and a statement that no changes were made to the Fact Sheet after approval by the Department.

If you have any questions, do not hesitate to contact me at (718)482-4928.

Sincerely,

Koon S. Tang, P.E.
Remediation Section Chief
NYSDEC, Region 2 Office

cc: Amar Nagi, NYSDEC
P. D. Smith, NYSDEC
Wan-Joe Sun, NYSDEC
Sarah Anderson, NYSDEC
Julia Guastella, NYSDOH
Michael Sherwood, Shaw Environmental

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FIGURES

EXECUTIVE SUMMARY

Shaw Environmental and Infrastructure, Inc (Shaw) has been retained by the New York City School Construction Authority (SCA) to prepare a Remedial Action Work Plan (RAWP) for the former Metro North site located at 672 Concourse Village West, Bronx, New York (hereafter referred to as the “Site”). The Site consists of Block 2443/Lot 78 on the Borough of Bronx tax assessor’s map.

Administratively, the Mott Haven site is being addressed under the Brownfield Cleanup Program Act (BCP) Agreement between the New York State Department of Environmental Conservation (NYSDEC) and SCA. The BCP area represents the area of the Site where remedial activities are proposed, and which are described in this RAWP.

Shaw completed site investigation activities between March and September 2005. These investigative activities were completed as two separate phases. The Remedial Investigation activities, completed pursuant to the NYSDEC approved RIWP (July 2005), were performed between March and August 2005. A Supplemental Investigation (SI) was performed to the north and west of the Site to identify off-site contamination which may be impacting the Mott Haven Site. These SI activities were based on a Scope of Work (SOW) presented to NYSDEC and New York State Department of Health (NYSDOH) on July 14, 2005.

The findings of the RI identified soil and groundwater contamination above NYSDEC Recommended Soil Cleanup Objectives (RSCOs) and groundwater quality standards, specifically associated with volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The most elevated VOC and SVOC compounds detected include benzene, toluene, ethylbenzene, and xylenes (BTEX), and the polynuclear aromatic hydrocarbons or PAHs (e.g. naphthalene, chrysene, benzo(a)anthracene, benzo(a)pyrene, phenanthrene). The highest organic contaminant detected was naphthalene. The most significant contamination identified was generally confined to the northwestern portion of the Site, as well as upgradient and off site, at a depth corresponding to the top of the zone of saturation (water table).

Remedial Action Objectives (RAOs) have been established to ensure that all proposed site remedies are protective of human health and the environment. The RAOs proposed for the BCP area are:

- Ensure that on-site contaminant concentrations in soil and groundwater and soil gas do not pose unacceptable risks to school occupants;
- Achieve cleanup of VOCs and SVOCs to RSCOs as per TAGM 4046; and
- Maintain existing groundwater quality at the downgradient property line.

To achieve the above remedial action objectives, the following remedial actions are proposed to be completed at the Site:

- A hydraulic barrier will be constructed along the northern and western boundaries of the BCP area to prevent contaminated groundwater from entering the Mott Haven Site.
- Contaminated soil (approximately 300 ft x 125 ft x 12 ft deep) will be removed from the BCP area.
- The excavated BCP area will be restored with clean backfill.
- Engineering controls, consisting of a vapor membrane barrier and passive sub slab depressurization system (SSDS) will be incorporated beneath the school as an added safeguard against the possibility of residual soil vapors migrating into the school building.
- Institutional controls (Environmental Easement) will also be implemented to ensure that deed restrictions and engineering controls remain in place.

An evaluation of the proposed remedy demonstrates that it will be fully protective of human health and the environment. The selected remedy utilizes source removal as the primary means of remediating the site; source removal is the primary goal of the BCP. The selected remedy also utilizes institutional (environmental easements, deed restrictions) and engineering controls. Engineering controls include a hydraulic barrier along the northern and western sides of the BCP area to prevent contaminated groundwater from entering the BCP area. As an added safeguard, a vapor barrier and passive SSDS beneath the school will prevent any potential residual VOC vapors from entering the school.

Verification that remedial action objectives have been met will be accomplished through confirmatory soil sampling (following excavation) and groundwater monitoring for a period of 2 years following implementation of the barrier walls.

1.0 INTRODUCTION

Shaw Environmental and Infrastructure, Inc (Shaw) has been retained by the New York City School Construction Authority (SCA) to prepare a Remedial Action Work Plan (RAWP) for the former Metro North site located at 672 Concourse Village West, Bronx, New York (hereafter referred to as the “Site”). The Site consists of Block 2443/Lot 78 on the Borough of Bronx tax assessor’s map (**Figure 1**). **Figure 2** is a site location map.

Administratively, the Mott Haven site is being addressed under the Brownfield Cleanup Program Act (BCP) Agreement between the New York State Department of Environmental Conservation (NYSDEC) and SCA. **Figure 3** delineates the BCP area. The BCP area represents the area of the Site where remedial activities are proposed, and which are described in this RAWP.

The purpose of this RAWP is to describe the remedy for the BCP area. The implementation of the remedy will make the BCP area suitable for use as a public school.

1.1 Existing Site Conditions

The Site is a vacant lot located in a topographic depression. According to the United States Geological Survey (USGS) 7.5-minute Quadrangle Map, *Central Park, NY-NJ*, dated 1995, the approximate elevation of the Site is 20 feet above mean sea level. The properties to the west and east are approximately 30 feet higher in elevation than the Site. An approximate 30-foot high stone or concrete retaining wall borders the site to the west.

The properties immediately to the north, including two public schools (PS156 and IS151), are constructed on a concrete deck approximately 30 feet above the Site. The properties to the south are at approximately the same elevation as the Site. The Site topography gently slopes to the east. The site is relatively flat except for four debris mounds which range in height from approximately 4 to 12 feet above ground surface. These mounds have been present at the Site for many years as evidenced by 30-foot tall trees growing from the mounds. Generally, the fill mounds consist of demolition debris (e.g. concrete, brick) and sand and silt fill materials. These debris mounds are to be removed from the site under a separate construction contract and are not part of this RAWP. **Figure 4** depicts the existing physical characteristics of the Site.

1.2 Historic Site Conditions and Surrounding Land Use

A review of historical records (Sanborn Fire Insurance maps) shows that much of the Site operated as a rail yard from prior to 1891 to approximately 1975. The Sanborn maps show that the Site contained many tracks with a machine shop, carpenter shop, paint area, offices and storage areas. The tracks extended at least 1000 feet beyond the northern boundary of the Site.

Properties in the vicinity of the Site and adjacent to the Site are potential sources of contamination to the Site. Of particular significance relative to the contamination identified on the Site, was the historical presence of a gasoline service station and a manufactured gas plant (MGP) in the upgradient area northwest of the Site. The exact location of the MGP relative to the Site cannot be determined from the Sanborn maps. The URS Phase I ESA indicated that an auto repair shop and gasoline filling station were historically located at the southwestern corner of East 156th Street and Sheridan Avenue/Concourse Village West, adjacent to and immediately west of the Site. By 1977 the filling station was no longer depicted on the map, but the auto repair shop remained. The URS Phase I ESA report indicated that the MGP operated from prior to 1891 to 1946.

Further details about the historic site conditions and surrounding land use, including a review of the Sanborn Maps are found in the Remedial Investigation (RI) Report.

2.0 SUMMARY OF REMEDIAL INVESTIGATION

The following is a summary of the Remedial Investigation completed at the Site. Specific details and findings of the investigation activities can be found in the RI Report which is the companion document to this RAWP.

Shaw completed site investigation activities between March and September 2005. These investigative activities were completed as two separate phases. The Remedial Investigation activities, completed pursuant to the NYSDEC approved RIWP (July 2005), were performed between March and August 2005. A Supplemental Investigation (SI) was performed to the north and west of the Site to identify off-site contamination which may be impacting the Mott Haven Site. These SI activities were based on a Scope of Work (SOW) presented to NYSDEC and New York State Department of Health (NYSDOH) on July 14, 2005.

Pursuant to the RIWP and the Supplemental Investigation SOW, the following activities were conducted: geophysical investigations; installation of twenty-three (23) soil gas points / implants and collection of soil vapor samples; installation of forty-seven (47) soil borings; excavation of nine (9) test pits; installation of twenty (20) groundwater monitoring wells; installation of eight (8) bedrock soil borings; site reconnaissance on surrounding properties; laboratory analysis of soil gas, soil and groundwater samples; and permeability tests to assess the hydraulic characteristics of the shallow aquifer beneath the Site.

2.1 Findings

The findings of these investigations are summarized as follows:

- Groundwater flows in a southeasterly direction. The depth to groundwater ranges from approximately 4.5 to 30 feet (ft) below grade surface (bgs) across the Mott Haven Site and areas to the north and the west; the differences in depth to groundwater are attributable to the topographic elevation changes in the investigation area (the properties immediately west of the Site are approximately 30 feet higher in elevation relative to the Site).

- Groundwater seepage velocity is estimated to be approximately 10 feet/year across the Site.

- Volatile organic compounds (VOCs) were detected in soil samples collected across the Site and off-site. Several of these VOCs exceed their Recommended Soil Cleanup Objectives (RSCOs). Compounds that exceeded their applicable RSCOs include: benzene, toluene, ethylbenzene and xylenes (BTEX), naphthalene, isopropylbenzene, acetone, and methylene chloride. BTEX compounds are usually associated with lighter petroleum products similar to gasoline and naphthalene is associated with MGP wastes.

- Several soil samples (both on and off-site) had SVOCs that exceed the applicable RSCOs. These compounds include: Benzo(a)anthracene, chrysene, benzo(a)pyrene, dibenzofuran, phenanthrene, fluoranthene, pyrene, benzo(b)fluoranthene, benzo(k)fluroanthene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, butylbenzylphthalate, naphthalene, 2-methylnaphthalene, and phenanthrene. Most of these compounds are associated with heavier petroleum products similar to manufactured gas plant (MGP) waste.

- Metals above the RSCOs were encountered in all of the soil borings, tests pits and debris piles; most metal concentrations exceed USA Eastern Background Standards. This Site is located in an urban setting and the observed concentrations are considered to be indicative of background conditions and not related to Site contamination.

- There were no herbicides detected in any of the soil borings. Aroclor-1260 and Arcolor-1254 were the only PCBs detected in soil (six soil borings in the southern portion of the Site, and one soil boring [SB-45] in the BCP area). Only two locations, SB-22 and SB-45, had detections for pesticides. All detections were below pertinent RSCOs.

- The highest concentrations of VOCs in groundwater were detected in samples from the northwest corner of the Site, as well as off site (to the northwest and upgradient of the Site). Several VOCs (acetone, cis-1,2-dichloroethene, naphthalene, benzene, toluene, ethylbenzene, xylenes, isopropylbenzene, N-propylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, sec-butylbenzene, p-isopropylbenzene, n-butylbenzene, tetrachloroethene and vinyl chloride) were detected in excess of the applicable groundwater quality standards upgradient and in the northwest corner.

- The highest concentrations of SVOCs in groundwater were observed in the northwest corner of the Site and off site (northwest and upgradient of the Site). The SVOCs detected above the applicable groundwater standards include: naphthalene, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, phenol and acenaphthene.

- A number of metal constituents were detected above the groundwater quality standards in the samples collected. These included antimony, arsenic, barium, beryllium, cadmium, chromium, iron, lead, magnesium, manganese, and nickel. These detections are considered to be associated with background conditions typical of urban settings.

- There were no detections for PCBs or pesticides in the groundwater samples. 2,4-Dichlorophenoxyacetic acid (2,4-D) was the only herbicide detected, but all detections were below the groundwater quality standard.

- Methane was detected in all of the soil gas samples collected. Elevated methane levels were observed in samples collected from the northwest corner of the Site. Organic silt with root fibers was observed in soil borings in close proximity to the northwest corner, indicating that the elevated methane results may be attributable to decomposition of the organic matter and/or the adsorbed hydrocarbon impacts observed in this area.

- VOCs were detected in all of the soil gas samples collected. The most elevated VOC soil gas concentrations were observed in samples collected from the northwest corner of the Site.

To summarize, soil and groundwater contamination was detected at concentrations above NYSDEC RSCOs and groundwater quality standards, specifically associated with VOCs and SVOCs. The most elevated VOC and SVOC compounds detected include BTEX, and the polynuclear aromatic hydrocarbons or PAHs (e.g. naphthalene, chrysene, benzo(a)anthracene, benzo(a)pyrene, phenanthrene). The highest organic contaminant detected was naphthalene. The most significant contamination identified was generally confined to the northwestern portion of the Site as well as upgradient and off site, at a depth corresponding to the top of the zone of saturation (water table).

Figure 5 depicts the highest concentrations of total VOCs in soil borings across the Site, **Figure 6** depicts the naphthalene concentrations detected in soil samples across the Site, and **Figure 7** depicts the total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations detected in groundwater samples across the Site.

2.1.1 Sources of Contamination and Contamination Distribution

The contamination of Site soils and groundwater with VOCs and SVOCs can be attributed to two (2) upgradient sources of contamination: a historic manufactured gas plant (MGP) identified in the area northwest of the Site and a historic gasoline service station located west of the Site.

Two types of waste were generally produced by MGPs, purifier waste and coal tar. The purifier waste was generated from removal of contaminants from the gas prior to storage and distribution. This waste usually contains high levels of cyanide compounds. Insignificant detections of cyanide at the Site indicate that only small quantities of purifier waste were produced or disposed during plant operations. Coal tar waste was a dark-colored liquid with a viscosity similar to light oil, which was often sold off to be used in other products. The coal tar contained high levels of SVOCs (in particular PAHs) including naphthalene, which is considered to be a “signature compound” of coal tar. While VOCs such as BTEX are also present in MGP waste, these constituents are a minor component compared to the SVOC fraction. In addition, VOCs tend to dissipate/degrade quickly, leaving heavier SVOCs behind, naphthalene in particular.

Figure 6 depicts the distribution of naphthalene detected in the soil, showing concentrations generally an order of magnitude higher than the RSCO of 13,000 ppb. Evidence of coal tar was observed principally in the northwest area both in the BCP area (SB-45) and off site (SB-47, SB-48), extending more than 300 feet upgradient to the northwest, off Site in the area of MW-18. A soil sample from MW-18 exhibited a concentration of naphthalene (220,000 ppb) which besides SB-45 (on Site) was the highest naphthalene concentration detected during these investigations.

In review of the historical Sanborn maps it is noted that areas adjacent to the MGP plant to the south and east were occupied by railroad tracks. As such, it is reasonable to assume that any purposeful and significant dumping of coal tar wastes would not have occurred near or on the tracks (which would have interfered with rail operations) but would most likely have taken place off site, as evidenced by the high concentrations of naphthalene (and other SVOCs) detected in MW-18; the coal tar related contamination was observed approximately 25 ft bgs with fill material above it. The Langan Engineering Retaining Wall Evaluation Report (Langan, 2005) states that the retaining wall was likely constructed at the same time that the rail yard was established. However, the coal tar related contamination observed in the MW-18 soil boring suggests that the retaining wall was constructed sometime after the MGP was in operation (the MGP was built prior to 1891). Since MW-18 is located upgradient of the retaining wall, this waste disposal could have occurred prior to construction of the retaining wall when the area northwest of the Site and in the vicinity of MW-18 was presumably at a much lower and more comparable elevation to that of the Site, and therefore, more accessible. Assuming the retaining wall was constructed sometime after the MGP was in operation, deliberate off site dumping of coal tar wastes may have occurred upgradient, as supported by the high detection of naphthalene in MW-18. It is also noted that the Langan Engineering Retaining Wall Evaluation Report (Langan, 2005) shows that there is a coarse gravel material laid along the west side of the retaining wall. This material could be a preferred pathway for groundwater (and contamination) migration in a southerly direction adjacent to the wall.

Incidental spills and releases intrinsic in MGP operations and/or surface water transport of coal tar contaminated sediments from adjacent off site dumping (in the area around MW-18, for example) are the likely causes of the coal tar contamination seen in the northwest corner of the Site.

The presence of VOCs (specifically BTEX) in the northwest portion of the Site is likely related to the historic operation of a gasoline filling station/auto repair shop adjacent to and immediately upgradient of the Site which operated prior to the mid 1970’s. Significant VOC contamination was identified in the groundwater beneath the area of the filling station/auto repair facility. **Figure 7** depicts the concentration of BTEX detected in the groundwater and confirms the likely source of the VOCs on the Site as the historic service station.

The groundwater contamination identified in the northwest corner of the Site is confined to this area and there has been no significant migration of VOC or SVOC contamination across the Site or off site. Low groundwater seepage velocities and long travel time for contamination to move across the Site, allow for natural attenuation of the VOCs. This natural attenuation has stabilized the historic VOC plume as evident by the low (below groundwater quality standards) or non detect BTEX concentrations in all of the monitoring wells along the downgradient side (south and east of the BCP area) of the Site. Because of their inherent low solubilities, SVOCs detected in the groundwater samples are not anticipated to migrate. As such, active groundwater remediation is not recommended for the Site.

3.0 REMEDIAL ACTION EVALUATION

Based on the investigations completed at the Site, and a review of the subsurface analytical data from the Site and adjacent contaminated properties, a remedial action strategy has been developed to make the Site suitable for use as a public school. As a central component of the remedial action strategy, a Public Health Exposure Assessment has been prepared based on the nature and extent of contamination identified during the RI activities. The Exposure Assessment includes a discussion of fate and transport of the contamination identified at the Site within the context of potential exposure pathways to on site workers, occupants of the new school and off site residents and individuals. Potential exposure routes on site will be mitigated by the remedy that will be implemented for the Site as described below. Off site migration of site related contaminants is not significant. Accordingly, no exposure to off-site residents and individuals is documented. The Public Health Exposure Assessment was included in the RI document as Appendix H.

The proposed remedial action objectives and the specific remedial strategies are described below.

3.1 Remedial Action Objectives

Remedial Action Objectives (RAOs) have been established to ensure that all proposed site remedies are protective of human health and the environment. The RAOs provide the basis on which to evaluate the effectiveness of the Site remedy. VOCs and SVOCs are present in soil and groundwater in excess of RSCOs and Part 703 groundwater quality standards. Accordingly, the RAOs proposed for the Site are:

1. **Ensure that on-site contaminant concentrations in soil and groundwater and soil gas do not pose unacceptable risks to school occupants**.
   Since there is no use of groundwater at the Site and no other potential for school occupants to contact subsurface contaminants, there will be no exposure to groundwater or soil. The most significantly contaminated soil will be removed as part of the remedy, thereby removing the source of the soil gas vapors. Also, as an added safeguard, a vapor barrier and passive SSDS beneath the school will prevent any potential residual VOC vapors from entering the school.

2. **Achieve cleanup of VOCs and SVOCs to RSCOs as per TAGM 4046**
   The proposed remedy will remove the soil concentrations of VOCs and SVOCs to the extent practical and replace it with clean backfill that meets the TAGM criteria.

3. **Maintain existing groundwater quality at the downgradient property line.**
   The RI groundwater data demonstrate that there is significant upgradient BTEX contamination migrating onto the Site, but natural attenuation has stabilized the groundwater plume and there is no significant contamination migrating beyond the downgradient site boundary. Implementation of the remedy, which includes redirecting contaminated groundwater from upgradient sources

around the footprint of the proposed school campus, will not result in significant contamination migrating beyond the downgradient site boundary.

3.2 Remedial Actions

To achieve the remedial action objectives outlined above, the following remedial actions are proposed to be completed at the site.

- A hydraulic barrier will be constructed along the northern and western boundaries of the BCP area to prevent contaminated groundwater from entering the Mott Haven Site.
- Contaminated soil (approximately 300 ft x 125 ft x 12 ft deep) will be removed from the BCP area.
- The excavated BCP area will be restored with clean backfill.
- Engineering controls, consisting of a vapor membrane barrier and passive sub slab depressurization system (SSDS) will be incorporated beneath the school as an added safeguard against the possibility of residual soil vapors migrating into the school building.

3.2.1 Hydraulic Barrier Wall

The main purpose of the hydraulic barrier wall is to prevent upgradient contaminated groundwater from entering the BCP area and to minimize the amount of dewatering during excavation. As shown on **Figure 7**, contaminated groundwater originating from an upgradient source is migrating onto the site. To effectively redirect this groundwater, a hydraulic barrier will be constructed along the northern and western boundaries of the site. **Figures 8** and **9** present a plan view and a cross section, respectively, of the hydraulic barrier along the northern boundary of the BCP area. The length and depth of the hydraulic barrier corresponds to the BCP area and the area of excavation of contaminated soil. Specific details of the hydraulic barrier are provided in Chapter 5.

As indicated, the hydraulic barrier will redirect groundwater from the excavation area. As upgradient groundwater encounters the hydraulic barrier it will initially be redirected to the east and south along the northern and western hydraulic barrier walls, respectively. Migration will then assume a southeasterly flow component consistent with the regional groundwater flow. Limited groundwater mounding is anticipated along the wall. However, while mounding will increase the hydraulic gradient and seepage velocities adjacent to and immediately upgradient of the wall, the lack of mobility of SVOCs, and natural attenuation of VOCs (as described in the RI) should result in no appreciable impact to downgradient groundwater quality (i.e., stabilized plume), and no off site migration of contamination.

Groundwater quality will be monitored annually downgradient of the hydraulic barriers and at the downgradient property line for two years following implementation of the barrier walls, to confirm that there are no changes in the existing groundwater quality. An annual monitoring frequency has been selected because of the low groundwater seepage velocity (10 ft/year across the Site). Two new monitoring wells will be used to assess water quality beyond the hydraulic barriers. In addition, monitoring wells MW-5, MW-3, and MW-11 will be monitored at the downgradient property line to confirm that there are no changes in the existing groundwater quality. All groundwater monitoring samples will be analyzed for VOCs.

3.2.2 Soil Excavation

Contaminated soil (approximately 300 ft x 125 ft x 12 ft deep) will be removed from 3 distinct sections of the BCP area (**Figure 10**). Prior to excavation, temporary sheet piling will be installed on the eastern and southern perimeters of each section, which, along with the upgradient hydraulic barrier wall, will completely enclose the excavation area. Soils will be excavated and removed to elevations of 9.3 Borough President of Bronx Datum (BPBD) in Section 1, elevation 14.5 BPBD in Section 2, and elevation 10.0 BPBD in Section 3. The depth of excavation for each of the sections is well below the depth interval of the highest VOC and SVOC contamination levels. In addition, the areal limits of the excavation fully encompass the most contaminated zones. **Figures 5**, **6**, and **7** summarize the highest detections of total VOCs, naphthalene, and BTEX, respectively, characterized during the RI. Accordingly it is anticipated that the vast majority of the contaminant mass will be removed as a result of the excavation activities. Confirmatory sampling will be completed at the final excavation depths to determine if any remaining soils exceed RSCOs. Upon the completion of removal of the contaminated soil from each of the 3 sections, the excavations will be backfilled with clean fill and the temporary sheet piling will be removed. Details of the soil excavation program are provided in Chapter 5.

While it is possible that some residual soil contamination (exceeding RSCOs) may remain in the excavation, this contamination will be well below the surface and there will be no potential for direct contact, and therefore no risk to Site occupants.

3.2.3 Vapor Barrier and Passive Sub Slab Depressurization System

The RI described the distribution of VOCs and methane in soil gas. The most elevated detections were observed in the northwest corner of the Site corresponding to the area of the highest soil and groundwater contamination and the BCP area. (Methane may also be attributable, at least in part to the natural organic characteristics of the soil.)

Redirecting the upgradient contaminated groundwater from entering the BCP area, and excavating the vast majority of the contaminated soils (as well as the native organic deposits) will mitigate concerns of vapor emissions from the subsurface. However, as an added safeguard, a vapor barrier and passive sub slab depressurization system will be installed beneath the school. The vapor barrier will be an impermeable liner that will be installed beneath the entire foot print of the school. Beneath the liner a passive SSDS will be constructed consisting of a gravel layer with perforated PVC installed within the gravel. The passive SSDS will provide a preferential pathway for any residual soil vapors to migrate away from the school and will eliminate the potential for any accumulation of residual soil vapors beneath the school. Additional details of the vapor barrier and passive SSDS are provided in Chapter 5.

4.0 ALTERNATIVE ANALYSIS AND REMEDY SELECTION

The goal of the remedy selection process is to select a remedy that is fully protective of human health and the environment based on the intended future land use of the BCP area. Two key issues that will be considered during the remedy selection are:

1. Source Removal – As specified in Section 4.3 (1) of the BCP Guide, source removal should be the goal of all BCP remedies. Source removal and control measures include (ranked most preferable to least preferable);

    - Removal and/or treatment – All free product and/or grossly contaminated soil shall be removed and/or treated to the greatest extent possible;
    - Containment – Any source remaining after removal shall be contained to the greatest extent possible;
    - Elimination of exposure – Exposure to any source remaining after removal shall be eliminated through additional measures including the elimination of volatilization into buildings to the greatest extent possible ; and
    - Treatment of source at the point of exposure – Including well head treatment or the management of volatile contamination within buildings shall be considered as a measure of last resort.
2. Plume Stabilization – A goal of the BCP is to prevent further migration of a plume of groundwater contamination.

4.1 Contaminants of Concern and Extent of Contamination

The contaminants of concern (COC) for the BCP area include VOCs and SVOCs. The principal VOCs involved are the BTEX compounds related to a potential gasoline release, and the principal SVOCs are PAHs related to wastes generated by a former MGP, both located in the general upgradient area northwest of the Site. Naphthalene in particular is considered a “signature compound” of MGP operations.

4.1.1 Groundwater

The highest concentrations of BTEX were detected upgradient of the BCP area as shown on **Figure 7** with significant concentrations also detected in monitoring wells within the BCP area. No significant concentrations of BTEX were detected in any of the monitoring wells downgradient of the BCP area. The highest naphthalene concentrations were detected in the monitoring wells upgradient of the Site (MW-18, 1400 micrograms per liter [µg/L]; MW-15, 1600 µg/L; and MW-14 950 µg/L) and in on-site monitoring wells within the BCP area (MW-7, 1300 µg/L and MW-12, 2500 µg/L). Naphthalene was not detected in any of the monitoring wells downgradient of the BCP area.

4.1.2 Soil

The highest concentrations of VOCS in soil were detected in samples from soil borings upgradient (MW-18) of the BCP area and soil borings located within the BCP area. Soil samples were not collected for analysis from the upgradient monitoring well locations that had the highest BTEX concentrations in the groundwater. The highest SVOC concentrations were detected in soil samples from the borings upgradient approximately 300 feet to the northwest (MW-18) of the BCP area and soil borings located within the BCP area. This is exemplified on **Figure 6** which shows the naphthalene concentrations detected in soil. The highest naphthalene concentration, 220,000 micrograms per kilogram, was detected in samples from both MW-18 and MW-12. The highest concentrations of both the VOCs and SVOCs in the BCP area were in samples collected from the approximate depth of the water table (4 to 6 ft. bgs); the shallow (0 to 3 ft. bgs) and deeper (>10 ft. bgs) soil samples had significantly lower concentrations.

4.2 Alternative Analysis

To date, no soil cleanup objectives have been developed for the BCP under Title 14. Therefore, the alternative analysis, as specified in Section 4.1 (3) of the BCP Guide, will consider an unrestricted use scenario, also referred to as Track 1 and a proposed restricted use scenario based on site-specific information and land use, also referred to as Track 4. The alternative analysis will evaluate each remedy with the following nine criteria:

- Protection of Human Health and the Environment;
- Standards, Criteria, & Guidance;
- Long-term Effectiveness & Permanence;
- Reduction of Toxicity, Mobility, or Volume;
- Short-term Effectiveness & Impacts;
- Implementability;
- Cost Effectiveness;
- Community Acceptance; and
- Land Use.

4.2.1 Track 1

The Track 1 remedy, as specified by Section 4.6 (2) of the BCP Guide, must allow the BCP area to be developed for any use; i.e., restrictions on the use of the BCP area will not be permitted. Reliance upon institutional and engineering controls to address exposure and meet the RAOs for the BCP area is not allowed (the BCP Guide does allow one exception; however, those conditions do not apply to this BCP area).

It is not possible to implement a Track 1 remedy for the BCP area because there is an upgradient source of VOC-contaminated groundwater that will continue to flow onto the BCP Area (recontaminating the BCP area) without the implementation of engineering controls to abate the VOC-contaminated groundwater. Therefore, there is no remedy that can satisfy the Track 1 requirements, and, therefore, there is no alternative to analyze.

4.2.2 Track 4 – Hydraulic Barrier/Soil Removal/Vapor Barrier/Passive Sub Slab Depressurization System

The approved land use for the BCP area is a public school campus. The proposed remedy will provide full protection of the public health and environment. The proposed remedy includes:

- **Hydraulic Barrier -** This will be constructed along the northern and western boundaries of the BCP area. The hydraulic barrier along the western portion of the BCP area will be a jet grout wall with a dual purpose: 1.) to perform as a hydraulic barrier; and 2.) to provide adequate structural support to the foundation of the existing retaining wall located on the western side of the BCP area. The hydraulic barrier on the northern BCP area boundary will be a Waterloo Barrier® or equivalent sheet-pile wall. The hydraulic barrier will redirect groundwater from flowing into the BCP area and provide excavation protection during the soil removal (see below).

- **Soil Removal -** Removal of significantly contaminated soil from within three sheet-pile lined excavation sections (**Figure 10**) which constitute the BCP area (disposal of these materials is expected to be in an appropriately permitted off-site disposal facility). The sheet-piling is required to provide structural support of the adjacent soils during excavation and to control infiltration of groundwater into the excavation areas. Each section will be dewatered (water table at 5 ft bgs) and excavated from within an enclosed structure (with treatment of all vapors that are generated) to prevent fugitive emission of VOCs into the surrounding environment during the removal action.

- **Vapor Barrier** – The vapor barrier will be an impermeable liner that will be installed beneath the entire foot print of the school.

- **Passive Sub Slab Depressurization System -** Beneath the vapor barrier will be a passive sub slab depressurization system consisting of a gravel layer with perforated PVC installed within the gravel. The passive SSDS will provide a preferential pathway for any residual soil vapors to migrate away from the school and will eliminate the potential for any accumulation of residual soil vapors beneath the school.

The proposed remedy also includes a groundwater monitoring program (see Section 3.2.1) to monitor and assess groundwater quality conditions. The evaluation of the proposed remedy, based on the nine criteria previously discussed, is presented below.

4.2.2.1 Protection of Human Health and the Environment

The proposed remedy is fully protective of human health and the environment. The key component to this remedy is the removal, and proper off-site disposal, of more than 26,000 tons of VOC and SVOC contaminated soil from the top 10 to 13 ft bgs of the entire BCP area. As previously stated, source removal is the primary goal of the BCP. Once removed, the contaminated soil will no longer pose a human health or environmental threat in the BCP area. Similarly, the dewatering operation will purge all of the contaminated groundwater from within the top 13 ft of the BCP area plus some additional volume of contaminated groundwater that will mostly be originating from upgradient of the Site.

The Public Health Exposure Assessment, presented in Appendix H of the RI Report, identifies several potential exposure pathways based on the approved land use:

- On-site construction workers could be exposed to contaminants in surface and subsurface soils via incidental ingestion, dermal contact, and inhalation of particles and vapors during routine construction activities, and to site-related contaminants in groundwater via incidental ingestion, dermal contact, and inhalation of vapors; and

- On-site school employees and students could be exposed to site-related contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particles and vapors, and to site-related contaminants in subsurface soil and groundwater via vapor intrusion into the future school buildings and subsequent inhalation of vapors.

The potential exposure pathways for construction workers will be primarily eliminated by the removal of the contaminated soil, the redirection of contaminated groundwater flowing into the BCP area from an upgradient source, and further mitigated by the development and implementation of appropriate site-specific health and safety practices. The surface soil potential exposure pathway for on-site school employees and students will be eliminated in the BCP area by the soil removal action, subsequent placement of clean backfill, and hydraulic barrier to redirect upgradient groundwater flow (from an upgradient source) from the BCP area. The subsurface soil and groundwater potential exposure pathway to on-site employees and students will be eliminated by the soil removal and dewatering actions. However, as an added safeguard, a vapor barrier and passive sub slab depressurization system will be installed beneath the school to prevent the potential for VOC vapors to enter the school.

There is also the potential health risk related to the implementation of the remedy itself. The public will not be exposed to either incidental ingestion or dermal contact because the BCP area will be secured by means of fencing or some other physical barrier. A community air monitoring program (CAMP) will be implemented throughout the entire remedial action. The CAMP will call for the monitoring of VOCs, dust particulates, and other related vapors during construction activities. The CAMP will specify monitoring protocol and limits which trigger either additional monitoring, or, if necessary, shut down of the construction activities until the source of vapors is identified and a means to control the vapors has been established. In addition, since the VOC and SVOC contaminants at the BCP area can be both a potential health risk and create nuisance odors, all of the excavation activities will be completed within enclosed structures with treatment of all vapors expelled from the structures. This will significantly reduce, if not eliminate, the release of any harmful vapors.

The proposed remedy will be fully protective of human health and the environment based on the proposed land use.

4.2.2.2 Standards, Criteria, and Guidance

The following standards and criteria may apply to the proposed remedy:

1. 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
2. 6 NYCRR Part 175 – Special Licenses and Permits – Definitions and Uniform Procedures
3. 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes (November 1998)
4. 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
5. 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
6. 6 NYCRR Subpart 374-3 – Standards for Universal Waste (November 1998)
7. 6 NYCRR Part 376 – Land Disposal Restrictions
8. 6 NYCRR Parts 700-706 – Water Quality Standards (June 1998)
9. 6 NYCRR Part 750 through 758 – Implementation of NPDES Program in NYS (“SPDES Regulations”).

The following guidance may apply to the proposed remedy:

1. TAGM 4013 – Emergency Hazardous Waste Drum Removal/Surficial Cleanup Procedures (March 1996)
2. TAGM 4031 – Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites (October 1989)
3. TAGM 4032 – Disposal of Drill Cuttings (November 1989)
4. TAGM 4046 – Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
5. TAGM 4059 – Making Changes to Selected Remedies (May 1998)
6. Citizen Participation in New York’s Hazardous Waste Site Remediation Program: A Guidebook (June 1998)

7. TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
8. TOGS 1.3.8 – New Discharges to Publicly Owned Treatment Works
9. Air Guide 1 – Guidelines for the Control of Toxic Ambient Air Contaminants
10. Solidification/Stabilization and its Application to Waste Materials

The proposed remedy will comply, as applicable, to the above standards, criteria, and guidance (SCGs) through specific language within the specifications presented in Section 5. The one guidance that may not be met is TAGM 4046 (RSCOs). The proposed remedy specifies that the excavations will be terminated at specific elevations, depending upon the individual sections to be excavated. These specified elevations have been based on the data collected during the RI program. While it is possible that some residual soil contamination (exceeding RSCOs) may remain in the excavation, this contamination will be well below the surface, there will be no potential for direct contact, and the proposed remedy will still be fully protective of human health and the environment.

4.2.2.3 Long-term Effectiveness and Permanence

The source removal action will permanently remove the vast majority of the significantly contaminated soils. This action will be both permanent and 100 percent effective relative to the BCP area. The risk from the soil remaining below the specified excavation depths (may have low concentrations of either VOCs and/or SVOCs, some exceeding the corresponding RSCOs) is considered to be insignificant. These low concentrations of contaminants, particularly the VOCs, may produce some residual vapors beneath the school. However, as an added safeguard, both the vapor barrier and the passive SSDS will eliminate this exposure pathway in the event that minor concentrations of vapors are formed.

The dewatering operation will remove all of the contaminated groundwater within the top 10 ft of the BCP area and the hydraulic barrier will prevent VOC-contaminated groundwater from flowing into the BCP area. The jet grout wall along the western side of the BCP area will have a minimum hydraulic conductivity of 1.0×10^{-5} centimeters per second (cm/sec). The average hydraulic conductivity of the shallow aquifer at the BCP area is 1.4×10^{-4} cm/sec, a full order of magnitude higher than the jet grout wall. The lower hydraulic conductivity of the jet grout wall will redirect nearly all of the upgradient groundwater to the south and around the BCP area. The very minor volume of groundwater that does move through the jet grout wall will have very little, if any, measurable impact on the groundwater quality in the BCP area. The Waterloo Barrier® has a minimum hydraulic conductivity of 1.0×10^{-7} cm/sec which is generally considered impermeable. The jet grout wall and Waterloo Barrier® have no operation or maintenance requirements and are permanently placed in the subsurface.

The proposed remedy will have a permanent and very effective long-term impact on protecting human health and the environment.

4.2.2.4 Reduction of Toxicity, Mobility or Volume

The proposed remedy significantly reduces the volume of VOC and SVOC contaminants within the BCP Area. The removal of approximately 26,000 tons of soil includes the vast majority of the significantly contaminated soil identified within the BCP area. Consequently, the toxicity of the VOC and SVOC contaminated soil is effectively eliminated (the contaminants are removed from the BCP area), and the mobility of the VOC and SVOC contaminants is no longer an issue (also because the contaminants have been removed from the BCP area). Concurrent to the soil removal action, the dewatering operation will remove all of the contaminated groundwater from within the top 13 ft of the BCP area. Consequently, the toxicity of the VOC and SVOC contaminated groundwater is effectively eliminated (the contaminants are removed from the BCP area), and the mobility of the VOC and SVOC groundwater contaminants is no longer an issue (also because the contaminants have been removed from the BCP area).

The ability of the upgradient VOC-contaminated groundwater to impact the BCP area has been significantly reduced by the jet grout wall and Waterloo Barrier®. These barriers have no operation or maintenance requirements and will continue to divert contaminated groundwater away from the BCP area indefinitely.

4.2.2.5 Short-term Effectiveness

The potential short-term adverse impacts and risks of the proposed remedy are well defined:

- Risk to workers during the implementation of the proposed remedy from incidental ingestion, dermal contact, and vapor inhalation from a combination of contaminated soil and groundwater; and

- Risk to the local public from vapor or dust inhalation (vapors released during the excavation process).

There is no risk to the local public from incidental ingestion or dermal contact because the BCP area will have some form of physical barrier (i.e., chain link fence) to keep them away from the BCP area. Risk to workers during the implementation of the proposed remedy will be mitigated by the development and use of site-specific health and safety practices. These practices will include, but not be limited to, wearing appropriate personal protective equipment (PPE) and monitoring of the ambient air quality to assess the need for using air-purifying respirators (APRs).

Risk to the local public from vapor or dust inhalation as well as any nuisance odor will be mitigated by completing all of the excavation and backfilling activities within a confined temporary structure. This temporary structure will maintain a negative pressure on the inside so that outside air will flow into the structure. This will be accomplished with a vacuum system that will pump air out of the structure through a treatment system that will remove particulates (i.e., dust) and any VOC and SVOC vapors, as well as nuisance odors. As that treated, clean air is pumped out of the structure, fresh air is brought into the structure. This system will also help maintain good air quality within the temporary structure for the workers. Also, as described in Section 4.2.2.1, a CAMP will be implemented to monitor the air quality at the Site to assure that no harmful vapors are being released from the Site.

4.2.2.6 Implementability

The technical feasibility for implementing this proposed remedy is high. The soil removal program is straight forward and utilizes standard construction techniques. The Waterloo Barrier® and jet grout hydraulic barrier have been used on other contaminated sites. The use of a jet grout hydraulic barrier has been proposed for use as part of a remedy at the Phelps Dodge Class 2 Inactive Hazardous Waste Site in Queens, New York; the proposed remedy has been accepted by the NYSDEC. The vapor barrier and passive SSDS are standard engineering controls that are implemented to mitigate soil vapor concerns.

4.2.2.7 Cost

The total capital and operational costs for the proposed remedy is approximately $10,062,000 (exclusive of the grout wall along the western side of the BCP area). A detail cost breakdown for the proposed remedy is provided below. The operation and maintenance (O&M) costs assumes the only O&M is an annual groundwater monitoring program for 2 years that will run concurrently with the remedial work.

Item	***Total***
Capital Costs	$7,397,000
Engineering Design & Permitting	$1,730,000
O&M	$20,000
Contingency	$915,000
Total	**$10,062,000**

4.2.2.8 Community Acceptance

Pursuant to the BCP Agreement, a Citizen Participation Plan has been developed to educate the public regarding the proposed remedy and to facilitate community acceptance of the clean up and development of the Site.

4.2.2.9 Land Use

The Site will be developed into a public school campus (land use already approved by the NYSDEC). An Environmental Easement will be established to ensure all institutional controls (i.e., deed restriction) and engineering controls remain in place. As demonstrated above, the proposed remedy will be fully protective of this approved land use.

4.3 Remedy Selection

The selected remedy, which utilizes a hydraulic barrier, source removal, vapor barrier, and passive sub slab depressurization system, will be fully protective of human health and the environment. The remedy utilizes source removal as the primary means of remediating the site; source removal is the primary goal of the BCP. The selected remedy utilizes environmental easements which ensure that deed restrictions and engineering controls remain in place. Engineering controls include a hydraulic barrier along the northern and western sides of the BCP area to prevent contaminated groundwater from entering the BCP area and the Mott Haven Site. As an added safeguard, a vapor barrier and passive SSDS beneath the school will prevent any potential residual VOC vapors from entering the school.

5.0 REMEDIAL ACTION DESIGN

The following sections present the remedial action design for the Site. Detailed technical specifications and contract drawings will be provided under separate cover and constitute part of the RAWP.

5.1 Soil Remediation

The following provides a description of the soil remediation program.

Hydraulic Barrier Wall

A hydraulic barrier will be constructed along a portion of the northern and western boundaries of the BCP area. As shown in **Figure 8**, the hydraulic barrier located along the western portion of the BCP area will consist of a jet grout wall extending from the northwest corner of the BCP area approximately 450 linear feet southwards along the western boundary. The jet grout wall will have a dual purpose: 1.) to perform as a hydraulic barrier; and 2.)to provide adequate foundation to the existing retaining wall located on the western side of the Site. The hydraulic barrier located on the northern BCP area boundary will consist of a Waterloo Barrier® or equivalent extending approximately 150 linear feet along the northern boundary of the BCP area beginning at the northwest corner.

These hydraulic barriers will minimize dewatering during excavation, provide excavation protection during the soil removal, and, in the long term, foundation support for the structures and building on the adjacent properties. The hydraulic barriers will also redirect upgradient groundwater from flowing into the BCP area, in particular, into areas of the BCP beneath the footprint of the proposed structure.

5.1.1 Soil and Material Removal

Contaminated soil (approximately 300 ft x 125 ft x 12 ft deep) will be removed from the BCP area. Disposal of these materials is expected to be in an appropriately permitted off-site disposal facility.

Removal of the impacted soil will be from within three excavation sections. As shown in **Figure 10**, the three sections are located in the northwest corner of the Site, and make up the BCP area. Section 1 measures 150 linear feet in the east-west direction and 100 linear feet in the north-south direction. Sections 2 and 3 each measure 125 linear feet in the east-west direction and 100 linear feet in the north-south direction. Prior to initiating the removal of soil from within each of these sections, temporary sheet-piling will be installed around the cell perimeter, utilizing the permanent hydraulic barriers located on the northern and western boundaries of the BCP area, and an enclosed structure will be constructed over the excavation area. The sheet-piling is required to provide structural support of the adjacent soils during excavation and to control infiltration of groundwater into the excavation areas. Conducting each excavation from within an enclosed structure will prevent fugitive emission of volatile compounds and dust into the surrounding environment during the removal action. Soil will be removed from within Sections 1, 2, and 3 to an elevation of 9.3, 14.5, and 10.0 BPBD, respectively.

Upon completion of the removal of soil from each of the three sections, the sections will be backfilled to an approximate elevation of 22 feet BPBD and the temporary sheet piling will be removed.

5.2 Detailed Technical Performance Requirements

Technical performance requirements were developed to ensure that each component of the remedial design meets or exceeds the remedial action objectives described in Section 3.1. The following sections will describe the technical performance requirements developed for each component of the remedial design.

5.2.1 Site Controls

Where needed, site controls will be installed that restrict public access to the site where remedial work will be performed. The western perimeter consists of a 13 to 20-foot retaining wall with a chain-link fence along the top. Along the north and east there exists chain-link fencing. Temporary fencing will need to be installed along the south side on the adjacent property. In addition, the physical features, namely, the rail road corridor along the east side of the property will discourage access. To restrict access during remedial activities, warning tape may be used at certain locations such as open excavations, cleaning areas, stockpile areas, etc. For the duration of removal activities, a sign-in/sign-out sheet will be maintained for the site. All on-site personnel and site visitors will be required to sign in upon entering the site and sign out upon leaving. Implementation of safe work practices will provide for additional site security during remediation. Safe work practices that will contribute to overall site security include the following:

- Maintaining temporary construction fencing around all open excavations and other potentially dangerous areas;
- Utilization of temporary relocatable structures to restrict access to the remedial action work areas;
- Parking heavy equipment in a designated area each night and removing keys;
- Maintaining an organized work area, including proper storage of all tools and equipment;
- Conducting a daily security review; and
- 24-hour security guard.

Work and staging areas will be maintained on site. No off-site storage of contaminated materials will be allowed. The selected contractor will be required to submit a site layout and traffic control plan that will address site security.

5.2.2 Erosion and Sediment Controls

Specific erosion and sedimentation control measures for the removal activities will be implemented in accordance with NYS requirements and approved site permits. Additionally, certain operational and management practices will be implemented throughout the project to provide an additional measure of erosion and sedimentation control. These operational measures include use of enclosures (all soil excavation and handling, as well as all backfilling operations will be completed within enclosed structures that will eliminate any erosion or sediment movement away from the BCP area, i.e., all contained within the enclosures); wetting any on-site access roads; use of gravel roads; installing truck wash pads, and vehicle entrances. At minimum, a sediment and erosion control plan will be developed. Given that the expected disturbance area will be greater than 1 acre, a SPDES and NOI permit will need to be filed. Typical control measures that are included in these plans and permits are geotextile fencing and hay bales along the edge of the roads, around stockpiles, and areas to be disturbed. The erosion and sedimentation control measures and procedures will be maintained for the duration of the project until such time that site restoration activities have provided a final or temporary surface cover (as appropriate) in all areas. For the duration of the project, the erosion and sedimentation control measures will be inspected each workday and maintained.

5.2.3 Air and Dust Control

During all remedial activities air and dust emissions will be monitored and controlled to protect the surrounding environment from exposure to airborne contaminants. Temporary structures such as that provided by Sprung Structures, Inc. (or approved equal) will be required before any excavation activities are undertaken. The temporary tent-like structures are constructed of metal beams and trusses and a strong reinforced fabric. The structures are secured to the ground surface and a negative air pressure system will be installed and operated to prevent the release of vapors and dust. The air system will include a filtration system to lower air emissions to meet federal, state and local requirements. Outside the structures, perimeter monitoring will be conducted to verify compliance (i.e., CAMP).

Within the structure, vapor and dust will be monitored for worker protection. A site-specific HASP will be developed and implemented. The HASP will address worker protection by setting the monitoring criteria, action levels and protective equipment. Air and dust hazards to workers are volatile and semi-volatile organic vapors, carbon monoxide, dust, and methane.

5.2.4 Protection of Adjacent Structures

During implementation of the proposed remedial action, protection of structures located on adjacent properties will be achieved through monitoring of settlement and vibration and by modifying remedial construction activity accordingly. The following performance criteria shall be utilized in assessing the impact of remedial construction on settlement and vibration of adjacent structures:

- Settlement threshold: Proceed with caution if settlement of 0.01 foot is measured. Stop and implement action if 2 consecutive positive readings are noted.
- Vibration threshold: Proceed with caution when readings of 0.5 inches per second peak particle velocity are recorded. Stop and implement corrective measures when velocity exceeds 1.0 inch per second.

5.2.5 Hydraulic Barriers

Two types of permanent hydraulic barriers will be utilized in this remedial design: a jet grout wall along the western boundary of the BCP area, and a Waterloo Barrier® sheet-pile wall or approved equal along the northern boundary of the BCP area.

The proposed jet grout wall will extend from the building subgrade level (elevation 22 feet BPBD) to an elevation of -8 BPBD, for a total height of 30 feet. The barrier will be truncated if bedrock or decomposed rock is encountered before that level. The barrier will have a maximum hydraulic conductivity through a 24-inch-wide zone of 1×10^{-5} cm/sec. This is the minimum in-place hydraulic conductivity that can be consistently achieved for the various soil types present at the Mott Haven Campus site.

The Waterloo Barrier® sheet-pile wall or approved equal will be installed along the northern BCP boundary to a depth necessary to allow excavation within Section 1 to an elevation of 10 feet BPBD (a minimum of 20 ft bgs). The maximum hydraulic conductivity of the sheet-pile wall shall be 1×10^{-7} cm/sec. The maximum allowable deflection of the sheet-pile wall shall be no more than 1-inch.

5.2.6 Temporary Sheet Piling

Temporary sheet piling will be installed around the remaining perimeter of Sections 1, 2, and 3, and tied into the permanent hydraulic barriers located on the northern and western boundaries of the BCP area. This temporary sheet piling will be installed to a depth necessary to allow excavation within Sections 1, 2 and 3 of elevation 9.3, 14.5, and 10.0 BPBD, respectively. The maximum allowable deflection of the temporary sheet piling shall be no more than 2-inches (typical). After installing the clean backfill, the temporary sheet piling will be removed.

5.2.7 Removal Activities

Contaminated soil (approximately 300 ft x 125 ft x 12 ft deep) will be removed from three sections in the BCP area. **Figures 8** and **10** present the location, extent and depth of the section excavations.

A contractor's excavation plan will be developed that will address the details to meet the technical requirements of the project. These requirements are:

- To design and install temporary and permanent sheeting to protect completed work and existing structures and ensure worker safety;
- To design and install the above sheeting to support the control of groundwater into the excavations during the removal action work;
- To erect over each cell a relocatable temporary structure with a negative pressure air system that meets work safety codes and air emission requirements;
- To excavate potentially contaminated soil to the extent and depth required on **Figure 10**;
- To detail a means to dry any saturated soil, such as using gravity drying pads, adding kiln cement or other material to stabilize the water, so that it meets disposal or transport requirements; and
- To install clean (by TAGMs 4046) backfill material into the sections.

5.2.8 Groundwater Control

The excavations in the three Sections described above will penetrate approximately seven to ten feet below the observed water table. Each Section will be dewatered in advance of the excavation to reduce the volume of water in the excavated soil and to provide a solid bottom to place clean backfill material. The contractor will be required to submit a Dewatering Plan presenting the method by which the excavations will be dewatered that will show the location of all pumps, sumps, pipelines, sediment filters, sedimentation basins, and other necessary equipment. The plan will also include a list of the products to be used for dewatering. The piping materials, route to discharge, and the location of the storage tanks will be included in the plan. Dewatering of each Section will maintain the saturation zone at least one foot below the bottom of the excavation. The contractor will be responsible for the disposal of all liquids generated by the dewatering operation. The contractor will be required to obtain all necessary permits (and any sampling and analysis necessary for those permits) to either transport and dispose of the liquids or treat and discharge (to the sanitary sewer) the liquids.

5.2.9 Backfill of Excavation Areas

All backfilling operations (the means, methods, and sequence for backfill placement and equipment) will be detailed in the Excavation Plan that will be submitted by the contractor as part of the Contract Bid package.

All backfill material will be imported and consist of certified clean soil or aggregate. The contractor will provide the following for each source of backfill material:

- Laboratory analytical reports from a qualified testing laboratory certifying that the soil is clean and suitable for use per NYS TAGM requirements;
- Classification, according to NYSDOT Standard Specifications for Coarse Aggregate size designation 1A or 1; and
- Laboratory compaction curve according to ASTM D 1557.

The imported backfill material shall be free of organic materials, loam, wood, ash, or other objectionable materials which may be decomposable, compressible, or which cannot be properly compacted.

5.3 Remediation Schedule

The work schedule will be Monday through Saturday with the maximum period of operation being two 8-hour work shifts each day.

5.4 Vapor Barrier and Passive Sub Slab Depressurization System

The following section describes the vapor barrier and passive SSDS that will be installed beneath the school.

System components include an 18-inch gas permeable aggregate layer with 6-inch Schedule 80 slotted PVC piping network below a fluid applied soil gas vapor barrier which is protected between two geotextiles. The PVC piping network will transition to 6-inch carbon steel pipe below the slab of the school at 6 building penetrations and continue as risers through the roof which vent to the atmosphere. The vapor barrier will be applied horizontally to create a continuous vapor barrier beneath the entire footprint of the school with durable seals to every footing, pier and penetration to ensure a single membrane layer. All horizontal application of the vapor barrier will be on top of the placed gas permeable aggregate and immediately below the poured slab.

6.0 SUMMARY AND CONCLUSIONS

Shaw Environmental and Infrastructure, Inc (Shaw) has been retained by the New York City School Construction Authority (SCA) to prepare a Remedial Action Work Plan (RAWP) for the former Metro North site located at 672 Concourse Village West, Bronx, New York (hereafter referred to as the "Site"). The Site consists of Block 2443/Lot 78 on the Borough of Bronx tax assessor's map.

Administratively, the Mott Haven site is being addressed under the Brownfield Cleanup Program Act (BCP) Agreement between the New York State Department of Environmental Conservation (NYSDEC) and SCA. The BCP area represents the area of the Site where remedial activities are proposed, and which are described in this RAWP.

Shaw completed site investigation activities between March and September 2005. These investigative activities were completed as two separate phases. The Remedial Investigation activities, completed pursuant to the NYSDEC approved RIWP (July 2005), were performed between March and August 2005. A Supplemental Investigation (SI) was performed to the north and west of the Site to identify off-site contamination which may be impacting the Mott Haven Site. These SI activities were based on a Scope of Work (SOW) presented to NYSDEC and New York State Department of Health (NYSDOH) on July 14, 2005.

The findings of the RI identified soil and groundwater contamination above NYSDEC Recommended Soil Cleanup Objectives (RSCOs) and groundwater quality standards, specifically associated with volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The most elevated VOC and SVOC compounds detected include benzene, toluene, ethylbenzene, and xylenes (BTEX), and the polynuclear aromatic hydrocarbons or PAHs (e.g. naphthalene, chrysene, benzo(a)anthracene, benzo(a)pyrene, phenanthrene). The highest organic contaminant detected was naphthalene. The most significant contamination identified was generally confined to the northwestern portion of the Site, as well as upgradient and off site, at a depth corresponding to the top of the zone of saturation (water table).

Remedial Action Objectives (RAOs) have been established to ensure that all proposed site remedies are protective of human health and the environment. The RAOs proposed for the BCP area are:

- Ensure that on-site contaminant concentrations in soil and groundwater and soil gas do not pose unacceptable risks to school occupants;
- Achieve cleanup of VOCs and SVOCs to RSCOs as per TAGM 4046; and
- Maintain existing groundwater quality at the downgradient property line.

To achieve the above remedial action objectives, the following remedial actions are proposed to be completed at the Site:

- A hydraulic barrier will be constructed along the northern and western boundaries of the BCP area to prevent contaminated groundwater from entering the Mott Haven Site.

- Contaminated soil (approximately 300 ft x 125 ft x 12 ft deep) will be removed from the BCP area.
- The excavated BCP area will be restored with clean backfill.
- Engineering controls, consisting of a vapor membrane barrier and passive sub slab depressurization system (SSDS) will be incorporated beneath the school as an added safeguard against the possibility of residual soil vapors migrating into the school building.
- Institutional controls (Environmental Easement) will also be implemented to ensure that deed restrictions and engineering controls remain in place.

An evaluation of the proposed remedy demonstrates that it will be fully protective of human health and the environment. The selected remedy utilizes source removal as the primary means of remediating the site; source removal is the primary goal of the BCP. The selected remedy also utilizes institutional (environmental easements, deed restrictions) and engineering controls. Engineering controls include a hydraulic barrier along the northern and western sides of the BCP area to prevent contaminated groundwater from entering the BCP area. As an added safeguard, a vapor barrier and passive SSDS beneath the school will prevent any potential residual VOC vapors from entering the school.

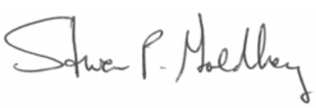
Verification that remedial action objectives have been met will be accomplished through confirmatory soil sampling (following excavation) and groundwater monitoring for a period of 2 years following implementation of the barrier walls.

7.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Shaw has prepared this Remedial Action Work Plan for the Former Metro North Property located at 672 Concourse Village West Site in Bronx, New York.

Shaw Environmental & Infrastructure, Inc.

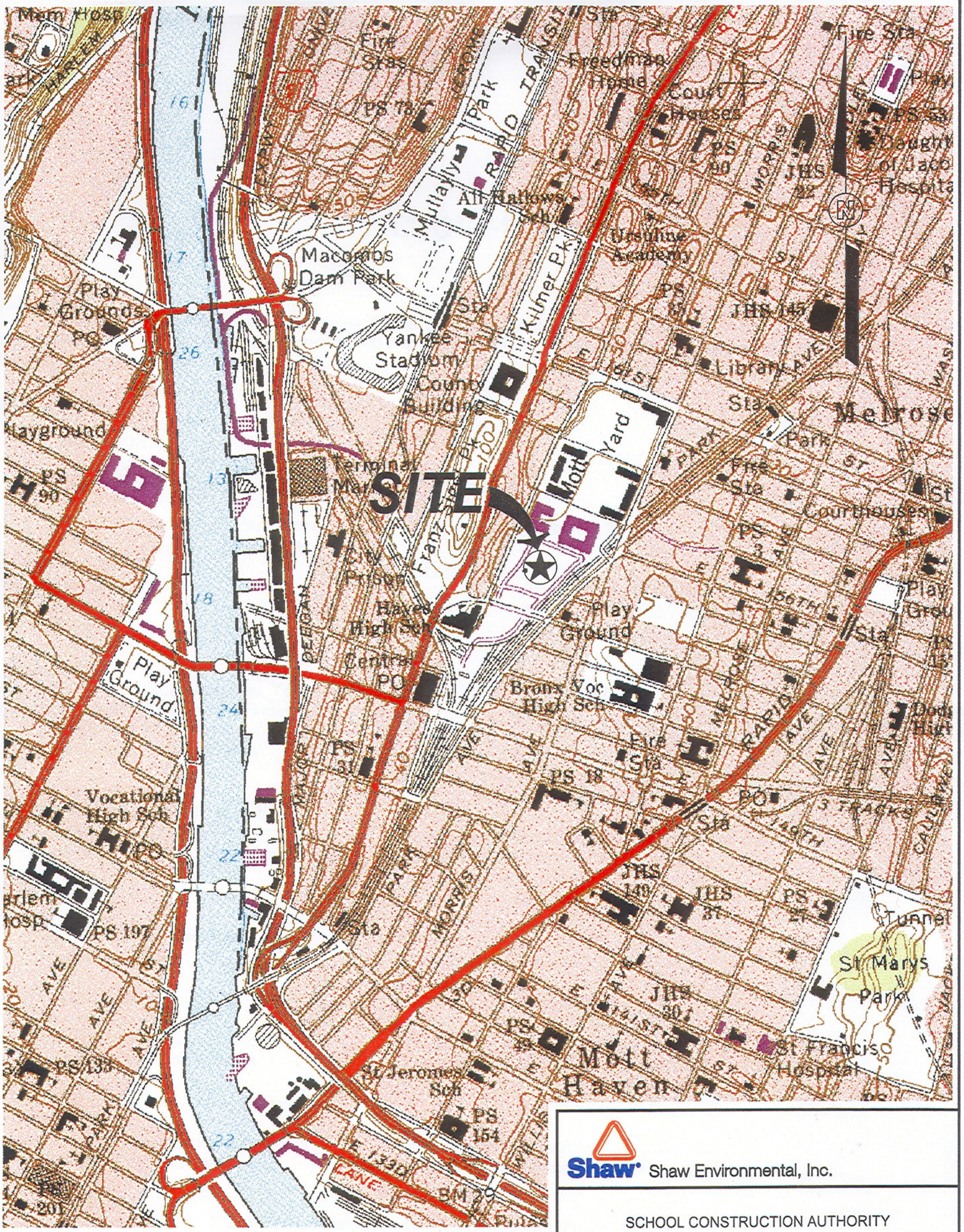
Curtis Kraemer, P.G.
Senior Geologist



Steven P. Goldberg, Ph.D., CPG
Senior Project Manager

August Arrigo, P.E.
Senior Engineer
License No. 070843

FIGURES



NOT TO SCALE

REFERENCE:

BASE MAP SOURCR: www.nysgis.state.ny.us

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ALBANY, NY	10/13/05	H. FARIELLO	S. SHKOLNIK			114926A3

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Plot Date/Time: 10/13/05 11:57am
Plotted by: Samuil.Shkolnik

Xref: .
Image: 04007368

Shaw Shaw Environmental, Inc.

SCHOOL CONSTRUCTION AUTHORITY

FIGURE 1
SITE VICINITY MAP

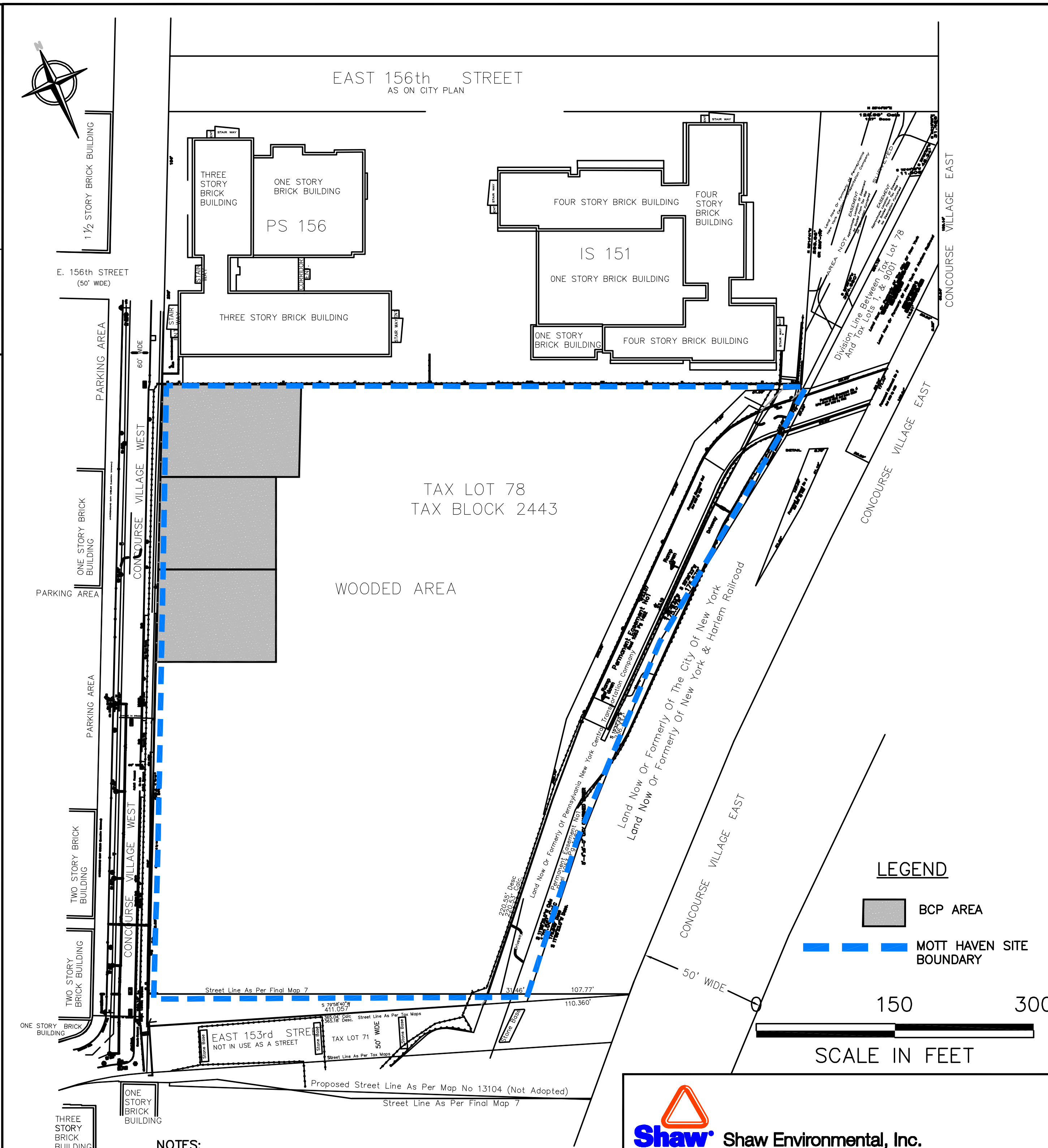
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: HM	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY			
DRAWN BY: HM	SITE LOCATION MAP			
CHECKED BY:	MOTTHAVEN SITE BOROUGH OF THE BRONX			
APPROVED BY:	DATE: 11/15/05	SCALE: NTS	DRAWING NO.	FIGURE 2

OFFICE New York, NY | DRAWING NUMBER 114926



NOTES:

1. HORIZONTAL DATUM: COORDINATE SYSTEM BASED UPON PUBLISHED COORDINATES OF EXISTING WELLS AND MH AT CP 802

2. VERTICAL DATUM: QUEENS BOROUGH PRESIDENT'S DATUM WHICH IS 2.725 FT ABOVE U.S. COAST AND GEODETIC SURVEY DATUM, SANDY HOOK, NJ (NGVD 29)

Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SITE PHYSICAL CHARACTERISTICS
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	10/26/05	AS SHOWN	114926B83	3

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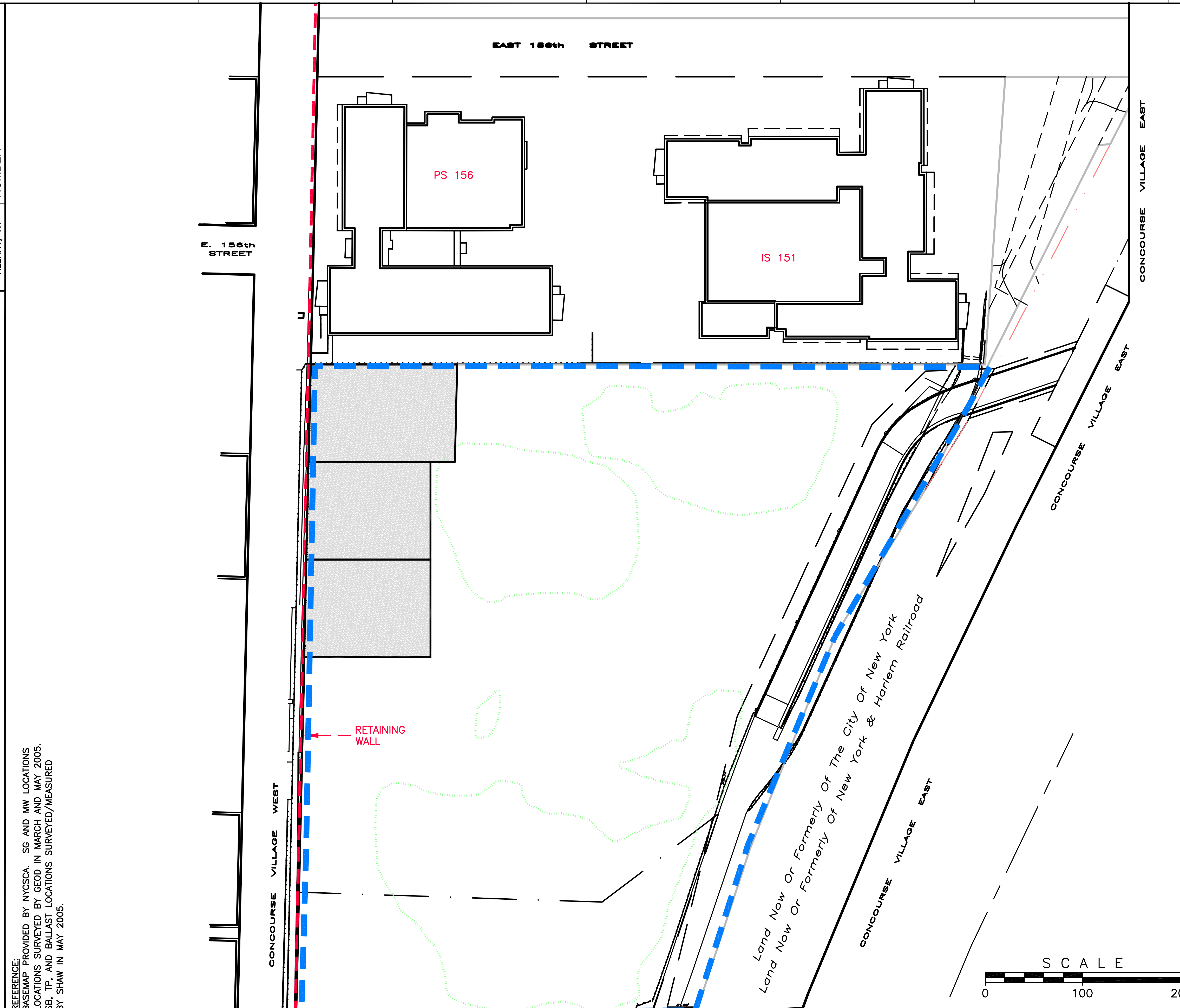

LEGEND

- DEBRIS MOUNDS
- RETAINING WALL
- MOTT HAVEN SITE BOUNDARY
- BCP AREA

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

OFFICE ALBANY, NY | DRAWING NUMBER 114926B83

VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SITE PHYSICAL CHARACTERISTICS
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE: 10/26/05	SCALE: AS SHOWN	DRAWING NO. 114926B83	FIGURE 4

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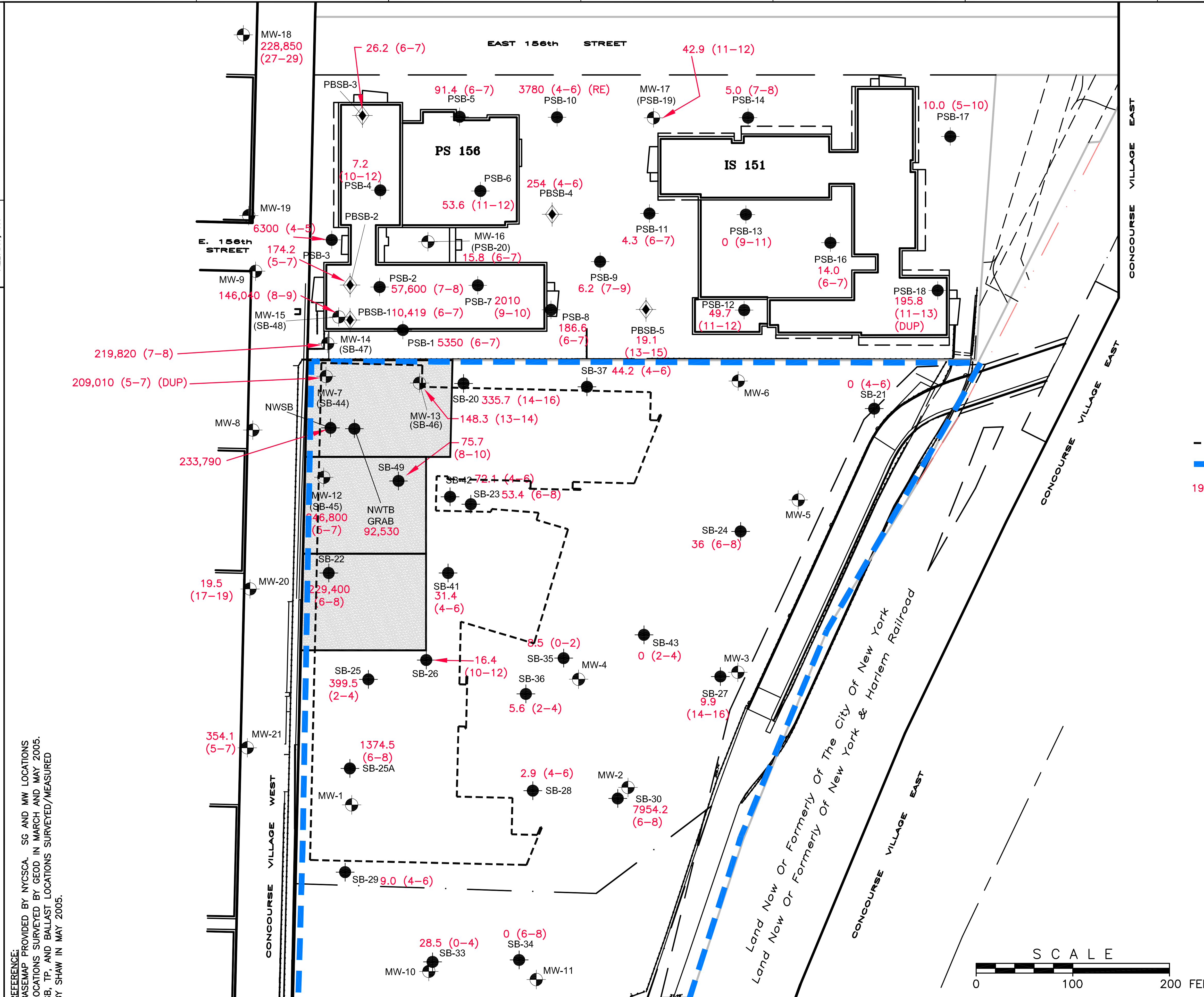


LEGEND

- MONITORING WELL
- SOIL BORING
- SOIL BORING (12 TO 15 FEET) (PSB)
- BEDROCK SOIL BORING (PBSB)
- TEST PIT/BALLAST PILE
- BCP AREA
- PROPOSED FOOTPRINT OF SCHOOL
- MOTT HAVEN SITE BOUNDARY

195.8 (11–13) 195.8 ppb TVOCs at 11–13 ft bgs.

PS–PUBLIC SCHOOL.

IS–INTERMEDIATE SCHOOL.

NOTE:

TOTAL VOC CONCENTRATION SHOWN IS THE HIGHEST DETECTION IN THE BORING

REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005. SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED BY SHAW IN MAY 2005.

OFFICE ALBANY, NY | DRAWING NUMBER 114926B56

VERIFY SCALE 0 1"

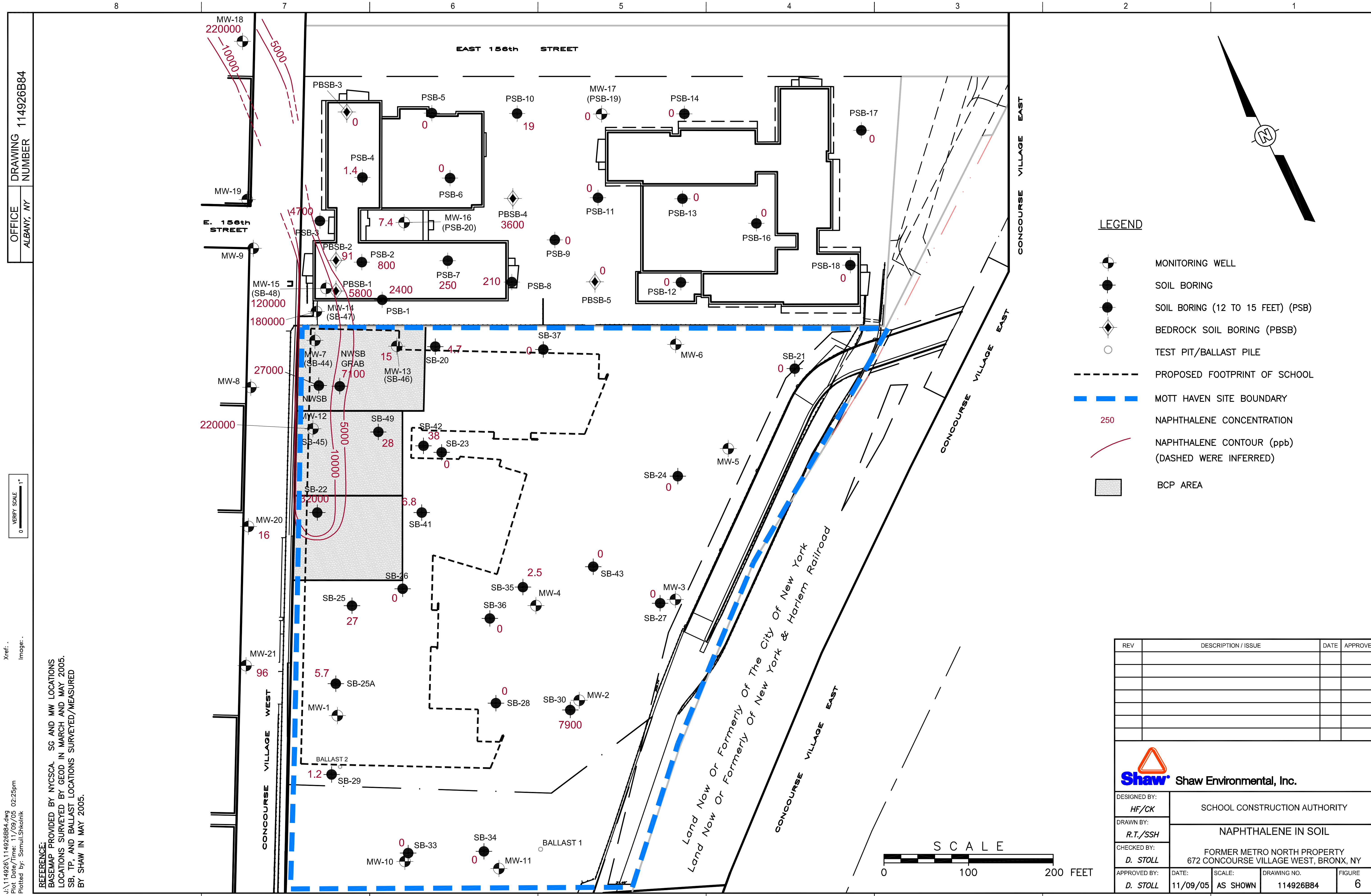
File: N:\PROJ\NYC-SCA\Mott Haven\RAWP\Figures\Figure 5.dwg Layout: 11 x 17 construction User: heather.moore Nov 15, 2005 – 2:52pm
Xref: .
Image: .

REV	DESCRIPTION / ISSUE	DATE	APPROVED

Shaw Environmental, Inc.

DESIGNED BY: HF/SG	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	TOTAL VOCs IN SOIL
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE: 10/22/05	SCALE: AS SHOWN	DRAWING NO. 114926B56	FIGURE 5


EAST 156th STREET
E. 156th STREET
CONCOURSE VILLAGE EAST
CONCOURSE VILLAGE WEST
Land Now Or Formerly Of The City Of New York
Land Now Or Formerly Of New York & Harlem Railroad
LEGEND
MONITORING WELL
SOIL BORING
SOIL BORING (12 TO 15 FEET) (PSB)
BEDROCK SOIL BORING (PBSB)
TEST PIT/BALLAST PILE
PROPOSED FOOTPRINT OF SCHOOL
MOTT HAVEN SITE BOUNDARY
250 NAPHTHALENE CONCENTRATION
NAPHTHALENE CONTOUR (ppb) (DASHED WERE INFERRED)
BCP AREA
SCALE
0 100 200 FEET
REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.
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APPROVED
Shaw Environmental, Inc.
DESIGNED BY: HF/CK
DRAWN BY: R.T./SSH
CHECKED BY: D. STOLL
APPROVED BY: D. STOLL
SCHOOL CONSTRUCTION AUTHORITY
NAPHTHALENE IN SOIL
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY
DATE: 11/09/05
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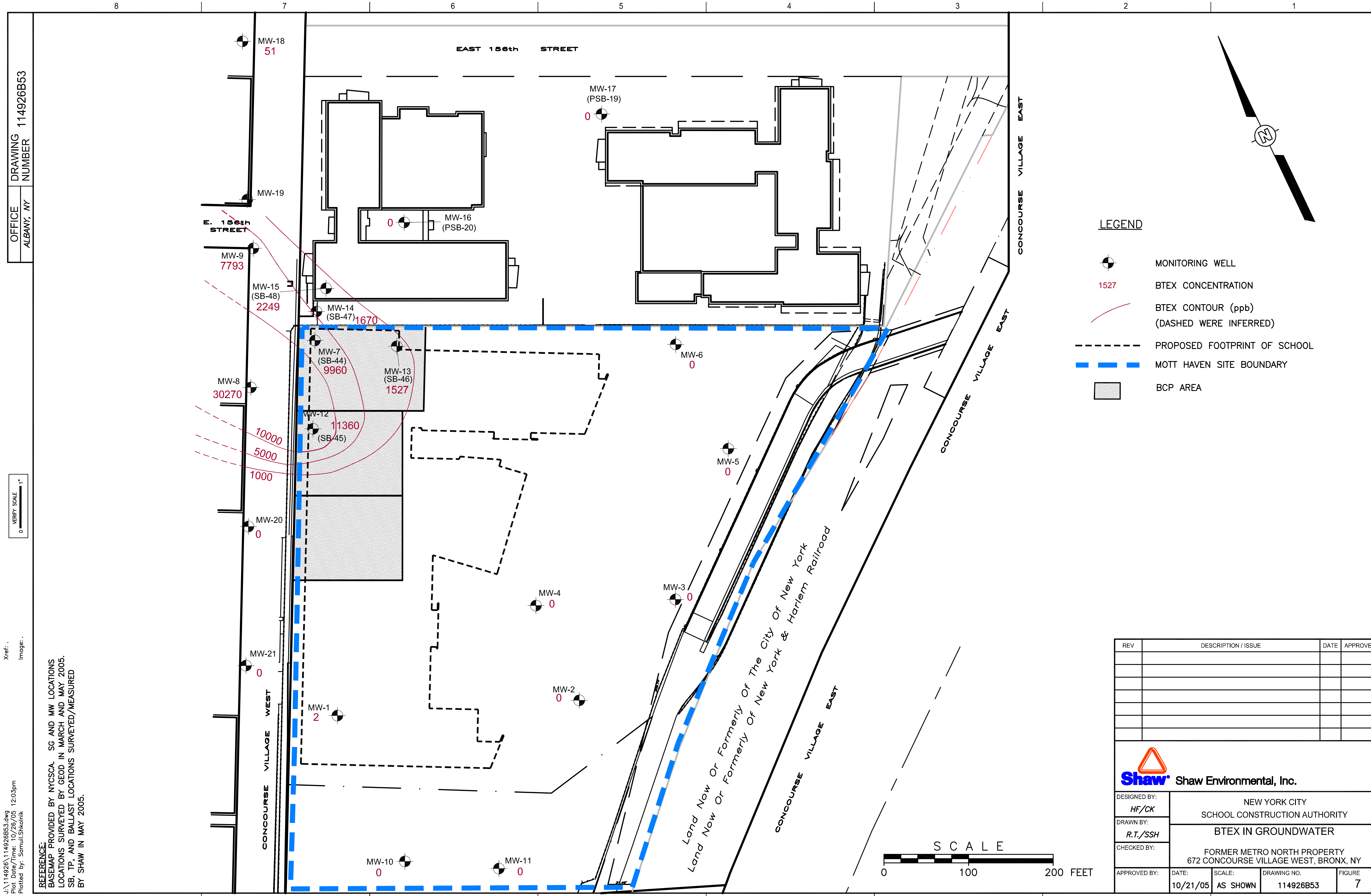
FIGURE 6



EAST 156th STREET
E. 156th STREET
CONCOURSE VILLAGE WEST
CONCOURSE VILLAGE EAST
MW-18
51
MW-17
(PSB-19)
0
MW-16
(PSB-20)
0
MW-19
MW-9
7793
MW-15
(SB-48)
2249
MW-14
(SB-47)
1670
MW-7
(SB-44)
9960
MW-13
(SB-46)
1527
MW-8
30270
MW-12
11360
(SB-45)
10000
5000
1000
MW-6
0
MW-5
0
MW-20
0
MW-4
0
MW-3
0
MW-21
0
MW-2
0
MW-1
2
MW-10
0
MW-11
0
Land Now Or Formerly Of The City Of New York
Land Now Or Formerly Of New York & Harlem Railroad
LEGEND
MONITORING WELL
1527 BTEX CONCENTRATION
BTEX CONTOUR (ppb) (DASHED WERE INFERRED)
PROPOSED FOOTPRINT OF SCHOOL
MOTT HAVEN SITE BOUNDARY
BCP AREA
SCALE
0 100 200 FEET
REFERENCE:
BASEMAP PROVIDED BY NYCSCA. SG AND MW LOCATIONS
LOCATIONS SURVEYED BY GEOD IN MARCH AND MAY 2005.
SB, TP, AND BALLAST LOCATIONS SURVEYED/MEASURED
BY SHAW IN MAY 2005.
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Plotted by: Samuil.Shkolnik
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Image: .
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DESCRIPTION / ISSUE
DATE
APPROVED
Shaw Shaw Environmental, Inc.
DESIGNED BY: HF/CK
DRAWN BY: R.T./SSH
CHECKED BY:
APPROVED BY:
NEW YORK CITY
SCHOOL CONSTRUCTION AUTHORITY
BTEX IN GROUNDWATER
FORMER METRO NORTH PROPERTY
672 CONCOURSE VILLAGE WEST, BRONX, NY
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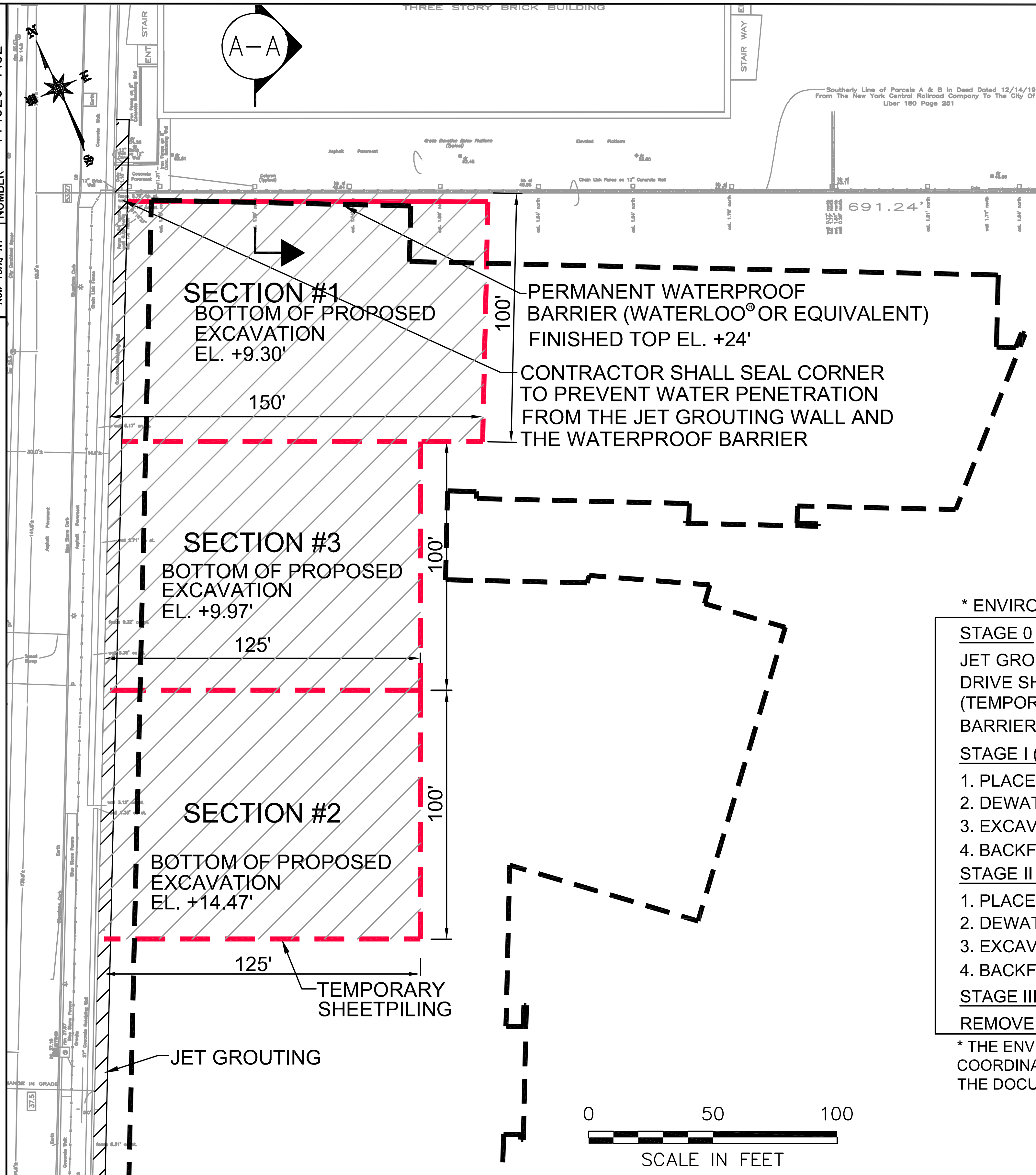
DRAWING NO. 114926B53
FIGURE 7

OFFICE New York, NY | DRAWING NUMBER 114926-FIG2



LEGEND

- REMEDIATION AREA
- LIMITS OF PROPOSED CAMPUS
- TEMPORARY SHEETPILING
- PERMANENT WATERPROOF BARRIER
- JET GROUT WALL

* ENVIRONMENTAL REMEDIATION STAGING

STAGE 0

JET GROUTING
DRIVE SHEETING
(TEMPORARY & WATERLOO BARRIER)

STAGE I (SECTION 1 & 2)

1. PLACE ENCLOSURE
2. DEWATERING (1' BELOW EXCAVATION LIMITS)
3. EXCAVATION
4. BACKFILL

STAGE II (SECTION 3)

1. PLACE ENCLOSURE
2. DEWATERING (1' BELOW EXCAVATION LIMITS)
3. EXCAVATION
4. BACKFILL

STAGE III

REMOVE TEMPORARY SHEETING

* THE ENVIRONMENTAL REMEDIATION STAGING SHOULD BE COORDINATED WITH ADDITIONAL STAGING PLANS INCLUDED IN THE DOCUMENTS.

NOTE

1. FOR SECTION A-A, SEE FIGURE 9
2. CONTRACTOR SHALL SET-UP TEMPORARY FACILITIES PER SECTION 01100 AND 02300.
3. CONTRACTOR SHALL ESTABLISH SITE CONTROLS PER SECTION 01011
4. CONTRACTOR SHALL ESTABLISH EROSION AND SEDIMENTATION CONTROLS PER SECTIONS 01100 AND 02120
5. CONTRACTOR SHALL ESTABLISH AIR AND DUST CONTROLS PER TAGM 4031 AND SECTIONS 02300 AND 02320
6. CONTRACTOR SHALL ABANDON ALL MONITORING WELLS WITHIN THE FOOTPRINT OF THE EXCAVATION AND PROTECT ALL OTHER PER SECTION 02610
7. CONTRACTOR SHALL ENSURE PROTECTION OF ADJACENT STRUCTURES BY MONITORING SETTLEMENT AND VIBRATION AS SPECIFIED IN SECTION 02255
8. CONTRACTOR SHALL INSTALL JET GROUT WALL ON WESTERN BOUNDARY OF SITE IN ACCORDANCE WITH SECTION (REFER TO LANGAN SPECIFICATION)
9. CONTRACTOR SHALL INSTALL WATERLOO® BARRIER SHEET PILE WALL ON NORTHERN BOUNDARY OF SITE IN ACCORDANCE WITH SECTION 02255
10. CONTRACTOR SHALL INSTALL TEMPORARY SHEET PILE WALLS IN ACCORDANCE WITH SECTION 02255
11. CONTRACTOR SHALL FURNISH MOBILE STRESSED MEMBRANE STRUCTURE IN ACCORDANCE WITH SECTION 02320
12. CONTRACTOR SHALL MAINTAIN WATER LEVEL WITHIN EXCAVATION AREAS AT AN ELEVATION EQUAL TO 1' BELOW BOTTOM OF EXCAVATION DURING ALL REMOVAL AND BACKFILL ACTIVITY IN ACCORDANCE WITH SECTION 02300 AND 02140
13. CONTRACTOR SHALL CONDUCT ALL SOIL REMOVAL AND HANDLING IN ACCORDANCE WITH SECTIONS 02300 AND 02310
14. CONTRACTOR SHALL TRANSPORT AND DISPOSE OF ALL EXCAVATED MATERIAL IN ACCORDANCE WITH SECTION 02091
15. CONTRACTOR SHALL BACKFILL EXCAVATIONS TO EL. 22' IN ACCORDANCE WITH SECTION 02300

Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SITE PHYSICAL CHARACTERISTICS
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	10/26/05	AS SHOWN	114926B83	8

REFERENCE:
BASEMAP PROVIDED BY NYCSCA

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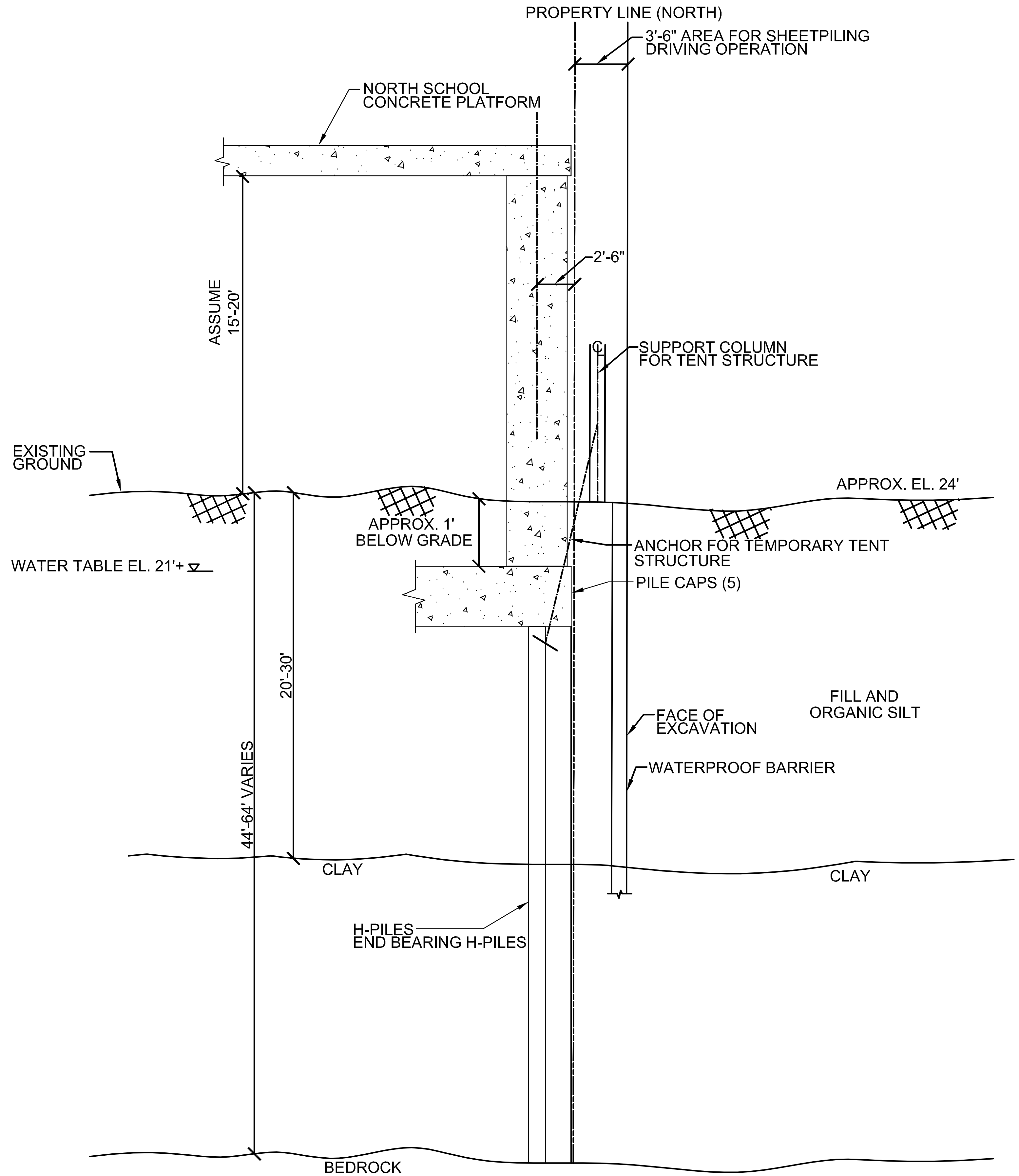

0 100 200

SCALE IN FEET

SECTION A-A

NOTES:

- AREA AVAILABLE FOR SHEETPILING DRIVING OPERATION IS 3'-6" SOUTH OF NORTH PROPERTY LINE
- DEPTH OF SHEET PILE SHALL BE DETERMINED BY CONTRACTOR
- WATERPROOF BARRIER DEPTH (WATERLOO® OR EQUIVALENT) SHALL BE DETERMINED BY CONTRACTOR. HOWEVER, BARRIER SHALL BE A MINIMUM OF 30' BELOW GRADE
- MAX PERMISSIBLE VERTICAL TOLERANCE (PLUMBNESS) 1/5" PER FOOT VERTICAL
- BOTTOM OF PROPOSED EXCAVATION EL.+9.3 (NORTH SIDE)-SECTION #1
- TENT STRUCTURE AND DETAILS SHOWN FOR CLARITY CONTRACTOR RESPONSIBLE FOR MEETING DESIGN AND FIELD CONDITIONS
- MAXIMUM ALLOWABLE DEFLECTION OF THE SHEETING SHALL BE 2" TYPICAL AND SHALL BE NO MORE THAN 1" ALONG THE NORTH SIDE FOR WATERPROOF BARRIER

NOTES:

1. REFER TO LANGAN GEOTECHNICAL REPORT FOR DATA ON SUBSURFACE CONDITIONS AND TOP OF ROCK CONTOURS.
2. REFER TO DRAWING 2 FOR PLAN.
3. THE 4TH AND 5TH PILE CAPS FROM THE NORTHWEST CORNER OF THE SITE EXTEND BEYOND THE PROPERTY LINE BY APPROXIMATELY 10-1/2" AND 3" RESPECTIVELY.
4. THE TOP OF THE WATERPROOF BARRIER SHALL BE CUT AT GRADE, BUT NO LESS THAN ELEVATION 24' TO ENSURE THAT IT EXTENDS ABOVE THE WATERTABLE.

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	SITE PHYSICAL CHARACTERISTICS
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	10/26/05	AS SHOWN	114926B83	9

OFFICE New York, NY | DRAWING NUMBER 114926-FIG3

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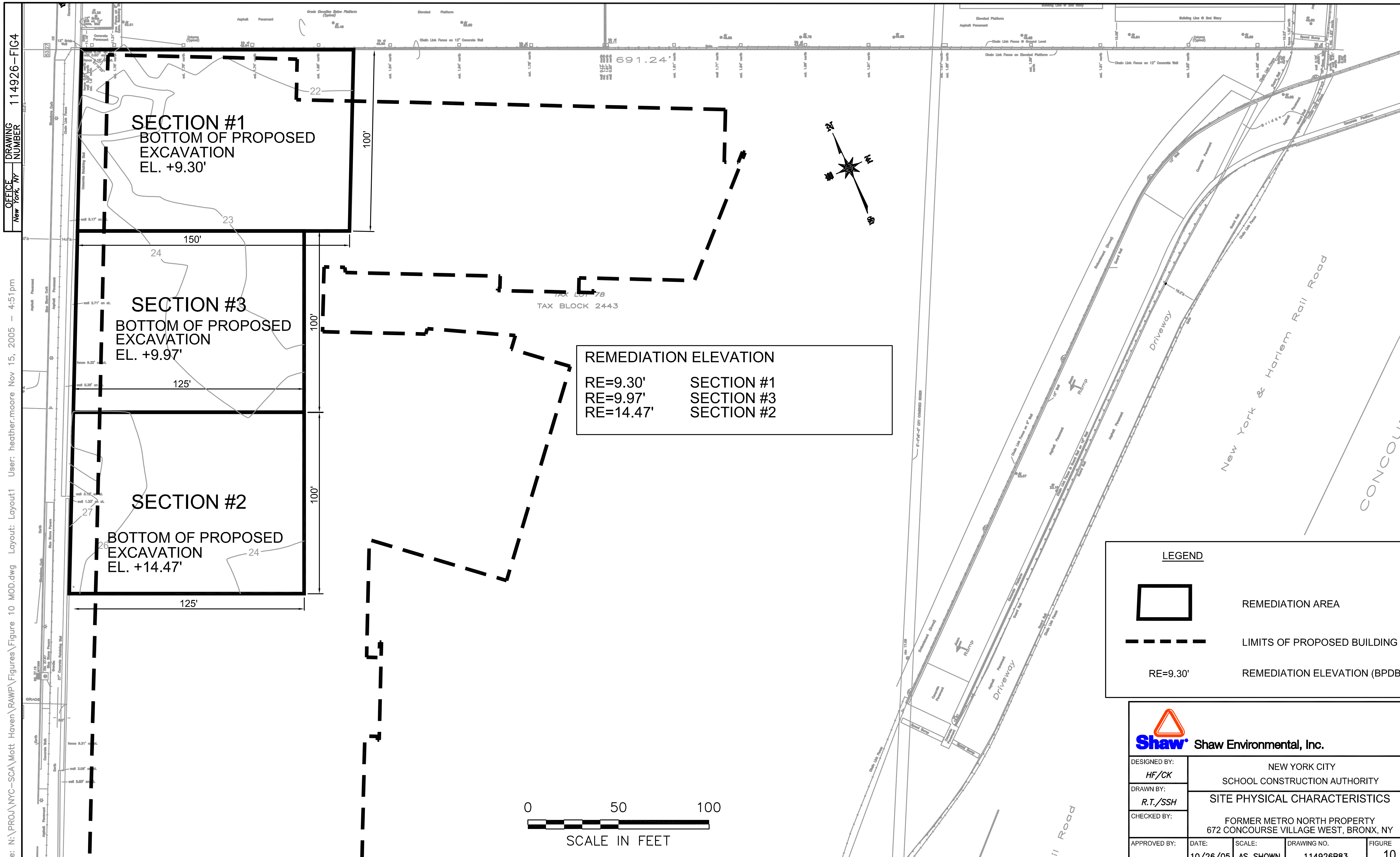

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Appendix E

Soil Management Plan

SOIL MANAGEMENT PLAN

FOR THE

FORMER METRO-NORTH PROPERTY (MOTT HAVEN)
730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK
BCP AGREEMENT Index W2-1074-05-08
SITE NUMBER C203030
SCA Job # 19730
SCA LLW# 033485

November 2008

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NEW YORK 11101-3045

TABLE OF CONTENTS

Section **Page**

FIGURES:

1.0 INTRODUCTION

1.1 Description of Site

The New York City School Construction Authority (NYCSCA) entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) to develop a 7-acre property located at 730 Concourse Village West in Bronx County, New York City, New York into four schools. At the request of the NYSDEC, the BCA only covers a one acre area (hereafter referred to as the "BCP Area") which measures 300 feet (in a general north-south direction) by approximately 125 feet (in a general east-west direction) in the northwest corner of the 7-acre property. This Soil Management Plan (SoMP) addresses the property which includes the BCP Area and the remainder of the property (hereafter referred to as the "Non-BCP Area A") and the 6-acre area beneath PS 156 and IS 151 (hereafter referred to as the "Non-BCP Area B"). The total 13-acre area encompassing the BCP Area, Non-BCP Area A, and Non-BCP Area B will hereafter be referred to as the "Site". Figure 1 depicts the areas that will be covered under this SoMP.

The Site is situated in a topographic depression, characteristic of urban property undergoing construction. The properties to the west and east are approximately up to 30 feet higher in elevation than the Site. An approximate 30-foot high stone retaining wall borders the site to the west. The Site is a former Metro-North rail yard that will be redeveloped into a four school campus including a gymnasium and auditorium.

1.2 Summary of Brownfield Cleanup Program Activities

Multiple investigations have been conducted at the BCP Area and Non-BCP Area A starting in 2001 which are documented in the Remedial Action Work Plan (RAWP) that was submitted on November 15, 2005, and approved by the New York State Department of Environmental Conservation (NYSDEC) on July 5, 2006. On February 17, 2006, the New York City School Construction Authority (NYCSCA) entered into a BCP Agreement WC-1074-05-08 with the NYSDEC. Work completed under the BCP included the excavation and off-site disposal of contaminated soil from the BCP Area. The soils at the water table interface in this area had been impacted from releases from historical operations in the vicinity of the site associated with a manufactured gas plant and gasoline filling station. Approximately 29,000 tons of contaminated soils were removed from this area by October 2007. The vast majority of the environmental contamination of concern was limited to the BCP area. The remainder of the Site outside of the BCP Area consists of historic urban fill. Figure 1 is a site map depicting the BCP Area and the remainder of the Site.

Additional information regarding investigations performed at the Site and a description of the Remedial Activities is provided in the November 15, 2005 RAWP and in the December 2007 Final Engineering Report (FER).

1.3 Objective of Soil Management Plan

The objective of the Remedial Actions at the Site was to remove contamination from the Site not associated with the on-site historic fill material. The following Soil Management Plan (the Plan) has been prepared to enable appropriate management of historic urban fill material at the Site during any future activities which could breach the cover system at the Site. This Soil Management Plan is intended to provide a detailed description of the procedures required to properly manage the historic urban fill material left in place at the Site following completion of the remedial action in the event that future construction activities (i.e., underground utility upgrades, landscaping, asphalt or concrete repairs, etc.) are required which might disturb the area of the historic urban fill material. This Plan includes a description of the area of historic urban fill material; a description of the cover system implemented as part of the remedial action; and protocols to be followed during construction activities which affect the cover system.

2.0 DESCRIPTION OF HISTORIC URBAN FILL MATERIAL

Outside of the BCP Area, and within a small 50 feet by 60 foot area immediately north of the BCP Area where the contamination was treated with in-situ stabilization, the soils at the Site are characteristic of historic urban fill and not associated with any specific waste disposal activity or source of contamination as referenced in the Remedial Action Work Plan. NYSDEC regulations describe historic fill material as "non-indigenous or non native material historically deposited or disposed in the general area of, or on, a site to create useable land by filling water bodies, wetlands or topographical depressions, which is in no way connected with the subsequent operations at the location of the emplacement and which was contaminated prior to placement." This urban fill material characterized at the Mott Haven site consists of elevated concentrations of certain metal constituents, and several semi-volatile organic compounds (SVOCs), in particular polynuclear aromatic hydrocoarbons (PAHs) above the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Recommended Soil Cleanup Objectives (RSCOs). Metal constituents detected above the TAGM RSCOs include beryllium, chromium, mercury, nickel and zinc. The historic urban fill material provides the basis for this Soil Management Plan.

3.0 DESCRIPTION AND MANAGEMENT OF COVER SYSTEM

The following section describes the surface cover system that will be installed at the Site during construction of the new school building. The purpose of the surface cover system is to eliminate the potential for direct human contact with subsurface material and to eliminate the potential for runoff from the property.

3.1 Description of Surface Cover System

As part of the school construction activities, a surface cover system will be installed at the Site. This cover system for the BCP Area and Non-BCP Area A will be comprised of a combination of asphalt covered roads, concrete covered sidewalks/walkways, an athletic field (artificial turf), school buildings on concrete slab, and landscaped areas. The cover system for Non-BCP Area B will be a cement concrete cap. The cover systems are designed to prevent contact with the historic urban fill material. Figures 2 and 3 depict the various BCP Area and Non-BCP Area A surface cover system components and details.

School buildings and an athletic field cover the majority of Non-BCP Area A. Areas of Non-BCP Area A not covered by the buildings and the athletic field will be landscaped or occupied by roads and sidewalks/walkways. As detailed on Figure 3, the following is a description of the major soil cover types that will be constructed across the BCP Area and Non-BCP Area A:

- Building slabs: The school building is to be constructed on reinforced concrete slabs
- Athletic field: An artificial turf will be installed. Approximately 2-feet of drainage stone will be placed directly below the turf surface. Below the stone will be a network of 12-inch drainage pipes. A woven geotextile fabric will be installed beneath the piping, overlying the soil
- Sidewalks/walkways: Sidewalks and walkways will consist of 4-5 inch thick reinforced concrete
- Asphalt roads: Roads will be constructed of bituminous pavement consisting of a 1.5 inch minimum bituminous concrete wearing course overlying a 3 inch minimum bituminous concrete base course
- Landscaped areas: At least 2 feet of soil meeting TAGM RSCOs and that contains no detectable volatile organic compounds as defined in Section 2.3.2.6 of the SMP (i.e. environmentally clean fill).

In addition to the above, a cement concrete cap will be incorporated on the ground surface of Non-BCP Area B. The design of the cover for Non-BCP Area B includes an average of eight (8) inches of crushed stone base with a minimum of four (4) inches of cement concrete cap.

3.2 Surface Cover System Management Program

The surface cover system at the Site will be maintained in a manner that ensures the system's integrity as originally designed and constructed. The surface cover system management program will include monthly walk-throughs and annual inspections.

Routine walk-throughs will be performed on a monthly basis by the school custodian who will identify any observed changes to the cover system. In the event of a change in previous conditions, the custodian will log the information and immediately request an inspection from New York City Department of Education (DOE), Department of School Facilities (DSF). A Monthly inspection Checklist will be generated for use by the school custodian, and a copy of the Monthly Inspection Checklist will be sent to DOE by the 15th of each month.

Annual inspections will be performed by an independent professional engineer retained by the DOE, DSF in the presence of custodial staff. Based on the results of the inspection and the engineering/environmental assessment, if necessary, the DOE, DSF will determine if design and specifications are required or if the work can be performed by DOE, DSF maintenance staff. If the project requires development of a design and the need to hire an outside contractor, the work will be undertaken by SCA.

Observations of the asphalt, concrete and soil components of the surface cover system will be noted during these inspections as detailed below:

> A. Asphalt and Concrete: Monthly walk-throughs and annual inspections will be performed for all asphalt and concrete cover system areas of the BCP Area and Non-BCP Area A in order to document the presence of any cracks, depressions, and/or exposed soil as a result of deterioration of the asphalt or concrete surface. In addition, monthly and annual inspections will be performed in Non-BCP Area B. The damaged areas will be repaired using the appropriate methods within thirty (30) days, weather permitting. Access to any completely breached portions of the surface cover system will be restricted and the breached portions of the asphalt and concrete cover system will be repaired utilizing standard dust control techniques within five (5) days weather permitting.
>
> B. Landscaped areas: Monthly walk-throughs and annual inspections will ensure that the historic urban fill material in the limited landscaped areas is not exposed. Examples of exposed fill material include depressions or ruts greater than 12-inches in depth, the presence of bricks and

glass pieces mixed with soil, observed dark brown or black materials other than topsoil in the base of the depression or rut. If any damage to the cover is evidenced, but the underlying fill materials are not exposed, the damaged areas will be repaired using the appropriate methods within thirty (30) days of identifying the damage, weather permitting. Access to any completely breached portions of the surface cover system will be restricted and the surface cover system will be repaired utilizing standard dust control techniques within five (5) days, weather permitting.

A maintenance manual for the artificial turf system will be kept on site. The maintenance manual will describe the materials, devices, and procedures to be followed for use and maintenance of the turf system. School personnel will be provided training in both the operation and maintenance of the turf system, and custodial staff will conduct regular inspections of the turf. DOE will replace the turf when standard repairs are no longer practical.

3.3 Management of Soils/Fill and Long Term Maintenance of Cover System

The purpose of this section is to provide environmental guidelines for management of subsurface soils and the long-term maintenance of the cover system during any future intrusive work which breaches the cover system.

The Soil Management Plan includes the following conditions:

- Any breach of the soil cover system, including for the purposes of construction or utilities work, must be replaced or repaired using an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination. The repaired area must be covered with clean soil and reseeded or covered with an impervious product such as concrete or asphalt, to prevent erosion in the future.

- As further described in Section 5, Site soil that is excavated and is intended to be removed from the property must be managed, characterized, and properly disposed of in accordance with NYSDEC regulations and directives.

- Any offsite fill material brought to the Site for filling and grading purposes shall meet the definition of environmentally clean soil and backfill as defined in Section 2.3.2.6 of the SMP.

- Prior to any construction activities, workers will be notified of the Site conditions with clear instructions regarding how the work is to proceed. Invasive work performed at the property will be performed in accordance with all applicable local, state and federal regulations to protect worker health and safety.

- If the cover system has been breached during the year covered by the Annual Inspection Report, then the DOE, DSF will include a certification in the Annual Inspection Report that all repair work was performed in conformance with this Soil Management Plan.

- The details for the surface cover designs used at the BCP Area and Non-BCP Area A are shown in Figures 2 and 3. After completion of invasive work that affects the cover system at the Site, the cover system must be replaced and reconstructed in conformance with these original surface cover designs. The design of the cover for Non-BCP Area B includes an average of eight (8) inches of crushed stone base with a minimum of four (4) inches of cement concrete cap.

3.4 Emergency Situations

The custodial staff will immediately inspect the cover system, following any emergency situation. Examples of emergency situations include a water main break, emergency utility work, flooding, hurricane, earthquake, etc. The findings will be documented on an Inspection Form which summarizes inspection observations. If the emergency situation resulted in a breach of the soil cover system, the procedure outlined in the previous section will be followed.

3.5 Recordkeeping

The following recordkeeping requirements will be implemented for all cover system inspections at the school. All observations will be noted in either the Monthly or Annual Inspection Checklists that will include:

- Name of Inspector and/or team members
- Date and Time of Inspection
- Detailed Description of Areas Inspected (Interior and Exterior)
- Observations of Each Area Inspected

Monthly Inspection Checklists will be maintained by custodial staff (with a copy sent to DOE) and include an explanation for any observed physical changes in the condition of the cover system since the last inspection. Observations will include, but not be limited to, cracks in exterior asphalt and concrete; and soil disturbances. The inspection will include findings and recommendations for restoration to previous conditions. As part of the annual inspections, the Monthly Inspection Checklists will be reviewed, the custodians will be interviewed and provided SMP refresher training, and the Annual Inspection Report will be produced in accordance with the requirements of Section 5 of the SMP

The Annual Inspection Report will be completed and submitted to the NYSDEC by March 1st of each year. A copy of the Annual Inspection Report will be provided to the school custodian of each school on the Site. Copies of the Site inspections, assessments, evaluation, monitoring, and Annual Inspection Reports will be maintained at the each school custodian's office and the DOE/DSF.

3.6 Notification Requirements

Non-routine notifications are to be submitted by the property owner(s) to the NYSDEC, the Bronx Borough President's Office, the New York City Council Representative for the district, and Community Board 4 on an as-needed basis for the following reasons:

- 120-day advance notice of any proposed changes in Site use that are consistent with the terms of the BCA;
- 15-day advance notice of any proposed ground-intrusive activities that are non-routine and non-emergency;
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action taken to mitigate the damage or defect;
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of action taken and the impact to the environment and the public; and
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

The subject school custodian will be notified at least five (5) business days before conducting activities that may breach the surface cover system. Examples of intrusive work that may breach the surface cover system include landscaping encompassing the removal/replacement of shrubs, bushes or trees; underground utility work, removal and repaving any asphalt surfaces, walkway replacement, etc. The notification letter will include, but not be limited to, the proposed portions of the system to be breached, the purpose of the intrusive activities, a plan for managing and disposing of any solid waste generated during the activity, and a plan to replace the surface cover system in a manner that is at least as protective to human health and the environment as the original surface cover system. The requirements for these Plans will be incorporated into the design documents and will be consistent with local, state, and federal requirements in effect at the time.

4.0 CONSTRUCTION ACTIVITIES AFFECTING COVER SYSTEM

4.1 General Protocols

The following general protocols will apply in the event that construction work is required which will disturb the Site cover system:

- The DOE, DSF, or NYCSCA (Agency) and parties performing the construction work are completely responsible for the safe performance of all invasive work and the structural integrity of excavations and structures that may be affected by the construction work (such as building foundations).

- The hours for operation of construction activities will conform to the New York City Department of Buildings construction code requirements or otherwise according to specific variances issued by that agency.

- Future construction activities at the Site will not impair or compromise~~,~~ remedial activities described in the pending Final Engineering Report.

- Appropriate soil erosion prevention equipment (e.g., silt fencing, hay bales, etc.) will be installed around the entire perimeter of the construction area.

- Mechanical processing at the Site of any soils or historic urban fill is prohibited. All historical urban fill removed from the Site will be properly characterized and disposed of at an approved offsite facility.

4.2 Project Oversight

The project manager will designate a remedial engineer or their qualified representative will be assigned to oversee all construction activities that involve the area of the cover system and will be responsible to ensure that all invasive work involving the surface cover material, including work performed by contractors, is performed in compliance with this Soil Management Plan. Certification of the compliance of this work will be stamped and signed and submitted on an annual basis in the Annual Site Management Plan (outlined in more detail in the Site Management Plan). The Remedial Engineer will review all pre-construction plans submitted by contractors for compliance with this Soil Management Plan and will certify compliance in the Annual Site Management Plan. All invasive work performed will be witnessed by the Remedial Engineer or qualified representative.

The Remedial Engineer will be responsible for providing all required Professional Engineer (P.E.) certifications listed in this Soil Management Plan. The Remedial Engineer will certify compliance of all pre-construction plans submitted by contractors, as specified in the Annual Site Management Report (outlined in more detail in the Site Management Plan).

4.3 Health and Safety

A Health and Safety Plan (HASP) will be prepared by a Certified Industrial Hygienist or a health professional for performing the construction activities prior to commencement of the work to ensure that the Site activities are performed in full compliance with governmental requirements, including Site and worker safety requirements mandated by the Occupational Safety and Health Administration (OSHA). The HASP will identify a Site Safety Coordinator who will oversee the construction activities and ensure that the HASP is being properly implemented. Any confined space entry that is required during the construction activities will comply with all OSHA requirements to address the potential for combustible gases. The Site owner and associated parties and the contractor will be completely responsible for the appropriate performance of work according to the HASP and applicable laws.

5.0 MATERIALS MANAGEMENT FOR CONSTRUCTION ACTIVITIES AFFECTING COVER SYSTEM

The following sections describe the process for materials management during construction activities that will disturb the Site cover system and area of historic urban fill.

5.1 Field Screening Activities

Screening of soils and fill will be performed during all invasive construction work (e.g., excavations, underground utility upgrades, landscaping, asphalt or concrete repairs, etc.), that may penetrate the cover system. The field screening activities will include recording of visual and olfactory observations of soil and fill excavated during the construction work. Measurements obtained from a photoionization detector (PID) or flame ionization detector (FID) will also be recorded.

5.2 Excavated Material Testing Requirements

Soil/fill that is excavated during construction work will be further characterized prior to transportation offsite for disposal at a permitted facility. In the unlikely event that the excavated soil/material exhibits staining, elevated PID/FID measurements or odors not indicative of historic fill, one (1) composite sample and a duplicate sample will be collected for each 100 cubic yards (CY) of stockpiled soil/fill. For other excavated historic fill requiring offsite disposal, one (1) composite sample and a duplicate sample will be collected for each 2,000 CY of stockpiled soil/fill, and a minimum of one (1) composite sample will be collected for volumes less than 2,000 CY.

The composite sample will be collected from five (5) locations within each stockpile. A duplicate composite sample will also be collected. Measurements from a PID will be recorded for each of the five (5) individual locations. One (1) grab sample will be collected from the individual location with the highest PID measurement. If none of the five (5) individual sample locations exhibit PID readings, one (1) location will be selected at random. The composite sample will be analyzed for pH, Target Compound List (TCL) SVOCs and TCL pesticides and PCBs; and Target Analyte List (TAL) metals plus cyanide. The grab sample will be analyzed for TCL VOCs.

Soil samples will be composited by placing equal portions of historic fill from each of the five (5) composite sample locations into a pre-cleaned, stainless steel or Pyrex glass mixing bowl. The historic fill will be thoroughly homogenized using a stainless steel scoop or trowel and transferred to pre-cleaned jars provided by the laboratory. Sample jars will then be labeled and chain-of-custody form will be prepared. Additional characterization sampling for offsite disposal may be required by the disposal facility. The contractor is responsible for performing any required laboratory analysis of the material and satisfying any other requirements of the disposal facility. To potentially reduce offsite disposal requirements/costs, the contractor may choose to characterize each stockpile individually.

In the unlikely event that the analytical results suggest that concentrations may exceed the standards for Resource Conservation Recovery Act (RCRA) characteristics, Toxicity Characteristic Leaching Procedure (TCLP) analysis will be completed. If the analytical results indicate that concentrations exceed the standards for Resource Conservation Recovery Act (RCRA) characteristics, the material will be considered a hazardous waste and must be properly disposed offsite at a permitted disposal facility within 90 days of excavation. If the analytical results indicate that the soil is not a hazardous waste, the material will be properly disposed offsite at a solid waste management facility. Stockpiled soil will not be transported offsite until the analytical results are received.

5.3 Offsite Disposal of Materials

5.3.1 Notifications to NYSDEC

All historic urban fill excavated and removed from the Site will be treated, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. and will be disposed in accordance with all local, State and Federal laws.

Historic urban fill from the Non-BCP Area A or Non-BCP Area B (all historic fill has been removed from the BCP Area) Site is prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Letters will be provided to NYSDEC that fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws. This will include, at minimum: (a) a letter from the Owner to the disposal facility providing all pertinent soil chemistry data and noting that the material is being removed from a Brownfield Cleanup site in New York State and (b) a letter from the receiving facility stating that they understand the source and that the material is acceptable under all appropriate permits.

5.3.2 Fill/Soil Disposal Requirements

Non-hazardous historic urban fill/soil taken offsite will be handled, at minimum, as a municipal solid waste per 6NYCRR Part 360-1.2. The historic urban fill and soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils other than historic fill that are to be removed from the Site will be considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC as Construction and Demolition (C/D) materials and not as virgin soils. These soils may be sent to a permitted Part 360 landfill. These soils may also be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, written correspondence to the C/D facility that provides detailed explanation that the material is derived from a Brownfield Cleanup Site, and that the soil material must not be redirected to a Soil Recycling Facility. The chemical data for the soil must be attached to the correspondence.

The contractor is responsible for performing any required laboratory analysis of the material and satisfying any other requirements of the disposal facility.

5.3.3 Water Disposal Requirements

Groundwater at the Site is located at approximately 5 feet below ground surface (bgs) and future construction may encounter groundwater. If dewatering is necessary, dewatered fluids will not be recharged back to the land surface or subsurface of the Site. All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed offsite in accordance with applicable local, state, and federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by the New York City Department of Environmental Protection (NYCDEP).

The contractor is responsible for performing any required laboratory analysis of the material and satisfying any other requirements of the disposal facility.

5.3.4 Hazardous Waste Disposal Requirements

In the unlikely event that hazardous waste is encountered during construction work, the waste will be stored, transported, and disposed in full compliance with applicable local, state, and federal regulations. The contractor is responsible for performing any required laboratory analysis of the material and satisfying any other requirements of the disposal facility.

5.3.5 Disposal Documentation

The Agency and its Remedial Engineer will be responsible for the appropriate disposal of all material removed from the Site during construction including, but not limited to, historic urban fill, other solid waste, and fluids. Appropriately licensed haulers will be used to transport material removed from the Site and will be in full compliance with all applicable local, state and federal laws. A Bill of Lading system and waste disposal manifests will be used to document the disposal of all materials.

5.4 Truck Management

To ensure proper offsite transportation of excavated materials, all trucks leaving the Site will have tight-fitting covers. The trucks will also be washed prior to leaving the Site. Truck wash waters will be collected and disposed in an appropriate manner. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during the construction activities.

5.5 Stockpile Management

Stockpiles will be kept covered at all times with appropriately anchored tarps during the construction activities. Stockpiles will be inspected at a minimum once each week and after every storm event. Damaged tarp covers will be promptly replaced. Silt fencing will be installed around soil stockpiles to prevent rainwater runoff from mixing with the stockpiled material. Hay bales will also be used as necessary near catch basins, surface waters and other discharge points to prevent runoff impact.

5.6 Odor and Dust Controls

Odor control methods will be implemented during the construction activities to control emissions of nuisance odors from excavations or stockpiles. If nuisance odors are identified, construction activities will cease and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. The NYSDEC will be notified of all odor events concerning the construction work. Implementation of all odor controls, including cessation of work, will be the responsibility of the Remedial Engineer who is responsible for certifying the compliance of the construction activities.

All necessary means will be employed to control odors and eliminate associated nuisances onsite and offsite associated with the intrusive work. Odor control methods to be used may include one or more of the following measures as recommended by the Remedial Engineer: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; (c) use of foams to cover exposed odorous soils; (d) use of chemical odorants in spray or misting systems; and, (e) monitoring of odors in surrounding neighborhoods. If these methods are not successful, erection of enclosures will be considered around work areas to control odors. Alternatively, the intrusive work may be modified to minimize the generation of nuisance odors from the Site.

In addition to controlling odors, dust suppression control methods will also be implemented during the construction activities. Dust suppression control measures may include misting of the material during the excavation work.

5.7 Restrictions on Reuse of Onsite Materials

The following restriction on reuse of onsite materials will apply:

- Cleaning or processing of encountered concrete is prohibited.
- Organic matter (wood, roots, stumps, etc.) or other solid waste derived during invasive activities is prohibited for reuse onsite.
- Historic urban fill and soils removed from beneath the installed cover system will not be reused within a cover soil layer, within landscaping berms or as backfill for subsurface utility lines.
- Concrete pavement, asphalt pavement and/or recessed safety surfaces that are removed during construction activities cannot be re-used to restore the previously installed cover system.

5.8 Backfilling Requirements

Subgrade material used to backfill excavations or placed to increase Site grades or elevation shall meet the following criteria:

- Any offsite fill material brought to the Site for filling and grading purposes shall be from an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination.
- All backfill will meet the definition of environmentally clean fill as defined in Section 2.3.2.6 of the Site Management Plan
- If the contractor designates a source as “virgin” soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development, or agricultural use.
- Virgin soils will be subject to collection of one (1) representative grab sample per source. The sample will be analyzed for TCL VOCs; TCL SVOCs; TCL pesticides and PCBs; arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver and cyanide. As stated above all backfill will meet the definition of environmentally clean fill as defined in Section 2.3.2.6 of the Site Management Plan
- Non-virgin soils will be tested via collection of one (1) grab sample per 500 CY of material from each source area. If more than 1,000 CY of soil are borrowed from a given offsite non-virgin soil

source area and both samples of the first 1,000 CY meet the environmentally clean fill requirements listed in Section 2.3.2.6 of the Site Management Plan, the sample collection frequency will be reduced to one (1) grab sample for every 2,500 CY of additional soils from the same source, up to 5,000 CY. For borrow sources greater than 5,000 CY, sampling frequency may be reduced to one (1) sample per 5,000 CY, provided all earlier samples meet the environmentally clean fill requirements listed in Section 2.3.2.6 of the Site Management Plan.

6.0 CONTINGENCY PLAN

This section details the protocols to follow in the unlikely event that previously unidentified contaminants and/or material are discovered during onsite construction activities.

6.1 Identification of Unknown Contaminated Media or USTs

Identification of unknown or unexpected contaminated media identified by field screening activities during invasive Site work will be promptly communicated by telephone to the NYSDEC project manager. If previously unidentified underground storage tanks or contaminant sources are identified, sampling will be performed on product, sediment and surrounding soils, etc. These samples will be submitted for laboratory analysis for the following parameters: TAL metals; TCL VOCs; TCL SVOCs; and TCL pesticides and PCBs. These analytical parameters will not be modified without prior approval from the NYSDEC.

In the unlikely event that any USTs are encountered during soil disturbance, UST closures will, at a minimum, conform to DER-10.

7.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Shaw has developed a Soil Management Plan for the former Metro-North Property (Mott-Haven) site located at 730 Concourse Village West, Bronx, New York based on the Brownfield Cleanup Agreement W2-1074-05-08 entered into between the NYCSCA and the NYSDEC.

Shaw Environmental, Inc.

Curtis A. Kraemer

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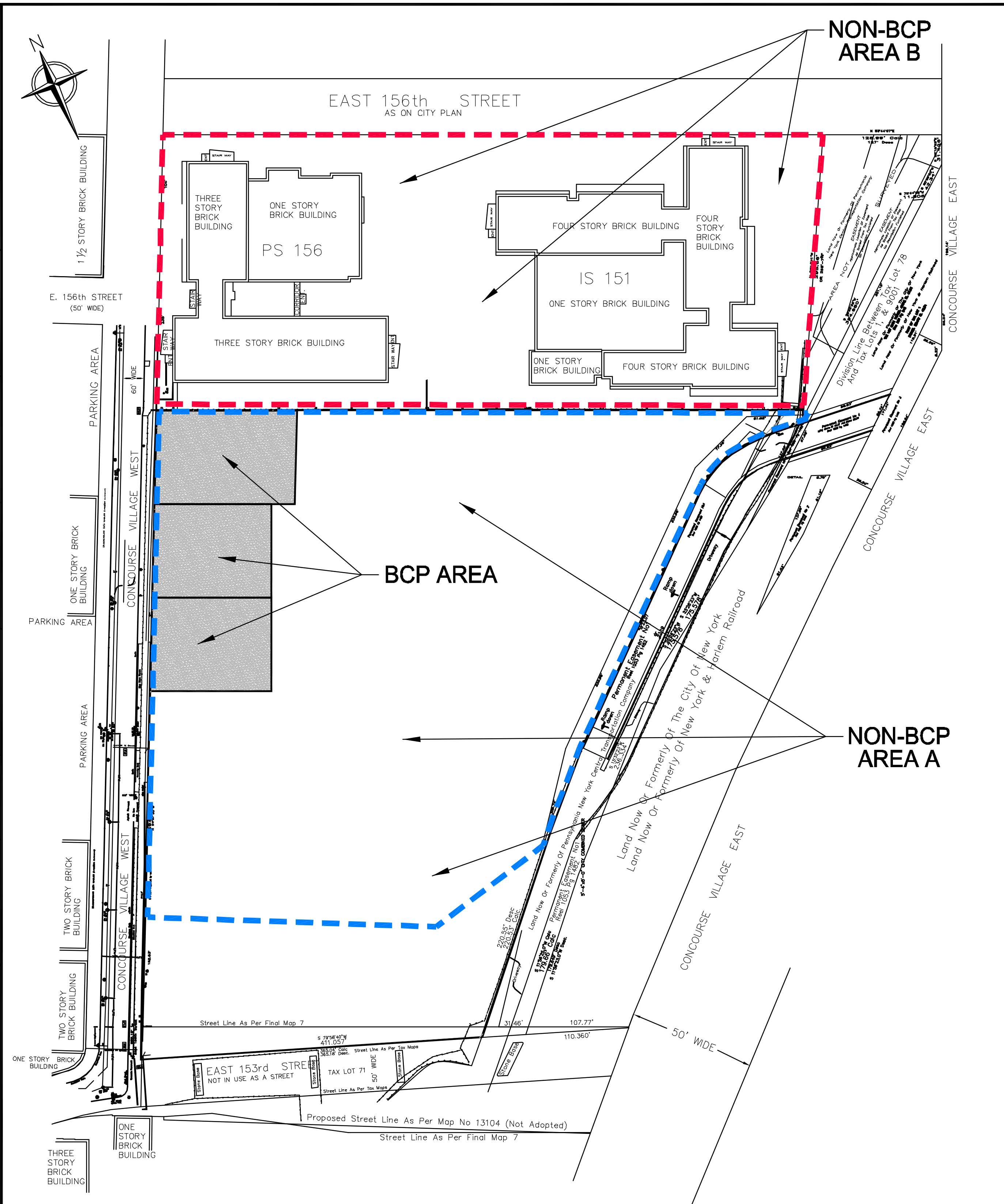
Curtis A. Kraemer, P.G.
Senior Geologist

Michael R. Sherwood

____

Michael R. Sherwood
Technical Reviewer

FIGURES



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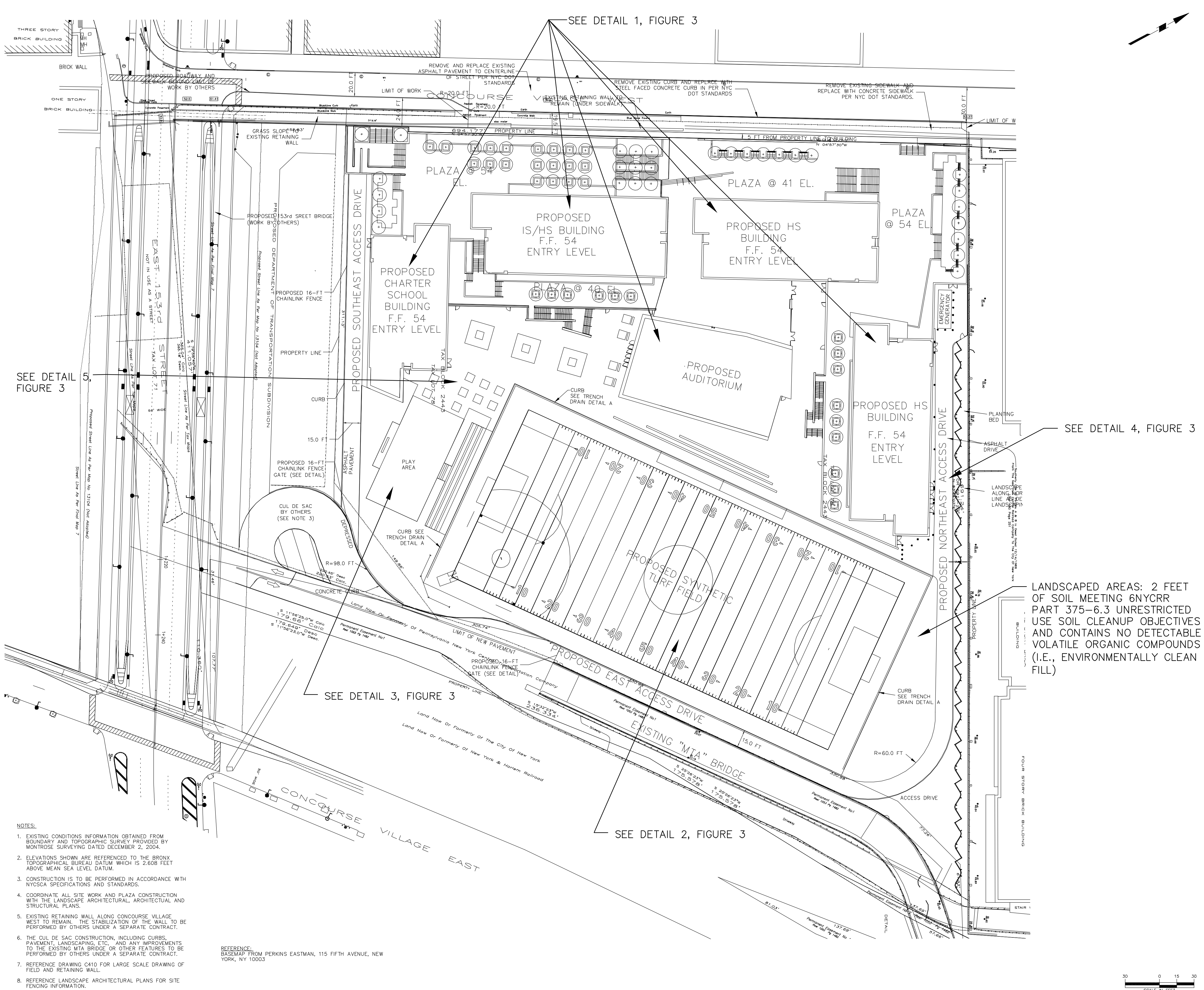
SCALE IN FEET

Shaw® Shaw Environmental, Inc.

DESIGNED BY: CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY		
DRAWN BY: B. Snyder	FIGURE 1 SITE MAP FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY		
CHECKED BY: C. Kraemer			
APPROVED BY:	DATE: 8/13/08	SCALE: AS SHOWN	DRAWING NO. Figure 1 — FIGURE 1

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	8/13/08	--	B. Snyder	C. Kraemer	--	Figure 1

File: O:\Shaw Offices – CAD Files\Harriman NY\Mott Haven Campus\Figure 1.dwg
Plot Date/Time: Aug 13, 2008 – 1:43pm
Plotted By: william.snyder
Xref:
Image: BCP Area & Area A.jpg



NOTES:

1. EXISTING CONDITIONS INFORMATION OBTAINED FROM BOUNDARY AND TOPOGRAPHIC SURVEY PROVIDED BY MONTROSE SURVEYING DATED DECEMBER 2, 2004.
2. ELEVATIONS SHOWN ARE REFERENCED TO THE BRONX TOPOGRAPHICAL BUREAU DATUM WHICH IS 2.608 FEET ABOVE MEAN SEA LEVEL DATUM.
3. CONSTRUCTION IS TO BE PERFORMED IN ACCORDANCE WITH NYCSCA SPECIFICATIONS AND STANDARDS.
4. COORDINATE ALL SITE WORK AND PLAZA CONSTRUCTION WITH THE LANDSCAPE ARCHITECTURAL, ARCHITECTUAL AND STRUCTURAL PLANS.
5. EXISTING RETAINING WALL ALONG CONCOURSE VILLAGE WEST TO REMAIN. THE STABILIZATION OF THE WALL TO BE PERFORMED BY OTHERS UNDER A SEPARATE CONTRACT.
6. THE CUL DE SAC CONSTRUCTION, INCLUDING CURBS, PAVEMENT, LANDSCAPING, ETC, AND ANY IMPROVEMENTS TO THE EXISTING MTA BRIDGE OR OTHER FEATURES TO BE PERFORMED BY OTHERS UNDER A SEPARATE CONTRACT.
7. REFERENCE DRAWING C410 FOR LARGE SCALE DRAWING OF FIELD AND RETAINING WALL.
8. REFERENCE LANDSCAPE ARCHITECTURAL PLANS FOR SITE FENCING INFORMATION.

REFERENCE:
BASEMAP FROM PERKINS EASTMAN, 115 FIFTH AVENUE, NEW YORK, NY 10003

30 0 15 30
SCALE IN FEET

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
115 FIFTH AVENUE
NEW YORK, NY 10003

CONSULTING ARCHITECT: ALEXANDER GORLIN ARCHITECT LLC
137 VARICK STREET
NEW YORK, NY 10013

STRUCTURAL ENGINEER: LESLIE E. ROBERTSON ASSOCIATES, RLLP
30 BROAD STREET
NEW YORK, NY 10004

MECHANICAL ENGINEER: FLACK + KURTZ ENGINEERS
475 FIFTH AVENUE
NEW YORK, NY 10017

CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA
360 WEST 31ST STREET, 8TH FLOOR
NEW YORK, NY 10001

FOOD SERVICE CONSULTANT: ROMANO GATLAND
99 WEST HOFFMAN AVENUE
LINDENHURST, NY 11757

ACOUSTIC AND THEATER CONSULTANT: HARVEY MARSHALL BERLING ASSOCIATES, LLC.
173 WEST 81ST STREET
SUITE 2, LOWER LEVEL
NEW YORK, NY 10024

LANDSCAPE ARCHITECT: RGR LANDSCAPE
115 FIFTH AVENUE
NEW YORK, NY 10003

BID SET

NOTE: Drawing may be printed at reduced scale

NO.	REVISION	DATE
1	ISSUED FOR ADDENDUM No. 1	JULY 31, 2006

KEY PLAN:

Block # 2443 Lot # 78

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Christine Schlendorf
Designer:	Ernesto Vela
Drawn by:	Christine Schlendorf
Checked by:	Perry Nuñez

LLW No.:	Facility Code:	Date:
033485	1215-05	06/30/06

Project:
MOTT HAVEN CAMPUS
-

Address: 730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

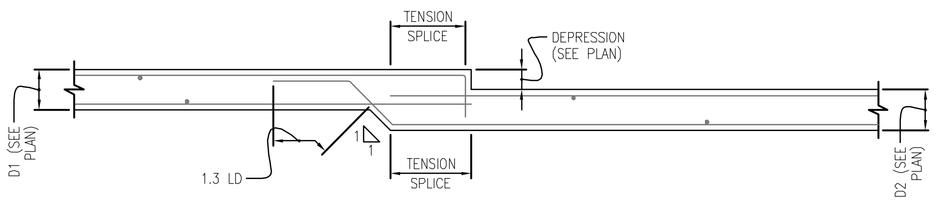
Drawing Title:
FIGURE 2
PRINCIPAL SITE COVERS

Drawing No.:

Sheets in Contract:
of 1072

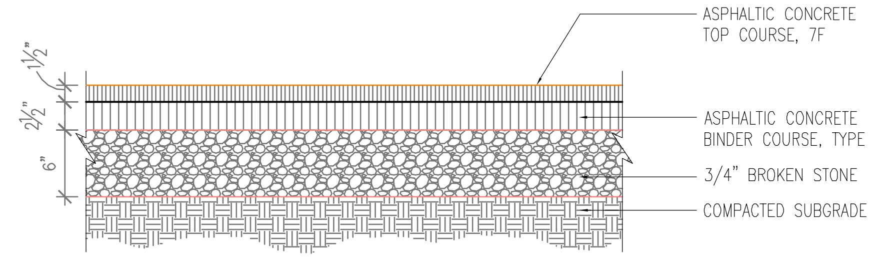
PFA No. 21200.00

O:\Shaw Offices – CAD Files\Harriman NY\Mott Haven Campus\FIGURE 2 New-SoMP.dwg 08/14/07 – 4:09pm



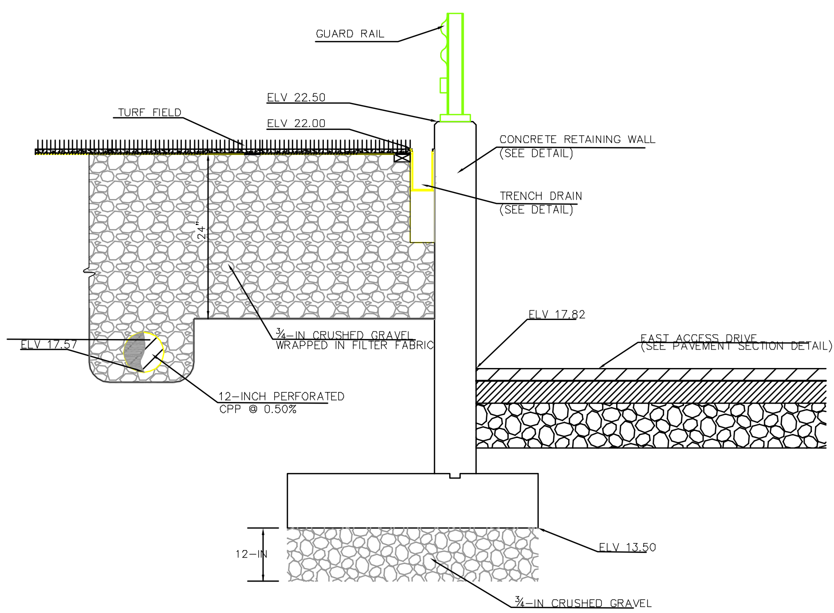
STEP IN SLAB

DETAIL 1



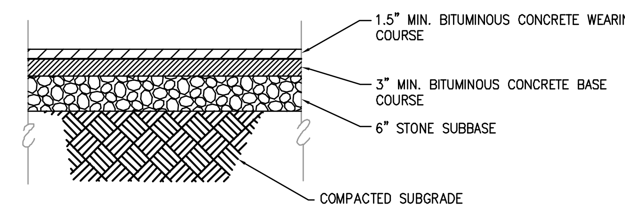
ASPHALT PAVEMENT AT RECREATION AREA

DETAIL 3



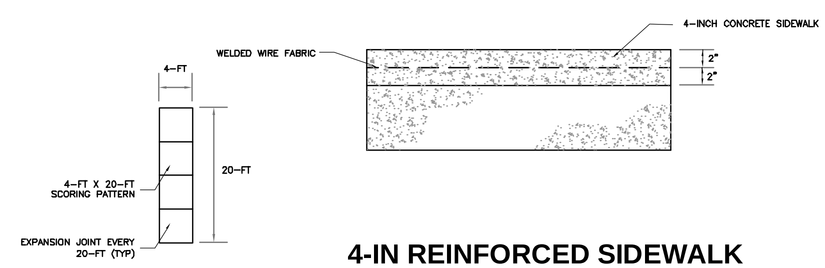
ATHLETIC FIELD

DETAIL 2



NEW BITUMINOUS PAVEMENT SECTION

DETAIL 4



4-IN REINFORCED SIDEWALK SECTION WITH SCORING PATTERN

DETAIL 5

Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY		
DRAWN BY: R.T./SSH	DETAILS		
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY		
APPROVED BY:	DATE: 8/14/08	SCALE: AS SHOWN	DRAWING NO. Figure 3–SoMP	FIGURE 3

DRAWING NUMBER Figure 24–SMP

OFFICE New York, NY

File: O:\Shaw Offices – CAD Files\Harriman NY\114926\SMP – DEC 2007\Figure 3 – SoMP.dwg Layout: Layout1 User: william.snyder Aug 14, 2008

Appendix F

Vapor Barrier
Specifications and Plans

SECTION 02220
WATERPROOFING / GAS VAPOR BARRIER (FLUID APPLIED)

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Install a fluid applied waterproofing / gas vapor barrier, LIQUID BOOT® or the Authority approved equivalent, under concrete slab and for wall applications as indicated, specified and required in the Contract Documents and Drawings (ENV1A, ENV1B, ENV1C, ENV1D, ENV1E,ENV1F, ENV2, and A390).

This Section specifically references products manufactured by LBI Technologies, Inc. (LBI). Another Authority approved product may be substituted provided it meets the material properties, test and application procedures defined in Part 2 and Part 3 of this Section.

1.02 RELATED SECTIONS

A. Environmental Site Assessment Reports........Section 02010

B. Site Preparation............................Section 02100

C. Earthwork...................................Section 02200

D. Sub-Slab Depressurization System...........Section 02221

E. Pile Foundations............................Section 02360

F. Porous Asphalt Paving and Aggregate Base.....Section 02512

1.03 STANDARDS AND REGULATIONS

A. American Society of Testing and Materials (ASTM) Standards.

ASTM D882 - Tensile Properties of Thin Plastic Sheeting.

ASTM D1709 - Impact Resistance of Plastic Film by the Free-Falling Dart Method.

ASTM D2582 - Puncture-Propagation Tear Resistance of

Plastic Film and Thin Sheeting.

ASTM D3776 - Mass per Unit Area (Weight) of Woven Fabric.

ASTM D4833 – Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.

ASTM E84 – Surface Burning Characteristics of Building Materials.

ASTM E96 - Water Vapor Transmission of Materials.

ASTM E1643 - Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

ASTM E1745 - Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

B. National Fire Protection Association, latest editions.

701 – Fire Tests for Flame-Resistant Textiles and Films.

1.04 RESTRICTIONS AND QUALITY CONTROL

A. Preinstallation Meeting: Convene a preinstallation meeting prior to the start of waterproofing / gas vapor barrier installation to assure proper substrate and installation conditions. Require attendance of parties directly affecting work of this Section, including Contractor, Architect/Engineer, installer and special inspector (if any). Review installation, protection, and coordination with other work.

B. General Performance Requirements: It is required that the waterproofing / gas vapor barrier be vapor tight and water tight for fifty (50) years. Failure to comply with this requirement will be considered a failure of materials and workmanship. The waterproofing / gas vapor barrier shall pass all acceptance tests outlined in Part 3.04 of this Section.

C. Installer: Waterproofing / gas vapor barrier installer shall be trained and approved by waterproofing / gas vapor barrier manufacturer, LBI Technologies, Inc. (LBI) or Authority approved equal.

The following is a list of some approved installers:

Quality Maintenance Contractors/USA Poly Coats
Contact: Nels Carlson
Phone: 1-800-249-1084

Edgeboro International
Contact: Jack Whitman, Jr.
Phone: 732-227-1356

Debrino Caulking
Contact: Al Poole
Phone: 518-732-7234

Terrafix Environmental
Contact: Troy Shaw
Phone: 416-674-0363

Structural Preservation Systems
Contact: Sanjiv Inamdar
Phone: 973-636-2700

D. Inspection: Contractor shall provide a licensed engineer with experience and qualifications to approve the work, independent of the installer, to conduct the inspection of the waterproofing / gas vapor barrier installation. Qualifications of this licensed engineer shall be approved by the Authority prior to the inspection. Approval of the work by an engineer does not relieve the manufacturer and/or the installer of their responsibility to produce and install the water and vapor protection system to meet the performance requirements as stated above. The inspection shall be performed by a licensed engineer with experience and qualifications to approve the work; independent of the installer. This is not the Authority's responsibility.

E. The installer shall perform a smoke test in accordance with Article 3.04C of this Section and shall document successful completion of this test.

1.05 SUBMITTALS

A. All submittals shall be received by the Authority for review at least 14 days prior to the commencement of work.

B. Product Data: Submit manufacturer's product data, including installation instructions and termination shop drawings.

C. Samples: Submit representative samples of the following for approval:

1. Waterproofing / gas vapor barrier membrane material.
2. Protection Board and/or Protection Mat.
3. Geotextiles.

D. Material Test Reports: Indicate and interpret test results for compliance of waterproofing / gas vapor barrier with requirements indicated, as applicable.

E. Certification: Submit manufacturer's Certification of Compliance indicating that materials delivered and used in the work are in strict compliance with specified requirements, see Article 2.01 in this Section.

F. Documentation of successful smoke test completion as required in Article 3.04C of this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original unbroken packages bearing manufacturer’s label showing brand, weight, volume, and batch number. Deliver materials to the site only after the Authority has reviewed and approved the required submittals.

B. Store materials at site in strict compliance with manufacturer’s instructions. Store materials in a clean, dry area on-site. Do not allow materials to freeze in containers.

C. Protect materials during handling and installation to prevent damage. Replace any damaged materials at no cost to the Authority unless the damaged material can be repaired per the manufacturer's requirements and to the satisfaction of the Authority and such that foundation water and vapor protection is not compromised.

1.07 PROJECT/SITE CONDITIONS

A. Protect all adjacent areas not to receive waterproofing / gas vapor barrier. Where necessary, apply masking to prevent staining of surfaces to remain exposed wherever membrane abuts to other finish surfaces.

B. Perform work only when existing and forecasted weather conditions are within manufacturer’s recommendations for the material and product used.

C. Minimum clearance required for application of product:
   1. 90 degree spray wand – 2 feet.
   2. Conventional spray wand – 4 feet.

D. Ambient temperature shall be within manufacturer’s specifications. For winter conditions the Contractor shall use space heaters and necessary cover (i.e., visqueen) to bring the ambient temperature to +45°F until the protection course and structural slab rebar has been placed.

E. The Contractor shall coordinate with all trades involved, the scheduling of excavation and backfill to ensure that all necessary components of work, due to be buried, are installed thus avoiding duplication of excavation work unless otherwise shown on the Contract Drawings or noted in other sections of the Contract Documents. No other work should be performed in areas above an installed waterproofing / vapor barrier section until the waterproofing / vapor barrier protection geotextile has been installed and the waterproofing / vapor barrier installer approves it. The Contractor shall verify there are no interferences with other existing or proposed subsurface systems. Aggregate backfill must be rolled flat and non-angular.

F. All plumbing, electrical, mechanical and structural items to be under or passing through the waterproofing / gas vapor barrier shall be positively secured in their proper positions and appropriately protected prior to membrane application.

G. Waterproofing / gas vapor barrier shall be installed before placement of reinforcing steel. When not possible, all exposed reinforcing steel shall be masked by General Contractor prior to membrane application.

H. Expansion joints must be filled with a conventional waterproof expansion joint material.

I. Surface preparation shall be per manufacturer’s specification.

1.08 EXTENDED WARRANTY

A. Submit a warranty, signed by the manufacturer of the waterproofing / gas vapor barrier and geotextile materials, agreeing to replace/repair defective materials including significant leakage of water and vapors within warranty period. The warranty period is 50 years after date of acceptance by the Authority.

Submit a separate warranty, signed by the installer of the waterproofing / gas vapor barrier and geotextile materials, agreeing to replace/repair defective materials and workmanship, including significant leakage of water and vapor within warranty period. The installer's warranty period is 5 years after date of acceptance by the Authority. For the Authority to accept the 5-year warranty from the installer, the following shall be performed:

- The installer shall comply with the Contract Document (Specification Sections 02220 and 02221 and Drawings ENV1A, ENV1B, ENV1C, ENV1D, ENV1E, ENV1F, ENV2, and A390) requirements for installation.
- SCA Project Management or a 3rd Party designated by the Authority shall perform inspections to verify that the waterproofing / gas vapor barrier was installed to specification.
- The requirements of Article 3.04 of this Section shall be met, including but not limited to "Once the membrane has passed the smoke test inspection, the successful completion shall be documented and signed off by a qualified inspector as delineated by the Engineer, General Contractor, or the Authority."

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fluid applied waterproofing / gas vapor barrier system - LIQUID BOOT® or approved equivalent; a single course, high build, polymer modified asphaltic emulsion. Water borne and spray applied at ambient temperatures. A minimum thickness of 80 dry mils is required. Non-toxic and odorless. LIQUID BOOT® Trowel Grade has similar properties with greater viscosity and is trowel applied. Manufactured by LBI Technologies, Inc., Santa Ana, CA (714) 384-0111.

B. Waterproofing / gas vapor barrier physical properties:

GAS VAPOR MEMBRANE	TEST METHOD	VALUE
Hydrogen Sulfide Gas Permeability	ASTM D1434	None Detected
Benzene, Toluene, Ethylene, Xylene, Gasoline, Hexane, Perchloroethylene, Trichloroethylene, Vinyl Chloride	ASTM D543 (tested at 20,000 ppm)	Less than 1% weight change
Sodium Sulfate (2% water solution)	ASTM D543, D412, D1434	Less than 1% weight change
Acid Exposure (10% H_2SO_4 for 90 days)	ASTM D543	Less than 1% weight change
Radon Permeability	Tested by US Dept. of Energy	Zero permeability to Radon (222Rn)
Chromate Exposure (10% Chromium^{6+} salt for 31 days)	ASTM E96	Less than 1% weight change
Air Infiltration	ASTM E283-91	0 cfm/sq. ft.
Bonded Seam Strength Tests	ASTM D6392	Passed
Micro Organism Resistance (Soil Burial) average weight change, average tensile strength change, average tensile stress change, average elongation change, bonded seams, methane permeability	ASTM D4068-88	Passed
Methane Permeability	ASTM 1434-82	Passed
Oil Resistance Test average weight change, average tensile strength change, average tensile stress change, average elongation change, bonded seams, methane permeability	ASTM D543-87	Passed
Heat Aging average tensile strength change, average tensile stress change, average elongation change, bonded seams	ASTM D4068-88	Passed
Dead Load Seam Strength	City of Los Angeles	Passed
Environmental Stress-Cracking	ASTM D1693-78	Passed
PCE Diffusion Coefficient	Tested at 6,000 mg/m^3	2.74×10^{-14} m^2/sec
TCE Diffusion Coefficient	Tested at 20,000 mg/m^3	8.04×10^{-14} m^2/sec
WATERPROOFING	**TEST METHOD**	**VALUE**
Soil Burial	ASTM E154-88	Passed
Water Penetration Rate	ASTM D2434	$<7.75 \times 10^{-9}$ cm/sec
Water Vapor Permeability	ASTM E96	0.24 perms
Water Vapor Transmission	ASTM E96	0.10 grains/h-ft^2
POTABLE WATER	**TEST METHOD**	**VALUE**
Toxicity Test	22 CCR 66696	Passed. CCR Bioassay—Flathead Minnow
Potable Water Containment	ANSI/NSF 61	NSF Certified for tanks >300,000 gallons

GENERAL INFORMATION	TEST METHOD	VALUE
Coefficient of Friction (with geotextile both sides)	ASTM D5321	0.72
Cold Bend Test	ASTM D146	Passed. No cracking at –25°F
Freeze-Thaw Resistance (100 Cycles)	ASTM A742	Meets criteria. No spalling or disbondment

Accelerated Weathering and Ultraviolet Exposure	ASTM D822	No adverse effect after 500 hours
Hydrostatic Head Resistance	ASTM D751	Tested to 138 feet or 60 p.s.i
Elongation	ASTM D412	1,332% without reinforcement, 90% recovery
Elongation with 8oz. non-woven geotextile both sides	ASTM D751	100% (same as geotextile tested separately)
Tensile Strength	ASTM D412	58 p.s.i. without reinforcement
Tensile Strength with 8oz. non-woven geotextile both sides	ASTM D751	196 p.s.i. (same as geotextile tested separately)
Tensile Bond Strength to Concrete	ASTM D413	2,556 lbs/ft^2 uplift force
Puncture Resistance with 8oz. non-woven geotextile both sides	ASTM D4833	286 lbs. (travel of probe = 0.756 inches) (same as geotextile tested separately)
Flame Spread	ASTM E108	Class A with top coat (comparable to UL790)
Electric Volume Resistivity	ASTM D257	1.91×10^{10} ohms-cm

C. Protection - On vertical surfaces, use: LIQUID BOOT® UltraShield P-100 or other protections as approved by the manufacturer, project architect or engineer.

On horizontal surfaces, use: LIQUID BOOT® UltraShield P-150 above the 80 mil LIQUID BOOT® waterproofing / vapor barrier or other protections as approved by the manufacturer, project architect or engineer.

Due to the diverse jobsite conditions, all protection materials must be approved by the membrane manufacturer, including the use of the LIQUID BOOT® UltraShield products.

D. Geotextile - LIQUID BOOT® Base Fabric T-60 non-woven geotextile as a cushion layer on gas permeable aggregate, unless otherwise specified and approved by membrane manufacturer. The heat-rolled side shall be used as the application surface.

E. Adhesive system for LIQUID BOOT® UltraShield: Use LIQUID BOOT® UltraGrip.

F. Cold Joints, Cracks, Form Tie Holes: Covered with Hardcast CRT 1602 Tape 3" wide.

G. General: Provide additional installation accessories as necessary. Ensure accessories are from same manufacturer as waterproofing / vapor barrier.

PART 3 - EXECUTION

3.01 EXAMINATION

All surfaces to receive waterproofing / gas vapor barrier shall be inspected and approved by the Authority or approved representative and installer prior to commencing work.

3.02 SURFACE PREPARATION

Provide 24-inch minimum clearance out from surfaces to receive the waterproofing / gas vapor barrier. The application surface shall be prepared and provided to the applicator in accordance with manufacturer's specifications listed below:

A. Concrete/Shotcrete/Masonry

Concrete surfaces shall be light broom finish or smoother, free of any dirt, debris, loose material, release agents or curing compounds. Fill all voids more than 1/4 inch deep and 1/4 inch wide. Masonry joints, cold joints, and form joints shall be struck smooth.

All penetrations shall be prepared in accordance with manufacturer's specifications. Provide a 3/4 inch minimum cant of LIQUID BOOT®, or other suitable material as approved by manufacturer, at all horizontal to vertical transitions and other inside corners of 120° or less. **Allow to cure overnight before the application of LIQUID BOOT®.**

All cracks or cold joints greater than 1/16 inch must be completely grouted with non-shrink grout as approved by engineer.

Install Hardcast reinforcing tape over all cold joints, cracks and form tie holes (after holes and cracks are grouted).

B. Dirt & Gravel

The subgrade shall consist of an 18-inch-thick layer of 3/4-inch rounded gas permeable aggregate compacted to provide a level working surface. The subgrade shall be moisture conditioned and compacted to a minimum relative compaction of 90 percent or as specified by civil/geotechnical engineer. The surfaces to be lined shall be free of all other rocks, stones, sticks, roots, sharp objects, or construction debris of any kind. No standing water, excessive moisture or frozen ground shall be allowed. Remove all stones or dirt clods greater than

1/4 inch. (NOTE: Aggregate sub-bases shall be rolled flat). All penetrations shall be prepared in accordance with manufacturer's specifications. All form stakes that penetrate the membrane shall be of rebar which shall be bent over and left in the slab. The Authority shall approve the subgrade on which the liner is to be installed prior to commencing work.

Trenches shall be cut oversize to accommodate waterproofing / gas vapor barrier membrane and protection course with perpendicular to sloped sides and maximum obtainable compaction. Adjoining grade shall be finish graded and compacted. Excavated walls shall be vertical or sloped back, free of roots and protruding rocks. Specific sub-grade preparation shall be designed by a qualified civil or geotechnical engineer.

If organic materials with potential for growth (ie: seeds or grasses) exist within the subbase, spray apply soil sterilant at the sterilant manufacturer's recommended rate.

3.03 INSTALLATION

A. INSTALLATION ON CONCRETE/SHOTCRETE/MASONRY
Follow the procedures below carefully.

1. Refer to Article 3.03D, "Sealing Around Penetrations", for procedures to seal around penetrations.

2. Provide a 3/4 inch minimum cant of LIQUID BOOT®, or other suitable material as approved by manufacturer, at all horizontal to vertical transitions and other inside corners of 120° or less. **Allow to cure overnight before the application of LIQUID BOOT®.**

3. Delineate a test area **on site** with a minimum dimension of 10 feet by 10 feet (3m by 3m). Apply LIQUID BOOT® to a thickness of 80 mils and let it cure for **24 hours**. Observe for blisters. If minor or no blistering occurs, proceed to the next step. (See note regarding blisters). If significant blistering does occur, apply a thin (10 mil) tack coat of LIQUID BOOT® "A" side without catalyst to the entire concrete surface and allow to cure before proceeding. (See also information regarding blister repair).

4. Spray apply LIQUID BOOT® to an 80 mil minimum dry thickness. Increase thickness to 100 dry mils if shotcrete is to be applied directly to membrane. If a second coat is required, remove any standing water from the membrane before proceeding with the second application.

5. Do not penetrate membrane. Keep membrane free of dirt and debris and traffic until a protective cover is in place. **It is the responsibility of the General Contractor to insure that the membrane and the protection system are not penetrated.**

6. After membrane has cured and checked for proper thickness and flaws, install protection material pursuant to manufacturer's instructions.

   NOTE: All testing or inspection to be performed prior to placing protection course.

7. **NON-HORIZONTAL SURFACES:** Spray on non-horizontal surfaces should begin at the bottom and work towards the top. This method allows the product to adhere to the surface before hitting catalyst runoff.

   NOTE: Due to the nature of concrete as a substrate, it is normal for some blistering to occur. This is caused by either concrete's tendency to off-gas or water that is temporarily trapped between the concrete and the membrane. With time and the applied pressure of backfill or over-slab, blisters will absorb into the concrete without detriment to the membrane.

   A small number of blister heads should be sampled and checked for proper membrane thickness. If the samples have the minimum required membrane thickness (80 mils), then the remaining blisters should not be punctured or cut. If the samples have less than the minimum 80 mil required membrane thickness, then the area can either be resprayed to obtain the proper thickness, or the blisters can be cut out and the area resprayed or patched with LIQUID BOOT® Trowel Grade.

B. INSTALLATION ON DIRT SURFACES AND MUDSLABS

1. Roll out geotextile on sub-grade with the heat-

rolled side facing up. Overlap seams a minimum of six inches (6"). Lay geotextile tight at all inside corners. Apply a thin (10 mil) tack coat of LIQUID BOOT® “A” side without catalyst within the seam overlap.

Line trenches with geotextile extending at least six inches (6") onto adjoining sub-grade if slab and footings are to be sprayed separately. Overlap seams a minimum of six inches (6"). Lay geotextile tight at all inside corners. Apply a thin (10 mil) tack coat of LIQUID BOOT® “A” side without catalyst within the seam overlap.

2. Minimize the use of nails to secure the geotextile to the dirt subgrade. Remove all nails before spraying membrane, if possible. Nails that cannot be removed from the dirt subgrade are to be patched with geotextile or Hardcast reinforcing tape overlapping the nail head by a minimum of two inches (2"). Apply a thin tack coat of LIQUID BOOT® under the geotextile patch, when patching with geotextile.

3. Refer to Article 3.03D, "Sealing Around Penetrations", for procedures to seal around penetrations.

4. Spray apply LIQUID BOOT® onto geotextile to an 80 mil minimum dry thickness. Increase thickness to 100 dry mils if shotcrete is to be applied directly to membrane. If a second coat is required, remove any standing water from the membrane before proceeding with the second application.

5. <u>Do not penetrate membrane</u>. Keep membrane free of dirt, debris and traffic until a protective cover is in place. **It is the responsibility of the General Contractor to insure that the membrane and the protection system are not penetrated.**

6. After membrane has cured and checked for proper thickness and flaws, install protection material pursuant to manufacturer’s instructions.

NOTE: All testing or inspection to be performed prior to placing protection course.

C. BLIND SIDE INSTALLATION (If Necessary)

1. Attach subsurface drain mat or, securely nail 8 oz. non-woven geotextile over lagging and soldier piles keeping geotextile tight to lagging wall. Overlap seams a minimum of six inches (6").

2. Roll out specified geotextile vertically with the heat-rolled side facing out and staple to lagging using 3/8 long staples 12" on center. Overlap seams a minimum of six inches (6"). Spray LIQUID BOOT® within the seam overlap to a thickness of 80 mils minimum. Do not staple top layer of geotextile at overlap.

3. Refer to Article 3.03D, "Sealing Around Penetrations", for procedures to seal around penetrations.

4. Provide a 3/4 inch minimum cant of LIQUID BOOT®, or other suitable material as approved by manufacturer, at all horizontal to vertical transitions and other inside corners of 120° or less. **Allow to cure overnight before the application of LIQUID BOOT® membrane.**

5. Spray apply LIQUID BOOT® to a minimum thickness of 80 mils (100 mils if installing shotcrete walls). <u>Remove any standing water</u>.

6. <u>Do not penetrate membrane</u>. Keep membrane free of dirt and debris until concrete is in place. **It is the responsibility of the General Contractor to insure that the membrane and the protection system are not penetrated.**

D. SEALING AROUND PENETRATIONS

1. Option 1

   a. Clean all penetrations. All metal penetrations shall be sanded clean with emery cloth.

   b. For applications requiring geotextile, roll out geotextile on sub-grade with the heat-rolled side facing up, overlapping seams a minimum of six inches (6"). Cut the geotextile around penetrations so that it lays flat on the sub-grade. Lay geotextile tight at all inside corners. Apply a thin (10 mil) tack coat of LIQUID BOOT® "A" side without catalyst within the seam overlap.

c. At the base of penetration install a minimum ¾ inch thick membrane cant of LIQUID BOOT®, or other suitable material as approved by manufacturer. Extend the membrane at an 80 mil thickness three inches (3") around the base of penetration and up the penetration a minimum of three inches (3"). **Allow to cure overnight before the application of LIQUID BOOT® membrane (Refer to Typical Riser Detail at Slab on Contract Drawing ENV-2).**

d. Spray apply LIQUID BOOT® to an 80 mils minimum dry thickness around the penetration, completely encapsulating the collar assembly and to a height of one and one half inches (1 1/2") minimum above the membrane as described in step "c" above. Spray apply LIQUID BOOT® to surrounding areas as specified for the particular application **(Refer to Typical Riser Detail at Slab on Contract Drawing ENV-2).**

e. Allow LIQUID BOOT® to cure completely before proceeding to step "f".

f. Wrap penetration with polypropylene cable tie at a point two inches (2") above the base of the penetration. Tighten the cable tie firmly so as to squeeze, but not cut, the cured membrane collar.

g. Inspect to verify that all underground conduits (electrical, plumbing, cable, telephone, etc.) penetrating through the membrane are air tight.

2. Option 2 (For Gas Vapor Membrane Only)

a. Clean all penetrations. All metal penetrations shall be sanded clean with emery cloth.

b. For applications requiring geotextile, roll out geotextile on sub-grade with the heat-rolled side facing up, overlapping seams a minimum of six inches (6"). Cut the geotextile around penetrations so that it lays flat on the sub-grade. Lay geotextile tight at all inside corners. Apply a thin (10 mil) tack coat of LIQUID BOOT® "A" side without catalyst within the seam overlap.

c. Spray apply LIQUID BOOT® to surrounding areas as specified for the particular application to an 80 mil minimum dry thickness. At the base of penetration install a minimum 3/4 inch thick membrane cant of LIQUID BOOT®, or other suitable material as approved by manufacturer. Extend the membrane at 80 mil thickness up the penetration a minimum of three inches (3"). **Allow to cure overnight before proceeding to step "d" (Refer to Typical Riser Detail at Slab on Contract Drawing ENV-2).**

d. Spray apply LIQUID BOOT® the membrane at an 80 mil thickness three inches (3") around the base of penetration and up the penetration, completely encapsulating the collar assembly, to a height of one and one half inches (1 1/2") minimum above the membrane as described in step "c" above. **(Refer to Typical Riser Detail at Slab on Contract Drawing ENV-2).**

e. Allow LIQUID BOOT® to cure completely before proceeding to step "f".

f. Wrap penetration with polypropylene cable tie at a point two inches (2") above the base of the penetration. Tighten the cable tie firmly so as to squeeze, but not cut, the cured membrane collar.

g. Inspect to verify that all underground conduits (electrical, plumbing, cable, telephone, etc.) penetrating through the membrane are air tight.

3.04 FIELD QUALITY CONTROL

Field Quality Control is a very important part of all LIQUID BOOT® applications. Applicators should check their own work for coverage, thickness, and all around good workmanship before calling for inspections.

The membrane must be cured at least overnight before inspecting for dry-thickness, holes, shadow shrinkage, and any other membrane damage. If water testing is to be performed, allow the membrane to cure at least 72 hours prior to the water test.

When thickness or integrity is in question the membrane should be tested in the proper manner as described below. However, over-sampling defeats the intent of inspections. Inspectors should always use visual and tactile measurement to guide them. Areas suspected of being too thin to the touch should be measured with the gauges to determine the exact thickness.

A minimum of one (1) sample per thousand square feet of applied material shall be observed by the Authority or approved representative.

A. ON CONCRETE/SHOTCRETE/MASONRY & OTHER HARD SURFACES

1. Membrane shall be checked for proper thickness with a blunt-nose depth gauge, taking one reading every 500 square feet. Record the readings. Mark the test area for repair, if necessary.

2. If necessary, test areas are to be patched over with LIQUID BOOT® to an 80 mils minimum dry thickness, extending a minimum of one inch (1") beyond the test perimeter.

B. ON DIRT AND OTHER SOFT SUBSTRATES

1. Coupon samples shall be cut from the membrane and geotextile sandwich to a maximum area of 2 square inches. Measure the thickness with a mil-reading caliper, per 500 square feet. Deduct the plain geotextile thickness to determine the thickness of LIQUID BOOT® membrane. Mark the test area for repair. Readings shall be recorded on the Coupon Sampling and Smoke Testing Log by qualified inspector.

2. Voids left by sampling are to be patched with geotextile overlapping the void by a minimum of two inches (2"). Apply a thin tack coat of LIQUID BOOT® under the geotextile patch. Then spray or trowel apply LIQUID BOOT® to an 80 mils minimum dry thickness, extending at least three inches (3") beyond geotextile patch.

C. SMOKE TESTING FOR HOLES

All Waterproofing / Gas Vapor Membranes shall be Smoke Tested in accordance with the following protocol:

1. The waterproofing / gas membrane shall be visually inspected. Any apparent deficiencies and/or installation problems shall be corrected prior to Smoke Testing.

2. Smoke Testing of the LIQUID BOOT® membrane to be conducted by Approved LIQUID BOOT® Installer and observed by qualified inspector as designated.

3. The date, time, testing reference area, temperature, wind speed/direction, and cloud cover shall be recorded on the Smoke Testing Record. The ambient air temperature at the time of testing should be in excess of 45° F and the wind speed at ground level should be 15 mph or less. (Note: visual identification of leaks becomes more difficult with increasing wind speed.)

4. Delineate a smoke testing area of 2,000 - 5,000 ft^2 maximum). Assemble and situate smoke testing system to inject smoke beneath membrane. Only inert, non-toxic smoke is to be utilized for membrane Smoke Test.

5. Designate testing control areas by cutting openings in an “X” pattern (min. 4” X 4”) in the membrane at selected locations. Mark testing control areas for identification prior to conducting the smoke test.

6. Activate smoke generator / blower system (nominal 150 – 950 cfm). Apply sufficient pressure as to ensure that smoke will permeate the designated testing area. For verification, ensure that smoke is leaking through testing control areas.

7. Pump smoke beneath the membrane (Min. 1 – 2 minutes). Observe for leaks in the membrane. Reduce pressure / flow rate if excessive lifting of the membrane occurs.

8. Thoroughly inspect entire membrane surface within area delineated for testing. Use marking device as approved by LBI Technologies Inc. to mark / label any leak locations. Mark / label leak locations on floor plan and corresponding testing reference area.

9. Repair leak locations marked in step #7 by spraying LIQUID BOOT® or using trowel grade LIQUID BOOT®.

10. Repeat step #'s 7 and 8, as necessary to confirm integrity of the membrane.

11. Readings shall be recorded on the Coupon Sampling and Smoke Testing Log by qualified inspector. Once the membrane has passed the smoke test inspection, the successful completion shall be documented and signed off by a qualified inspector as delineated by the Engineer, General Contractor, or the Authority.

3.05 PROTECTION

A. The 80 mil waterproofing / gas vapor barrier shall be protected per manufacturer's recommendations to prevent disturbance, damage or deterioration by work of other trades or environmental conditions. Protect waterproofing / gas vapor barrier from damage during installation of reinforcing steel and utilities and during placement of concrete slab or granular materials. Sharp angular backfill materials shall not be placed immediately against the LIQUID BOOT® barrier.

B. The Authority will visually inspect the condition of the 80 mil waterproofing / gas vapor barrier immediately prior to placing the overlying geotextile protective layer or below-grade wall backfill. All damage to the installed waterproofing / gas vapor barrier shall be repaired at the Contractor's expense prior to placement of concrete or backfill.

C. Ensure there is no moisture entrapment by waterproofing / vapor barrier due to rainfall or ground water intrusion.

D. Protect reinforced waterproofing / vapor barrier from damage until covered by finish wall.

E. Immediately repair damaged waterproofing / vapor barrier in accordance with manufacturer's instructions.

3.06 WARRANTY

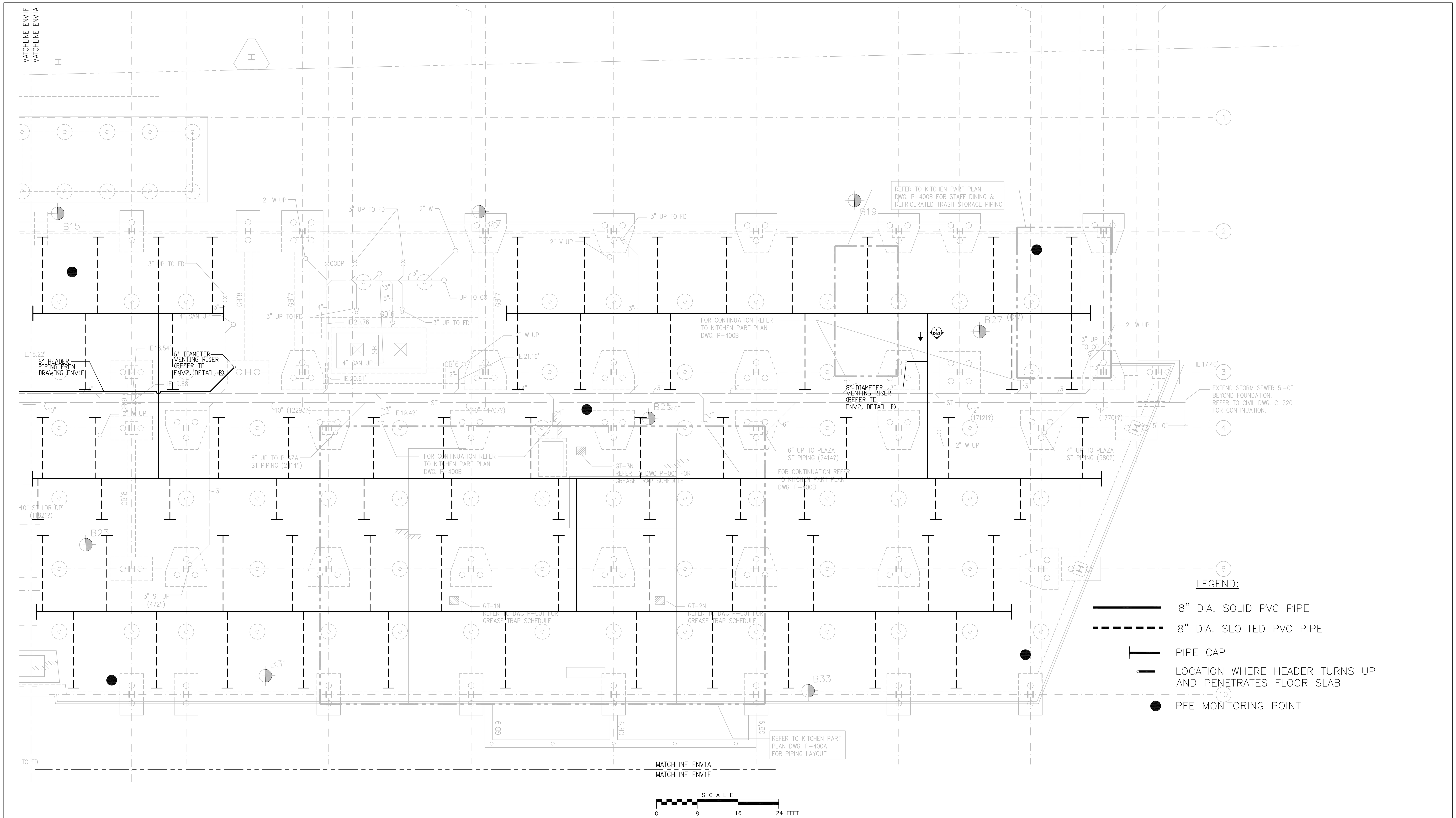
A. The manufacturer and installer shall provide separate written warranties to the Authority as specified in Article 1.08 of this Section.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:	________________	________________
1. Waterproofing / gas vapor barrier material		
2. Protection Board/Mat		
3. Geotextiles		
Shop Drawings:	________________	________________
Samples:	________________	________________
Design Data:	________________	________________
1. Barrier Composition		
Test Reports:	________________	________________
Daily Logs:	________________	________________
Certification:	________________	________________
Warranties:	________________	________________
Inspection Certification Reports (Coupon Sampling And Smoke Testing Log):	________________	________________

* * *



NOTES :

1. THE SURFACES TO BE LINED SHALL BE FREE OF ALL ROCKS, STONES, STICKS, ROOTS, SHARP OBJECTS, OR CONSTRUCTION DEBRIS OF ANY KIND. NO STANDING WATER, EXCESSIVE MOISTURE OR FROZEN GROUND SHALL BE ALLOWED.
2. AGGREGATE BACKFILL MUST BE ROLLED FLAT AND NON-ANGULAR.
3. DRAWINGS ENV1A THROUGH ENV1F AND ENV2 SHALL BE USED IN CONJUNCTION WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
4. REFER TO ARCHITECTURAL DRAWINGS FOR SPECIFIC LIQUID BOOT TERMINATION DETAILS.
5. UNDERSLAB GAS VAPOR COLLECTION PIPING SHALL BE CONSTRUCTED OF SCHEDULE 80 PVC WITH 6 ROWS OF 0.03 INCH WIDE SLOTS ALONG THE CIRCUMFERENCE OF THE PIPE KEEPING SLOT SPACING OF 0.25 INCH THROUGHOUT THE LENGTH OF EACH PIPE. THE INSIDE AND OUTSIDE SLOT LENGTHS SHALL BE 1.5 AND 2.75 INCHES RESPECTIVELY. THE SOLID PIPING SHALL BE CONSTRUCTED OF SCHEDULE 80 PVC WITH 1 ROW OF 0.5 INCH DIAMETER PERFORATION AT THE BOTTOM OF THE PIPE KEEPING PERFORATION SPACING OF 2 FEET THROUGHOUT THE LENGTH OF EACH SOLID PIPE TO DRAIN THE CONDENSATE WATER. SLOTTED AND SOLID PIPE ENDS TO BE CAPPED.
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DRAWING PREPARED BY SHAW ENVIRONMENTAL & INFRASTRUCTURE ENGINEERING OF NEW YORK, P. C.
BASE DRAWING: SCHOOL A FIRST FLOOR FRAMING PLAN, DRAWING NO.S101A

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

Architecture & Engineering
E. Bruce Barrett, R.A., Vice President

Elon R. Abneri, P.E., Director of Design Studio 1
Timothy F. Ng, R.A., PP., Director of Design Studio 2
George D. Roussey, P.E., Director of Design Studio 3
Gory Deane, Director of Operations, Special Projects

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
115 FIFTH AVENUE
NEW YORK, NY 10003

CONSULTING ARCHITECT: ALEXANDER GORLIN ARCHITECT LLC
137 VARICK STREET
NEW YORK, NY 10013

STRUCTURAL ENGINEER: LESLIE E. ROBERTSON ASSOCIATES, RLLP
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475 FIFTH AVENUE
NEW YORK, NY 10017

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LINDENHURST, NY 11757

ACOUSTIC AND THEATER CONSULTANT: HARVEY MARSHALL BERLING ASSOCIATES, LLC.
173 WEST 81ST STREET
SUITE 2, LOWER LEVEL
NEW YORK, NY 10024

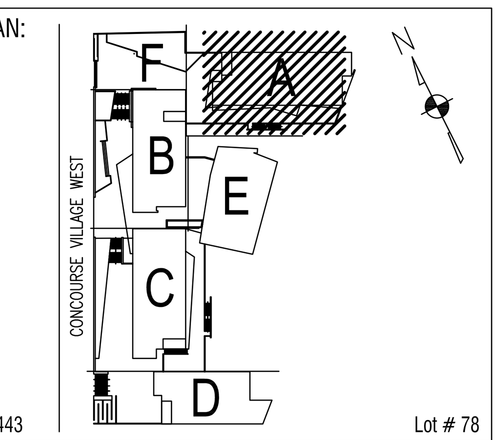
LANDSCAPE ARCHITECT: RGR LANDSCAPE
115 FIFTH AVENUE
NEW YORK, NY 10003

BID SET

NOTE: Drawing may be printed at reduced scale

NO.	REVISION	DATE
1	FID SUBMISSION	10.31.06

KEY PLAN:



Block # 2443 Lot # 78

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Ernesto Vela
Designer:	Joanna Wrenn
Drawn by:	Randy Tagoff
Checked by:	August Arrigo

LLW No.:	Facility Code:	Date:
033485	1215-05	06/30/06

Project:
MOTT HAVEN CAMPUS
-

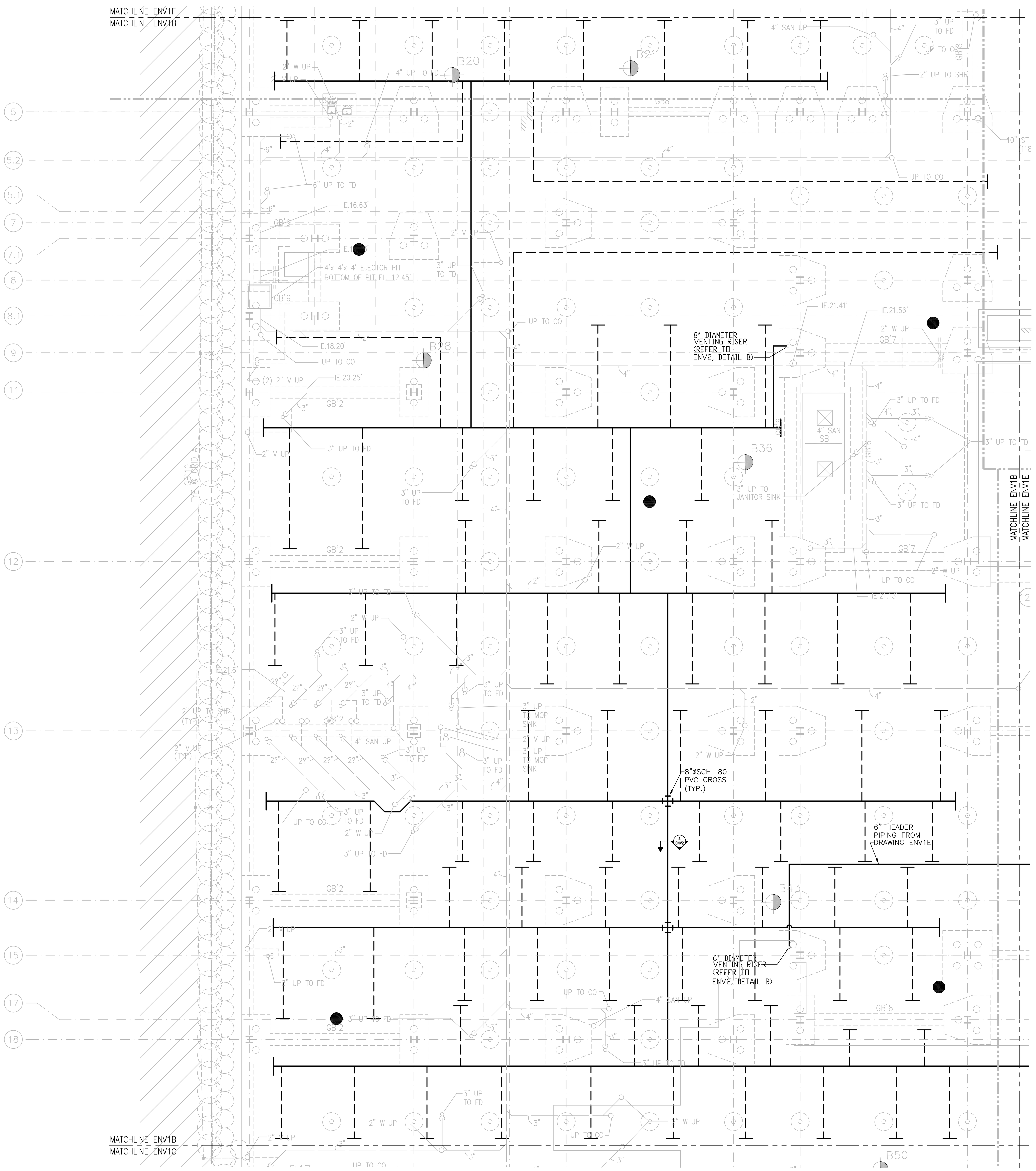
Address: 730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

Drawing Title:
BUILDING A-
GAS VAPOR COLLECTION
SYSTEM PIPING PLAN

Drawing No.:
ENV1A

Sheets in Contract:
45 of 1072

PEA No. 21200.00



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LEGEND:

- 8" DIA. SOLID PVC PIPE
- 8" DIA. SLOTTED PVC PIPE
- PIPE CAP
- LOCATION WHERE HEADER TURNS UP AND PENETRATES FLOOR SLAB
- PFE MONITORING POINT

DRAWING PREPARED BY SHAW ENVIRONMENTAL & INFRASTRUCTURE ENGINEERING OF NEW YORK, P. C.
BASE DRAWING: SCHOOL B FIRST FLOOR FRAMING PLAN, DRAWING NO.S101B

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
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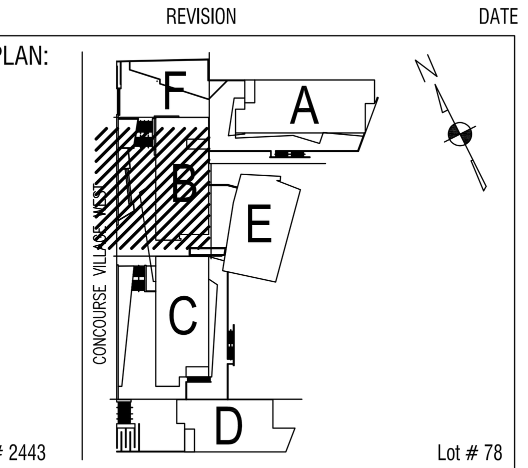

Block # 2443
Lot # 78

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Project Architect/Engineer:	Ernesto Vela
Designer:	Joanna Wrenn
Drawn by:	Randy Tagoff
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033485	1215-05	06/30/06

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MOTT HAVEN CAMPUS
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Drawing Title:

BUILDING B-
GAS VAPOR COLLECTION
SYSTEM PIPING PLAN

Drawing No.:

ENV1B

Sheets in Contract:
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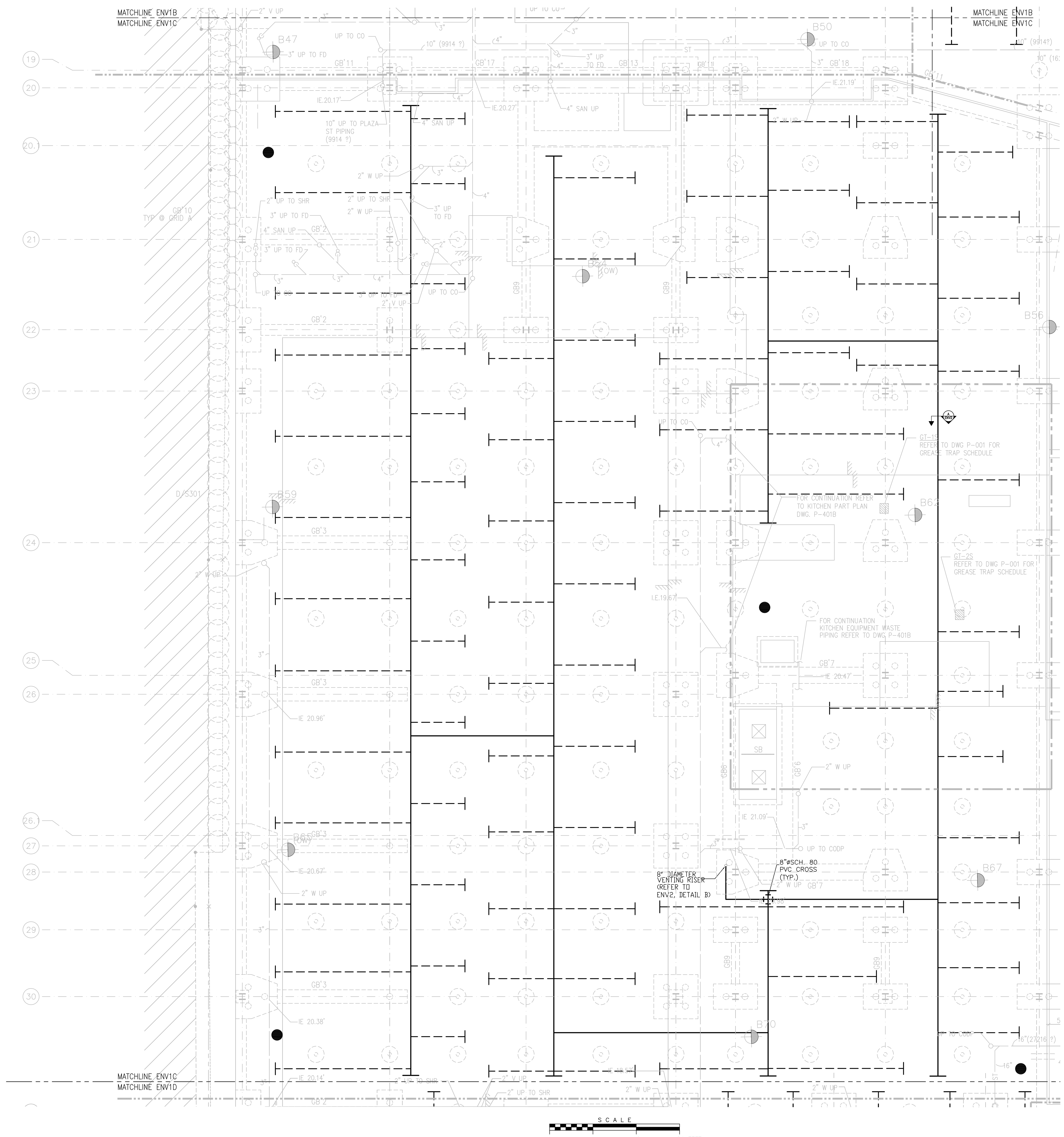
PEA No. 21200.00



DRAWING PREPARED BY SHAW ENVIRONMENTAL & INFRASTRUCTURE ENGINEERING OF NEW YORK, P. C.
BASE DRAWING: SCHOOL C FIRST FLOOR FRAMING PLAN, DRAWING NO. S101C

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LEGEND:

- 8" DIA. SOLID PVC PIPE
- 8" DIA. SLOTTED PVC PIPE
- PIPE CAP
- LOCATION WHERE HEADER TURNS UP AND PENETRATES FLOOR SLAB
- PFE MONITORING POINT

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

Sharon L. Greenberger, MCP, President & CEO

Architecture & Engineering
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BID SET

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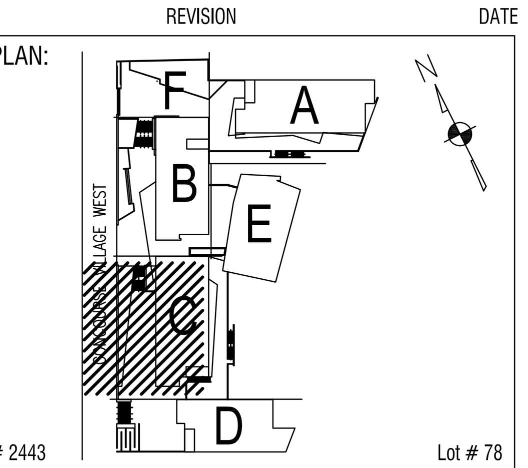
KEY PLAN:



SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Ernesto Vela
Designer:	Joanna Wrenn
Drawn by:	Randy Tagoff
Checked by:	August Arrigo

LLW No.:	Facility Code:	Date:
033485	1215-05	06/30/06

Project:

MOTT HAVEN CAMPUS
-

Address: 730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

Drawing Title:

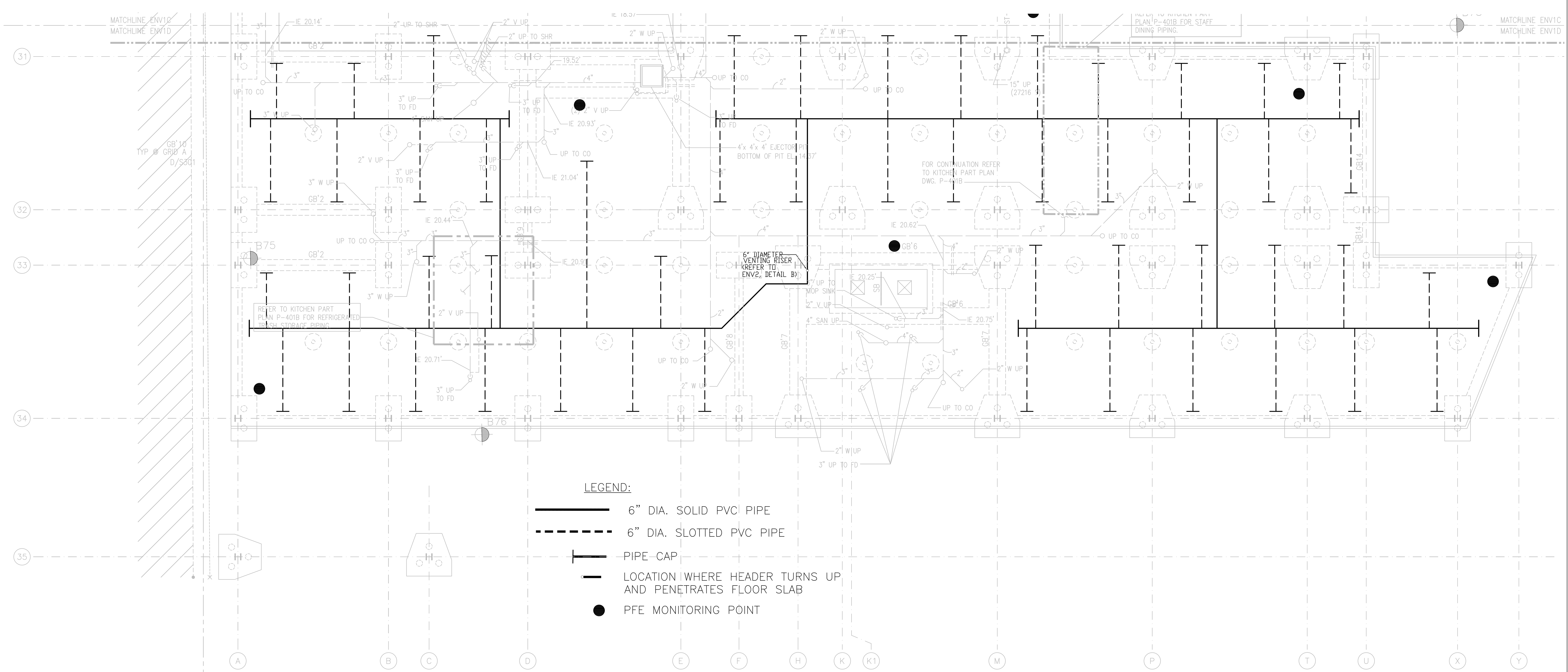
BUILDING C-
GAS VAPOR COLLECTION
SYSTEM PIPING PLAN

Drawing No.:

ENV1C

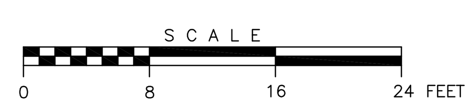
Sheets in Contract:
47 of 1072

PEA No. 21200.00



LEGEND:

(solid line)	6" DIA. SOLID PVC PIPE
(dashed line)	6" DIA. SLOTTED PVC PIPE
(capped line)	PIPE CAP
(short line)	LOCATION WHERE HEADER TURNS UP AND PENETRATES FLOOR SLAB
(dot)	PFE MONITORING POINT



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DRAWING PREPARED BY SHAW ENVIRONMENTAL & INFRASTRUCTURE ENGINEERING OF NEW YORK, P. C.
BASE DRAWING: SCHOOL D FIRST FLOOR FRAMING PLAN, DRAWING NO.S101D

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
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BID SET

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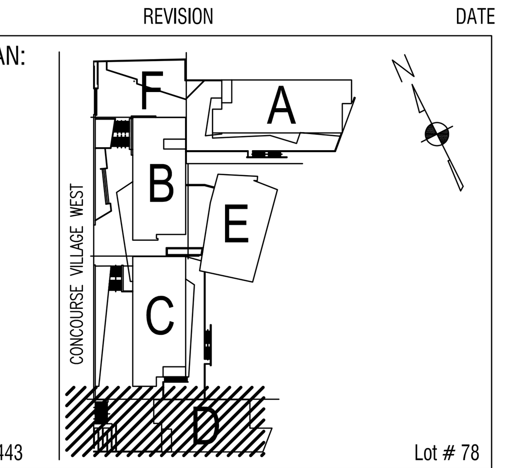

Block # 2443 Lot # 78

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Ernesto Vela
Designer:	Joanna Wrenn
Drawn by:	Randy Tagoff
Checked by:	August Arrigo

LLW No.:	Facility Code:	Date:
033485	1215-05	06/30/06

Project:
MOTT HAVEN CAMPUS
-

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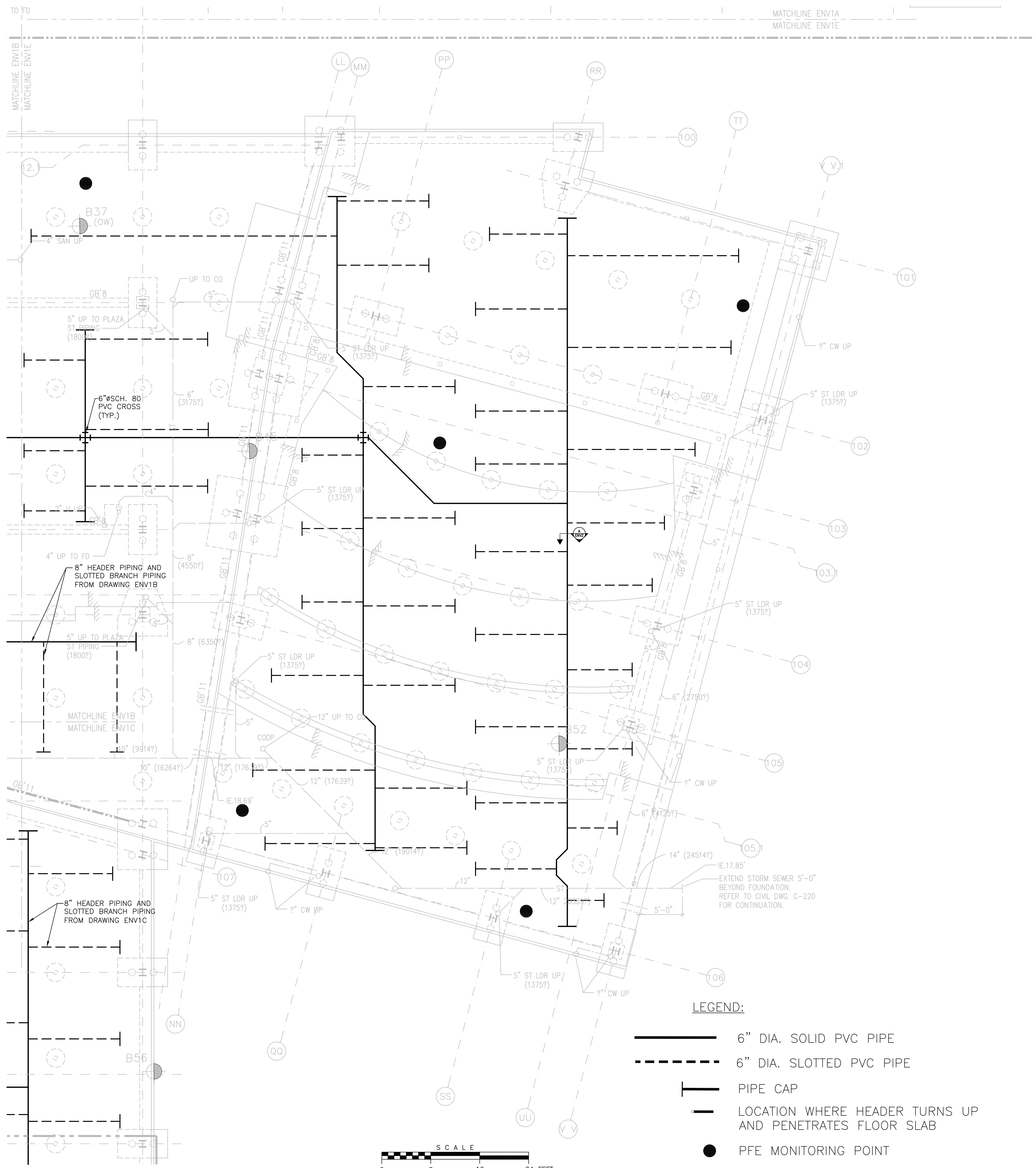
Drawing Title:
BUILDING D-
GAS VAPOR COLLECTION
SYSTEM PIPING PLAN

Drawing No.:
ENV1D

Sheets in Contract:
48 of 1072

PEA No. 21200.00



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BASE DRAWING: SCHOOL E AUDITORIUM FRAMING PLAN, DRAWING NO.S101E

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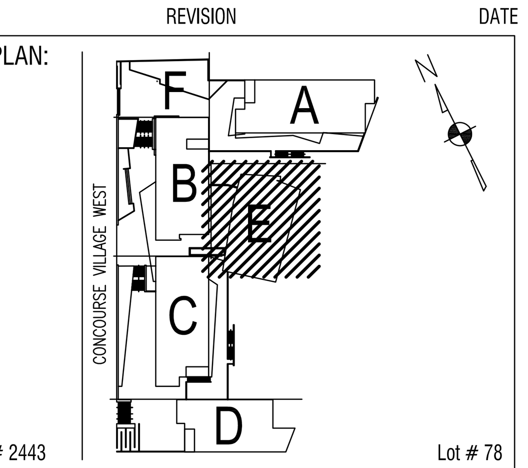

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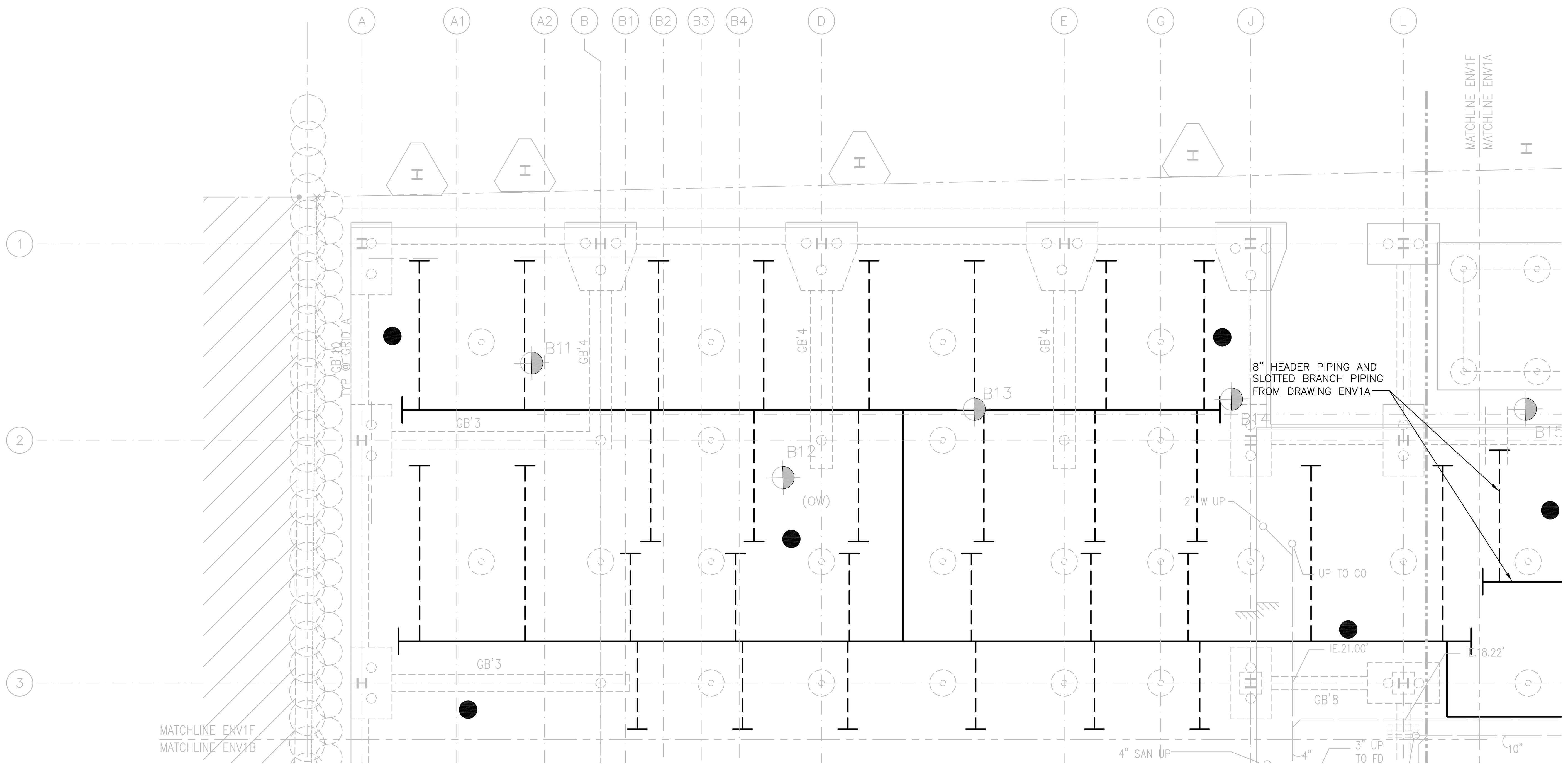

SCALE
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8. WHERE SUBSLAB HEADER PIPING IS SHOWN TO PASS THROUGH GRADE BEAMS, 6" PIPING SHALL BE REDUCED DOWN TO 4" AT THESE LOCATIONS WITH SCH 80 PVC REDUCER BUSHINGS. 4" SUBSLAB PIPING SHALL RUN THROUGH SLEEVES INSTALLED THROUGH THE 5 1/2" THICK SECTION OF CONCRETE BETWEEN THE BOTTOM OF THE FLOOR SLAB AND TOP OF GRADE BEAM. REFER TO STRUCTURAL DRAWINGS FOR DETAILS. USE 45° SCH 80 PVC ELBOWS TO BRING SUBSLAB HEADER PIPING TO REQUIRED ELEVATION BETWEEN BOTTOM OF FLOOR SLAB AND TOP OF GRADE BEAM.
9. WHERE SUBSLAB HEADER AND SOLID PIPING IS SHOWN TO PASS ABOVE UTILITIES, 6" HEADER PIPING SHALL RUN THROUGH SLEEVES INSTALLED THROUGH THE CONCRETE ENCASED UTILITIES. THE SECTION OF SLOTTED PIPING PASSING THROUGH THE SLEEVES SHALL BE CONVERTED TO SOLID PIPING TO PREVENT CONCRETE PLUGGING. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
10. TOP OF VENT STACKS SHALL BE A MINIMUM OF 3 FEET ABOVE THE ROOF LINE AND CAPPED WITH 6" RAIN HATS. CONTRACTOR TO VERIFY THAT VENT STACK EXHAUST LOCATIONS ARE AT LEAST 10 FEET AWAY FROM ANY ADJOINING OR ADJACENT BUILDINGS, HVAC INTAKES, SUPPLY REGISTERS, AND/OR OPENINGS LESS THAN TWO FEET BELOW THE EXHAUST POINTS. FINAL LOCATION AND HEIGHT OF VENT STACKS SHALL BE IN ACCORDANCE WITH NEW YORK CITY BUILDING CODE AND NEW YORK STATE DEPARTMENT OF HEALTH GUIDANCE.
11. A MINIMUM OF ONE (1) OFFSET PIPE CLAMP IS REQUIRED PER FLOOR WITH SPACING BETWEEN PIPE CLAMPS NOT TO EXCEED 15'.
12. REFER TO DRAWING ENV2 DETAIL D AND ARCHITECTURAL DRAWINGS FOR PIPING DETAILS AT ROOF. CONTRACTOR SHALL FIRESTOP ALL NEW PENETRATIONS THROUGH FLOORS AND ROOF AS REQUIRED BY NEW YORK CITY BUILDING CODE AND MAINTAIN MINIMUM REQUIRED FIRE RATING.
13. USE GRAY HEAVY BODIED CEMENT FOR ALL GLUED PVC JOINTS.
14. USE PIPE JOINT COMPOUND OR JOINT TAPE (TEFLON) ON MALE THREADS AT EACH GALVANIZED STEEL PIPE JOINT AND TIGHTEN JOINT TO LEAVE NO MORE THAN THREE (3) THREADS EXPOSED.
15. PIPING CAN BE ADJUSTED UP TO 12" IN ANY DIRECTION TO ACCOMMODATE BUILDING UTILITY/MECHANICAL REQUIREMENTS. OFFSET PIPING SHALL BE PROVIDED WHERE NECESSARY TO ACCOMODATE GRAVITY DRAINAGE, UTILITIES, AND OTHER SUBSURFACE OBSTRUCTIONS. INSTALLATION OF OFFSETS SHALL BE MADE WITH 45° FITTINGS TO MINIMIZE THE SYSTEM PRESSURE DROP ACROSS THE OFFSET.
16. REFER TO STRUCTURAL FOUNDATION SECTIONAL VIEW FOR ANY VARIATION TO SLAB DEPTHS AND ELEVATIONS.
17. TESTING PROCEDURES: CONTRACTOR SHALL PRESSURE TEST ABOVEGROUND VAPOR PIPING WITHIN THE BUILDING. TEMPORARILY PLUG PIPING AT BUILDING SLAB (CLEANOUT TEST TEE) AND ROOF AND PRESSURIZE PIPING TO 10 PSIG WITH AIR. SOAP ALL JOINTS AND MONITOR PRESSURE GAUGE FOR 30 MINUTES MINIMUM WITHOUT LOSS IN PRESSURE. REPAIR LEAKS AND RETEST AS NECESSARY. PRESSURE TESTING SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION SECTION 02221, ARTICLE 3.01 B.
18. ALL PROPOSED PIPING/TRENCH LOCATIONS TO BE CONFIRMED AND APPROVED BY THE AUTHORITY OR AUTHORITY'S FIELD REPRESENTATIVE DURING THE TIME OF CONSTRUCTION.
19. ROOFTOP VENT STACKS SHALL BE SECURELY ANCHORED FROM A MINIMUM OF THREE (3) POINTS WITH ADEQUATE STRUCTURAL SUPPORTS SUCH AS GUY WIRES.
20. MANUFACTURER OF FLUID APPLIED WATERPROOFING/VAPOR BARRIER SHALL BE LIQUID BOOT® OR AUTHORITY APPROVED EQUAL.
21. LIQUID BOOT® IS TO BE APPLIED TO THE ENTIRE FOOTPRINT OF BUILDING AND ALONG EXTERIOR SUBSURFACE WALLS.

LEGEND:

6" DIA. SOLID PVC PIPE
6" DIA. SLOTTED PVC PIPE
PIPE CAP
LOCATION WHERE HEADER TURNS UP AND PENETRATES FLOOR SLAB
PFE MONITORING POINT

DRAWING PREPARED BY SHAW ENVIRONMENTAL & INFRASTRUCTURE ENGINEERING OF NEW YORK, P. C.
BASE DRAWING: SCHOOL F FIRST FLOOR FRAMING PLAN, DRAWING NO. S101F

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30–30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101–3045

ARCHITECT: PERKINS EASTMAN
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NEW YORK, NY 10003

CONSULTING ARCHITECT: ALEXANDER GORLIN ARCHITECT LLC
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NEW YORK, NY 10013

STRUCTURAL ENGINEER: LESLIE E. ROBERTSON ASSOCIATES, RLLP
30 BROAD STREET
NEW YORK, NY 10004

MECHANICAL ENGINEER: FLACK + KURTZ ENGINEERS
475 FIFTH AVENUE
NEW YORK, NY 10017

CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA
360 WEST 31ST STREET, 8TH FLOOR
NEW YORK, NY 10001

FOOD SERVICE CONSULTANT: ROMANO GATLAND
99 WEST HOFFMAN AVENUE
LINDENHURST, NY 11757

ACOUSTIC AND THEATER CONSULTANT: HARVEY MARSHALL BERLING ASSOCIATES, LLC.
173 WEST 81ST STREET
SUITE 2, LOWER LEVEL
NEW YORK, NY 10024

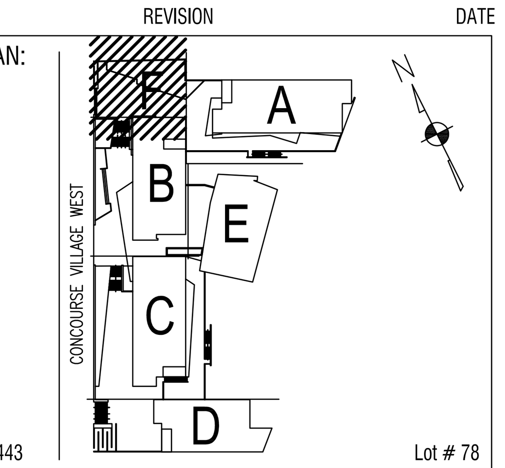
LANDSCAPE ARCHITECT: RGR LANDSCAPE
115 FIFTH AVENUE
NEW YORK, NY 10003

BID SET

NOTE: Drawing may be printed at reduced scale

NO.	REVISION	DATE
1	FID SUBMISSION	10.31.06

KEY PLAN:



Block # 2443 Lot # 78

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Ernesto Vela
Designer:	Joanna Wrenn
Drawn by:	Randy Tagoff
Checked by:	August Arrigo

LLW No.:	Facility Code:	Date:
033485	1215-05	06/30/06

Project:
MOTT HAVEN CAMPUS
-

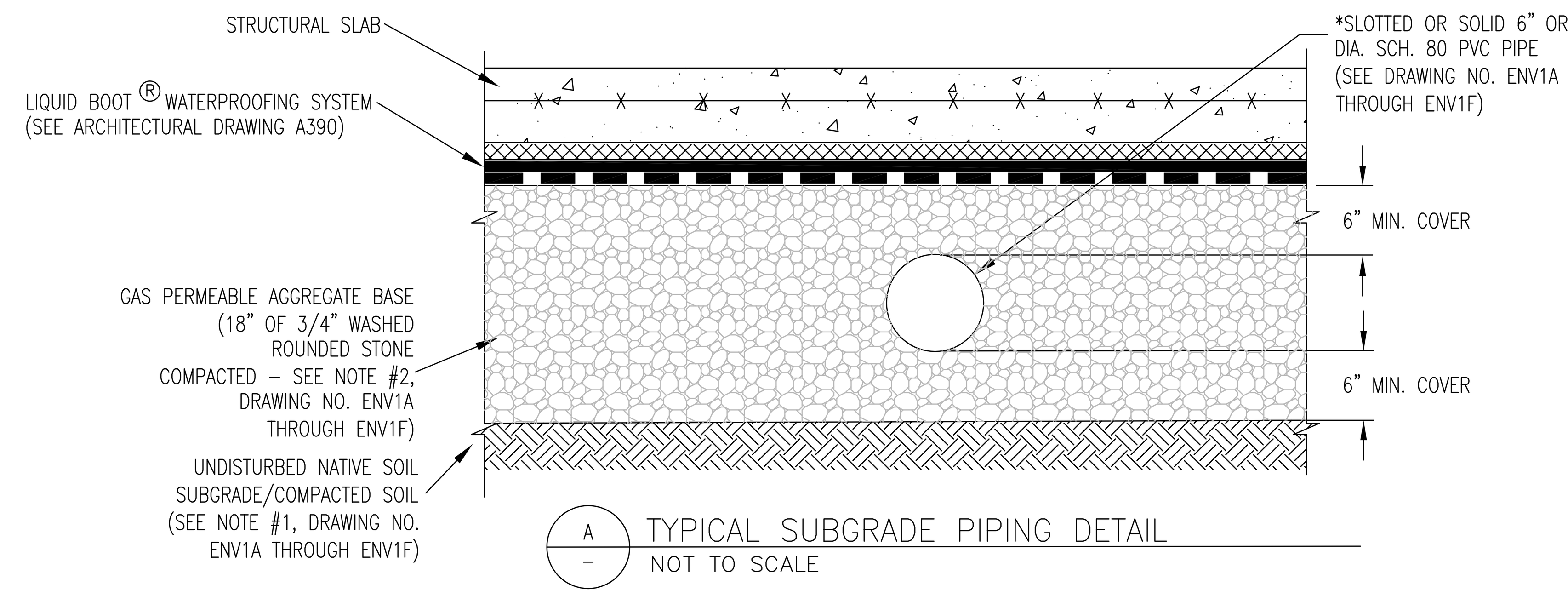
Address: 730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

Drawing Title:
PRACTICE GYMNASIUM– GAS VAPOR COLLECTION SYSTEM PIPING PLAN

Drawing No.:
ENV1F

Sheets in Contract:
50 of 1072

PEA No. 21200.00

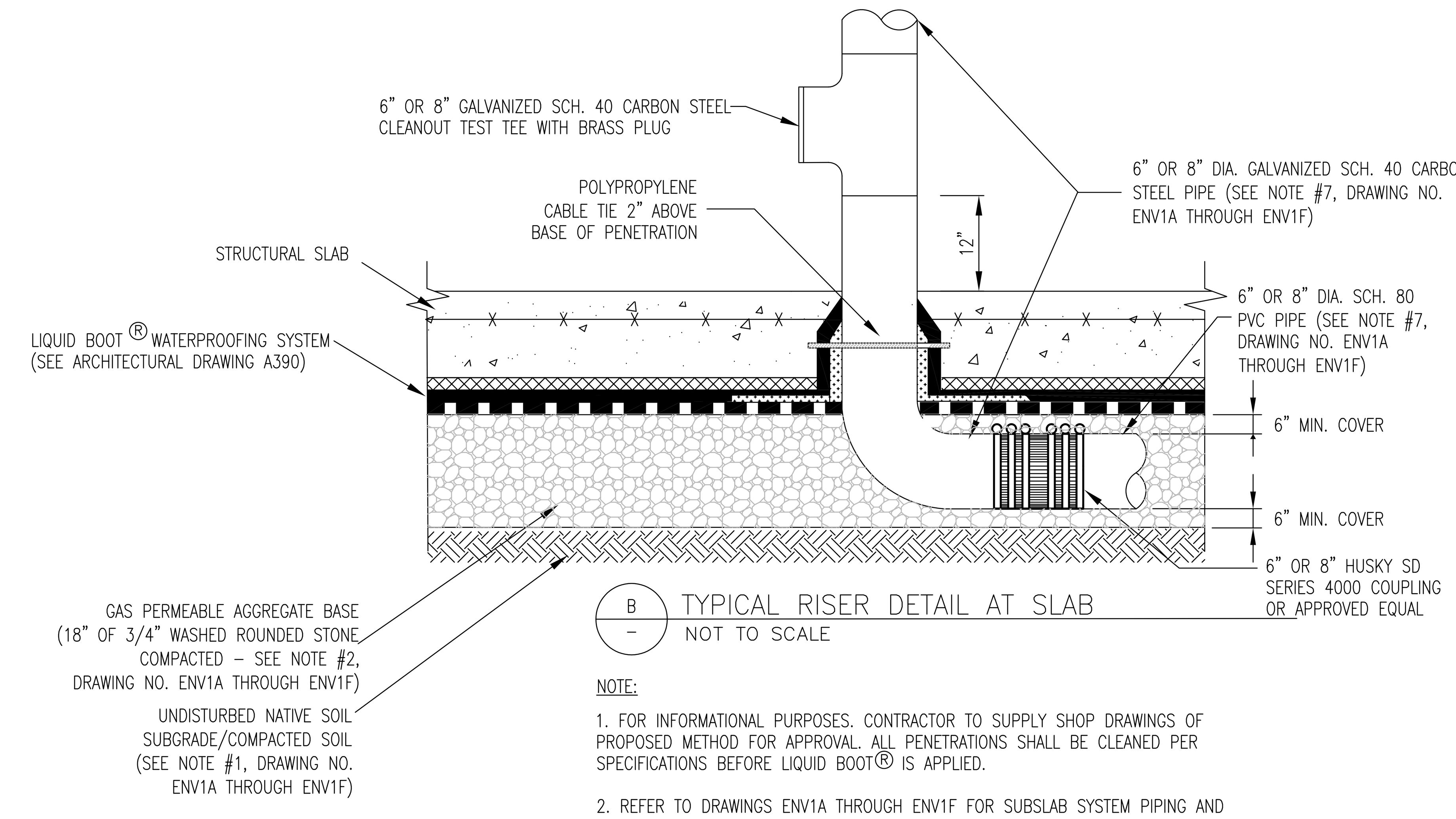


A – TYPICAL SUBGRADE PIPING DETAIL
NOT TO SCALE

NOTE:

1. 6" AND 8" SLOTTED AND SOLID SCH. 80 PVC PIPE TO BE WRAPPED IN FILTER SOCK. FOR INFORMATIONAL PURPOSES. CONTRACTOR TO SUPPLY SHOP DRAWINGS OF PROPOSED METHOD FOR APPROVAL.

2. REFER TO DRAWINGS ENV1A THROUGH ENV1F FOR SUBSLAB SYSTEM PIPING AND VENT STACK PIPE DIAMETERS.

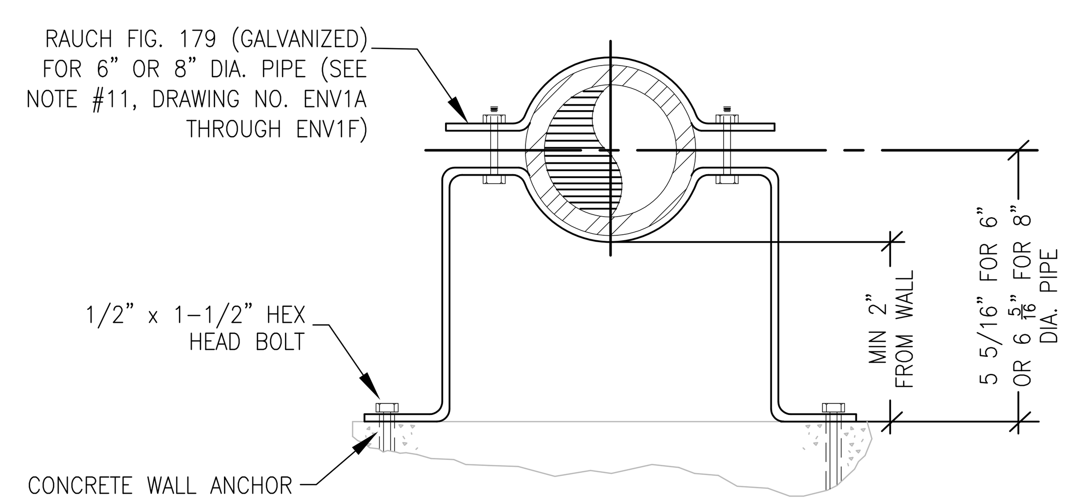


B – TYPICAL RISER DETAIL AT SLAB
NOT TO SCALE

NOTE:

1. FOR INFORMATIONAL PURPOSES. CONTRACTOR TO SUPPLY SHOP DRAWINGS OF PROPOSED METHOD FOR APPROVAL. ALL PENETRATIONS SHALL BE CLEANED PER SPECIFICATIONS BEFORE LIQUID BOOT® IS APPLIED.

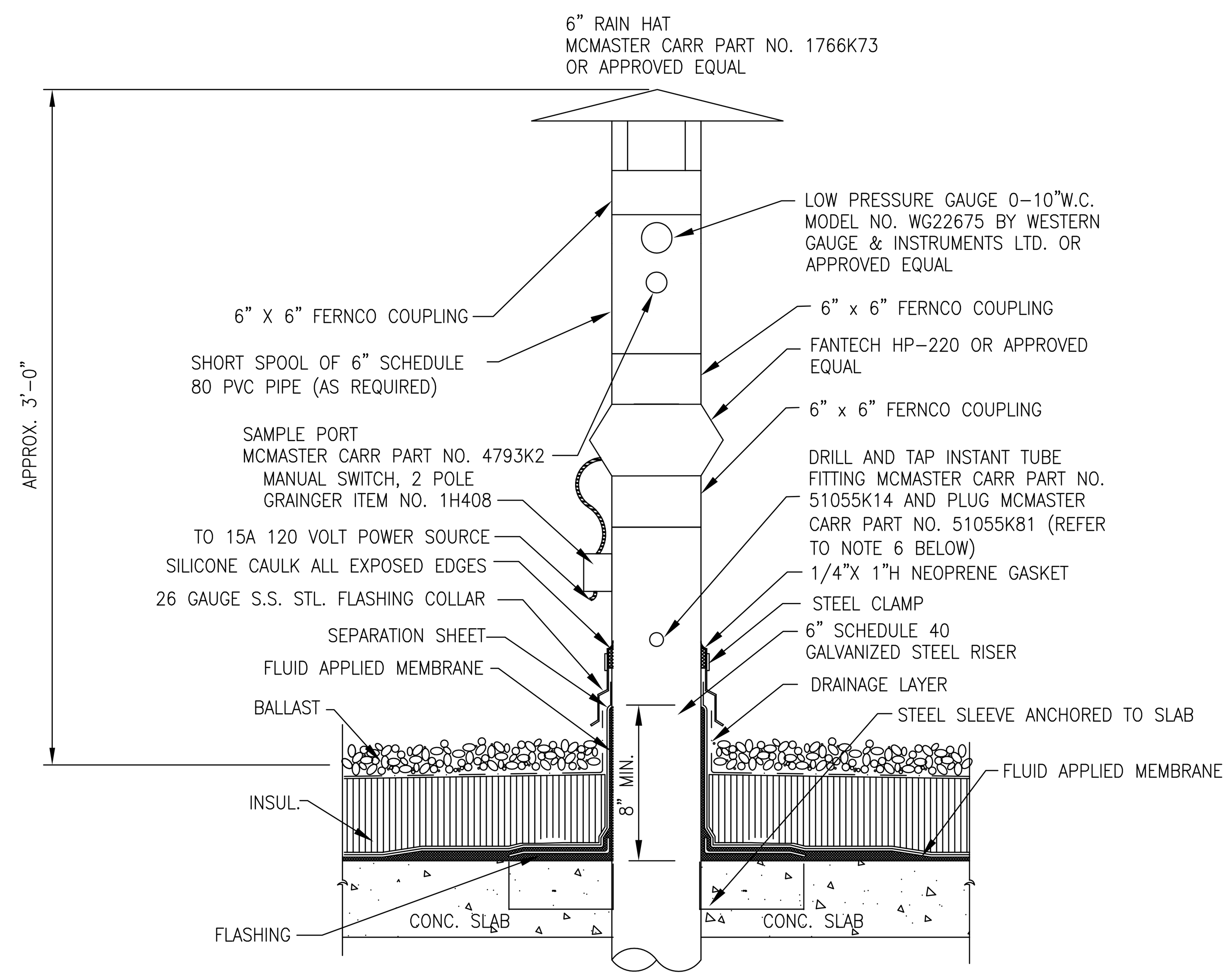
2. REFER TO DRAWINGS ENV1A THROUGH ENV1F FOR SUBSLAB SYSTEM PIPING AND VENT STACK PIPE DIAMETERS.



C – TYPICAL PIPE ANCHORING DETAIL– OFFSET PIPE CLAMP
NOT TO SCALE

NOTE:

1. REFER TO DRAWINGS ENV1A THROUGH ENV1F FOR VENT STACK PIPE DIAMETERS.



D – TYPICAL 6" RISER DETAIL AT ROOF
NOT TO SCALE

NOTE:

1. POST & SLEEVE MUST BE CLEAN AND FREE OF ALL RUST AND OTHER CONTAMINANTS.

2. MEMBRANE SHOULD BE APPLIED TO SUBSTRATE BENEATH POST/SLEEVE PRIOR TO ITS INSTALLATION.

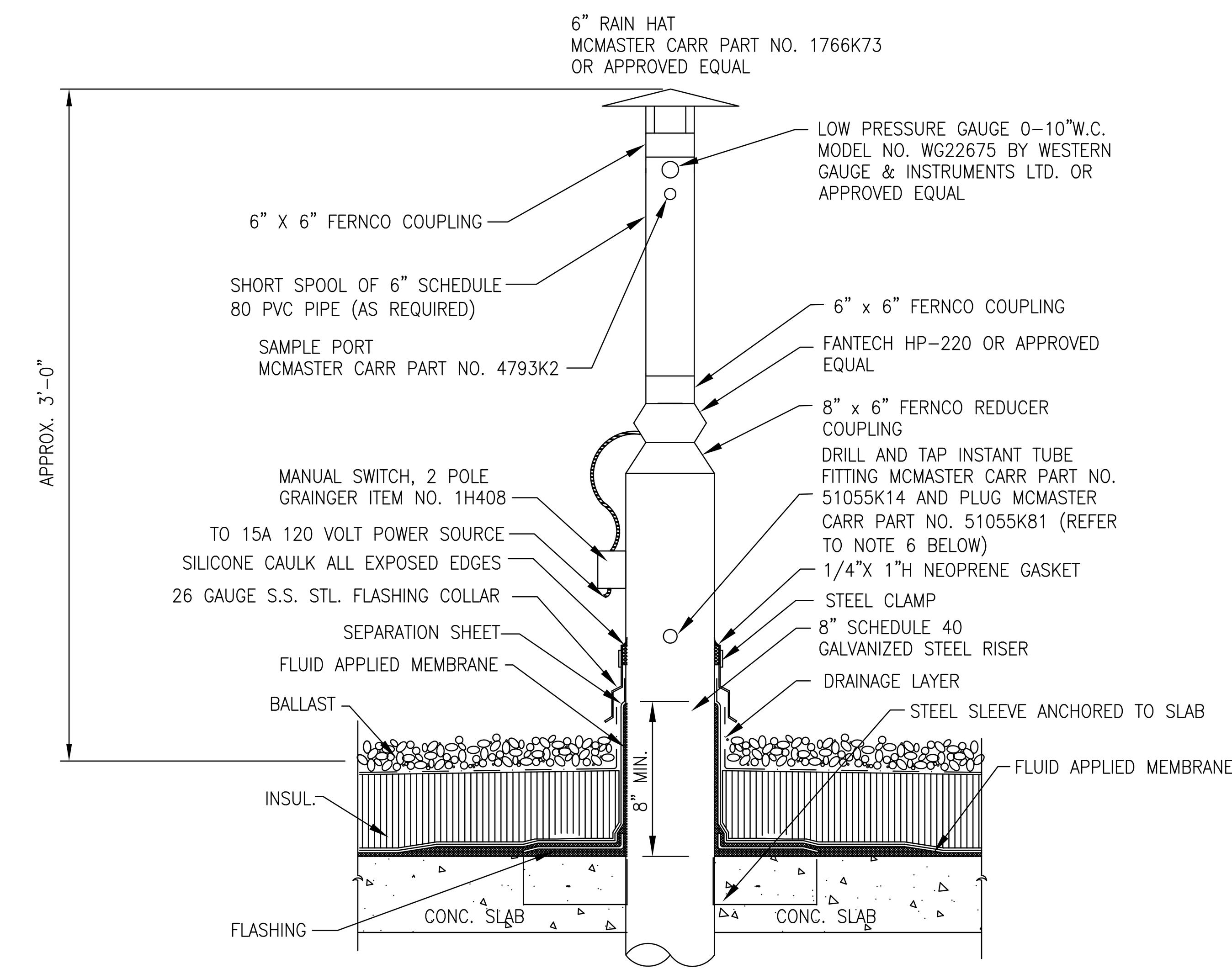
3. SUPPORT RISER LATERALLY AT ROOF/STRUCTURE.

4. A SINGLE REINFORCING SHEET SHOULD BE USED WHENEVER POSSIBLE. OVER BOLT HEADS, SHEET CAN BE CUT IN "X" PATTERN AND EMBEDDED FLAT INTO MEMBRANE.

5. IN-LINE TUBE FAN TO BE APPROVED BY SITE ENGINEER IF DIFFERENT THAN SPECIFIED.

6. INSTALL INSTANT TUBE FITTING A MINIMUM OF 12" FROM THE BASE OF THE FAN UNIT. FLOW SHALL BE MEASURED USING A TSI VELOCITY METER MODEL 8360 OR APPROVED EQUAL. DRILL LIP INSIDE OF INSTANT TUBE FITTING USING A DRILL BIT THAT MATCHES THE O.D. OF THE TSI WAND.

7. ALL ELECTRICAL EQUIPMENT AND WIRING MUST BE INSTALLED IN ACCORDANCE WITH NFPA 70.



E – TYPICAL 8" RISER DETAIL AT ROOF
NOT TO SCALE

NOTE:

1. POST & SLEEVE MUST BE CLEAN AND FREE OF ALL RUST AND OTHER CONTAMINANTS.

2. MEMBRANE SHOULD BE APPLIED TO SUBSTRATE BENEATH POST/SLEEVE PRIOR TO ITS INSTALLATION.

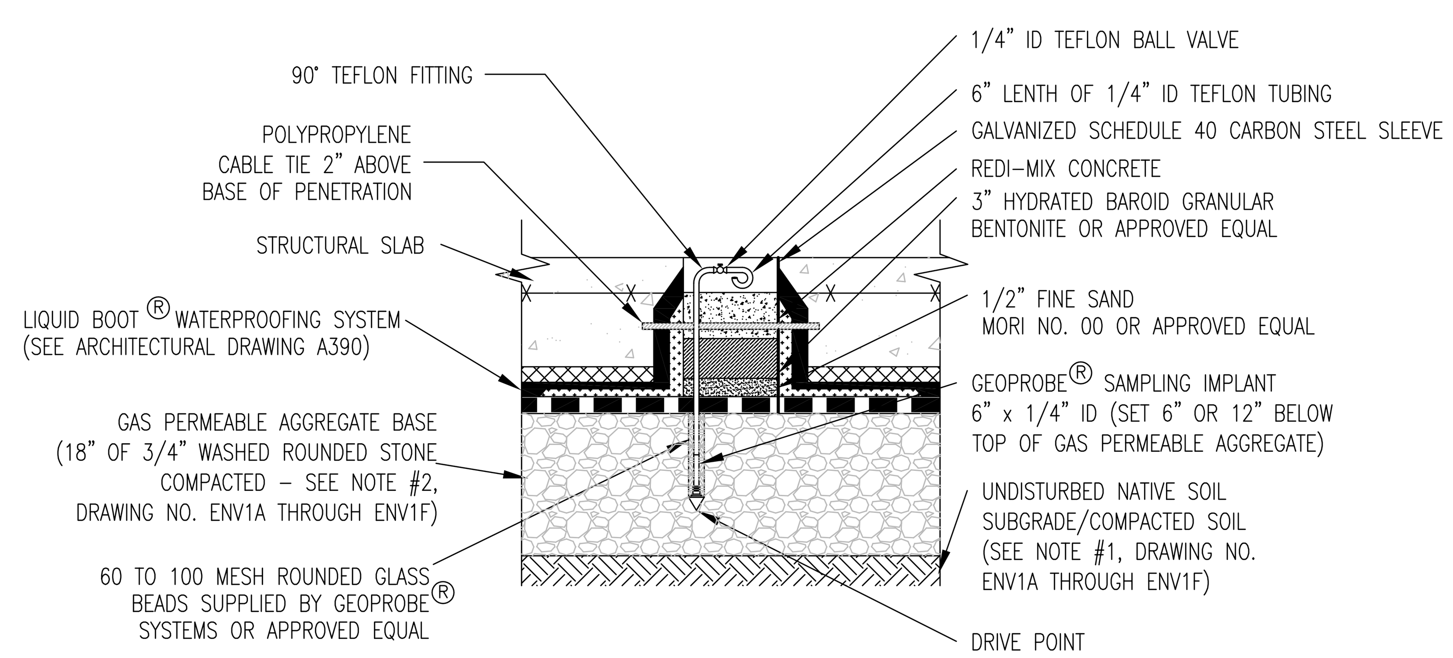
3. SUPPORT RISER LATERALLY AT ROOF/STRUCTURE.

4. A SINGLE REINFORCING SHEET SHOULD BE USED WHENEVER POSSIBLE. OVER BOLT HEADS, SHEET CAN BE CUT IN "X" PATTERN AND EMBEDDED FLAT INTO MEMBRANE.

5. IN-LINE TUBE FAN TO BE APPROVED BY SITE ENGINEER IF DIFFERENT THAN SPECIFIED.

6. INSTALL INSTANT TUBE FITTING A MINIMUM OF 16" FROM THE BASE OF THE FAN UNIT. FLOW SHALL BE MEASURED USING A TSI VELOCITY METER MODEL 8360 OR APPROVED EQUAL. DRILL LIP INSIDE OF INSTANT TUBE FITTING USING A DRILL BIT THAT MATCHES THE O.D. OF THE TSI WAND.

7. ALL ELECTRICAL EQUIPMENT AND WIRING MUST BE INSTALLED IN ACCORDANCE WITH NFPA 70.



F – TYPICAL PRESSURE FIELD EXTENSION MONITORING POINT DETAIL AT SLAB
NOT TO SCALE

NOTE:

1. FOR INFORMATIONAL PURPOSES. CONTRACTOR TO SUPPLY SHOP DRAWINGS OF PROPOSED METHOD FOR APPROVAL. ALL PENETRATIONS SHALL BE CLEANED PER SPECIFICATIONS BEFORE LIQUID BOOT® IS APPLIED.

2. SEE ARCHITECTURAL DRAWINGS A101-A THROUGH A101-F FOR DETAILS ON COMPLETION OF TOP OF PRESSURE FIELD EXTENSION MONITORING POINTS.

FAN PERFORMANCE (FANTECH HP-220)

CFM vs. STATIC PRESSURE INCHES W.C.								V	W	MAX AMPS
0"	0.5"	0.75"	1.0"	1.25"	1.5"	MAX PRESS	–			
344	260	226	193	166	137	2.46	–	115	85–152	1.3

DRAWING PREPARED BY SHAW ENVIRONMENTAL & INFRASTRUCTURE ENGINEERING OF NEW YORK, P.C.

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
Sharon L. Greenberger, MCP, President & CEO

Architecture & Engineering
E. Bruce Barrett, R.A., Vice President
Elan R. Abneri, P.E., Director of Design Studio 1
Timothy F. Ng, R.A., PP., Director of Design Studio 2
George D. Roussey, P.E., Director of Design Studio 3
Gary Deane, Director of Operations, Special Projects

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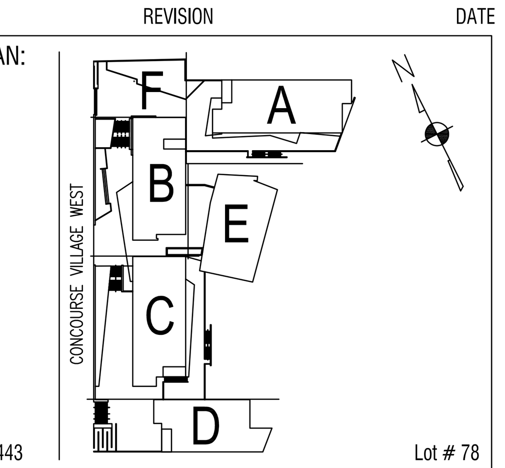

Block # 2443 Lot # 78

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Ernesto Vela
Designer:	Joanna Wrenn
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Checked by:	August Arrigo

LLW No.:	Facility Code:	Date:
033485	1215-05	06/30/06

Project:
MOTT HAVEN CAMPUS
-

Address: 730 CONCOURSE VILLAGE WEST
BRONX, NEW YORK 10451

Drawing Title:
GAS VAPOR PIPING AND BARRIER TERMINATION DETAILS

Drawing No.:
ENV2

Sheets in Contract:
51 of 1072

PEA No. 21200.00

Appendix G

Jet Grout Hydraulic Barrier Specifications and Plans

SECTION 02168
JET GROUT CUT-OFF WALL

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnishing labor, equipment, materials, and supervision for construction of a continuous cementitious cut-off wall immediately behind the existing timber sheeting by jet grouting injection techniques using cementitious grouting materials.

1.02 RELATED SECTIONS

A. Section 02100 - Site Preparation

B. Section 02200 - Building Earthwork

C. Section 02220 - Instrument Monitoring

D. Section 02300 - Excavation, Handling, and Backfill

E. Section 02380 - Tiebacks and Anchor Dowels

F. Section 03600 - Jet Grout Materials

1.03 REFERENCES

A. Information Available to Bidders includes:

1. Logs of soil test borings, which are included in the drawing set.

2. Logs of test pits made in front of the retaining wall, which are included in the drawing set.

3. Front elevation of the retaining wall and the retaining wall cores, which are included in the drawing set.

B. ASTM C 39-1994: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

C. ASTM C 42-90: Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

D. ASTM C 109-93: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.

E. ASTM C 143-90a: Standard Test Method for Slump of Hydraulic Cement Concrete.

F. ASTM C 150-1994: Standard specifications for Portland Cement.

G. ASTM C 173-94: Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

H. ASTM C 260-94: Standard Specification for Air-entraining Admixtures for Concrete.

I. ASTM C 403: Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance.

J. ASTM C 494: Standard specification for Chemical Admixtures.

K. ASTM C 617-94: Standard Practice for Capping of Cylindrical Concrete Specimens.

L. ASTM C 939-94a: Standard Test Method for Flow of Grout for Pre-Placed Aggregate.

M. ASTM D 1557: Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort and 56,000 ft-lbs Force per Cubic Foot.

N. ASTM D 4380: Standard Test Method for Density of Bentonite Slurries.

O. ASTM D5084: Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

1.04 DEFINITIONS

A. Grout Monitor: A double-or triple-phase drill pipe used to convey two or three fluids of the jet grouting process.

B. Jet Grouting: The process of creating a continuous soil/cement mass by simultaneously eroding and mixing the in-situ soil with cement grout. The soil is eroded by forcing grout (for the double fluid system) or water (for the triple fluid system) through the exit nozzle of the monitor under high pressure and a high exit velocity. Near cylindrically-shaped columns of cement treated soil and rock fill are created by simultaneously rotating and withdrawing the grout monitor.

1.06 **SUBMITTALS**

A. The Contractor submittals shall be signed and sealed by his Professional Engineer licensed in the State of New York to the Engineer for review.

B. General Work Procedures: Submit a narrative description of the step by step procedures and sequence of construction proposed to install the jet-grout cut-off wall below the existing retaining wall.

1. Site layout, mobilization, staging, and phasing plan of all equipment, temporary facilities, and temporary enclosures.

2. Materials handling, transport, and storage.

3. Location and identification plan of primary and secondary jet grout columns, including grout column spacing distance from face of wall and jet grouting sequence.

4. Detailed sequence of pre-drilling and jet grouting operations including the time between construction of primary and secondary columns.

C. Batching of Cement Grout: Submit a complete description of all aspects of the proposed cement grout batching operation, including but not limited to:

1. Narrative description of cement delivery, storage, mixing, holding, and pumping.

2. Proposed batch size and corresponding weights of each mix component. Mixes shall be based on the approved grout mixes in Section 03600.

3. Methods to determine dispensed weight of each mix component during batching, including dry cement, water and chemical admixtures, as well as verification of final grout mix proportions.

4. Proposed method for increasing or decreasing flow characteristics of the grout mix, if needed.

5. Methods for controlling airborne dry cement, and any other non-liquid admixtures or materials used in the jet grout operations.

D. Proposed Jet Grouting Methods: Submit a complete description of all aspects of the jet grouting operation including but not limited to:

1. Narrative of the overall step-by-step procedures of the jet grouting operation.

2. Type of jet grout system, i.e. Double or Triple Fluid system.

3. Target diameter of jet grout columns.

4. Rotation rate and withdrawal speed of grout monitor.

5. Pump discharge pressures of the air, grout, and water (if used) fluids.

6. Grout flow rate.

7. Method for pre-drilling the jet grout boreholes, if necessary. Include method for pre-drilling the existing retaining wall footing. If no pre-drilling is used, method for advancing monitor to bottom level of the grout hole.

E. Spoil Control: Submit a detailed description and step-by-step procedures for containing all grout, water, and grout spoil. The submittal must describe in detail the Contractor's schemes to prevent contamination of the ground surface and site structures within and beyond the limits of the work area, including public and property adjacent to the work area.

F. Vendor's Certificates: Furnish certifications for the properties of the material, and other materials.

G. Equipment: Submit a list of all equipment, by size, weight type and capacity proposed for the work. Include manufacturer's specification information. The list shall include:

1. Jet grouting equipment including type of system, i.e. double or triple fluid system, and outside diameter of drill rods. Include description of the low-headroom rig for use below the existing raised platform.

2. Pre-drill equipment capable of penetrating reinforced concrete slabs and/or footings as well as gravel, cobble or boulder-sized rock fill material.

3. Cement storage silo, mixer, holding reservoirs, grout pumps, grout hoses and/or pipes.

4. Equipment for controlled dispensing of all mix components to the grout mixer. Include equipment for dispensing liquid admixtures and calibrated range of error.

5. Pump type, discharge pressure and flow rate for each of the fluids used.

6. Equipment to monitor and regulate grout pumping operations including measure of flow rate, volume, and pressure of grout injected.

7. Equipment to monitor and regulate jet grouting operations including withdraw rate and rotation speed of the grout monitor.

8. Post construction coring equipment.

9. Other equipment and specialty tools required to complete the work.

H. Shallow Utilities: Detailed method for protecting monitoring shallow utilities to remain to ensure no damage and no inflow of grout into the pipes occurs during restoration work.

I. Cement Grout

1. Cement grout slurry mix designs, as required in Section 03600 - Jet Grout Materials.

2. Manufacturer's data sheets or independent laboratory test data that demonstrates the fluid and hardened physical properties of the proposed design mixes meet the requirements specified in Section 03600 - Jet Grout Materials.

3. Seven (7) day and 14-day axial compressive strength of grout specimens obtained from the Contractor's test batch of approved grout mix in accordance with Section 03600.

J. Quality Control: Submit a proposed Quality Control Program for the work in conformance with requirements of Section 3.07 of this part. Quality control work performed by the Engineer as specified in Section 3.08 of this part does not release the Contractor from his obligation to perform such quality control work. The submittal shall include:

1. Blank field logs for monitoring and recording the entire jet grouting operation. Logs shall include quality control of grout mixes used, record of

actual grout pump rates, pressures, and total grout used for each grout hole, as well as actual withdraw rate and rotation speed of the grout monitor.

2. Proposed test procedures, test frequencies, test apparatus for grout cylinder specimens and extracted grout cores.

3. Name of the independent laboratory or laboratories the Contractor intends to use to perform the tests required.

4. Results of laboratory test data on recovered cores of the in-situ cement treated soil.

1.07 DELIVERY, HANDLING, AND STORAGE

A. Check material upon delivery to assure proper material has been received.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The cement grout shall be of consistent water/cement ratio and various combinations of chemical admixtures submitted and reviewed by the Engineer as required in Section 03600, Jet Grout Materials.

B. No additional admixtures may be used without submitting the additional design mix for review by the Engineer as required in Section 03600.

C. Quantities: The Contractor must have on site at all times sufficient quantities of cement, water, and admixtures to allow for uninterrupted grouting operations and to immediately change grout flow properties as dictated by field conditions.

2.02 EQUIPMENT

A. Jet Grout Equipment:

1. The jet grouting equipment must be capable of extending to the depths necessary to construct the specified jet-grout cut-off wall.

2. The equipment shall be capable of grouting angled holes at the locations shown on the drawings.

3. Low-headroom jet-grout rig shall be capable of constructing the required columns north of the property line (to Sta 0-20) and below the elevated platform.

4. Equipment shall be capable of creating minimum of 4-ft-diameter columns of cement-treated soil.

5. Equipment shall have the ability to maintain accurate and steady withdraw rate and rotation speed of the grout monitor, including digital monitoring read-outs of same.

B. Pre-Drilling Equipment

1. The drilling equipment shall be capable of advancing boreholes of sufficient diameter for insertion of the jet grout monitor and rods to the specified depths below existing ground surface through coarse gravel-sized crushed stone.

2. The equipment shall be capable of penetrating cobble or boulder-sized materials, if encountered.

3. The equipment shall be capable of penetrating reinforced through the existing retaining wall footing.

C. Grouting Equipment

1. Grout Mixer: The Grout Mixer shall be a high-speed colloidal-type mixer.

2. Holding Tanks: Holding tanks or sumps must have continuous mechanical paddle mixers to prevent segregation of the grout prior to pumping and injecting.

3. Fluid Pumps: Use pumps of sufficient capacity to provide constant pressures necessary to create minimum 4-ft-diameter grout columns.

4. Grout mixer, pump, and holding tank must be of sufficient capacity to construct individual jet grout columns without interruption.

5. Grout hoses, pipes, etc.

6. Grout Regulating Equipment to completely monitor all phases of the grouting operations including but not limited to:

a. Grout Batching

1) Monitor weights of all grout mix components, including liquid admixtures.

2) Verify mix proportions and fluid properties of the grout.

b. Jet Grouting:

Monitor and display the following parameters:

1) Pump pressure of all fluids used.

2) Grout flow rate.

3) Volume of grout injected per linear foot of grout column.

4) Maintain and monitor constant withdraw rate and rotation speed of jet grout monitor.

D. Coring Equipment

1. To obtain cores of the intact grout wall, use PQ-sized (3.3 in-dia) doubled-tube core barrel with diamond core bit. Drilling equipment shall be capable of continuously coring of soil/grout wall to the specified bottom of wall.

E. Excavation, Backfill, and Compaction Equipment

1. Mechanical Excavator: Mechanical excavator shall be of sufficient size to perform the necessary excavation operations specified herein.

2. Compaction: Vibratory compaction equipment sufficient for controlled backfilling of all excavations to the compaction requirements specified herein.

PART 3 - EXECUTION

3.01 **PREPARATION**

A. Protect all site structures, pavements, and utilities not designated for removal.

B. Protect the existing retaining wall and all other structures beyond the limits of the designated work area. If damage occurs in the course of work, restore damaged area to original condition.

C. Locate and identify existing utilities, both active and inactive, in the area of the proposed work.

D. Perform all demolition work as shown on the Demolition Plan.

E. Make all other site preparations to control grout, water and grout spoils.

3.02 **GROUT WALL REQUIREMENTS**

A. Depth: The depth of the grout cut-off wall shall extend continuously from el 22 Borough President of Bronx Datum (BPBD) to a depth of 30 ft (el -8 BPBD). For Sta. 0+00 to Sta 1+75, the first row of jet grout columns shall extend to a depth of 52 ft below el 22, or to el -30, as shown on the Contract Drawings.

B. Width: Provide two rows of jet-grout columns. The first row shall have a minimum diameter of 4 ft and the second row shall have a minimum diameter of 3.5 ft. The composite wall shall have a minimum thickness of 5 ft.

C. The minimum width and depth of the grout wall shall be continuous along the entire length of bulkhead within the contract limits.

D. In-Situ Properties:

1. Strength: Retained cores of the in-situ grout wall shall demonstrate a minimum 14-day and 28-day unconfined axial compressive strength as determined by ASTM C39-94a shall be 500 lb/in^2 and 750 lb/in^2, respectively.

2. Hydraulic Conductivity: A 24-inch-thick continuous core of the cut-off wall shall have a maximum in-situ hydraulic conductivity of 1×10^{-5} cm/sec. The

in-situ hydraulic conductivity shall be measured in-situ by falling head tests and in the laboratory on both retrieved cores and on specimens made from fresh soil-cement mixture.

3. Quality of recovered cores for each 5-ft-long run:

   a. Percent recovery of PQ-sized cores shall be a minimum of 95 percent.

   b. Percent recovery of PQ-sized cores greater than 6-inches-long shall be a minimum of 50 percent

E. Drilling, jet grouting, and post construction coring operations shall not damage the existing retaining wall structure. Core holes shall be filled with grout after specified permeability tests are made.

F.

3.03 JET GROUTING METHOD AND SEQUENCE

A. Jet grouting shall be performed using a double-fluid or triple-fluid system.

1. Jet grout columns shall have a minimum diameter of 4-ft-diameter for the first row and 3½-ft-diameter for the second row, and 4-ft-diameter for the battered row.

B. The drilling and grouting of the grout holes shall be performed according to the principles of the split-spaced method.

1. Primary columns shall be constructed.

2. Secondary grout holes shall split the distance between the primary holes.

3. The need and location of tertiary holes used for remedial grouting shall be determined after post-construction quality control coring is made.

C. Quality Control: Upon completion of a section of the cut-off wall, perform sampling and testing of the in-situ grout wall specified in paragraph 3.07 of this section.

3.04 TEST JET GROUT COLUMNS

A. Prior to the start of production work, perform a test section of at least 5 columns, located away from the retaining wall and at the location shown on the drawing. The purpose of the test section is to verify that the proposed methods and sequence of construction can achieve the minimum column diameter and physical properties.

B. Collect wet molds of the fresh soil-cement mixture from at least two of the test columns, as specified in Article 3.08. Perform laboratory hydraulic conductivity tests on each of the specimens.

C. Upon completion of the test section, excavate and expose the columns to allow for direct measurement of the column dimensions.

D. After seven days, perform at leas one full length core of the column to confirm that the ground treatment has reached the required depths.

E. Perform an in-situ hydraulic conductivity test as described herein.

F. If the physical or engineering properties are not achieved, then the contractor shall modified his procedures to improve the size or quality of the jet grout columns.

3.05 <u>JET GROUT COLUMN LAYOUT</u>

A. Prepare a preliminary plan giving location, center spacing, identification number, and diameter of jet grout columns.

B. The contractor shall retain a surveyor, licensed in the State of New York, to locate all grout holes. Grout hole layout shall be done after initial site clearing and other site preparations have been made.

C. Jet grout columns shall be laid out in accordance with the submitted and approved location and identification plan and any subsequent revised plan.

1. Final jet grout column spacing shall be 3-feet-on-center for both the 4-ft diameter columns and the 3½-ft-diamter columns, and 4-ft-diameter for the battered columns.

2. The spacing between the two rows of columns shall be 2½ ft, and the second row shall be staggered 1½ ft.

3. The battered row of columns shall be 1 ft west of the first row and shall have an angle of inclination of 10 degrees from the vertical.

4. If a greater grout hole spacing is used, the jet grout column diameter must be increased; the use of larger diameter columns shall be subject to the approval of the Engineer.

D. The ground surface elevation of each grout hole shall be measured and recorded with respect to the Borough President of Bronx Datum immediately prior to the jet grouting of each column to establish the required depth interval of the column..

3.06 INSTALLATION OF JET GROUT COLUMNS

A. Install sleeve casings and/or other methods of controlling grout spoil expelled from the borehole.

B. Advance the grout monitor at least one foot below the plan bottom of column.

C. Obstructions: The Contractor should be prepared to drill through these larger materials. It may be necessary to break large obstructions ahead of the casing to allow for washing through the casing.

D. Reinforced Concrete: A reinforced concrete footing projecting out of the face of retaining wall was encountered in all the exploratory test pits. The Contractor shall supply equipment to penetrate the structure for advancement of the grout monitor.

E. Tolerances:

1. Horizontal Alignment: Jet grout column centers shall be located a maximum of 18 inches east of the face of retaining wall. Deviations of more than 3 inches from the planned alignment shall not be made without prior approval of the Engineer.

2. Vertical Alignment: Jet grout boreholes shall not deviate from vertical more than two (2) percent of its full depth from the centerline of the top of the cut-off wall without approval of the Engineer.

F. Jet Grouting:

1. Cement Grout: Use submitted and accepted cement grout with required admixtures. Grout shall be thoroughly mixed prior to pumping.

2. Start jet grouting at least one foot below the plan bottom of column. Commence grout, air, and water (if used) pumping in accordance with the submitted and approved fluid pumping procedures.

3. Commence withdrawing and rotating the grout monitor in accordance with the submitted and approved withdraw rates and rotation speeds.

G. Sequence of Installation

1. Install Row 1, the row closest to the face of wall. Install both primary and secondary columns.

2. Install the second row of columns, that which is outboard of the first row. Install both primary and secondary columns.

3. Install the battered row of columns.

3.07 SPOIL CONTROL

A. No spoil resulting from the jet grout operation shall in any way contaminate the ground surface or surface structures and features within or beyond the limits of the work area.

B. Spoil that returns to the ground surface and is expelled from the borehole during pre-drilling and grouting operations is expected for every jet grout column.

C. The spoil is considered to have the same contaminants as the in-situ soil and shall be disposed of in the same matter.

D. Spoil must be diverted directly from the borehole to a temporary containment structure or disposal tank without contamination of the ground surface or surface features.

E. Use sleeve casing pipes, rubber skirts, packers, "bathtubs", pumps, pipes, and hoses or other equipment, as necessary to prevent intentional or accidental contamination of grout spoil onto the ground surface or surface structures within or beyond the limits of the work area as well as prevent contamination of building, or pedestrians.

F. Install approved containment and control facilities to prevent contamination of ground surface, surface structures, buildings, etc prior to the start of drilling and grouting work.

G. The grout, water, and grout spoil containment system shall remain in place and fully functional throughout the course of the Work.

H. Inspect containment equipment measures at least twice daily to ensure no accidental spillage of diverted and contained fluids.

I. Should leaks or breaches in the containment system be detected, immediately suspend drilling and grouting operations as directed by the Authority or Authority's Representative/Engineer.

1. Inspect the containment system and identify the cause(s) of leakage.
2. Make all necessary repairs prior to resuming drilling and grouting operations.
3. Resume operations at the direction or approval of the Authority or Authority's Representative/Engineer.

J. Remove temporarily contained spoils daily. This includes any hardened grout waste that is collected during grouting batching and injecting.

K. Remove and all collected spoil material daily, or as necessary to prevent delays in the drilling and grouting operations.

L. Legally dispose off-site all collected spoil materials. Disposal in other areas of the site is absolutely prohibited.

3.08 QUALITY CONTROL BY CONTRACTOR

A. General

1. The Contractor shall assist and cooperate with the Engineer and provide free access during all construction activities.
2. The Contractor shall provide all necessary sampling equipment and retain all testing personnel. The

Contractor shall be responsible for his own quality control testing.

3. The Contractor shall perform all excavation, backfill, and compaction work associated with visual inspection as specified herein.

4. The Contractor shall drill and extract all cores of the in-situ grouted mass.

5. The Contractor shall retain the services of an independent, approved laboratory (or laboratories) to obtain specimens and perform laboratory tests of all the physical and engineering properties of the retrieved cores and the specimen molds prepared from the fresh grout, as specified in this section.

6. Deliver to the Engineer all test records and laboratory analyses associated with the quality control testing defined.

B. Pre-Drilling: Perform the following items during pre-drilling of jet grout boreholes with concurrent verification by the Engineer and provide daily records of same:

1. Monitoring and logging of soils encountered during drilling including obstructions

2. Grout hole depth and bottom elevation

3. Grout hole verticality and horizontal alignment

C. Jet Grouting: Perform the following items to monitor the jet grouting operations with concurrent verification by the Engineer:

1. Verify initial proportions of cementitious material, water, and liquid chemical admixtures.

2. Measure and record total volumes of grout injected. If different grout mixes or admixtures are used, maintain a separate volume log for each mix.

3. Record injection pressures of all jet grout fluids used.

4. Fluid Properties of Cement Grout: Perform the following field test to verify consistency in batching operations at least every 5th batch of similar grout mix.

a. Flow in accordance with ASTM C 939-94a.

b. Density in accordance with ASTM D 4380.

c. Set time in accordance with ASTM C 403.

5. Obtain two 3-inch-diameter by 6-inch-high cylinders of freshly mixed grout slurry for every 25 yd^3, but not less than two (2) per every grout mix combination (i.e. different admixtures) per day. Grout cube specimens shall be tested for 7 day and 28 day axial compressive strength in accordance with ASTM C 39-94a. The grout specimens shall be obtained, cured and handled in accordance with ASTM specification for grout samples.

D. Fresh Molds

1. Obtain 3-inch-diameter by 6-inch-high cylinders of in-situ soil-cement mixture retrieved from fresh jet-grout columns.

2. Retrieve two fresh molds every 50 linear feet of jet-grout wall.

3. Obtain a pair of specimens from both rows of grout columns.

4. Collect fresh samples from various depth intervals as directed by the Engineer. The contractor shall assume that the fresh grout samples will be obtained for the full depth of the grout columns.

5. Test each specimen in the laboratory for hydraulic conductivity.

E. Coring of Grouted Mass

The Contractor shall obtain minimum PQ-sized cores (3.3 inch-diameter) of the grouted wall a minimum of 4 days after completion that section of grout wall at the frequency specified herein, at locations selected by the Engineer.

1. Within 3 days after completion of the first 30 linear ft of grouted wall, obtain at least 3 cores to confirm the jet grouting methods are achieving the specified continuous zone of cement treated soil.

   a. The Contractor shall not be permitted to continue his jet grouting operations until the results of the cores are obtained and the continuity of the cement treated zone is confirmed.

b. The Contractor shall sequence his operation to construct the first 30 linear feet without constructing excessive primary grout columns.

2. Cores shall be obtained a minimum of one per 50 ln-ft for the remainder of the grouted wall. Each core that does not achieve the percent recovery or quality requirements as specified in paragraph 3.2 D.3 of this section shall be replaced at a location selected by the Engineer at no cost to the Authority.

3. Cores shall be obtained from the top continuously through to specified bottom of the wall.

4. Cores shall be obtained at locations selected by the Engineer.

5. The coring operation shall be logged by the Contractor in accordance with accepted rock coring practices.

6. The cores shall be provided to the Engineer for inspection and logging.

7. Core holes shall be tremie-filled with grout at the completion of drilling.

F. Laboratory Testing of In-Situ Grout Wall

The Contractor or Contractor's certified testing laboratory shall perform the following tests:

1. For each coring location and each wet mold location, perform a one 14-day and one 28-day unconfined axial compressive strength test in conformance with ASTM C 39-94. The portion of recovered core to be tested shall be selected by the Engineer.

2. Perform a hydraulic conductivity test on a specimen from each core location in accordance with ASTM D5084.

G. In-situ hydraulic conductivity test

Perform falling head hydraulic conductivity tests at each of the core hole locations. Fill the core hole with water to the top of the column and measure the time to reach equilibrium.

H. Ground Surface Elevation Control: The Contractor shall establish ground surface elevation control points along the length of the retaining wall.

1. Install two ground surface elevation control points for every 50 linear ft of retaining wall.

2. Each set of control points shall include a point located on either jet grout columns centerline. Control points shall be within three feet of the centerline.

3. Measure control point elevations:

   a. Initial measurement before jet grouting.

   b. After construction of adjacent primary columns but before secondary columns.

   c. Immediately after construction of adjacent secondary columns.

   d. Seven days after construction of secondary columns.

4. Submit elevation measurements within 24 hours.

I. Document all locations of discontinuity, inadequate width, and inadequate strength identified by the Engineer on a dimensioned plan prepared by the Contractor's surveyor.

3.09 QUALITY CONTROL BY ENGINEER

A. General

1. The Engineer shall be on site full time.

2. The Engineer will provide the field engineering and evaluations necessary to document that the construction procedures and materials are consistent with the design assumptions and that the constructed grout wall meets the design intent and requirements of the Contract Documents.

B. Pre-Drilling

The Engineer shall verify and record the entire grouthole drilling operation in accordance with Paragraph 3.7.B of this part.

C. Jet Grouting

The Engineer shall verify and record the entire grouting operations in accordance with Paragraph 3.7.C of this part.

D. Post Construction Coring

1. The Engineer shall determine locations for coring of the grout wall. It is at the discretion of the Engineer to increase the specified number of grout cores based on observed conditions.

2. The Engineer shall observe and log the boreholes.

3. The Contractor shall make the obtained cores available for visual inspection and field logging.

4. The Engineer shall select the portion of each core to be laboratory tested.

E. Recording of all Contractor activities by the Engineer does not relieve the Contractor from any of his responsibilities specified in Article 3.08 of this Section.

F. In-situ Hydraulic Conductivity Testing
The engineer will record the water levels during the falling head tests and will perform the necessary calculations to determine the in-situ hydraulic conductivity of the grout cut-off wall.

3.10 **REMEDIAL GROUTING**

A. Remedial grouting of deficient zones of the grout wall shall be the responsibility of the Contractor at no additional cost to the Authority.

B. Based on the quality control measures during and after construction, the Engineer shall identify portions of the grout wall that do not meet the specified dimensions or physical properties.

C. The Contractor shall prepare a dimensioned location plan and section showing all the deficient zones identified by the Engineer. This plan shall be conformed with the deficient areas identified within the test excavations.

D. The Contractor shall submit his remedial grouting procedures before the start of work including grout hole locations, spacings, and drilling.

E. Drilling and remedial grouting shall be done in accordance with the specified procedures in this section.

END OF SECTION

SECTION 03600
JET GROUT MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnishing, all cementitious materials and chemical admixtures for grout to be injected into the ground.

1.02 RELATED SECTIONS

A. Section 02168-Grout Wall Production Construction

1.03 REFERENCE STANDARDS

A. ASTM C 39-94 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

B. ASTM C 150-94: Standard specifications for Portland Cement.

C. ASTM C 185: Standard Test Method for Air Content of Hydraulic Cement Mortars.

D. ASTM C 260-94: Standard specification for Air-Entraining Admixtures for Concrete.

E. ASTM C 403: Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance.

F. ASTM C 494: Standard specification for Chemical Admixtures.

G. ASTM C 617-94: Standard Practice for Capping of Cylindrical Concrete Specimens.

H. ASTM C 939-94a: Standard Test Method for Flow of Grout for Pre-placed Aggregate.

I. ASTM C 1012: Standard Test Method for Length Change of Hydraulic Cement Mortars Exposed to a Sulfate Solution.

J. ASTM C 1157-94a: Standard Performance Specification for Blended Hydraulic Cement.

K. ASTM D 4380: Standard Test method for Density of Bentonitic Slurries.

L. ASTM D5084: Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

1.04 SUBMITTALS

A. The Contractor shall submit the following items signed and sealed by his Professional Engineer licensed in the State of New York.

1. Proposed Grout Mixes: Submit all proposed cement grout mixes intended for use in the jet grout operations. Mix submittals shall include all chemical admixtures, fillers, or other cementitious materials necessary to meet the requirements herein and in Section 02168. The submittals shall be received by the Engineer. Submittals shall include at a minimum:

   a. Type of Portland cement.

   b. Type and proportion of all mix components, including chemical admixtures. Give proportions by weight per 100 lbs of cementitious material. For silica fume, give as a percent dry weight of total cementitious material.

   c. Specific gravity and water/cement ratio.

   d. Product data and manufacturers' instructions for products used under paragraph 2.1 below including MSDS sheets.

2. Trial Grout Mixes: Submit the confirmatory field and laboratory test results made on the fluid and hardened properties of the grout trial mixes prior to the start of work.

3. If at any time during the field test section or the production work, the Contractor proposes a different grout mix design that in the judgement of the Engineer may have different strength and permeability properties, that mix shall be submitted for review. Laboratory test results of grout cube specimens shall also be submitted for review.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement: Use Portland Cement meeting the specifications for Type II - Moderate Sulface Resistant Cement in accordance with ASTM C150-94.

B. Water: Water shall be clean, uncontaminated potable water.

C. Admixtures: Use chemical or mineral admixtures necessary to achieve the requirements of Paragraphs 3.1 and 3.2 herein as well as Sections 02168 including but not limited to:

1. High Range Water Reducing Admixtures (Superplasticizers): Use Rheobuild® 2000 manufactured by Master Builders Technologies, Inc. or approved equal that meets ASTM C 494 requirements for Type F Chemical Admixtures for concrete.

2. Retarding or Accelerating Admixtures: Accelerants and/or retardants shall meet ASTM C494 requirements for Type B and/or Type C Chemical Admixtures.

3. Anti-Washout Admixture: Use Rheomac® UW450 manufactured by Master Builders Technologies, Inc. or approved equivalent that meets the washout resistance requirements specified herein.

PART 3 - EXECUTION

3.01 REQUIREMENTS OF FLUID GROUT

A. Water/Cement Ratio: Maximum of 1.0 by weight.

B. The mix shall have anti-washout characteristics to prevent dispersion of cement particles into the water.

C. Grout Flow: Grout flow shall be adequate to be pumped through the jet grout equipment.

D. The field batched grout shall maintain consistent water/cement ratio, density (or specific gravity), flow characteristics, and set time.

3.02 REQUIREMENTS OF SOLID GROUT

A. Strength: The minimum allowable 7-day, 14-day, and 28-day axial compressive strength on 3-inch-diameter by 6-

inch-high cylindrical specimens as determined by ASTM C39-94, shall be 2,000 lb/in^2, 2,500 lb/in^2, and 3,000 lb/in^2, respectively.

B. Hydraulic Conductivity: The grout shall have a hydraulic conductivity measured in the laboratory of no greater than $1x10^{-6}$ cm/sec, as measured by ASTM D5084.

3.03 PROPOSED GROUT MIXES

A. The Contractor shall develop his own cement grout mix formulations to meet the specified physical properties of the grout. The Contractor is alerted to the fact that more flowable mixes through the use of high range water reducers (superplasticizers) may be necessary and should account for that in his trial mix formulations.

B. The Contactor shall submit his proposed mix proportions to the Engineer along with data from the manufacturer that demonstrates the grout mixes will achieve the specified sulfate resistance properties.

3.04 TRIAL GROUT MIXES

A. The Contractor shall create a trial mix for each proposed grout mix approved by the Engineer that he intends to use. Measure the following fluid and hardened properties of the grout mix(es) and submit the result prior to the start of the field jet grouting work.

1. The 7-day axial compressive strength of 3-inch-diameter, 6-inch-high cylindrical specimens exceeds 2,000 lb/in^2 and the 14-day axial compressive strength exceeds 2,500 lb/in^2.
2. The density in accordance with ASTM D4380.
3. The flow in accordance with ASTM C939.
4. The set time in accordance with ASTM C403.
5. Hydraulic conductivity of the grout specimens at 7 days in accordance with ASTM D-5084.
6. Submit the 28-day strength test results within 3 days after the completion of the test.

The fluid properties established with the trial mixes will be used by the Engineer for verification of mix proportions during the production work.

B. Any mix with potentially different strength and hydraulic conductivity characteristics that has different combinations of chemical admixtures including set time accelerators retarders shall be considered a different design mix.

C. All trial grout mix batching and determination of fluid grout properties shall be made in the presence of the Engineer. Batching of trial grout mixes shall be done using a high speed colloidal type mixer.

3.05 GROUT MIXING AND INJECTION

A. Mix cementitious grout and chemical admixtures with the identical equipment and procedures required in Section 02168.

B. Inject grout using the equipment and by step procedures submitted for review in accordance with the requirements of Section 02168.

3.06 QUALITY CONTROL

A. All proportioning and mixing of the grout test batching shall be performed in accordance with the Contractor's submitted procedures and design mixes in the presence of the Engineer. This work can be done in the Contractor's yard.

B. The Contractor or the Contractor's testing laboratory shall obtain 3-inch-diameter, 6-inch-high cylindrical specimens perform the laboratory tests specified in this Section and Section 02168.

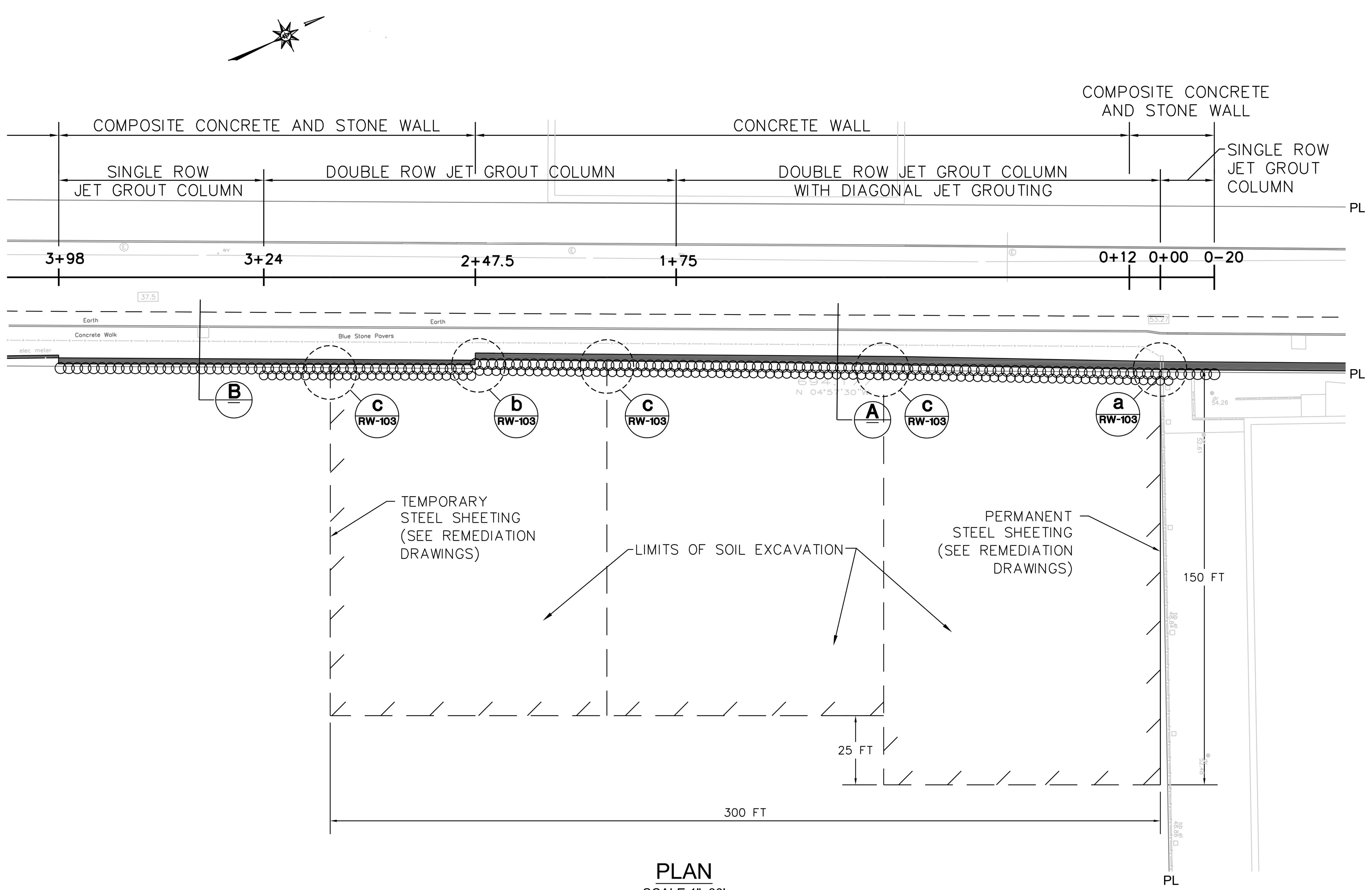
C. The following physical and engineering properties of the fluid or hardened grout shall be determined for each grout mix:

1. Strength in accordance with ASTM C 39-94a.
2. Hydraulic Conductivity in accordance with ASTM D5084
3. Density in accordance with ASTM D4320.
4. Flow in accordance with ASTM 939-94a.
5. Set time in accordance with ASTM C403.

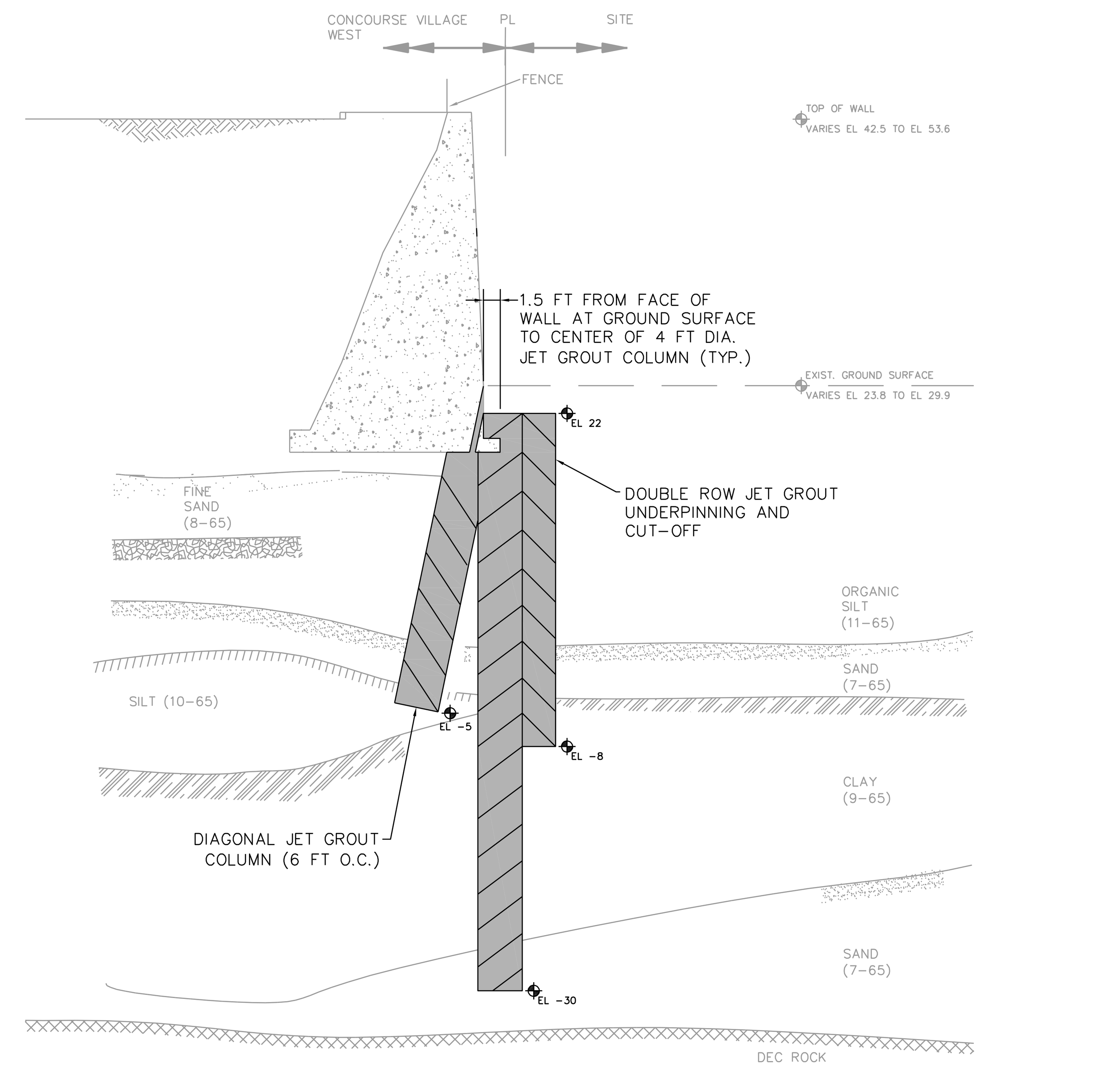
D. Quality Control of grout mix preparation in the field and injection shall be the responsibility of the Contractor in accordance with the requirements of Section 02168 Grout Wall Production Construction.

E. During Field Test Section and Construction work, grout specimens shall be obtained by the Contractor or his testing approved laboratory and laboratory tests made at the frequency specified in Section 02168.

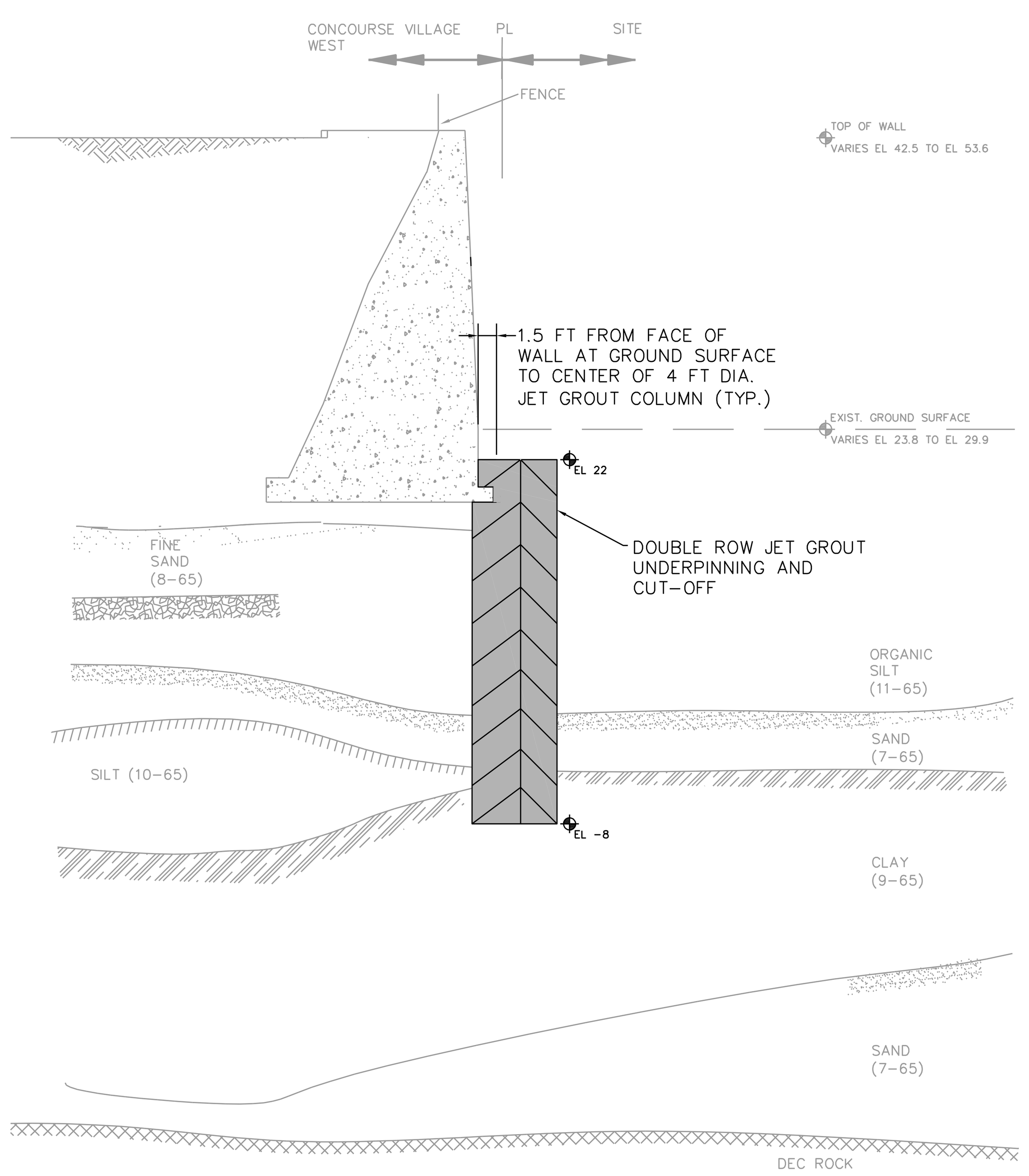
END OF SECTION



PLAN
SCALE 1"=30'



A DOUBLE ROW JET GROUT CUT-OFF WITH DIAGONAL JET GROUT
SCALE 1"=10'



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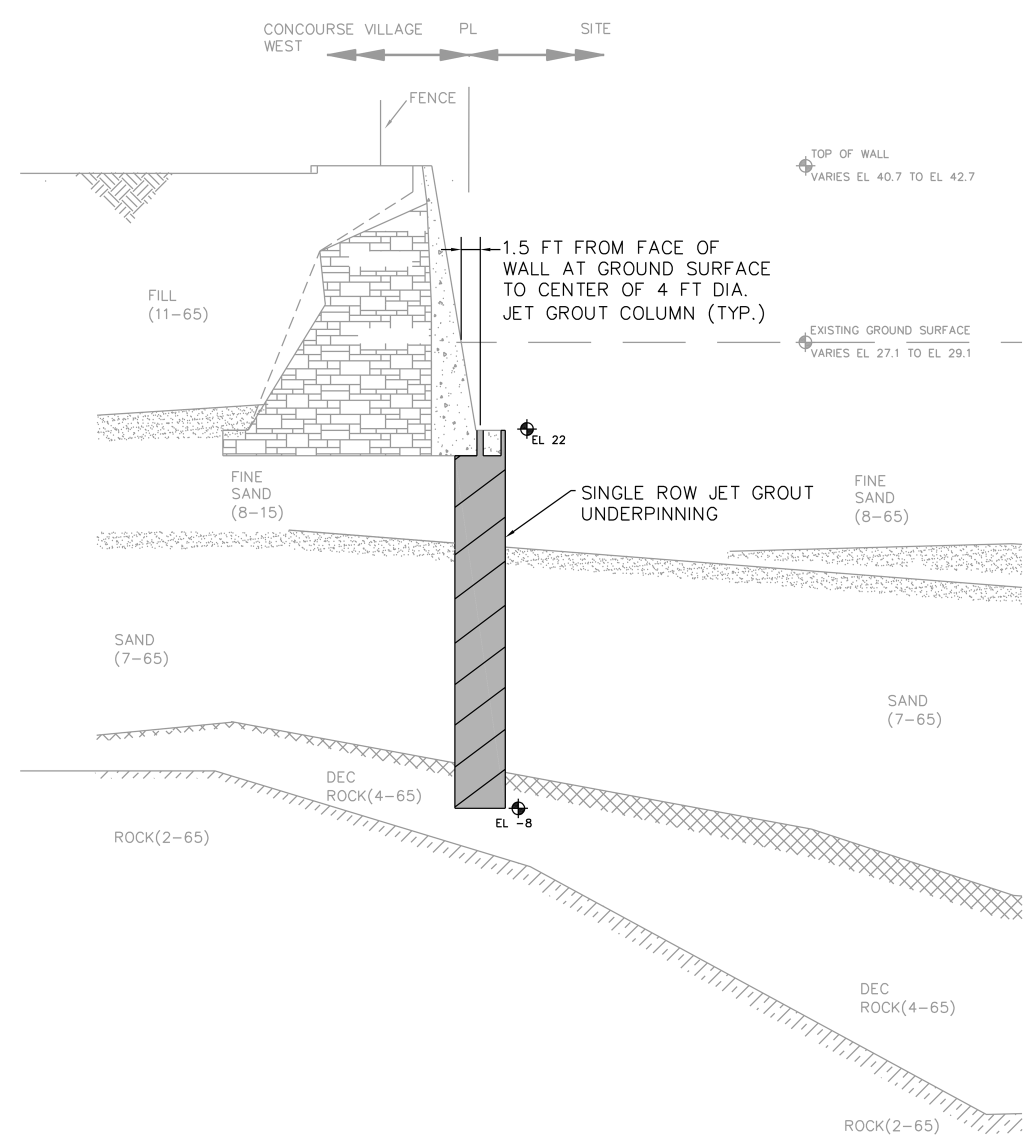
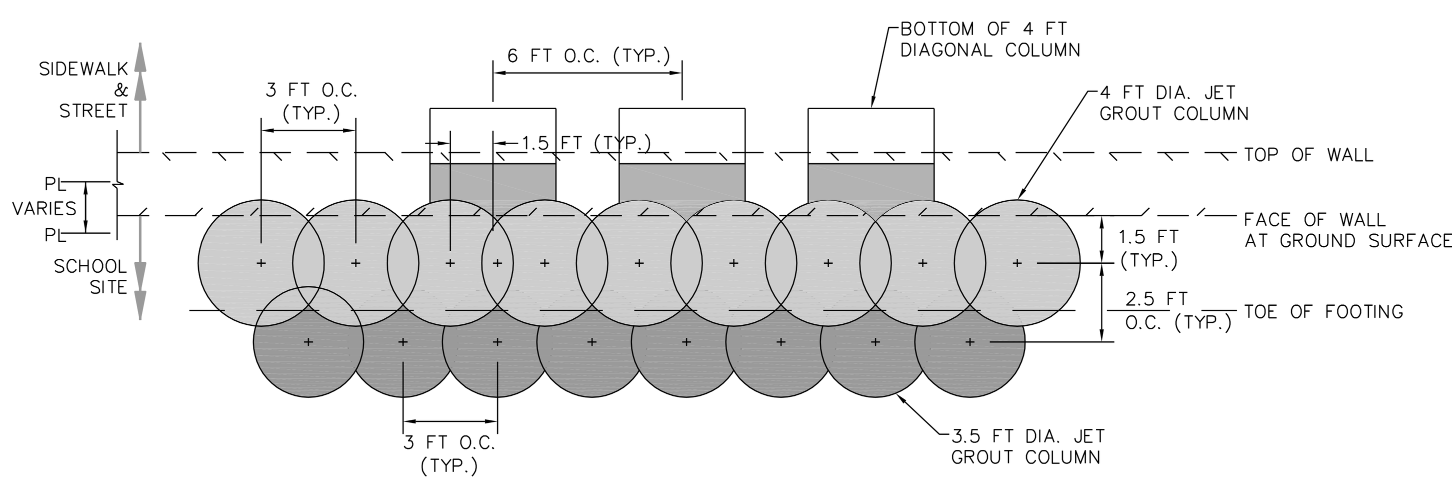
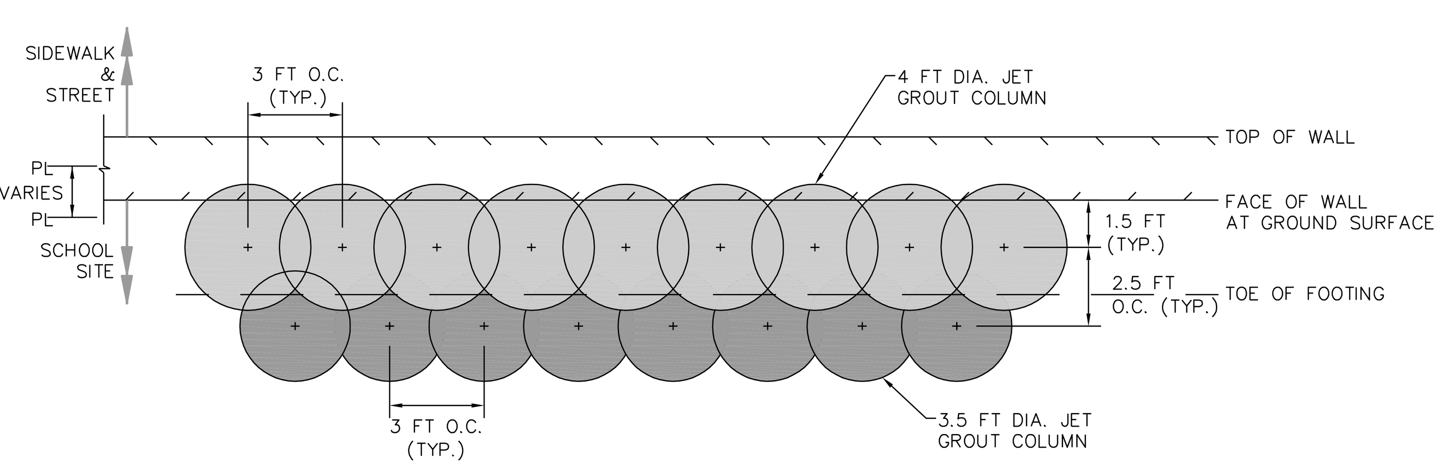
SCALE 1"=10'



C SINGLE ROW JET GROUT CUT-OFF
SCALE 1"=10'



TYP. PARTIAL PLAN DOUBLE ROW JET GROUT WITH DIAGONAL JET GROUTING
SCALE 1/4"=1'-0"



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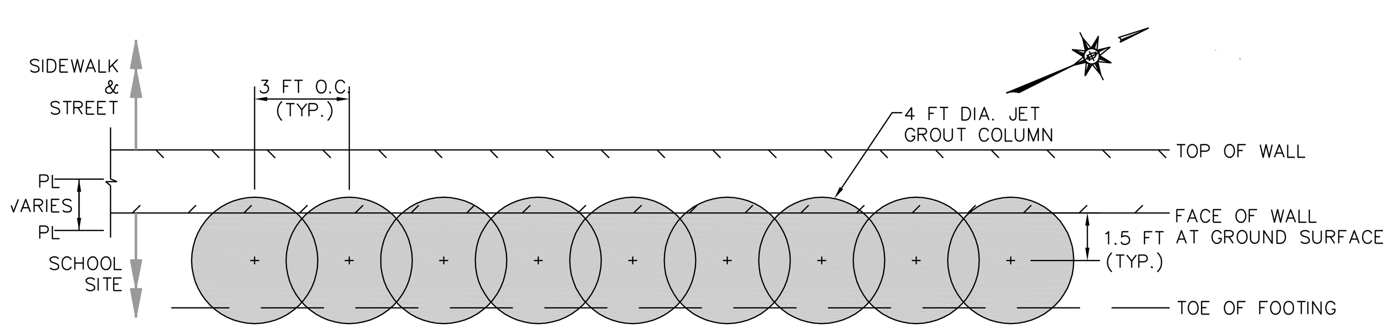
SCALE 1/4"=1'-0"



TYP. PARTIAL PLAN SINGLE ROW JET GROUT
SCALE 1/4"=1'-0"

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

William H Goldstein, President and CEO

Architecture & Engineering

E. Bruce Barrett, R.A., Vice President
Elan R. Abneri, P.E., Director of Design Studio 1
Timothy F. Ng, R.A., PP., Director of Design Studio 2
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Gary Deane, Director of Operations, Special Projects

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CONSULTING ARCHITECT: ALEXANDER GORLIN ARCHITECT LLC
137 VARICK STREET
NEW YORK, NY 10013

STRUCTURAL ENGINEER: LESLIE E. ROBERTSON ASSOCIATES
30 BROAD STREET
NEW YORK, NY 10004

MECHANICAL ENGINEER: FLACK + KURTZ ENGINEERS
475 FIFTH AVENUE
NEW YORK, NY 10017

CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA, 8TH FLOOR
360 WEST 31st STREET
NEW YORK, NY 10001-2727

FOOD SERVICE CONSULTANT: ROMANO GATLAND
99 WEST HOFFMAN AVENUE
LINDENHURST, NY 11757

ACOUSTIC AND THEATER CONSULTANT: HARVEY MARSHALL BERLING ASSOCIATES, LLC.
173 WEST 81ST STREET
SUITE 2, LOWER LEVEL
NEW YORK, NY 10024

NOTE: Drawing may be printed at reduced scale

NO.	REVISION	DATE

KEY PLAN:

Block # 24437 Lot # 78

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	Ernesto Vela
Designer:	RLJ
Drawn by:	RLJ
Checked by:	ARP

LLW No.:	Facility Code:	Date:
45426		11/1/05

Project:

MOTT HAVEN CAMPUS PACKAGE #2

Address: CONCOURSE VILLAGE WEST BRONX, NEW YORK

Drawing Title:

JET GROUT CUT-OFF WALL

Drawing No.:

RW-102

Sheets in Contract: of

PEA No. 21200.00

Appendix H

Waterloo® Hydraulic Barrier Specifications and Plans

SECTION 02330
SHEET PILING

PART 1 – GENERAL

1.01 SCOPE

A. This specification details the technical and quality assurance requirements for the design, supply and installation of steel sheet piling to perform the soil remediation work as indicated on the Drawings. Information on existing subsurface conditions at the locations of the planned sheet piling can be found in the Geotechnical Engineering Study and the Retaining Wall Evaluation Report prepared by Langan Engineering and Environmental Services.

B. The work consists of designing and installing sheet piling required to provide excavation support for site remediation work. The work will be performed in three sections as shown in the Contract Drawings. From north to south, the sections consists of Section 1: 150 ft (e-w) by 100 ft (n-s); Section 3: 125 ft (e-w) by 100 ft (n-s); Section 2: 125 ft (e-w) by 100 ft (n-s). The bottom of excavation shall be elevation 9.3 for Section 1; elevation 9.97 for Section 3; and elevation 14.47 for Section 2. The sheeting on the north side shall be permanent and the other sheeting shall be removed after completion of the remediation work and before the start of pile driving operations.

C. The site is an urban environment in the Bronx bounded to the west by a street (Concourse Village West) and an existing retaining wall. The wall will be underpinned using a jet grouting technique. The existing grade within the site is at approximately elevation 24. Groundwater levels in this area vary at the site, but are approximately elevation 21. There are also varying thicknesses of fill, organic silt, clay and, dense sand underlying various areas of the site. The bedrock surface varies dramatically in the area to be excavated. Boring logs provided in the contract drawings provide detailed information about subsurface conditions (B101 through B113).

D. The work covered by this specification shall be performed in strict accordance with this specification and the applicable drawings, and subject to the terms and conditions of the Contract.

E. The work to be performed under this section of the specification includes, but is not limited to the following:

1. Design sheet piling system for support of the three sections planned for excavation. A water-proof barrier such as Waterloo® or Authority approved equal shall be used along the north edge of the planned excavation and beyond for a length of 371 linear feet. Standard steel sheeting may be used along the east, south and intermediate sections. The Contractor shall determine all size, embedment, bracing and, appropriate steel type for the sheeting. The minimum depth of the Waterloo® sheet pile or authority approved equal along the north edge shall be 30’ below existing grade surface. The western side of the excavation area will be supported by jet grouting beneath an existing retaining wall.

2. Furnishing all plant, labor, equipment, appliances and materials and, performing all operations in connection with the installation of steel sheet piling and driving of all steel sheet piling including special piling required for closures and corners.

3. Excavation, removal and disposal of all materials and obstructions of whatever nature encountered that interfere with the driving of the sheet piling.

4. Inspection and maintenance of excavation supports.

5. Monitoring the behavior of adjacent structures.

6. Sheet piling removal.

1.02 RELATED SECTIONS

A. Summary of Work Section 01010

B. Jet Grout Cut-Off Wall Section 02168

C. Tiebacks and Anchors Section 02382

D. Jet Grout Materials Section 03600

E. Instrument Monitoring Section 02220

1.03 REFERENCED CODES, STANDARDS, AND SPECIFICATIONS

A. The codes and standards referenced below shall be in effect at the time of award of contracts, unless otherwise approved by the Authority or the Authority's Representative. If there is, or appears to be a conflict between this specification and a referenced document, the matter shall be referred to the Authority or the Authority's Representative for resolution.

1. American Society for Testing and Materials (ASTM)

    a. A36 Specification for Carbon Structural Steel

    b. A328 Standard Specification for Steel Sheet Piling

    c. A572 Specification for High-Strength, Low-Alloy Columbium-Vanadium Structural Steel

2. American Welding Society (AWS)

    a. D.1.1: Structural Welding Code – Steel

3. Specifications for Excavation/Dewatering

4. Geotechnical Engineering Study by Langan Engineering and Environmental Services, P.C., - August 10, 2005

5. Retaining Wall Evaluation Report by Langan Engineering and Environmental Services, P.C., - August 26, 2005

1.04 SUBMITTALS

A. The Contractor shall prepare design calculations, signed and sealed by a professional engineer registered in the State of New York for all sheet pile types and sizes to be utilized on the project. The calculations shall be submitted to the Authority's Representative no later than 10 days after Notice to Proceed and shall be reviewed by the Authority's Representative prior to final approval of the sheet piling system proposed by the Contractor. Calculations shall address each stage of excavation.

B. The Contractor shall prepare, ten days after review and approval of the design calculations, complete and accurate shop drawings of all work covered by this Section. The drawings shall include the size and spacing of all steel members. All members shall be numbered for identification in erection. Shop drawings shall give complete information necessary for fabrication of component parts of the structure, including location, type and size of all bolts and welds. Shop and field bolts and welds shall be clearly distinguished. Welding symbols used on shop drawings shall be all American Welding Society symbols. The types of steel used for component parts shown shall be noted on each shop drawing. Drawings shall show complete dimensioned layout of all steel sheet piling.

C. Contractor shall submit checked shop drawings to the Authority's Representative for approval.

D. No steel shall be ordered until such drawings have been approved by the Authority's Representative.

E. Welder's certificates for the appropriate classes of welding: Welders shall not be employed on the project prior to their approval by the Authority's Representative.

F. Contractor shall submit details of the quality control program planned for the sheet piling installation to ensure that the requirements of this specification have been met and shall be properly documented.

G. Certification of the License Agreement with Waterloo Barrier® Inc. or Authority approved equal, for the provision of quality control services for the sheet pile installation and joint sealing.

H. Approval by the Authority's Representative covers general design of details only and if any change is made, which would cause members not to fit, or would not give sufficient strength, the Contractor shall call the Authority's Representative's attention to the fact at once, in writing so that corrections may be made. If the Contractor fails to do this, the sole responsibility shall rest upon the Contractor.

I. Any error or omission on the Contractor's drawings even though approved, shall not relieve the Contractor from the responsibility of performing the work in accordance with the specifications.

J. Contractor shall submit complete description and plans for monitoring vibration and settlement at the existing structures north and west of the site, including frequency and threshold movement limits.

K. Any details not sufficiently shown on the plans will be furnished to the Contractor by the Authority's Representative upon request.

1.05 STORAGE

A. Material covered by this specification will be stored by the Contractor in the Contractor's facilities, either at the jobsite or at a nearby location. Steel sheet piles and appurtenant materials shall be stacked in a neat, regular and stable fashion. Adequate dunnage shall be provided under and within stacks of sheets at positions to prevent distortion of the sheeting. All necessary precautions shall be taken to prevent damage to the sheeting when handling and transporting. Sheeting or appurtenant materials damaged or distorted in any way may be rejected.

B. The Contractor shall paint an identification number on the inside and outside face of each sheet pile within 2-feet of final grade. The identification number shall be placed on the sheet pile before driving is initiated.

1.06 COORDINATION

A. Notify the Authority’s Representative at least 5 working days prior to beginning sheet piling operations.

B. The Contractor will be required to schedule work activities and work during installation of the Waterloo Barrier® in conjunction with third party Authority approved inspector to complete the barrier wall installation in the scheduled time period and to the satisfaction of the Authority’s Representative.

1.07 QUALITY ASSURANCE

A. Before the Contractor starts the work under this section and/or before he awards a subcontractor the work under this section, the Contractor shall submit evidence satisfactory to the Authority’s Representative indicating that he, or the firm whom he intends to award a subcontract can conform to the following requirements:

1. That they are experienced in the type of work required, that they have been engaged in performing such work for at least five years and that they have satisfactorily completed at least three projects for work comparable in type, quality, and approximate quantity to that required under this Contract.

2. That they are available for use on this project: a) equipment and facilities of adequate size, capacity and type in satisfactory condition; b) qualified and experienced design and field engineering personnel and workmen necessary to provide, install and, maintain the lateral support system required under this section.

1.08 PERFORMANCE REQUIREMENTS

A. Maximum seepage for the waterproof barrier to be installed along the north side, including the northwest corner shall be 1 x 10-7 cm/sec.

B. Maximum allowable deflection of the sheeting shall be 2-inches typical and shall be no more than 1-inch along the north side.

1.09 MONITORING AND PROTECTION OF ADJACENT STRUCTURES

A. A program of pre-construction and post-construction condition surveys shall be planned and implemented to establish monitoring points and criteria for protection of buildings.

B. A series of settlement monitoring points shall be established to monitor the structures for settlement both due to deflection of excavation supports or construction vibration.

C. Vibration monitoring shall be performed at selected points on the structures in order to assess the effects of sheet pile driving.

D. A response plan shall be developed as part of the monitoring program to maintain the progress of the work. The following tentative action thresholds shall be considered part of the plan:

1. Settlement threshold: Proceed with caution if settlement of 0.01 foot is measured. Stop and implement action if 2 consecutive positive readings are noted.

2. Vibration threshold: Proceed with caution when readings of 0.5 inches per second peak particle velocity are recorded. Stop and implement corrective measures when velocity exceeds 1.0 inch per second.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Structural Steel: New sections with a minimum yield stress of 36,000 pounds per square inch.

B. Steel Sheeting: Hot-rolled, interlocking structural sections conforming to ASTM A328. Steel sheeting shall be minimum ASTM A328 steel.

C. Waterloo Barrier® steel sheet piles and joint sealing system: WZ75 or WEZ95 sheet piles as required, as manufactured by CMRM (Canadian Metal Rolling Mills) shall be used along the northern portion of the excavation area. An equivalent system may be approved if the water-tightness of the alternate system is better than or equal to that of the Waterloo Barrier® system.

D. The Contractor will be required to furnish the Authority's Representative with three (3) certified copies of the records of chemical and physical tests of steel sheet piling. One bending test will be required upon at least one piece taken at random from every 30 tons of sheet piling. The testing agency shall be approved by the Authority's Representative. All costs in connection with testing shall be borne by the Contractor.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install the excavation support system in accordance with the approved Contractor Drawings and in such a manner as to prevent movement, settlement or loss of ground, removal of fines from the adjacent ground and damage to, or movement of adjacent structures.

B. The Contractor shall ascertain the location of any utilities or drain lines that pass through the area in which sheet piling is to be driven, and shall protect same during installation of sheet piling.

C. Piles shall be carefully located as shown on the Contractor's Drawings, in accordance with approved shop drawings and driven in a plumb position, each pile interlocked with adjoining piles for its entire length. The Contractor shall drive all piles true to line and shall provide suitable temporary wales or guide structures to insure that the piles are driven in correct alignment. All piles shall be driven to depths shown on the Contractor's drawings and shall extend to the elevations indicated for the tops of the piles.

D. Driving

1. Piles shall be driven by approved methods in such a manner as not to subject the piles to serious injury and to insure proper interlocking

throughout the length of the piles.

2. Pile hammers shall be of approved sizes and types and shall be maintained in proper alignment during driving operations by use of suitable leads or by guides attached to the hammer. A protecting cap of approved design shall be employed in driving when required, to prevent damage to the tops of the piles. Vibratory drivers / extractors are also acceptable. All piles shall be driven without the aid of a water jet, unless otherwise authorized.

3. If at any time, the forward or leading edge or the piling wall is found to be out of plumb in the plane of the wall, the piles already assembled and partly driven shall be driven to full depth and the Contractor shall provide and drive tapered piles or take other corrective measures to insure plumbness of succeeding piles. The maximum permissible taper for any tapered pile will be one eighth (1/8) of an inch per square foot of length.

4. Each run of piling shall be driven to grade progressively from the start and no pile shall be driven to a lower grade than those behind it in the same run, except when the piles behind it cannot be driven deeper. If the pile next to the one being driven tends to follow below the final grade, it may be pinned to the next adjacent pile.

5. Piles driven out of an interlock with adjacent piles or otherwise injured shall be removed and replaced by new piles at the Contractor's expense. Piles shall not be driven within 100-feet of concrete that is less than 7 days old.

6. Records shall be kept of each sheet pile driven, including the initial length of pile, final pile depth, and final stick-up before cut-off to final elevation. Notes on any unusual behavior of the pile or pile damage shall also be made. Forms for this purpose shall be supplied by the Contractor and approved by the Authority or the Authority's Representative before installation of sheet piling one week before installation of sheet piling starts.

E. Plumbness and Alignment – Sheet piling other than Waterloo® equivalent shall be installed plumb and true within the following tolerances: deviation from vertical, not more than 3/8 inch per foot alignment for non-Waterloo Barrier® sheeting, in any given 30-foot length of sheeting. No point at the top of the sheeting shall deviate more than 2-inches from a straight line.

F. Cutting and Splicing Piles – Accepted piles driven to final tip depth and extending above cut-off elevation shall be cut-off to required grade. Piles drive below grade and pile which, because of damaged heads have been cut off to permit further driving and are then too short to reach final grade shall be extended to the required grade by welding an additional length, when directed, without cost to the Authority. The Contractor shall trim the tops of piles damaged during driving, when directed to do so, at no cost to the Authority. Cut-offs shall become the property of the Contractor and shall be removed from the site.

G. If necessary, pre-excavate prior to installation of excavation support wall to remove obstructions.

H. Waterloo Barrier® system piles shall have a foot plate welded to the base of each female joint of the sealable sheet piling to prevent soil from entering the joint as the pile is driven into the ground. The Contractor shall be responsible for all cutting of sheet piles and attachment of the foot plates.

1. The maximum permissible vertical tolerance (plumbness) in the Waterloo Barrier® sheet pile installation shall not be greater than a deviation of 1/5 inch per 1-foot vertical. The integrity of the interlock between adjacent piles shall be verified by flushing the joint. Joint inspection and flushing shall be performed by the Quality Assurance / Quality Control Technician (C3 Environmental Limited). The Waterloo Barrier® system pile installation (or approved equivalent) practices shall be strictly followed.

I. Provide accurate records of each sheet pile driven. Submitted records shall include the following information:

1. Pile Identification Number
2. Date and time of driving
3. Elevation of top of pile
4. Length of sheet pile in the ground when driving is complete
5. Driving logs showing the time to install each foot of each sheet pile
6. Detailed remarks concerning alignment, obstructions, etc.
7. Plumbness records of each sheet pile installed
8. Joint flushing records for each joint installed (Waterloo Barrier® only)

3.02 BRACING FOR SUPPORT SYSTEM

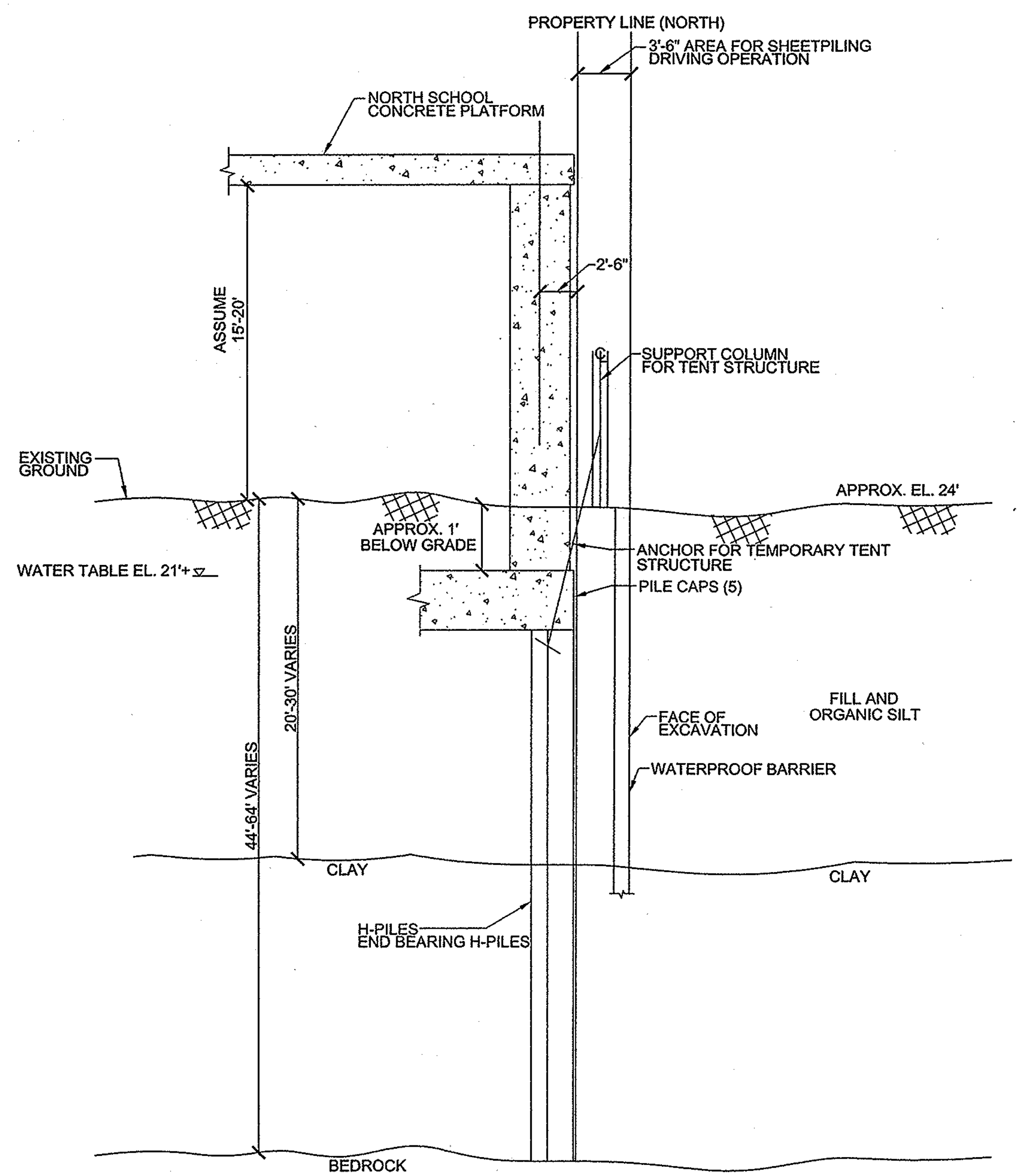
A. When wales are used, obtain tight bearing between wales and wall and ample bearing area with wedges and packing for load transfer.

B. Install and maintain internal support members in tight contact with each other and with the surface being supported.

3.03 REMOVAL

A. Except for the permanent waterproof barrier along the north side, sheet piling shall be removed at the completion of the remediation work at all other locations.

END OF SECTION



SECTION (A-A)

SCALE
1/4"=1'-0"

NOTES:

- AREA AVAILABLE FOR SHEETPILING DRIVING OPERATION IS 3'-6" SOUTH OF NORTH PROPERTY LINE
- DEPTH OF TEMPORARY SHEET PILE SHALL BE DETERMINED BY CONTRACTOR
- WATERPROOF BARRIER DEPTH (WATERLOO® OR EQUIVALENT) SHALL BE DETERMINED BY CONTRACTOR. HOWEVER, BARRIER SHALL BE A MINIMUM OF 30' BELOW GRADE
- MAX PERMISSIBLE VERTICAL TOLERANCE (PLUMBNESS) 1/5" PER FOOT VERTICAL
- BOTTOM OF PROPOSED EXCAVATION EL.+9.3 (NORTH SIDE)-SECTION #1
- TENT STRUCTURE AND DETAILS SHOWN FOR CLARITY CONTRACTOR RESPONSIBLE FOR MEETING DESIGN AND FIELD CONDITIONS
- MAXIMUM ALLOWABLE DEFLECTION OF THE SHEETING SHALL BE 2" TYPICAL AND SHALL BE NO MORE THAN 1" ALONG THE NORTH SIDE FOR WATERPROOF BARRIER

NOTES:

1. REFER TO LANGAN GEOTECHNICAL REPORT FOR DATA ON SUBSURFACE CONDITIONS AND TOP OF ROCK CONTOURS.
2. REFER TO DRAWING 2 FOR PLAN.
3. THE 4TH AND 5TH PILE CAPS FROM THE NORTHWEST CORNER OF THE SITE EXTEND BEYOND THE PROPERTY LINE BY APPROXIMATELY 10-1/2" AND 3" RESPECTIVELY.
4. THE TOP OF THE WATERPROOF BARRIER SHALL BE CUT AT GRADE, BUT NO LESS THAN ELEVATION 24' TO ENSURE THAT IT EXTENDS ABOVE THE WATERTABLE.

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY

OWNER: NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NY 11101-3045

ARCHITECT: PERKINS EASTMAN
115 FIFTH AVENUE
NEW YORK, NY 10003

CONSULTING ARCHITECT: ALEXANDER GORLIN ARCHITECT LLC
137 VARICK STREET
NEW YORK, NY 10013

STRUCTURAL ENGINEER: LESLIE E. ROBERTSON ASSOCIATES, RLLP
30 BROAD STREET
NEW YORK, NY 10004

CIVIL ENGINEER: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES
21 PENN PLAZA
360 WEST 31ST STREET, 8th Floor
NEW YORK, NY 10001

ENVIRONMENTAL ENGINEER: THE SHAW GROUP INC.
4 COMMERCE DRIVE SOUTH
HARRIMAN, NY 10926

100% CONTRACT DOCUMENT
ISSUE FOR BID

NOTE: Drawing may be printed at reduced scale

NO.	REVISION	DATE

KEY PLAN:

SCA Design Manager:	Bohdan Huhlewych
Project Architect/Engineer:	August Arrigo
Designer:	Frank Facciolo
Drawn by:	Randall Tagoff
Checked by:	Frank Facciolo

LLW No.:	Facility Code:	Date:
45426		03/03/06

Project:
PACKAGE #2
RETAINING WALL STABILIZATION AND SOIL REMEDIATION

Address: CONCOURSE VILLAGE WEST
BRONX, NEW YORK

Drawing Title:
PRE-EXCAVATION CONDITIONS AT NORTH END

Drawing No.:
DRAWING 3

Sheets in Contract:
3 of 7

PEA No. 21200.00

Appendix I

Sub Slab Depressurization System Specifications and Plans

PLANS FOR THE SUB SLAB DEPRESSURIZATION SYSTEM ARE THE SAME AS FOR THE VAPOR BARRIER AND CAN BE FOUND IN APPENDIX F

SECTION 02221
SUB-SLAB DEPRESSURIZATION SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Install a sub-slab depressurization system (SSDS) to allow the lateral movement, collection and venting of gas vapor from below the building. System components include an 18-inch gas permeable aggregate layer with 6-inch or 8-inch Schedule 80 slotted PVC piping network and 30 pressure field extension (PFE) monitoring points below a fluid applied waterproofing/gas vapor barrier which is protected underneath by a geotextile fabric and above by a protection course as specified in the Architectural Drawings. The 8-inch subslab PVC piping network is required for Buildings A, B, and C as specified in Drawings ENV1A, ENV1B, and ENV1C. The 6-inch subslab PVC piping network is required for Buildings D, E, and F as specified in Drawings ENV1D, ENV1E, and ENV1F. The PVC piping network transitions to Schedule 40 carbon steel pipe below the slab at six (6) building penetrations, continuing as risers through the roof, which vent to atmosphere by mechanical means. The active subslab ventilation system shall be equipped with six (6) rooftop inline fans, one (1) for each riser. Install all system components as indicated, specified and required in the Contract Documents and Drawings (ENV1A, ENV1B, ENV1C, ENV1D, ENV1E, ENV1F and ENV2).

1.02 RELATED SECTIONS

A. Environmental Site Assessment Reports.......Section 02010

B. Site Preparation............................Section 02100

C. Earthwork...................................Section 02200

D. Waterproofing/Gas Vapor
Barrier (Fluid Applied).................... Section 02220

E. Pile Foundations............................Section 02360

F. Asphalt Concrete Paving.................... Section 02511

G. Installation of Piping and Conduits.........Division 15

H. Electrical.................................. Division 16

1.03 STANDARDS AND REGULATIONS

A. Comply with applicable portions of the Building Code of the City of New York. Where requirements for products, materials, equipment, methods and other portion of the work specified herein exceed minimum requirements of N.Y. City Building Code, contractor shall comply with such requirements specified herein, unless specifically approved otherwise by the Authority.

B. Standards listed below are referenced in this section.

1. American Society for Testing and Materials (ASTM)
2. American Standards Association (ASA)
3. American National Standards Institute (ANSI)

1.04 RESTRICTIONS AND QUALITY CONTROL

A. Preinstallation Meeting: Convene a preinstallation meeting prior to the start of SSDS installation. Require attendance of parties directly affecting work of this section, including Contractor, Architect/Engineer, and installer. Review installation, protection, and coordination with other work.

B. Quality Control Inspections shall be performed throughout the installation by the Authority or its authorized representative in accordance with the attached Milestones Schedule and as is deemed necessary or appropriate by the Authority.

1.05 SUBMITTALS

A. Product Data: Submit manufacturer’s product data, including installation instructions. For gas collection and ventilation piping, submit manufacturer’s data regarding materials of construction, operable pressure ranges, compatibility with fluids, temperature tolerances and complete catalogue information. For PFE monitoring points submit manufacturer’s data regarding materials of construction and installation method.

B. Submit manufacturer's instructions for installation of fire stop materials for sleeves for pipes.

C. Submit Shop Drawings for all piping installations.

D. Pipe Schedule: Itemize pipe and fitting materials for each specified application.

E. Product Data
1.Cleanout test tee
2.Escutcheons
3.Pipe & Fittings
4.Inline ventilation fan
OR
Submit a compliance affidavit, if pipe, fittings, and equipment match contract documents. Manufacturer's technical product data submission will be required if a substitution is proposed.

F. Sample
1. Polyvinyl Chloride (PVC) pipe & fittings

G. Material Test Reports: Indicate and interpret test results for compliance of materials with requirements indicated, as applicable.

1.06 <u>DELIVERY, STORAGE, AND HANDLING</u>

A. Deliver materials to site in manufacturer's original, unopened contains and packaging, with labels clearly identifying product and manufacturer.

B. Deliver pipe materials properly protected and undamaged.

C. Store materials in a clean, dry area in accordance with manufacturer's instructions.

D. Properly protect all piping so as to prevent damage to the pipe or the introduction of foreign material into the pipe. For the purpose of protecting piping from pre-installation contamination, all piping shall be shipped to job site with suitable caps, sheet metal covers or plugs. Pipe caps shall not be removed until just before installation.

E. Examine all pipe and fittings before laying. Do not install any piece that is found to be defective. Protect all materials during handling and installation to prevent damage.

<u>PART 2 - PRODUCTS</u>

2.01 MATERIALS AND ACCESSORIES

A. GAS PERMEABLE AGGREGATE LAYER

Gas permeable aggregate layer shall be rounded stone as specified in Section 02200, Article 2.01H.

B. SUBSURFACE GAS VAPOR COLLECTION PIPE NETWORK, APPURTANCES, AND BUILDING PENETRATION PIPE

1. Polyvinyl Chloride (PVC) Pressure Pipe:

PVC pipe for gas vapor collection applications for underground installation shall be 6-inch or 8-inch diameter Schedule 80 pipe having 6 rows of 0.03-inch slots cut continuously with 0.25 inch spacing between the slots throughout the length of the piping (refer to Drawings ENV1A through ENV1F for pipe size). The inside and outside slot lengths shall be 1.5 and 2.75 inches respectively. The solid header piping shall be constructed of Schedule 80 PVC with one row of 0.5 inch diameter perforations in the bottom of the pipe with 2 feet spacing between the perforations throughout the length of the piping for drainage. Schedule 80 PVC solid header and slotted piping shall be installed as shown in Contract Drawings ENV1A, ENV1B, ENV1C, ENV1D, ENV1E, and ENV1F. Raw, unslotted pipe shall have a wall thickness of 0.432-inches, a max working pressure of 73 degrees F and weigh approximately 531 lbs/100-feet. Joints shall be solvent-welded.

C. PRESSURE FIELD EXTENSION MONITORING POINTS

1. Monitoring Point:

The pressure field extension monitoring point shall be a 6-inch long, 0.25-inch inside diameter sampling implant by Geoprobe® Systems (sample implant model AT-8625S) or approved equal.

2. Teflon Tubing:

The pressure field extension monitoring point shall be connected to 0.25-inch inside diameter Teflon tubing supplied by Geoprobe® Systems or approved equal.

3. Glass beads:

   The sampling implant shall be surrounded by 60 to 100 mesh rounded glass beads supplied by Geoprobe® Systems or approved equal.

4. Fine Sand:

   A ½-inch layer of fine sand shall be placed directly on top of the gas permeable aggregate. The fine sand shall be a Morie No. 00 or approved equal.

5. Bentonite:

   A three inch layer of bentonite shall be placed directly on top of the fine sand. The bentonite shall be Bariod Granular Bentonite or approved equal.

6. Steel Sleeve:

   Each pressure field extension monitoring point shall have a Galvanized schedule 40 carbon steel pipe cut to fit directly on top of the gas permeable aggregate and be finished flush with the top of the concrete slab.

D. WATERPROOFING/GAS VAPOR BARRIER (FLUID APPLIED)

Fluid Applied Waterproofing/Gas Vapor Barrier System shall be as specified in Section 02220 Waterproofing/Gas Vapor Barrier (Fluid Applied).

E. COLLECTION NETWORK TRANSITION AND RISER PIPE

1. Carbon Steel Pipe:

   a. Galvanized carbon steel pipe for gas vapor venting installation shall be 6-inch or 8-inch diameter (refer to Drawings ENV1A through ENV1F for pipe size), Grade A, seamless, electric resistance welded pipe, or type F furnace butt-welded, and shall be made in accordance with the current Edition of the ASTM A53 Specification. Pipe shall be free from scale, and rust, injurious sand marks, blisters, scale pits, laminations, imperfect welds, or other defects that might affect its strength, appearance or ability to resist corrosion. The maker's name shall be rolled or stamped in the metal at intervals of each length of pipe 2" and larger, and stamped on a metal tag secured to each bundle of pipe 1-1/2" and smaller.

b. Unless otherwise specified or indicated on Drawings, galvanized steel pipe shall be Schedule 40 galv. pipe.

c. Available Manufacturers:

U.S. Steel Co.
Sawhill Tubular Co.
North Star Steel
Sharon Tube Co.
Koppel Steel Corp.

d. Collection network transition shall be made below grade with heavy duty stainless steel couplings with shield of 28 gauge 304, 18-8 chromium nickel stainless steel, neoprene gasket and stainless steel bolts and bands and shall conform to ASTM C-1540-02.

Couplings shall be HI-Torque 80 by Clamp-All Corp., with two (2) clamps for pipe sizes up to and including 4" and four (4) clamps for pipe 5" to 10"; or Husky SD-4000 by Husky Technologies Division of ANACO with four (4) clamps for pipe sizes up to and including 4" and six (6) clamps for sizes 5" to 10" or Mission HW Series by Mission Rubber Company, with four (4) clamps for pipes up to and including 4” and six (6) clamps for pipes 5” to 10”.

F. INLINE VENTILATION FANS

Inline ventilation fans required for each riser shall be Fantech HP-220 or approved equal and shall be installed within the risers at the rooftop as shown in Drawing ENV-2 Details D and E. Contractor shall connect inline ventilation fans to existing electrical service on roof.

G. FITTINGS

1. Fittings for Galvanized Carbon Steel Pipe:

a. Fittings for aboveground steel ventilation stack shall be hot-dipped galvanized carbon steel. All fittings shall be of the same manufacturer, material, class, and schedule as the pipe. Threaded joints to be screwed with pipe joint compound or Teflon tape or flange joints with nitrile or urethane gaskets.

2. Fittings for PVC Pipe:

a. All fittings shall be of the same manufacturer, material, class, and schedule as the pipe. Any required threaded joints shall be provided with Teflon tape or flange joints with nitrile or urethane gaskets.

b. Solvent cement joints for the pipe and pipe installation shall be made in accordance with the manufacturer's recommendations and ASTM D2855.

H. PIPE NIPPLES

1. All pipe nipples shall be of the same materials as the connecting piping.

2. The use of close nipples is prohibited.

I. UNIONS

1. Threaded unions on steel pipe, unless otherwise specified, shall be of malleable iron with bronze ground seats suitable for 300 pounds W.S.P.

2. Flanged unions shall be cast iron for steel pipe, and brass for copper or brass pipe, gasket type suitable for 150 pounds W.S.P.

3. Flanged unions shall be provided with the necessary steel bolts, nuts and gaskets.

4. All unions used on galvanized piping shall be galvanized.

5. Unions shall be as manufactured by Stanley G. Flagg & Co., Inc., Stockham or Dart.

J. SLEEVES FOR PIPES

1. Sheet metal sleeves shall be 20 gauge.

2. Pipe sleeves shall be service weight cast iron pipe or schedule 40 galvanized steel pipe.

3. Fire stop penetration materials for sealing sleeves shall be listed by Underwriters Laboratories and shall have Material and Equipment Acceptance (MEA) approval.

4. Material for sealing spaces between pipe and sleeve through foundation walls below grade shall be Link-Seal Type "C" as manufactured by Thunderline Corp; Belleville, Mich. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve. Links shall be loosely assembled with bolts to form a continuous rubber bolt around the pipe with a pressure plate under each bolt head and nut. Link-Seal pressure plates shall be Type "C" (insulating type) to provide for electrical insulation and cathodic protection.

5. Materials for sealing space between each pipe and sleeve through non-fire rated exterior walls above grade shall be Non-shrinking cement.

6. Waterproof sleeves shall be Link-Seal Wall Sleeve as manufactured by Thunderline Corp, or MetraSeal wall sleeve by the Metraflex Co.

K. ESCUTCHEON PLATES TYPES SHALL BE AS FOLLOWS:

1. Galvanized cast-iron with set screw as manufactured by Grinnell, Fig. No. 395 or Carpenter & Paterson, Inc. Submit manufacturer product technical data.

2. Galvanized cast iron escutcheons with set screw shall be chrome plated for use in finished rooms or spaces.

3. Chrome plated cast brass with brass set screws as manufactured by Kohler or McGuire Mfg. Co., Catalog No. 127. Submit manufacturer product technical data.

L. GENERAL

Provide additional installation accessories as necessary.

Ensure accessories are from same manufacturer as product.

PART 3 - EXECUTION

3.01 EXAMINATION/INSPECTION

At a minimum, all components identified on the following Inspection Schedule for the installation of the SSDS shall be inspected and approved by the Authority or its approved representative upon completion of each phase of Work. Additional inspections, examinations and quality control measures may be required as per manufacturer's recommendation and are the responsibility of the Contractor. The Authority reserves the right to perform additional inspections or quality control tests as deemed necessary by the Authority at any point during the construction process.

A. INSPECTION SCHEDULE

#	Inspection Schedule – Milestone Description
1	Subbase preparation following foundation footing and pier installation.
2	Installation of Sch. 80 PVC collection pipe network, riser "stub-outs", and 30 PFE monitoring points prior to completion of gas permeable aggregate layer.
3	Final Inspection of all SSDS subsurface components prior to application of waterproofing/vapor barrier and concrete slab pours.
4	Application of waterproofing/vapor barrier as specified in the Contract Drawings and Specifications.
5	Inspection of the waterproofing/vapor barrier as required by manufacturer.
6	Final Inspection of all SSDS above grade components.
7	Completed installation of all portions of interior risers prior to enclosure within sheetrock/interior walls.
8	Observation of pressure test of completed interior riser pipes. See following information regarding test requirements.
9	Final inspection of completed system.

B. INTERIOR RISER PRESSURE TESTING

Each of the six (6) interior risers shall undergo a pressure test to ensure all components of the SSDS that pass through the facility interior can withstand 10 psig air pressure.

A cleanout test tee shall be permanently installed on each riser pipe within 12 inches of the pipe entry into the facility and prior to any additional joints, couplings or pipe segments. A pressure-stop balloon shall be inflated between the foundation wall or floor and the cleanout creating an airtight seal. A temporary airtight seal shall be placed at the riser termination on the roof. A static pressure of at least 10 psig shall be applied to the pipe at the cleanout location and maintained for a minimum of 30 minutes. All materials, gauges and equipment for this test shall be provided by the contractor. All test equipment provided must be certified as per Section 15414 Article 2.01B. Pressure testing must be witnessed by controlled inspection and SCA's FID Department.

If the pipe riser does not successfully maintain pressure, it is the responsibility of the contractor to identify and seal all leaks. The test shall be performed following all application of sealants as necessary until successful.

3.02 SURFACE PREPARATION

Preparation of all surfaces prior to the installation of the SSDS shall be as specified in the Contract Documents and Plans.

3.03 INSTALLATION

All components of the SSDS shall be installed as specified in the Contract Documents and Plans.

A. INSTALLATION OF THE GAS PERMEABLE AGGREGATE AND COLLECTION PIPE NETWORK

A 6-inch minimum layer of gas permeable aggregate shall be placed and compacted as necessary on the subgrade. The collection pipe shall be assembled and placed as identified on the Contract Drawings. Aggregate shall be placed a minimum of one pipe diameter on either side of the pipe to maintain the correct layout prior to inspection. Schedule 40 galvanized steel pipe at riser penetration locations shall be assembled and placed with supports as necessary to maintain accurate locations for application of the waterproofing/gas vapor barrier and concrete slab.

Following inspection, gas permeable aggregate shall be placed and backfilled to the bottom of slab elevation.

B. APPLICATION OF THE FLUID APPLIED WATERPROOFING/GAS VAPOR BARRIER

The fluid applied waterproofing/gas vapor barrier shall be installed as specified in Section 02220 and in accordance with manufacturer’s recommendations.

The waterproofing/gas vapor barrier shall be applied horizontally to create a continuous waterproofing/vapor barrier beneath the entire footprint of the building, with durable seals to every footing, pier, and penetration to ensure a single membrane layer. All horizontal application of the waterproofing/vapor barrier shall be on top of placed gas permeable aggregate and immediately below the poured slab.

The waterproofing/gas vapor barrier shall be applied vertically to all subsurface building walls and extend an additional one (1) inch above finished grade forming a lateral barrier on all sides of the waterproofing/gas permeable layer.

C. INSTALLATION OF THE VENT RISERS, INLINE VENTILATION FANS, AND VENTILAOR CAPS

Vent risers shall be as identified in the Contract Documents and Drawings. All transition from PVC to Steel Pipe shall be performed at exterior locations of the building (below slab) with heavy duty stainless steel couplings, Husky SD-4000 or approved equivalent, as specified in Article 2.01D of this Section. A total of six (6) vent risers shall be installed, tested, labeled and enclosed, as identified in the Contract Drawings. Each riser shall be terminated at the cleanout test tee and be plugged as described in Article 3.01 B. The contractor shall complete each riser piping run to the roof. Label shall be a continuous tape; a sign at any location in a pipe chase will not facilitate the entire chase. Each riser vent shall be equipped with a rooftop inline ventilation fan and capped with a rain hat.

Continuous Tape signage on all interior riser pipe beginning at the floor slab elevation and continuing to the installation of ventilator caps above roof penetrations shall be permanently installed on each riser and shall read:

CAUTION: DO NOT TAP OR PUNCTURE

D. INSTALLATION OF THE PFE MONITORING POINTS

PFE monitoring points shall be as identified in the Contract Documents and Drawings. Each PFE monitoring point shall consist of one 6-inch long, 0.25-inch inside diameter sampling implant by Geoprobe® Systems (sample implant model AT-8625S) or approved equal. The sample implant shall be attached to 0.25-inch inside diameter Teflon tubing from Geoprobe® Systems. The Implant will be installed in accordance with the manufacturer's instructions. This will include driving a macrocore probe rod with a handheld unit, attaching the sample implant to the drive tip, and placing glass beads around the sample implant while retracting the macrocore rods. The curb box and liner will be placed over the tubing. Approximately 0.5 inches of fine sand will be placed within the curb box liner, directly on top of the gas permeable aggregate. Approximately 3 inches of hydrated bentonite will be placed within the curb box liner and directly on top of the fine sand. Concrete will be placed on top of the hydrated bentonite to within 3 inches of the top of the curb box.

E. PIPING (GENERAL)

1. The run and arrangements of all pipes shall be approximately as shown on Contract Drawings or specified and as directed during installation, and shall be as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and neatly spaced. No pipe shall be installed where the headroom will be interfered with unless the conditions are such that it is unavoidable and permission is obtained from the Authority. Offsets will be permitted where walls reduce in thickness or beams interfere with direct runs; offsets shall be made at an angle of 45° to the vertical; in no case shall the space between the pipes, partitions, walls, etc., exceed 5". All exposed risers shall be erected plumb, standing free, close to and parallel with walls and other pipes and be uniformly spaced. All horizontal runs of piping hung from structural floor, slab or floor beams shall be erected as closely as possible to bottom of floor slabs,

ceilings, or I-beams as the case may be. In no case shall the headroom, beneath the pipe, be less than (7'-0") where the pipe is installed more than (1'-0") from wall, partition, etc., except where piping is required to be installed in Boiler Room and Mechanical spaces above floor. Horizontal piping shall be so graded as to drain to the low points and water lines to drain bibbs. All piping installed in floor shall be painted with a heavy coat of asphaltum. All piping shall be installed with ample space for pipe covering. All exposed plumbing piping in the Kitchen Areas shall be chrome plated brass pipe except for gas line. Provide threaded fittings. Chrome (silver) paints will not be accepted.

2. Roughing under ground or concealed in the floor or wall construction shall be properly installed, tested and inspected before any of the roughing is covered up. Should any work be covered up before being inspected and tested, it shall be uncovered and recovered at the expense of the Contractor. Plugged fittings shall be installed when called for. Reducer fittings shall be used in making reductions in sizes of pipes; bushings will not be allowed. Suitable air chambers or Water Hammers Arresters shall be provided as called for in other sections.

3. All lines of piping and branches for fixtures passing through or in connection with waterproofing shall be brought to the proper locations and levels so that fixtures and piping may be installed without disturbing the waterproofing.

F. PIPING JOINTS

1. The joints of steel and brass piping shall be screwed joints of full length and threads shall be NPT conforming to the requirements of ANSI B 2.1. All pipes shall be screwed close up to their shoulders, not to leave more than 3 threads exposed. The use of lamp wick is prohibited in threaded joints. All burrs shall be removed. Pipe joint cement or Teflon tape shall be used only on male threads.

2. Solvent-cementing:
a) Remove all burrs, chips, filings, and other debris from the pipe i.d. and o.d. before joining.

b) All pipe ends should be beveled to minimize the chances of wiping the solvent cement from the i.d. of the fitting as the pipe is socketed. Beveling can be done with the coarse file or beveling tool.

c) Using a clean, dry cotton rag, wipe away all loose dirt and moisture from the i.d. and o.d. of the pipe end and the i.d. of the fitting. Do not attempt to solvent-cement wet surfaces.

d) Using a natural-bristle brush about one-half the width of the pipe diameter to be joined, apply primer freely to the inner fitting socket. Keep the surface wet by continuously brushing the entire surface for 5 to 15 seconds. Redip the applicators as necessary, but avoid puddling inside the fitting. Reapply primer to the fitting socket.

e) Apply primer to the pipe surface in the same manner, making sure that the length of pipe evenly covered is at least equal to the fitting socket depth.

f) Using a second clean natural-bristle brush one-half the size of the pipe diameter, apply a heavy coat of solvent cement to the male end of the pipe. Next apply a liberal coat of solvent cement to the inside of the socket using straight outward strokes to keep excess cement out of the socket.

g) While both surfaces are still wet with solvent cement, insert the pipe into the socket with a twisting motion. The pipe must go to the bottom of the socket. The application of solvent cement to pipe and fitting, and the insertion of pipe into the fitting, should be completed in less than 1 minute. Hold the joints together for approximately 30 seconds until both surfaces are firmly gripped.

h) After solvent-cementing, hold joints together for 30 seconds until both surfaces are firmly gripped. Allow proper set time before disturbing joints. The initial set time prior to installation is as follows:

Temperature Range	Pipe Sizes 1/4″-1/2″	Pipe Sizes 1½″-3″	Pipe Sizes 4″-8″	Pipe Sizes 10″-16″	Pipe Sizes 18″-24″
60°-100°F	15 Min.	30 Min.	1 Hr.	2 Hr.	3 Hr.
40°-60°F	1 Hr.	2 Hr.	4 Hr.	8 Hr.	12 Hr.
0°-40°F	3 Hr.	6 Hr.	12 Hr.	24 Hr.	36 Hr.

G. CLEANOUT TEST TEE

1. Install a 6″ or 8″ galvanized carbon steel cleanout test tee for purposes of pressure testing on each riser pipe within 12 inches of the pipe entry into the facility and prior to any additional joints, couplings or pipe segments as described in Article 3.01B of this Section. Cleanout test tees at base of risers must be full size to facilitate testing. The cleanout test tees shall be closed with brass screw plugs of heavy pattern.

H. SLEEVES FOR PIPES

1. General: All plumbing pipes passing through floors, roofs, walls, partitions, furring, beams, trenches, and wherever else indicated on drawings shall be provided with sleeves installed and maintained by the Contractor. Core drilled holes shall be provided with sleeves. Where plumbing pipes pass through potentially wet floors that do not have membrane waterproofing such as toilet rooms, cafeteria kitchens, serving areas, dish washing room, janitor's sink closet, mechanical equipment rooms, pipe chases and areas that are provided with fire protection sprinkler systems, the Contractor shall install sleeves of galvanized steel pipe with welded clips or equivalent at bottom ends for securing sleeves to form work and shall project one inch above finished floors, and shall be caulked watertight.

2. Sleeves for gas service piping through exterior walls below grade and floor slabs on earth shall be installed and sealed in accordance with the latest regulations of the Administrative Code of the City

of New York. Sleeves for gas piping and gas vents through exterior walls shall be installed and sealed in accordance with the requirements of the serving utility. The space between each pipe and its sleeve through floor slabs on earth and exterior walls above grade for all other piping shall be sealed tightly with picked oakum and molten lead. The lead caulking shall finish flush with the face of the sleeve. The space between each pipe and its sleeve through exterior walls below grade for all other piping shall be sealed tightly with link seals. All penetrations need to be air tight.

3. For interior walls and floors and for pipes through roof, the space between each installed pipe and its sleeve shall be sealed with a three hour rated fire stop penetration material. Fire stop materials shall be installed in accordance with the instructions of the manufacturer.

4. Sheet Metal Sleeves

   a. Sleeves for pipes passing through floors, partitions, hung or furred ceilings, shall be installed with 1/2" maximum clearance all around pipes. Each sleeve for a pipe passing through an interior floor slab shall be fitted with a one-inch flange, or equivalent, at the bottom end for the purpose of securing it to the form work or sheet metal deck.

      The sleeve shall finish flush with the top of the finished floor. Sleeves for pipes passing through partitions, hung or furred ceilings shall be of one piece construction and shall finish flush with the finished surface.

   b. Sleeves installed for pipes passing through vent ducts shall be securely fastened, soldered and made airtight.

5. Pipe Sleeve: Install pipe sleeves for pipes passing through roofs, concrete beams, utility trenches, grade beams, brick walls, foundation walls and floor slabs on earth. Sleeves shall be installed with 1/2" maximum clearance all around pipe and shall finish flush with the surfaces penetrated. Pipe sleeves for pipes through roof shall be made of service weight cast iron only.

6. Sleeves through foundation walls below grade shall be provided under General Construction Work.

I. ESCUTCHEON PLATES

1. Install chrome plated solid cast iron escutcheon plates with set screw on exposed pipes passing through walls, partitions, floors and ceilings, in finished rooms and spaces.

2. Install galvanized solid cast iron escutcheon plates with set screw on concealed pipes passing through walls, partitions, floors and on exposed piping in unfinished rooms and spaces.

3. Install chromium plated cast brass escutcheon plates with brass set screw on waste and water supply piping at all plumbing fixtures including lavatories, drinking fountains, cabinet sinks, wash sinks, etc.

4. Plates shall fit snugly around the pipes and shall be fastened in place before pipes are insulated or concealed.

5. Split type escutcheon plates are not acceptable.

3.04 PIPE AND FITTING SCHEDULE

A. Sub-Slab Depressurization System

PVC pipe Schedule 80 slotted with welded joints (exterior)

Galvanized carbon steel pipe Schedule 40, with threaded fittings; Roll grooved ends, grooved pipe fittings. Fully sealed and pressure tested at 10 psi. (interior riser pipe)

3.05 PROTECTION

It is the responsibility of the Contractor to ensure that no damage occurs to components of the SSDS prior to, during or following installation of system, or during any subsequent performance of construction for the facility as identified on the Contract Drawings and plans. This includes the installation of all subsurface utilities required for the operation of building systems. Any damages to the SSDS during performance of the Work shall be repaired and tested at no additional cost to the Authority.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:		
1. Mfs’s product data for SSDS components.	________	________
2. Installation of fire Stop materials	________	________
3. Cleanout test tee	________	________
4. Escutcheons	________	________
5. Inline ventilation fan	________	________
OR		
Contractor’s affidavit Stating compliance with Piping materials requirements	________	________
Shop Drawings:	________	________
Schedule 1.Pipe & fittings	________	________
Sample		
1.Polyvinyl Chloride pipe & fittings	________	________

* * *

Appendix J

Electronic Database

THE ELECTRONIC DATABASE WILL BE PROVIDED AT A LATER DATE

Appendix K

New Monitoring Well Construction Logs

Shaw Environmental & Infrastructure, Inc.

Shaw The Shaw Group Inc.™

101-1 Colin Drive
Holbrook, New York 11741
Phone: (631)472 4000
Fax: (631) 472 4077

MONITORING WELL LOG

PROJECT NUMBER: 114926	**MOTT HAVEN, BRONX, NY**		
MONITORING WELL - MW - 3 A			
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **10.23.2007**	DATE COMPLETED: **10.23.2007**	
ELEVATION: -	GROUNDWATER LEVEL: **8.0Ft**	TOTAL BORING DEPTH: **15.0 Ft**	
GEOLOGIST: **Mike Wagner**		WEATHER: **64° F, Sunny**	
DRILLING METHOD: **HollowStem Auger**		PAGE: 1of 1	**WELL CONSTRUCTION**

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)	STICK UP 0.0	PIPE(2')
1			**Fill material (Rocks and Soil)**		**NO SAMPLE**		**CONCRETE**	**CONCRETE**
2				**FILL**				
3								
4							**RISER**	
5			**Brown, fine to medium SAND, little silt, moist**				**PIPE**	**Bentonite**
6				**SM**		**0.0**		
7								
8								
9			**Dark gray, SILT, some fine sand, wet**					
10								
11						**0.0**	**SCREEN**	**SAND**
12								
13				**ML**				
14								
15							**Well Bottom at 15.0 ft**	
16						**0.0**		
17								

NOTES:

Drilling Contractor: ADT

Drilling Equipment: Hollow Stem Auger (CME-LC 55)

Driller: Khaled

WELL CONSTRUCTION:

Well construction was done with 2" Dia. PVC Screen and 2' Stick up pipe above ground.

Well was protected with 5" Dia 5' long Protective Casing Pipe.

Bollards and 3' by 3' by 6" thick concrete pad were installed around the well.

Shaw Environmental, Inc.
92 North Avenue
New Rochelle, New York 10801
Phone: (914) 633-9324
Fax: (914) 235-0717

Shaw Environmental, Inc.

MONITORING WELL LOG

PROJECT NUMBER: 136769	**MOTT HAVEN, BRONX, NY**		
MONITORING WELL - MW-3R			
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **08.27.2010**	DATE COMPLETED:	**08.27.2010**
ELEVATION: -	GROUNDWATER LEVEL:	TOTAL BORING DEPTH:	**15.0 Ft**
GEOLOGIST: **Sanjay Sharma**		WEATHER:	**62° F, Sunny**
DRILLING METHOD **Geoprobe Macro Core**		PAGE:	1of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION (Based on 10-23-07 installation of MW-3A)	USCS SYMBOL	SAMPLE	PID DATA (ppm)	WELL CONSTRUCTION STICK UP 0.0	Flush Cover
1			**Fill material (Rocks and Soil)**	**FILL**				
2							**CONCRETE**	**CONCRETE**
3							**RISER**	
4							**PIPE**	**Bentonite**
5			**Brown, fine to medium SAND, little silt, moist**	**SM**				
6								
7								
8								
9			**Dark gray, SILT, some fine sand, wet**	**ML**				
10								
11							**SCREEN**	**SAND**
12								
13								
14								
15							**Well Bottom at 15.0 ft**	
16								
17								

NOTES:

Drilling Contractor: ADT

Drilling Equipment: GeoProbe 6610DT

Driller: Andrea

WELL CONSTRUCTION:

Well construction was completed with 1.5" Dia. PVC Screen and no stick up above ground. 10' pre-packed screen installed from '15' to 5' below grade. Sand backfill was placed around screen up to 4 ' below grade. Bentonite pellet seal was installed from 4' to 2' below grade. Remainder of annulus backfilled with concrete. Well was protected with 5" Dia flush-mounted cover set in 1' by 1' concrete pad.

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MONITORING WELL LOG

PROJECT NUMBER: 114926	MOTT HAVEN, BRONX, NY		
MONITORING WELL - MW - 5 A			
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **11.16.2007**	DATE COMPLETED: **11.16.2007**	
ELEVATION: -	GROUNDWATER LEVEL: **4.5Ft**	TOTAL BORING DEPTH: **13.0 Ft**	
GEOLOGIST: **Tim Leonard**		WEATHER:	
DRILLING METHOD **Geoprobe Macro Core**		PAGE: 1of 1	**WELL CONSTRUCTION**

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)	STICK UP 0.0	PIPE(2')
1	8:47 AM		Orange brown SAND/SILT/ORGANIC	FILL	NO			CONCRETE
2							RISER PIPE	BENTONITE
3			Light brown SAND, WET from 4.5'	SP		0.0		
4								
5								
6								
7							SCREEN	SAND
8						0.0		
9								
10								
11								
12						0.0		
13	8:57 AM		GREEN SAND	SP	SAMPLE		WELL BOTTOM AT 12.0'	

NOTES:

Drilling Contractor: ADT

Drilling Equipment: Geoprobe 6610 DT

Driller: Jiri Kaminski

WELL CONSTRUCTION:

After Geoprobe, 3" Casing Pipe with well drive point was driven down in the boring which could go upto 12' bgs.

Well construction was done with the prefabricated 1½" Dia. PVC Screen and 2' Stick up pipe above ground.

Well was protected with 4" Dia 5' long Protective Casing Pipe.
Ballards and concrete slab were installed around the well.

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MONITORING WELL LOG

PROJECT NUMBER: 136769	**MOTT HAVEN, BRONX, NY**		
MONITORING WELL - MW-5R			
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **08.27.2010**	DATE COMPLETED:	**08.27.2010**
ELEVATION: -	GROUNDWATER LEVEL:	TOTAL BORING DEPTH:	**15.0 Ft**
GEOLOGIST: **Sanjay Sharma**		WEATHER:	**62° F, Sunny**
DRILLING METHOD **Geoprobe Macro Core**		PAGE:	1of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION (Based on 11-16-07 installation of MW-5A)	USCS SYMBOL	SAMPLE	PID DATA (ppm)	WELL CONSTRUCTION: STICK UP 0.0	WELL CONSTRUCTION: Flush Cover
1			Orange brown SAND/SILT/ORGANIC	FILL			CONCRETE	CONCRETE
2								
3			Light brown, SAND, some silt, wet from 4.5'	SM			RISER PIPE	Bentonite
4								
5								
6								
7								
8								
9								
10								
11							SCREEN	SAND
12								
13			Dark green, fine SAND and SILT, wet	SP				
14								
15								
16							Well Bottom at 15.0 ft	
17								

NOTES:

Drilling Contractor: ADT

Drilling Equipment: GeoProbe 6610DT

Driller: Andrea

WELL CONSTRUCTION:

Well construction was completed with 1.5" Dia. PVC Screen and no stick up above ground. 10' pre-packed screen installed from '15' to 5' below grade. Sand backfill was placed around screen up to 4 ' below grade. Bentonite pellet seal was installed from 4' to 2' below grade. Remainder of annulus backfilled with concrete. Well was protected with 5" Dia flush-mounted cover set in 1' by 1' concrete pad.

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MONITORING WELL LOG

PROJECT NUMBER: 114926	MOTT HAVEN, BRONX, NY
MONITORING WELL - MW-11A	

UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **11.19.2007**	DATE COMPLETED:	**11.19.2007**
ELEVATION: -	GROUNDWATER LEVEL: **9.0Ft**	TOTAL BORING DEPTH:	**20.0 Ft**
GEOLOGIST: **Sanjay Sharma**		WEATHER:	**38° F, Wet Snow/Rain**
DRILLING METHOD **Geoprobe Macro Core**		PAGE:	1of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)
0–5	10:40 AM	50	0–4: Fill material	FILL	NO	0.0
			4–5: Light brown, M-C SAND, little gravel and few pebbles.	SP		
5–10		70	5–7: Dark gray to brown medium SILTY SAND, gravel and rock pieces.	SP		0.0
			7–12: Dark gray CLAYEY SILT, Wet at 9.0'.	ML		
10–15		100	12–12.5: Black ASH/C OALY stuff	FILL		0.0
			12.5–20: Greenish gray to gray SILTY CLAY	CL		
15–20	11:10 AM	100			SAMPLE	0.0

WELL CONSTRUCTION

STICK UP 0.0 — PIPE(2')

CONCRETE	CONCRETE
RISER PIPE	Bentonite
SCREEN	SAND

Well Bottom at 18 ft

NOTES:

Drilling Contractor:	ADT
Drilling Equipment:	Geoprobe 6610 DT
Driller:	Jiri Kaminski

WELL CONSTRUCTION:

After Geoprobe, 3" Casing Pipe with well drive point was driven down in the boring which could go upto 18' bgs.
Well construction was done with the prefabricated 1½" Dia. PVC Screen and 2' Stick up pipe above ground.
Well was protected with 4" Dia 5' long Protective Casing Pipe.
Ballards and concrete slab were installed around the well.

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MONITORING WELL LOG

PROJECT NUMBER: 136769	MOTT HAVEN, BRONX, NY		
MONITORING WELL - MW-11R			
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: 9.18.2010	DATE COMPLETED: 9.18.2010	
ELEVATION: -	GROUNDWATER LEVEL: 9.0Ft	TOTAL BORING DEPTH: 18.0 Ft	
GEOLOGIST: Curtis Kraemer		WEATHER: 67° F, Sunny	
DRILLING METHOD Geoprobe Macro Core		PAGE: 1of 1	WELL CONSTRUCTION

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION (based on 11-19-07 installatin of MW-11A)	USCS SYMBOL	SAMPLE	PID DATA (ppm)	WELL CONSTRUCTION (STICK UP 0.0 / Flush Cover)
0–4			Fill material (Rocks and Soil)	FILL			CONCRETE
4–5			Light brown, medium to coarse SAND, little gravel and few pebbles	SM			Bentonite; RISER PIPE
5–7			Dark gray to brown, medium SAND, little silt, gravel and rock pieces.	SM			Bentonite (to 6'); SAND
7–12			Dark gray, SILT, some clay, slightly plastic,wet at 9'	ML			SAND; SCREEN (from 8')
12–13			Dark gray, Medium SAND, little silt, wet	SM			SCREEN; SAND
13–18			Greenish gray to gray, CLAY, little silt, plastic	CL			SCREEN; SAND

Well Bottom at 18.0 ft

NOTES:

Drilling Contractor: ADT
Drilling Equipment: Geoprobe 6610 DT
Driller: Andrea

WELL CONSTRUCTION:

Well construction was completed with 1.5" Dia. PVC Screen and no stick up above ground. 10' pre-packed screen installed from '18' to 8' below grade. Sand backfill was placed around screen up to 6 ' below grade. Bentonite pellet seal was installed from 6' to 4' below grade. Remainder of annulus backfilled with concrete. Well was protected with 5" Dia flush-mounted cover set in 1' by 1' concrete pad.

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MONITORING WELL LOG

PROJECT NUMBER: 114926	**MOTT HAVEN, BRONX, NY**

MONITORING WELL - MW - 23

UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **10.22.2007**	DATE COMPLETED: **10.22.2007**
ELEVATION: -	GROUNDWATER LEVEL: **8.0Ft**	TOTAL BORING DEPTH: **15.0 Ft**
GEOLOGIST: **Mike Wagner**		WEATHER: **64° F, Sunny**
DRILLING METHOD: **Hollow Stem Auger**		PAGE: 1of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)	WELL CONSTRUCTION: STICK UP 0.0	PIPE(2')
1			**Fill material (Rocks and Soil)**		**NO SAMPLE**			
2							**CONCRETE**	**CONCRETE**
3				**FILL**				
4							**RISER**	
5							**PIPE**	**Bentonite**
6			**Dark brown, SILT, little fine sand, wet at 8.0'**			**0.0**		
7								
8								
9								
10								
11				**ML**		**0.0**	**SCREEN**	**SAND**
12								
13								
14								
15								
16			**Greenish gray, CLAY, litle silt, plastic**	**CL**		**0.0**	**Well Bottom at 15.0 ft**	
17								

NOTES:

Drilling Contractor: ADT

Drilling Equipment: Hollow Stem Auger (CME-LC 55)

Driller: Khaled

WELL CONSTRUCTION:

Well construction was done with 2" Dia. PVC Screen and 2' Stick up pipe above ground.

Well was protected with 5" Dia 5' long Protective Casing Pipe.

Bollards and 3' by 3' by 6" thick concrete pad were installed around the well.

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Fax: (631) 472 4077

MONITORING WELL LOG

PROJECT NUMBER: 114926	**MOTT HAVEN, BRONX, NY**		
MONITORING WELL - MW - 24			
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **3.16.2008**	DATE COMPLETED:	**3.16.2008**
ELEVATION: -	GROUNDWATER LEVEL: **5.0Ft**	TOTAL BORING DEPTH:	**13.0 Ft**
GEOLOGIST: **Curt Kraemer**		WEATHER:	**42° F, Cloudy, Rain**
DRILLING METHOD **Geoprobe Macro Core**		PAGE:	1of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)	WELL CONSTRUCTION STICK UP 0.0	PIPE(2')
0–1			**Dark brown, medium to coarse SAND, little silt, brick, concrete, FILL**	**FILL**	**NO SAMPLE**		**CONCRETE**	**CONCRETE**
1–2							**Bentonite**	**Bentonite**
2–4							**RISER PIPE**	
4						**0.0**		
5							▼ (groundwater)	▼
5–11			**Brown, medium SAND, little silt, wet**	**SM**			**SCREEN**	**SAND**
11–13			**Dark gray, SILT, some fine sand, wet**	**ML**				
13							**Well Bottom at 13.0 ft**	
14								
15								
16								
17								

NOTES:

Drilling Contractor: ADT
Drilling Equipment: Hollow Stem Auger (CME-LC 55)
Driller: Khaled

WELL CONSTRUCTION:
After Geoprobe, 3" Casing Pipe with well drive point was driven down to 13' bgs.
Well construction was done with the prefabricated 1 ½" Dia. PVC Screen and 2' Stick up pipe above ground.
Well temporarily protected with 4" Dia PVC pipe. The contractor will finish this area with cement grout at a later date.

Shaw Environmental & Infrastructure, Inc.

Shaw The Shaw Group Inc.™

101-1 Colin Drive
Holbrook, New York 11741
Phone: (631)472 4000
Fax: (631) 472 4077

MONITORING WELL LOG

PROJECT NUMBER: 114926	**MOTT HAVEN, BRONX, NY**		
MONITORING WELL - MW - 25			
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: **11.16.2007**	DATE COMPLETED: **11.16.2007**	
ELEVATION: -	GROUNDWATER LEVEL: **5.0Ft**	TOTAL BORING DEPTH: **13.0.0 Ft**	
GEOLOGIST: **Tim Leonard**		WEATHER:	
DRILLING METHOD **Geoprobe Macro Core**		PAGE: 1of 1	**WELL CONSTRUCTION**

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)	STICK UP 0.0	PIPE(2')
1	9:44 AM		**Dark gray SAND/SILT**		**NO**	**4.9**		**CONCRETE**
2							**RISER PIPE**	**BENTONITE**
3						**SLIGHT**		
4				**SP/ML**				
5						**ODOR**		
6								
7							**SCREEN**	**SAND**
8						**26.9**		
9			**Light gray SAND/SILT**					
10								
11			**Green SAND/SILT**	**SP/ML**				
12						**5.2**	**WELL BOTTOM AT 12.0'**	
13	9:57 AM				**SAMPLE**			

NOTES:

Drilling Contractor: ADT

Drilling Equipment: Geoprobe 6610 DT

Driller: Jiri Kaminski

WELL CONSTRUCTION:

After Geoprobe, 3" Casing Pipe with well drive point was driven down in the boring which could go upto 12' bgs.

Well construction was done with the prefabricated 1½" Dia. PVC Screen and 2' Stick up pipe above ground.

Well was protected with 4" Dia 5' long Protective Casing Pipe.
Ballards and concrete slab were installed around the well.

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MONITORING WELL LOG

PROJECT NUMBER: 130806	MOTT HAVEN, BRONX, NY

MONITORING WELL - MW - 25R

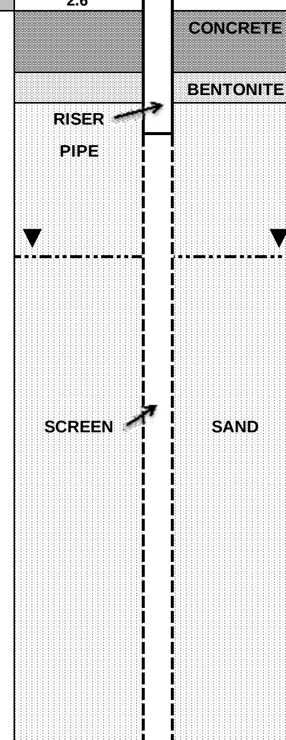
UTILITY CLEARANCE (0-5 ft) DATE:	DATE STARTED: 10.03.2009	DATE COMPLETED:	10.03.2009
ELEVATION: -	GROUNDWATER LEVEL: 4.0Ft	TOTAL BORING DEPTH:	13.0 Ft
GEOLOGIST: Sanjay Sharma		WEATHER:	64°F, Overcast
DRILLING METHOD Geoprobe Hollow Stem Auger		PAGE:	1 of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)
1	8:30 AM		Dark gray, medium to coarse SAND, little silt, moist	SP	NO SAMPLE	
2						
3						
4						
5						
6						
7						
8						
9			Light gray, fine to medium SAND, some silt, wet	ML		
10						0.0
11			Green to gray, SILT, little clay, trace fine sand			
12						
13	9:50 AM					

WELL CONSTRUCTION

STICK UP 2.6'

2" PVC



WELL BOTTOM AT 12.0'

NOTES:

Drilling Contractor: ADT

Drilling Equipment: Geoprobe 6610 DT

Driller: Jiri Kaminski

WELL DRILLING & CONSTRUCTION:

Advanced 3 1/4-inch inside diamter hollow stem augers down to 13 ft below ground surface. No soil samples were collected as the augers were advanced. Subsurface conditions presented in this log are from MW-25, installed in 2007. Well was installed inside of hollow stem augers. Bottom of 10-ft, 2-inch diamter well screen set at 12 ft bs. Sand backfill was placed around well screen up to 1.5 ft bgs. Bentonite pellet seal was placed from 1.5 to 1.0 ft bgs. Depth to groundwater = 4 ft bgs. Well was protected with 4" Dia 5' long protective steel casing set into concrete. Three bollards and a 6" thick concrete pad were installed around the well.

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MONITORING WELL LOG

PROJECT NUMBER: 114926	MOTT HAVEN, BRONX, NY	
MONITORING WELL - MW - 26		
UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: 10.23.2007	DATE COMPLETED: 10.23.2007
ELEVATION: -	GROUNDWATER LEVEL: 9.0Ft	TOTAL BORING DEPTH: 15.0 Ft
GEOLOGIST: Mike Wagner		WEATHER: 64° F, Sunny
DRILLING METHOD Geoprobe Macro Core		PAGE: 1of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)
1			SILT/SOIL		NO	
2						
3						
4						
5				ML		
6						0.0
7						
8						
9						
10			CLAY/SILT			
11						0.0
12				CL/ML		
13						
14						
15						
16			BLUE CLAY	CL		0.0
17					SAMPLE	

WELL CONSTRUCTION

STICK UP 0.0 | PIPE(2')

CONCRETE | CONCRETE

RISER PIPE | Bentonite

SCREEN | SAND

Well Bottom at 15 ft

Boring Depth at 15' bgs; Split Spoon upto 17' bgs.

NOTES:

Drilling Contractor: ADT

Drilling Equipment: Hollow Stem Auger (CME-LC 55)

Driller: Khaled

WELL CONSTRUCTION:

Well construction was done with 2" Dia. PVC Screen and 2' Stick up pipe above ground.

Well was protected with 5" Dia 5' long Protective Casing Pipe.

Ballards and concrete slab could not be installed around the well due to rocks all around.

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MONITORING WELL LOG

PROJECT NUMBER: 114926	MOTT HAVEN, BRONX, NY

MONITORING WELL - MW - 26R

UTILITY CLEARANCE (0' - 5') DATE:	DATE STARTED: 04.04.2008	DATE COMPLETED:	04.04.2008
ELEVATION: -	GROUNDWATER LEVEL: 9.0Ft	TOTAL BORING DEPTH:	15.0 Ft
GEOLOGIST: Sanjay Sharma		WEATHER:	43° F, Rain, cloudy
DRILLING METHOD: Geoprobe Macro Core		PAGE:	1of 1

DEPTH (ft)	TIME	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	SAMPLE	PID DATA (ppm)	WELL CONSTRUCTION: STICK UP 0.0	WELL CONSTRUCTION: PIPE(4')
0-5 (1, 2, 3, 4, 5)			Brown, medium to coarse SAND, little silt, brick, concrete (0-4)	FILL	NO SAMPLE		CONCRETE (0-2); Bentonite (2-3)	CONCRETE (0-2); Bentonite (2-3)
4-9			Brown, medium SAND, little silt, moist	SM		0.0 (5-7)		
9-15			Gray, SILT, some fine sand, wet	ML		0.0 (10-12)	SCREEN	SAND
16, 17							Well Bottom at 15.0 ft	

NOTES:

Drilling Contractor: ADT

Drilling Equipment: Hollow Stem Auger (CME-LC 55)

Driller: Khaled

WELL CONSTRUCTION:

After Geoprobe, 3" Casing Pipe with well drive point was driven down to 15' bgs.

Well construction was done with the prefabricated 1½" Dia. PVC Screen and 4' Stick up pipe above ground.

Well was protected with 4" Dia 5' long Protective Casing Pipe set in a 3' by 3' by 6" thick concrete pad.
Two bollards were installed on the south side of the concrete pad, the Waterloo Sheeting was on the north side of the well.

Appendix L

Groundwater Sampling Log

Groundwater Monitoring Well Sampling Log

Former Metro-North Property (Mott Haven)
730 Concourse Village West, Bronx, New York 10451

Sampler's Name: ______________________________ Weather Conditions: ______________________________
Company Name: ______________________________ Air Temperature (^oF): ______________________________
Sampler's Position: ______________________________ Sample Location: ______________________________
Sampling Date: ______________________________
Sampling Time: ______________________________

Sample Type ***(check all that apply)***

☐ Composite ☐ Grab
☐ Groundwater ☐ Surface Water ☐ Soil ☐ Sediment
☐ Leachate ☐ Industrial ☐ Storm Sewer ☐ Gas
☐ Other ______________________________

Monitoring Well Data

Casing Diameter ____________________ ☐ PVC ☐ Steel ☐ Other ________________
Static Water Level ____________________ ☐ from Well Casing ☐ from Protective Casing
Bottom Depth ____________________ ☐ from Well Casing ☐ from Protective Casing
Type of Water Level Indicator ☐ Steel Tape ☐ Electronic
Water Volume in Well ______________________________
Well Condition ______________________________

Monitoring Well Purge Data

☐ Submersible Pump ☐ PVC Bailer ☐ Suction Pump ☐ Teflon Bailer
☐ Poly Bailer ☐ Poly Cup ☐ Other ____________________
☐ Dedicated Purge Equipment ☐ Yes ☐ No

Pumping Rate ___________________________ Elapsed Purge Time ___________________________
Bail Volume ___________________________ Number of Bails ___________________________
Volume Purged ___________________________ Well Volumes ___________________________
Start and End Purge Time ________________________ Well Evacuated ☐ Yes ☐ No

Sampling Data

☐ Pump ☐ PVC Bailer ☐ Poly Bailer ☐ Teflon Bailer
☐ Stainless Bucket ☐ Poly Cup ☐ Tedlar Bag ☐ Direct
☐ Hand Corer ☐ Hand Auger ☐ Stainless Spoon ☐ Split Spoon
☐ Other ____
Dedicated Sampling Equipment ☐ Yes ☐ No
Metals Field Filtered ☐ Yes ☐ No
Depth of Sample _____________________ Sample Containers _____________________________

Physical and Chemical Data

Odor ☐ Yes ☐ No
Sediment ☐ Yes ☐ No
Color ☐ Yes ☐ No
Appearance ☐ Clear ☐ Turbid ☐ Sheen ☐ Immiscible Product
☐ Other __________________________

pH (SU) ___________ Temp © ___________ Conductivity _____________

ORP (mv) ___________ Turbidity (NTUs) _____________ PID (ppm) _______________

Comments: ____
____
____

GROUNDWATER MONITORING WELL SAMPLING LOG
LOW FLOW RATE AND SAMPLING DATA SHEET
FORMER METRO-NORTH PROPERTY (MOTT HAVEN)
730 CONCOURSE VILLAGE WEST, BRONX, NEW YORK 10451

Site: Mott Haven Campus

Sheet _________ of _________

Date: ____________________

Weather: ____________________

Environmental Consulting Firm: ____________________

Monitoring Well No.: __________ **Well Permit No.:** __________

Field Personnel: ____________________

Time	Purging	Sampling	pH (pH units)		Temperature (degrees C)		Specific Conductivity (mS/cm)		Redox Potential (mv)		Dissolved Oxygen (mg/L)		Turbidity (NTU)	Volume Water Removed	Pumping Rate	Depth to Water
			Reading	+/- 0.1	Reading	± 3%	Reading	± 3%	Reading	± 10mv	Reading	± 10%	Reading	(ml)	(ml/min)	(ft-TOIC)

Notes:

Appendix M

Site Inspection Checklists and Annual SMP Training Agenda

Monthly Inspection Checklist

Monthly/Severe Condition Inspection Form

Mott Haven Campus
730 Concourse Village West, Bronx, New York 10451

Inspector's Name:
Inspection Date:
Inspection Time:
Comments:

Weather Conditions:
Air Temperature (^oF):

A. SSDS SYSTEM INSPECTION

1. Walk the entire roof surface of school bulidings.

* Inspect fan stack guide wires.
* Inspect fan mounting and vibration isolators.
* Inspect condition of fan belt.
* Inspect alignment of fan belt.
* Record vacuum gauge reading:
* Inspect bolts and set screws for tightness and rusty condition.
* Inspect for cleanliness. Clean exterior surfaces only. Remove dust and grease on motor housing.
* Are the indicator lights on the Building Management System functioning properly?
* Confirm that spare fan is stored in designated secure location and in working condition.
* Confirm that the spare fan's bearings are completely filled with grease/lubricant.
* Rotate the fan wheel of the spare fan several times to ensure that bearings remain lubricated.
* Comments (see or hear anything unusual?):

B. COVER SYSTEM - BOTTOM FLOOR INSPECTION

1. Walk all of the bottom floors

* Any visible cracks or depressions in the ground floors?
* Any other visible openings (unintended) in the ground floors?
* Draw approximate location of floor cracks/openings on site map.
* Note the length of the crack/opening.
* Note the width of the crack/opening.
* Comments:

C. COVER SYSTEM - EXTERIOR INSPECTION

1. Walk and inspect the entire perimeter of the Site.

2. Walk and inspect all of the paved areas (concrete and asphalt) of the Site.

3. Walk and inspect all of the unpaved areas of the Site including artificial turf field.

* Are there any signs of significant cracks, settlement, or deterioration of the paved areas?
* Has any of the pavement material been removed?
* Are there signs of vehicular use on the unpaved areas (tire tracks, rutting, etc.)?
* Have any structures been constructed on the unpaved areas?
* Are there any signs of soil washing or erosion (gullies, soil washed out onto the pavement)?
* Are there any signs of intrusive activities (drilling, digging, trenching, grading, excavating, etc.)?
* Comments:

D. REPAIRS

Summarize needed/completed repairs to Engineering Controls:

Inspector's Signature: ______________________

Annual Inspection Checklist

Annual Inspection Form

Mott Haven Campus
730 Concourse Village West, Bronx, New York 10451

Inspector's Name:	Weather Conditions:
Inspection Date:	Air Temperature (^oF):
Inspection Time:	
Comments:	

A. PRE INSPECTION CHECKLIST

* Schedule Annual Inspection when school is not occupied by students.
* Review 12 Previous Monthly Inspection Checklists.
* Meet with Custodian and Principal to solicit comments/concerns regarding the operation of the Engineering Controls over the last 12 months.
* Conduct Annual Refresher SMP Training with DOE, DSF.
* Comments:

B. SSDS SYSTEM INSPECTION

1. Walk the entire roof surface of school buildings.

* Inspect fan stack guide wires.
* Inspect fan mounting and vibration isolators.
* Inspect condition of fan belt.
* Inspect alignment of fan belt.
* Record vacuum gauge reading.
* Inspect bolts and set screws for tightness and rusty condition.
* Verify spare fan is available, properly lubricated, and properly stored.
* Verify spare fan parts (i.e. drive belts) are available and in good condition.
* Inspect for cleanliness. Clean exterior surfaces only. Remove dust and grease on motor housing,
* Are the indicator lights on the Building Management System functioning properly?
* Comments (see or hear anything unusual?):

C. COVER SYSTEM - BOTTOM FLOOR INSPECTION

1. Walk all of the bottom floors

* Any visible cracks or settlement in the ground floors?
* Any other visible openings (unintended) in the ground floors?
* Draw approximate location of floor cracks/openings on site map.
* Note the length of the crack/opening.
* Note the width of the crack/opening.
* Comments:

Annual Inspection Form

Mott Haven Campus
730 Concourse Village West, Bronx, New York 10451

D. COVER SYSTEM - EXTERIOR INSPECTION

1. Walk and inspect the entire perimeter of the Site.

2. Walk and inspect all of the paved areas (concrete and asphalt) of the Site, including areas under PS 156 and IS 151.

3. Walk and inspect all of the unpaved areas of the Site including artificial turf field.

* Are there any signs of significant cracks, settlement or deterioration of the paved areas?
* Has any of the pavement material been removed?
* Are there signs of vehicular use on the unpaved areas (tire tracks, rutting, etc.)?
* Have any structures been constructed on the unpaved areas?
* Inspect synthetic turf. Any problems identified?
* Are the flush-mounted caps/protective casings for the 7 monitoring wells secured?
* Are there any signs of soil washing or erosion (gullies, soil washed out onto the pavement)?
* Are there any signs of intrusive activities (drilling, digging, trenching, grading, excavating, etc.)?
* Comments:

E. VAPOR BARRIER INSPECTION

1. Walk all of the bottom floors

* Review all cracks or other openings indentified in ground floors during previous inspections.
* Conduct smoke test at each identified crack/opening/depression using environmentally safe smoke.
* Draw approximate location of floor cracks/openings that appear to have potential leak through vapor barrier.
* Identify sources of potential impact to smoke test (i.e., HVAC vent nearby).
* Redo smoke test at location of potential vapor barrier leak after sealing off sources of potential impact.

Comments:

F. Repair

Summarize needed/completed repairs to Engineering Controls:

Inspector's Signature: ______________________________

Annual SMP Training Agenda

Annual SMP Training Agenda for DOE Staff and Management

1) Roll call & Introductions

   Mandatory participation of Head Custodian Engineer (CE), Fireman (foreperson for the school), Deputy Director of Facilities & DSF representative

2) Purpose of the Site Management Plan

3) Overview of Site History, Nature of Contamination & Remediation Performed

4) Description of Engineering Controls

   a. What function do they perform?
   b. Why must they be monitored and maintained?
   c. How long will they remain in-place?
   d. Who is responsible for providing the necessary operation & maintenance of the engineering controls? What is each person's role?
   e. What are the documentation and reporting requirements?
   f. What steps should be taken if a problem is encountered? Who do I call?
   g. Where is a copy of the SMP maintained?
   h. How are the monthly inspection forms and follow-up actions filed and transmitted? By whom?
   h. How is the SMP revised and updated? By whom?

5) Updated Contact List
   a. What is the process for notification of key staff changes?
   b. How are staffing changes addressed?
   c. How and when are new staff trained?
   d. What is the frequency of refresher training?
   e. Who is responsible for regulatory and public notifications?

6) Signatures (and dates) of Trained Participants

Appendix N

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

FOR THE

FORMER METRO-NORTH PROPERTY (MOTT HAVEN)
730CONCOURSE VILLAGE WEST
BRONX, NEW YORK
BCP AGREEMENT INDEX W2-1074-05-08
SITE NUMBER C203030
SCA JOB No.: 19730
SCA LLW No.: 033485

AUGUST 2007

Prepared For:
NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
30-30 THOMSON AVENUE
LONG ISLAND CITY, NEW YORK 11101-3045

Prepared By:
SHAW ENVIRONMENTAL, INC
4 COMMERCE DRIVE SOUTH
HARRIMAN, NEW YORK 10926

TABLE OF CONTENTS

FIGURES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared on behalf of the New York City School Construction Authority (NYCSCA) to support the implementation of a Groundwater Monitoring program to monitor the performance of the remedial actions listed in the Site Management Plan and to evaluate any changes in the upgradient groundwater quality at the Former Metro-North Property (Mott Haven) Site (hereafter referred to as the “Site”). The Site consists of seven (7) acres and is located at 730 Concourse Village West, Bronx, New York. The area covered by the Brownfield Cleanup Program (BCP) only covers approximately one acre in the northwest corner of the Site. The Site Management Plan, of which this QAPP is a part of, covers the entire 7-acre Site. The Site will be the location of a New York City public school campus of four schools.

This QAPP presents the sampling and analysis method to be utilized and outlines the responsibilities and procedures for data quality assurance, specific to the groundwater monitoring program. The QAPP is organized into sections that detail project management responsibilities, objectives for measurement, field sampling protocols, recordkeeping, and chain-of-custody requirements, sample preparation and laboratory analysis, data reduction and validation, and the overall laboratory and field quality assurance program components.

2.0 PROJECT RESPONSIBILITY

NYCSCA is responsible for the remediation and associated sampling at the Site. NYCSCA has retained Shaw Environmental, Inc. (Shaw) to prepare the QAPP. Shaw or another NYCSCA approved environmental consulting firm will perform the field monitoring and sampling, review the data generated, and prepare the associated reports for submittal to the New York State Department of Environmental Conservation (NYSDEC).

2.1 Project Management Responsibility

As directed by NYCSCA, Shaw or another NYCSCA approved environmental consulting firm will provide all project management and staffing for this project. A project manager will be responsible for overall project implementation and coordination with NYCSCA. The project manager has overall responsibility for ensuring that the project objectives and schedule are met. In addition, he/she is responsible for technical quality control and project oversight and will provide qualified site personnel and laboratory services for this monitoring program. The project manager has the authority to commit the resources necessary to meet project objectives and requirements, and to ensure that technical and scheduling objectives are achieved successfully.

The project staff is responsible for implementing the field investigation in accordance with this QAPP in order to meet the project objectives and requirements. The project staff will report directly to the project manager.

2.2 Quality Assurance Responsibility

QA responsibilities for the project are summarized below.

2.2.1 QAPP Review/Approval

The Project Quality Assurance/Quality Control (QA/QC) Officer is responsible for review and approval of the QAPP and the Field Sampling and Analysis Plans, and will provide QA technical assistance to the project personnel. The QA/QC Officer will not be directly involved in the day-to-day operations of the project but will be available to resolve any QA/QC discrepancies.

2.2.2 Data Assessment

It will be the responsibility of the Project QA/QC Officer, the Project Manager, and their staff to evaluate the analytical data to determine if the data generated have met the project data quality objectives and are sufficient to meet the projects monitoring objectives.

2.3 Field Operation Responsibility

2.3.1 Field Sampling

Each sampling event will be headed by a designated Field Operations Leader (FOL) who will be responsible for leading and coordinating all field activities. The FOL, who will report directly to the project manager, will be responsible for the implementation of the field program in accordance with all of the conditions of the QAPP, keeping field activities on schedule. The FOL will also be responsible for identifying any problems in the field and/or any changes to the monitoring program and initiating the appropriate corrective action with the project manager to resolve them.

2.3.2 Field Measurements

The FOL is responsible for ensuring all field instruments are in working order, and are calibrated and operated by the field team, and that all field measurements are recorded in the field log book.

2.4 Laboratory Responsibilities

A New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) approved analytical laboratory will perform the groundwater analysis. A copy of the laboratories Quality Assurance (QA) Manual program will be provided upon laboratory selection.

3.0 QA OBJECTIVES FOR DATA MEASUREMENT

The overall Quality Assurance (QA) objective of the groundwater monitoring program is to develop and implement procedures for field sampling, chain of custody, laboratory analysis and reporting, and to provide reliable analytical results. Specific procedures to be used for sampling, chain of custody, laboratory analysis, reporting, internal quality control, audits, preventative maintenance, and corrective actions are described in other sections of this QAPP. The purpose of this section is to address the Data Quality Objectives with respect to accuracy, precision, completeness, representativeness, and comparability.

3.1 Data Quality Objectives

Data quality objectives (DQO) are based on the concept that different data uses require different levels of data quality. Data quality can be defined as the degree of uncertainty in the data with respect to precision, accuracy and completeness. The 5 general levels of data quality are:

Level 1 – field screening or analysis using portable instruments. Results are often not compound-specific and not quantitative, but results are available in real-time. It is often used for health and safety monitoring and initial site characterization.

Level II – field analyses using more sophisticated portable analytical instruments; in some cases, the instruments may be set up in a mobile laboratory. There is a wide range in the quality of data that can be generated, depending on the use of suitable calibration standards, reference materials, and sample preparation equipment, and the training of the operator. Results are available in real-time or several hours.

Level III – USEPA routine analytical services. All analyses are performed in an off-site NYSDOH ELAP-certified analytical laboratory following standard USEPA protocols. Level III is characterized by rigorous QA/QC protocols and documentation.

Level IV – analytical analysis utilizing pre-approved, non-standard methods. All analyses are performed in an off-site approved analytical laboratory. Method development or method modification may be required for specific constituents or detection limits. Level IV will be characterized by rigorous QA/QC protocols and documentation.

Level V – physical property and engineering material analysis by approved standard or non-standard methods. All analyses are performed in an off-site laboratory. QA/QC protocols and documentation may be required for some analyses.

Data generated as part of the remedial program at the Site will include both Level I and Level III.

Field blank, trip blank and duplicate samples will be analyzed to assess the quality of the data resulting from the field sampling program. QA samples are described in Section 8.1.

The level of Quality Control (QC) provided by the laboratory will be as required by the applicable USEPA methods. Deliverables for the project will conform to NYSDEC Analytical Services Protocol (ASP) Category B.

Completeness is defined as the measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Completeness is expressed as the percentage of valid data obtained from a measurement system. For data to be considered valid, it must meet all the acceptance criteria including accuracy and precision, as well as any other criteria specified by the analytical method used. Any samples for which the critical data points fail accuracy or precision data quality objectives, and therefore completeness objectives, will require reanalysis of samples until the quality objectives are met. Sufficient sample volume will be collected to ensure that reanalysis can occur as needed.

Representativeness is the extent to which the database reflects the conditions in the study area. Representativeness is a function of the analytes evaluated and sampling locations. The sampling program is designed to maximize the collection of representative data. The historical database that has been compiled through site investigation, implementation of the remedial program, and the ongoing monitoring program has demonstrated that the contaminant plume is delineated and that the sampling program is adequate in monitoring concentration changes over time. Representativeness will be satisfied by ensuring that the sampling plan is followed, proper sampling techniques are used, proper analytical procedures are followed, and holding times of the samples are not exceeded.

Comparability expresses the degree of confidence with which one data set can be compared to another. Key factors promoting comparability are use of standard field and laboratory techniques, consistency in reporting (e.g., units) and collection of representative data. Because of the use of standard methods and the development of a formal QAPP, data generated as part of this monitoring program are anticipated to have high comparability with other data collected under this program.

4.0 FIELD SAMPLING AND ANALYSIS PLAN

The Field Sampling Plan (FSP) presents detailed methods and procedures for the collection of groundwater samples for laboratory chemical analysis.

4.1 Sampling Approach and Analytical Program

The field sampling, analytical and monitoring activities to be completed are for groundwater sampling. A groundwater monitoring network consisting of the following seven (7) existing monitoring wells will be sampled following installation of the hydraulic barrier walls: MW-3, MW-5, MW-11, MW-23, MW-24, MW-25, and MW-26. These groundwater monitoring wells will be sampled on a quarterly basis for the first year and then semi-annually through the completion of the school construction, after which time, data will be evaluated for determination if continued monitoring is necessary to document that the upgradient contamination sources described in the Site Management Plan have been remediated.

4.2 Decontamination Procedures

4.2.1 Pump Cleaning

The pump should be decontaminated prior to use. The following procedure will be followed when decontaminating the pump:

1. Place plastic sheet/bag on ground adjacent to pump.
2. Potable water rinse.
3. Alconox detergent and potable water scrub.
4. Potable water rinse.
5. Deionized water rinse.
6. Air dry when possible.

4.2.2 Sampling Equipment

All reusable sampling equipment will be pre-cleaned prior to field entry. The following cleaning procedures will be used:

1. Alconox detergent and potable water scrub.
2. Potable water rinse.
3. Deionized water rinse or potable water rinse.
4. Air dry on plastic sheeting.

Following this decontamination procedure, equipment will be wrapped in aluminum foil or stored in sealed polyethylene bags for on-site use. Whenever possible, pre-cleaned equipment will be used;

however, if the need arises, equipment will be cleaned in the field according to the general procedures described above.

4.3 Groundwater Sample Collection

The groundwater sampling program includes seven (7) monitoring wells at various locations on the Site as shown on Figure 1.

After noting any conditions that may affect the quality of the groundwater sample, an accurate water level measurement must be obtained. Measurement will be obtained utilizing a portable electronic water level indicator that has been decontaminated prior to use at each monitoring location. The initial water level measurement will be recorded in bound field log books and on the ground water sampling log sheet. After recording the water level, wells will be purged and sampled using the Low Stress (or Low-Flow) Purging and Sampling Procedure. This procedure is a preferred method of sampling and it is intended to provide samples that are representative of groundwater conditions in the geological formation. This is accomplished by minimizing stress on the geological formation and minimizing disturbance of sediment that has collected in the well.

Purge waters will be containerized for subsequent treatment or disposal in accordance with applicable laws and regulations.

All field measurements obtained during purging and sampling will be compared to previous sampling events (if available) to ensure that measurements are within their normal range (as defined by previous sampling events). Measurements found to be outside their normal range will be re-measured and noted in the field logbook.

Detailed procedures outlining the protocol for groundwater sample collection are provided below. All sampling equipment utilized will be constructed of inert materials designed to obtain samples with the minimum agitation possible. All non-dedicated sampling equipment will be decontaminated in accordance with the procedures outlined below.

4.3.1 Low-Flow Sampling

The purpose of the low-flow (stress) purging and sampling procedure is to collect groundwater samples from monitoring wells that are representative of groundwater conditions in a particular geological formation. This is accomplished by setting the intake velocity of the sampling pump to a flow rate that limits drawdown inside the well casing.

4.3.2 Pre-Sampling Activities

1. Start at the well known or believed to have the least contaminated groundwater and proceed systematically to the well with the most contaminated groundwater. If contaminant levels are not known, upgradient wells should be sampled first. Check the well, the lock, and the locking cap for damage or evidence of tampering. Record observations.

2. Lay out sheet of polyethylene for placement of monitoring and sampling equipment.

3. Slowly remove the well cap to avoid any foreign material from entering the well and place on the polyethylene. Check for volatile organic compounds (VOCs) at the top of the well casing with a photoionization detector (PID) and record the results. If a reading of greater than 5 parts per million (ppm) is recorded, the well will be vented until the readings fall below 5 ppm prior to continuing pre-sampling activities.

4. Measure and record the depth to water (to 0.01 feet) in all wells to be sampled prior to purging. Care should be taken to minimize disturbance in the water column and dislodging of any particulate matter attached to the sides or settled at the bottom of the well. If the well casing does not have a reference point (usually a V-cut or indelible mark in the well casing), make one.

4.3.3 Sampling Procedures

1. Install Pump: Slowly lower the pump, safety cable and disposable or dedicated tubing which is chemically compatible with petroleum related compounds into the well to the depth specified for that well. The pump intake must be kept at least 2 feet above the bottom of the well to prevent disturbance and resuspension of any sediment present in the bottom of the well. Record the depth to which the pump is lowered.

2. Measure Water Level: Before starting the pump, measure the water level again with the pump in the well. Leave the water level measuring device in the well.

3. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level should be monitored approximately every 5 minutes. Ideally, a steady flow rate should be maintained which results in a stabilized water level (drawdown of 0.3 feet or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.

4. Monitor Indicator Parameters: During purging of the well, monitor and record the field indicator parameters (temperature, specific conductance, pH, redox potential, and DO) approximately every 5 minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows:

   - ±0.1 for pH
   - ±3% for specific conductance (conductivity)
   - ±10 mv for redox potential
   - ±10% for DO

   Dissolved oxygen usually requires the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.

5. Collect sample directly from the dedicated or disposable tubing, not from the flow-through monitoring cup discharge hose. Maintain a constant pumping rate during sampling.

6. Remove Pump and Tubing: After collection of the samples, the tubing, unless permanently installed, must be properly discarded or dedicated to the well for resampling by hanging the tubing inside the well.

7. Measure and record well depth.

8. Close and lock the well.

4.4 Field Measurements

Field measurements of pH, specific conductance, temperature, dissolved oxygen, and oxidation-reduction potential will be obtained using the YSI 6820 Multi-Parameter Water Quality Monitor or equivalent device. The YSI 6820 will be calibrated and operated in accordance with the procedures specified in the manual to be provided by the manufacturer.

4.5 Analysis Plan

Groundwater samples will be analyzed for VOCs per EPA Method 8260.

QA/QC samples to be collected and analyzed include:

- Trip Blanks: One per matrix analyzed for VOCs (water) per event
- Field Blanks: One per event
- Field Duplicates: One per event
- MS/MSDs: One per event

5.0 RECORDKEEPING AND CHAIN-OF-CUSTODY

5.1 Field Logs

Field records must be documented in the field logbook and must contain sufficient information such that someone else can reconstruct the sampling event without reliance on the sample collector's memory. The logbook is a controlled document which records all major on-site activities. The logbook is a bound notebook with pages that cannot be removed without cutting or tearing pages. Daily entries into the logbook may contain a variety of information. At the beginning of each day the following information must be recorded:

- Date
- Start time (arrival)
- Weather
- All field personnel present
- Any visitors present
- End time (departure)

Entries in the field logbook will include, as applicable:

- Start and completion time of activities at each sample location.
- Sampling point name and description.
- Well purging procedure and equipment.
- Well-specific information such as static water level, depth, and volume purged.
- Sample depth interval for each well.
- Sample collection procedure and equipment.
- Sample flow rate for low-flow sampling
- Type and number of sample containers used (i.e., VOC vials).

- Preservatives used.
- Collector's sample identification numbers.
- Laboratory's sample identification numbers and sample shipment information.
- Modifications to health and safety protocols, (e.g., level of protection).
- Work performed.
- Field observations.
- Pertinent weather factors such as temperature, wind direction, and precipitation.
- Deviations from established protocols, if any.

A data sheet will also be completed for each sampling location, and placed in the project file. Photocopies will be made of all field logbook pages and placed in the project file. This ensures a record exists in the office of all field and sampling activities, and limits the potential loss of field notes due to the loss or destruction of the log book in the field.

5.2 Chain-of-Custody

Chain-of-custody records for all samples will be maintained throughout the sampling and analysis process. A sample will be considered to be "in custody" of an individual if said sample is either in direct view of or otherwise directly controlled by that individual. Storage of samples during custody will be accomplished according to established preservation techniques, in appropriately sealed storage containers. Chain-of-custody will be accomplished when the samples or sealed sample coolers are directly transferred from one individual to the next, with the first individual witnessing the signature of the recipient upon the chain-of-custody record.

If samples are to be sent via a courier (e.g., Federal Express), signed Chain-of-Custody Forms will be included in each cooler documenting sample content. In addition, the project manager or other designated member of the sampling team will confirm that the samples were received by the laboratory approximately 24 to 36 hours after shipment of the samples to confirm their arrival at the laboratory. Chain-of-Custody Forms will be placed in a zip-lock bag or equivalent sealable pouch and attached to the inside lid of the sample cooler. A copy will be kept by the sampling personnel.

The chain-of-custody records will contain the following information:

- Respective sample numbers of the laboratory and Shaw, if available.

- Signature of collector.
- Date and of time of collection.
- Sample type (i.e., groundwater).
- Identification of well point.
- Number of containers.
- Parameters requested for analysis (VOCs by USEPA method 8260).
- Signature of person(s) involved in the chain of possession.
- Description of sample bottles and their condition.
- Problems associated with sample collection (i.e., breakage, no preservatives), if any.

5.3 Laboratory Chain-of-Custody Procedures

The purpose of the chain-of-custody procedure is to document in a legally defensible manner, the transfer of custody for each sample from collection through analysis to analytical data reports. The sample custody procedures to be used by the laboratory will conform to the guidelines of the NYSDEC ASP, and are performed under the supervision of the Sample Coordinator. The Sample Coordinator will have primary responsibility for ensuring that chain-of-custody procedures are followed and all documentation is properly executed.

5.3.1 Sample Receiving and Log-In

When samples arrive at the laboratory, the sample coordinator from the laboratory documents the condition of the locked or sealed shipping box on the custody form. He/she then checks the sample label information against the custody record, notes the conditions of the samples and verifies proper container and preservative procedures. Samples are then logged in by assigning laboratory identification numbers in serialized ascending sequence. The sample log-in record will include the cooler temperature, sample number, date of receipt, condition of sample when received, the assigned laboratory number, sample preparation, sample distribution and other pertinent information. A sample distribution sheet will be generated.

5.3.2 Sample Storage

Prior to preparation and analysis, all samples will be secured in a refrigerator maintained at approximately 4°C.

5.3.3 Tracking During Sample Preparation and Analysis

Analysts will sign for the receipt of all samples to be processed and maintain the samples in their possession or in view at all times when the samples are outside of the storage area. At all times when custody is transferred, both the issuing and receiving parties will verify that information in the sample label is properly recorded.

6.0 CALIBRATION PROCEDURES

This section describes procedures for maintaining the accuracy of all instruments and measuring equipment to be used for field measurements and laboratory analysis.

6.1 Field Instruments

All instruments used in the field to gather, generate, or measure environmental data will be calibrated in accordance with procedures consistent with those recommended by the manufacturer to provide Level I field screening quality data. All equipment to be used during the field work will be examined to verify that it is in proper operating condition. Field notes from previous sampling work will also be reviewed to ensure any previous equipment problems are not overlooked and that all necessary repairs have been carried out.

Calibration of field instruments will be performed at intervals specified by the manufacturer or more frequently as conditions warrant.

6.2 Laboratory Instruments

All materials used for instrument calibration, internal standards and surrogate standards will be of the highest purity available and will be obtained through the USEPA Pesticide and Industrial Chemicals Repository, or a suitable commercial source. The procedures used and frequency of calibration for all analytical instruments will satisfy the NYSDEC ASP requirements.

7.0 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

All samples collected for chemical analysis during the groundwater monitoring program will be analyzed by a laboratory certified by the NYSDOH's ELAP to perform laboratory services in the State of New York. A copy of the laboratory certification will be provided upon selection of the laboratory.

7.1 Field Measurement Procedures

Measurements to be made in the field include:

VOCs (with PID)

pH

Temperature

Specific conductance

Turbidity

Dissolved oxygen

Water level

All measurements made using field instruments will provide Level 1 data. Instruments include a PID, a multi-parameter water quality monitor, and a water level indicator.

7.2 Laboratory Procedures

The samples will be managed in the laboratory in accordance with the procedures specified in the laboratory QA Manual.

7.3 Laboratory Data Reporting

Laboratory reports will be Category B deliverables format.

8.0 INTERNAL QUALITY CONTROL CHECKS

Quality control methods used in field activities and in the laboratory ensure that the data generated meet all the precision and accuracy objectives discussed in Section 3. In addition, these procedures provide a check of the integrity of sampling equipment and decontamination procedures, as well as possible sources of sample contamination in the laboratory.

8.1 Field Sample Collection

Quality control procedures for the field sampling activities will include the following measures:

- Field blanks
- Trip blanks
- Field duplicates
- Matrix spike/matrix spike duplicates (MS/MSDs)

Field and trip blanks are used as control or external QA/QC samples to detect contamination that may be introduced in the field (either atmospheric or from sampling equipment), in transit to or from the sampling site, or in the bottle preparation, sample log-in, or sample storage stages within the laboratory.

Field blank samples, prepared in the field, are analyzed to check for procedural contamination at the site that may cause sample contamination. Field blanks are collected water samples by pouring laboratory-supplied water through the sampling equipment. Trip blanks, prepared in the laboratory, are unopened VOC jars filled with laboratory-supplied water. Trip blanks are used to assess the potential for contamination of water samples due to volatile contaminant migration during sample shipment and storage. Duplicates are pairs of identical samples collected in the field to check variability in sampling and analysis.

Field blanks will be analyzed at a rate of one per sampling event. One trip blank will accompany each shipment. Duplicates will be collected at a rate of one per sampling event. Method-related QC samples (spikes, duplicates, method blanks, etc.) will be performed by the laboratory as required by the analytical method.

MS/MSDs are used to determine the effects of matrix interference on analytical results. Spikes of analytes are added to aliquots of sample matrix to determine accuracy as a percentage recovery of the analyte from the sample matrix. A matrix duplicate is prepared in the same manner as the matrix spike sample. One MS/MSD will be performed for each sampling event.

8.2 Field Measurements

Quality control procedures for measurements made in the field will include following the proper calibration specified by the manufacturer to ensure proper working order. Field measurements will be obtained until stabilization as described above in Section 4.3.3, Item No. 4. If measurements cannot be obtained within these limits, the instrument will be recalibrated or replaced.

8.3 Laboratory Analysis

Laboratory quality control procedures will follow the applicable USEPA method requirements. These procedures will include at a minimum, the following where applicable:

- Method blanks
- Surrogate spikes/recovery
- Matrix spikes/Matrix spike duplicates (MS/MSD)
- Internal standards
- Instrument calibration

Method blanks provide a check for residual contamination in the analytical instrument and are performed for each sample delivery group. Surrogates are non-target analytes that are added to samples and QA/QC samples to evaluate the effectiveness of the analyses.

9.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The project manager will be kept apprised of the QA/QC aspects related to the ongoing monitoring program to ensure the established objectives may be met. Reports to management will include:

- An assessment of measurement data accuracy, precision, and completeness.
- Significant QA/QC problems and recommended solutions.
- Resolutions of previously stated problems.

The Laboratory Director will provide QA update as part of the laboratory data package for each sampling episode to describe any QA/QC problems and corrective actions.

10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Shaw has developed a Quality Assurance Project Plan for the Former Metro-North Property (Mott Haven) Site located at 730 Concourse Village West, Bronx, New York.

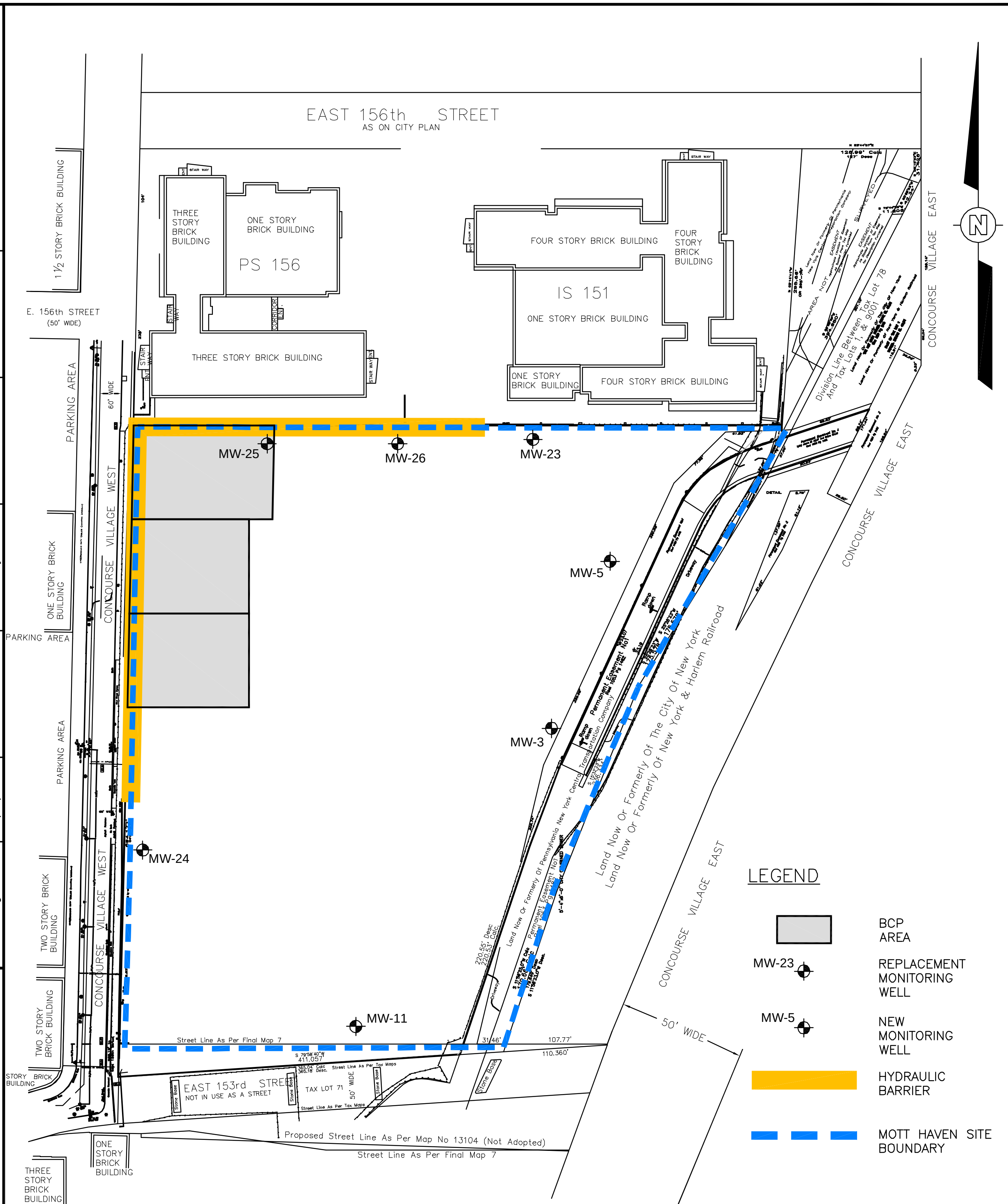
Shaw Environmental & Infrastructure, Inc.

Curtis A. Kraemer

Curtis A. Kraemer, P.G.
Senior Geologist

Steven P. Goldberg

Steven P. Goldberg, Ph.D., CPG
Quality Assurance\Quality Control Officer



SCALE

0 150 300 FEET

NOTES:

1. HORIZONTAL DATUM: COORDINATE SYSTEM BASED UPON PUBLISHED COORDINATES OF EXISTING WELLS AND MH AT CP 802

2. VERTICAL DATUM: QUEENS BOROUGH PRESIDENT'S DATUM WHICH IS 2.725 FT ABOVE U.S. COAST AND GEODETIC SURVEY DATUM, SANDY HOOK, NJ (NGVD 29)

Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: R.T./SSH	MONITORING WELL LOCATION PLAN
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	8/7/07	AS SHOWN	FIGURE 1-QAPP	1

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	8/7/07	--	B. Snyder	C. Kraemer	--	FIGURE 1-QAPP

File: \\seiharfs01\Common\PROJ\NYC-SCA\Mott Haven\114926\SIR & RIR\Figure 1-QAPP.dwg
Plot Date/Time: Aug 07, 2007 - 7:58am
Plotted By: william.snyder
Xref:
Image:

Appendix O

Confirmatory Sampling

Post Excavation Confirmatory Sample
Summary Table

APPENDIX O
Confirmatory Sampling Summary
Section 1
Volatile Organcic Compounds
Mott Haven Site, Bronx, New York

Parameter (mg/kg)	NYSDEC TAGM 4046 RSCO (mg/kg)	SAMPLE DESIGNATION AND SAMPLE DATE																		
		EP-1	EP-2	EP-3	EP-4	EP-5	EP-5A	EP-6	EP-7	EP-8	EP-9	EP-10	EP-11	EP-12	EP-13	EP-14	EP-15	EP-16	EP-17	EP-18
		7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	8/2/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/6/07	7/6/07	7/6/07	7/6/07	7/6/07	7/6/07
Acetone	0.2	<.021	<.022	0.27	0.33	0.4	0.36	0.41	0.160 J	<.021	0.140 J	0.34	<.020	<.023	<0.021	0.110 J	0.110 J	0.077 J	0.28	0.490
Benzene	0.06	<.0025	0.11 J	<.0026	<.0030	0.091	<0.0028	.0095 J	<.0026	<.0025	<.0026	0.0079 J	<.0024	0.028 J	<0.0025	<0.0026	<0.0027	<0.0024	<0.0027	<0.0027
2-Butanone	0.3	<.018	<.019	0.049 J	0.067 J	0.085 J	0.075 J	0.051 J	<.018	<.018	<.019	0.064 J	<.017	<.019	<0.017	<0.018	<0.018	<0.017	<0.019	0.097 J
Carbon Disulfide	2.7	<.0023	<.0024	<.0024	<.0028	<.0027	<0.0026	0.017 J	<.0024	<.0023	<.0024	<.0025	<.0022	<.0025	<0.0023	<0.0025	<0.0024	<0.0022	<0.0025	<0.0025
Carbon Tetrachloride	0.6	<.0028	<.0029	<.0029	<.0033	<.0032	<0.0031	<.0028	<.0029	<.0027	<.0029	<.0031	<.0027	<.0030	<0.0027	<0.0029	<0.0029	<0.0027	<0.003	<0.003
Chlorobenzene	1.7	<.0023	<.0024	<.0024	<.0027	<.0026	<0.0026	<.0023	<.0024	<.0022	<.0024	<.0025	<.0022	<.0025	<0.0022	<0.0023	<0.0024	<0.0022	<0.0025	<0.0025
Chloroethane	1.9	<.013	<.014	<.014	<.016	<.016	<0.015	<.014	<.014	<.013	<.014	0.15	<.013	<.015	<0.013	<0.014	<0.014	<0.013	<0.014	<0.015
Chloroform	0.3	<.0022	<.0023	<.0023	<.0026	<.0025	<0.0025	<.0022	<.0023	<.0022	<.0023	<.0024	<.0021	<.0024	<0.0021	<0.0022	<0.0023	<0.0021	<0.0024	<0.0024
1,2-Dichlorobenzene	7.9	<.0024	<.0026	<.0026	<.0029	<.0028	<0.0027	<.0025	<.0025	<.0024	<.0025	<.0027	<.0023	<.0027	<0.0024	<0.0025	<0.0026	<0.0023	<0.0026	<0.0027
1,3-Dichlorobenzene	1.6	<.0035	<.0037	<.0037	<.0042	<.0041	<0.004	<.0036	<.0036	<.0035	<.0037	<.0038	<.0034	<.0038	<0.0034	<0.0036	<0.0037	<0.0034	<0.0038	<0.0038
1,4-Dichlorobenzene	8.5	<.0034	<.0036	<.0036	<.0041	<.0040	<0.0039	<.0035	<.0036	<.0034	<.0036	<.0038	<.0033	<.0037	<0.0033	<0.0035	<0.0036	<0.0033	<0.0037	<0.0037
1,1-Dichloroethane	0.2	<.0017	<.0018	<.0018	<.0020	<.0020	<0.0019	<.0017	<.0018	<.0017	<.0018	<.0019	<.0016	<.0018	<0.0017	<0.0017	<0.018	<0.0016	<0.0018	<0.0018
1,2-Dichloroethane	0.1	<.0019	<.0020	<.0020	<.0023	<.0022	<0.0022	<.0020	<.0020	<.0019	<.0020	<.0021	<.0018	<.0021	<0.0019	<0.002	<0.002	<0.0018	<0.0021	<0.0021
1,1-Dichloroethene	0.4	<.0036	<.0038	<.0038	<.0043	<.0042	<0.0041	<.0037	<.0037	<.0036	<.0038	<.0040	<.0035	<.0039	<0.0035	<0.0037	<0.0038	<0.0035	<0.0039	<0.0039
1,2-Dichloroethene (trans)	0.3	<.0040	<.0042	<.0042	<.0048	<.0047	<0.0045	<.0041	<.0042	<.0040	<.0042	<.0044	<.0038	<.0044	<0.0039	<0.0041	<0.0042	<0.0038	<0.0043	<0.0044
Ethylbenzene	5.5	0.190	<.0023	<.0023	<.0027	<.0026	<0.0025	0.013 J	0.11	0.27	0.018 J	<.0024	<.0021	0.012 J	<0.0022	<0.0023	<0.0024	<0.0021	<0.0024	<0.0024
113 Freon	6	<0.0042	<0.0044	<0.0044	<0.005	<0.0048	<0.0047	<0.0043	<0.0043	<0.0041	<0.0044	<0.0046	<0.004	<0.0046	<0.0041	<0.0043	<0.0044	<0.004	<0.0045	<0.0046
Methylene chloride	0.1	0.031 JB	0.030 JB	0.029 JB	0.029 JB	0.037 B	<0.013	0.034 B	0.054 B	0.032 B	0.057 B	0.057 B	0.024 JB	<.013	0.046	0.053	0.048	0.048	0.067	0.040
4-Methyl-2-Pentanone	1	<.012	<.013	<.013	<.015	<.014	<0.014	<.013	<.013	<.012	<.013	<.014	<.012	<.014	<0.012	<0.013	<0.013	<0.012	<0.013	<0.014
Tetrachloroethene	1.4	<.0046	<.0048	<.0048	<.0055	<.0053	<0.0052	<.0047	<.0048	<.0045	<.0048	<.0050	<.0044	<.0050	<0.0045	<0.0047	<0.0049	<0.0044	<0.005	<0.005
1,1,1-Trichloroethane	0.8	<.0026	<.0028	<.0028	<.0032	<.0030	<0.003	<.0027	<.0027	<.0026	<.0027	<.0029	<.0025	<.0029	<0.0026	<0.0027	<0.0028	<0.0025	<0.0028	<0.0029
1,1,2,2-Tetrachloroethane	0.6	<.0019	<.0021	<.0021	<.0023	<.0023	<0.0022	<.0020	<.0020	<.0019	<.0020	<.0021	<.0019	<.0021	<0.0019	<0.002	<0.0021	<0.0019	<0.0021	<0.0021
1,2,4-trichlorobenzene	3.4	<.0043	<.0045	<.0045	<.0051	<.0050	<0.0048	<.0044	<.0044	<.0042	<.0045	<.0047	<.0041	0.150 J	<0.0042	<0.0044	<0.0045	<0.0041	<0.0046	<0.0047
Toluene	1.5	0.26 J	<.0027	<.0027	<.0031	<.0030	<0.0029	<.0026	.0091 J	0.011 J	<.0027	<.0028	<.0024	00.98 J	<0.0025	<0.0026	<0.0027	<0.0024	<0.0027	<0.0028
Trichloroethene	0.7	<.0019	<.0020	<.0020	<.0023	<.0022	<0.0022	<.0020	<.0020	<.0019	<.0020	<.0021	<.0019	<.0021	<0.0019	<0.002	<0.002	<0.0019	<0.0021	<0.0021
Vinyl Chloride	0.2	<.0052	<.0055	<.0055	<.0062	<.0060	<0.0058	<.0053	<.0054	<.0051	<.0054	<.0057	<.012	<.0057	<0.0051	<0.0053	<0.0055	<0.005	<0.0056	<0.0057
Xylenes	1.2	0.620	0.048 J	<0.0082	<0.0094	<0.0091	<0.0088	0.036	0.258	0.75	0.074 J	<0.0086	<0.0075	0.596	<0.0077	<0.0081	<0.0083	0.033 J	<0.0085	<0.0085
Methyl tert-butyl Ether	NE	<0.0023	<0.0024	<0.0024	<0.0028	<0.0027	<0.0026	<0.0024	<0.0024	<0.0023	<0.0024	<0.0025	<0.0022	<0.0025	<0.0023	<0.0024	<0.0024	<0.0022	<0.0025	<0.0025

Notes:

Shading identifies TAGM RSCO exceedance.

NE Not Established

J Estimated concentration

B compound detected in laboratory blank sample

APPENDIX O
Confirmatory Sampling Summary
Section 1
Semivolatile Organic Compounds
Mott Haven Site, Bronx, New York

Parameter (mg/kg)	NYSDEC TAGM 4046 RSCO (mg/kg)	SAMPLE DESIGNATION AND SAMPLE DATE																	
		EP-1	EP-2	EP-3	EP-4	EP-5	EP-6	EP-7	EP-8	EP-9	EP-10	EP-11	EP-12	EP-13	EP-14	EP-15	EP-16	EP-17	EP-18
		7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/30/07	7/6/07	7/6/07	7/6/07	7/6/07	7/6/07	7/6/07
Acenaphthene	50.0	<.074	<.076	<.079	<.087	<.084	<.075	<.077	<.074	<.076	<.079	<.071	<.082	<0.074	<0.077	<0.080	<0.071	<0.080	<0.081
Acenaphthylene	41.0	<.068	<.069	<.072	<.08	<.076	<.069	<.07	<.068	<.069	<.072	<.065	<.074	<0.067	<0.070	<0.073	<0.064	<0.073	<0.074
Anthracene	50.0	<.063	<.065	<.067	<.074	<.072	<.064	<.065	<.063	<.065	<.067	<.060	<.069	<0.063	<0.065	<0.068	<0.060	<0.068	<0.069
Benzo(a)anthracene	0.224/MDL	<.058	<.060	<.062	<.069	<.066	0.120	<.061	<.058	<.060	<.062	<.056	<.064	<0.058	<0.060	<0.063	<0.055	<0.063	<0.064
Benzo (a) pyrene	0.061/MDL	<.066	<.068	<.071	<.078	<.075	0.130	<.69	<.067	<.068	<.071	<.064	<.073	<0.066	<0.069	<0.072	<0.063	<0.072	<0.073
Benzo (b) fluoranthene	1.1	<.046	<.047	<.049	<.054	<.052	0.160	<.048	<.046	<.047	<.049	<.044	<.050	<0.046	<0.047	<0.050	<0.044	<0.049	<0.050
Benzo (g,h,i) perylene	50.0	<.069	<.071	<.074	<.081	<.078	0.93	<.072	<.069	<.070	<.074	<.066	NS	<0.069	<0.071	<0.075	<0.066	<0.074	<0.075
Benzo (k) fluoranthene	1.1	<.092	<.094	<.098	<.0110	<.0100	<.093	<.095	<.092	<.094	<.098	<.087	<.0100	<0.091	<0.095	<0.099	<0.087	<0.099	<0.100
bis(2-ethylhexyl)phthalate	50.0	<.080	<.082	<.085	<.094	<.090	<.081	<.083	<.080	<.082	<.085	<.076	<.088	<0.080	<0.083	<0.087	<0.076	<0.086	<0.087
Butylbenzylphthalate	50.0	<.067	<.069	<.072	<.079	<.076	<.069	<.070	<.067	<.069	<.072	<.064	<.074	<0.067	<0.070	<0.073	<0.064	<0.073	<0.074
Chrysene	0.4	<.075	<.077	<.080	<.088	<.085	0.130	<.078	<.075	<.077	<.080	<.071	<.082	<0.075	<0.077	<0.081	<0.071	<0.081	<0.082
4-Chloroaniline	0.220/MDL	<.050	<.051	<.053	<.058	<.056	<.050	<.052	<.050	<.051	<.053	<.047	<.055	<0.050	<0.051	<0.054	<0.047	<0.054	<0.054
4-Chloro-3-methylphenol	0.240/MDL	<.057	<.059	<.061	<.068	<.065	<.059	<.069	<.058	<.059	<.061	<.055	<.063	<0.057	<0.060	<0.062	<0.055	<0.062	<0.063
2-Chlorophenol	0.8	<.066	<.068	<.071	<.078	<.075	<.068	<.069	<.066	<.068	<.071	<.063	<.073	<0.066	<0.069	<0.072	<0.063	<0.072	<0.073
Dibenzofuran	6.2	<.069	<.071	<.074	<.081	<.078	<.070	<.072	<.069	<.070	<.074	<.066	<.076	<0.069	<0.071	<0.075	<0.066	<0.074	<0.075
Dibenzo(a,h)anthracene	0.014/MDL	<.052	<.054	<.056	<.062	<.059	<.053	<.054	<.052	<.053	<.056	<.050	<.057	<0.052	<0.054	<0.057	<0.050	<0.056	<0.057
2,4-Dichlorophenol	0.4	<.077	<.079	<.082	<.091	<.087	<.078	<.080	<.077	<.079	<.082	<.074	<.085	<0.077	<0.080	<0.083	<0.073	<0.083	<0.084
2,4-Dinitrophenol	0.200/MDL	<.0360	<.0370	<.0380	<.0420	<.0400	<.0360	<.0370	<.0360	<.0360	<.0380	<.0340	<.0390	<0.360	<0.370	<0.390	<0.340	<0.380	<0.390
2,6-Dinitrotoluene	1.0	<.059	<.061	<.063	<.069	<.067	<.060	<.061	<.059	<.060	<.063	<.056	<.065	<0.059	<0.061	<0.064	<0.056	<0.064	<0.064
Diethylphthalate	7.1	<.072	<.074	<.077	<.085	<.081	<.073	<.075	<.072	<.074	<.077	<.069	<.079	<0.072	<0.074	<0.078	<0.068	<0.078	<0.078
Dimethylphthalate	2.0	<.067	<.069	<.072	<.079	<.076	<.068	<.070	<.067	<.069	<.072	<.064	<.074	<0.067	<0.069	<0.073	<0.064	<0.072	<0.073
Di-n-butyl phthalate	8.1	<.063	<.065	<.068	<.075	<.072	<.065	<.066	<.063	<.065	<.068	<.061	<.070	<0.063	<0.066	<0.069	<0.060	<0.068	<0.069
Di-n-octyl phthalate	50.0	<.071	<.073	<.076	<.084	<.080	<.072	<.074	<.071	<.073	<.076	<.068	<.078	<0.071	<0.073	<0.077	<0.067	<0.076	<0.077
Fluoranthene	50.0	<.062	<.064	<.066	<.073	<.070	0.240	0.85 J	<.062	<.063	<.066	<.059	<.068	<0.062	<0.064	<0.067	<0.059	<0.067	<0.068
Fluorene	50.0	<.070	<.072	<.075	<.083	<.079	<.071	<.073	<.070	<.072	<.075	<.067	<.077	<0.070	<0.073	<0.076	<0.067	<0.076	<0.077
Hexachlorobenzene	0.41	<.066	<.068	<.071	<.078	<.075	<.068	<.069	<.067	<.068	<.071	<.064	<.073	<0.066	<0.069	<0.072	<0.063	<0.072	<0.073
Indeno (1,2,3-cd) pyrene	3.2	<.053	<.054	<.056	<.062	<.060	0.69	<.055	<.053	<.054	<.056	<.050	<.058	<0.053	<0.055	<0.057	<0.050	<0.057	<0.058
Isophorone	4.40	<.062	<.064	<.067	<.074	<.071	<.064	<.065	<.063	<.064	<.067	<.060	<.069	<0.062	<0.065	<0.068	<0.060	<0.068	<0.068
2-methylnaphthalene	36.4	0.260 J	<.072	<.074	<.082	<.079	<.071	0.100 J	0.110 J	<.071	<.074	<.066	<.077	<0.069	<0.072	<0.075	<0.066	<0.075	<0.076
2-Methylphenol	0.100/MDL	<.069	<.071	<.074	<.082	<.078	<.070	<.072	<.069	<.071	<.074	<.066	<.076	<0.069	<0.072	<0.075	<0.066	<0.075	<0.076
4-Methylphenol	0.9	<0.066	<0.067	<0.070	<0.077	<0.074	<0.067	<0.068	<0.066	<0.067	<0.070	<0.063	<0.072	<0.066	<0.068	<0.071	<0.063	<0.071	<0.072
Naphthalene	13.0	0.830	0.390 J	<.076	<.084	<.080	0.770	0.240 J	0.500	0.320 J	<.076	0.079 J	<0.78	<0.071	<0.074	<0.077	<0.068	<0.077	<0.078
Nitrobenzene	0.200/MDL	<.091	<.093	<.097	<.0110	<0100	<.093	<.095	<.091	<.093	<.097	<.087	<.0100	<0.091	<0.094	<0.098	<0.087	<0.098	<0.099
2-Nitroaniline	0.430/MDL	<.053	<.054	<.056	<.062	<.060	<.054	<.055	<.053	<.054	<.056	<.050	<.058	<0.053	<0.055	<0.057	<0.050	<0.057	<0.058
2-Nitrophenol	0.330/MDL	<.064	<.066	<.068	<.076	<.072	<.065	<.67	<.064	<.066	<.068	<.061	<.070	<0.064	<0.066	<0.069	<0.061	<0.069	<0.070
4-Nitrophenol	0.100/MDL	<.052	<.053	<.055	<.061	<.058	<.053	<.054	<.052	<.053	<.055	<.049	<.057	<0.052	<0.053	<0.056	<0.049	<0.056	<0.056
3-Nitroaniline	0.500/MDL	<.054	<.056	<.058	<.064	<.061	<.055	<.056	<.054	<.056	<.058	<.052	<.060	<0.054	<0.056	<0.059	<0.052	<0.059	<0.059
Pentachlorophenol	1.0/MDL	<.096	<.099	<.0100	<.0110	<.0110	<.098	<.0100	<.096	<.099	<.0100	<.092	<.0110	<0.096	<0.100	<0.100	<0.092	<0.100	<0.110
Phenanthrene	50.0	<.066	<.068	<.071	<.078	<.075	0.300	0.190 J	<.066	<.068	<.071	<.063	<.073	<0.066	<0.069	<0.072	<0.063	<0.072	<0.072
Phenol	0.03/MDL	<.063	<.065	<.067	<.074	<.071	<.064	<.066	<.063	<.065	<.067	<.060	<.069	<0.063	<0.065	<0.068	<0.060	<0.068	<0.069
Pyrene	50.0	<.074	<.076	<.079	<.087	<.083	0.270	0.160 J	<.074	<.075	<.079	<.070	<.0.81	<0.074	<0.076	<0.080	<0.070	<0.079	<0.080
2,4,5-Trichlorophenol	0.1	<.064	<.065	<.068	<.075	<.072	<.065	<.066	<.064	<.065	<.068	<.061	<.070	<0.064	<0.066	<0.069	<0.061	<0.069	<0.070

APPENDIX O
Confirmatory Sampling Summary
Section 2
Volatile Organic Compounds
Mott Haven Site, Bronx, New York
Samples Collected on May 14, 2007

	NYSDEC TAGM 4046 RSCO	SAMPLE DESIGNATION														
Parameter (mg/kg)	(mg/kg)	EP-34	EP-35	EP-36	EP-37	EP-38	EP-39	EP-40	EP-41	EP-42	EP-43	EP-44	EP-45	EP-46	EP-47	EP-48
Acetone	0.2	<0.020	<0.021	<0.022	0.260	0.160	0.150 J	<0.021	<0.022	<0.020	<0.021	0.380	0.470	<0.023	<0.020	<0.020
Benzene	0.06	<0.0024	<0.0025	<0.0027	<0.0025	<0.0024	<0.0027	<0.0025	<0.0027	<0.0024	<0.0025	<0.0027	<0.0028	0.069	<0.0023	<0.0024
2-Butanone	0.3	<0.017	<0.018	<0.019	<0.018	<0.017	<0.019	<0.018	<0.019	<0.017	<0.018	0.056 J	0.044 J	<0.019	<0.016	<0.017
Carbon Disulfide	2.7	<0.0022	<0.0024	<0.0024	<0.0023	<0.0022	<0.0025	<0.0023	<0.0025	<0.0022	<0.0023	<0.0025	<0.0026	<0.0025	<0.0021	<0.0022
Carbon Tetrachloride	0.6	<0.0027	<0.0028	<0.0029	<0.0028	<0.0026	<0.0030	<0.0028	<0.0030	<0.0027	<0.0028	<0.0030	<0.0031	<0.0030	<0.0026	<0.0026
Chlorobenzene	1.7	<0.0022	<0.0023	<0.0024	<0.0023	<0.0022	<0.0025	<0.0023	<0.0024	<0.0022	<0.0023	<0.0025	<0.0025	<0.0025	<0.0021	<0.0022
Chloroethane	1.9	<0.013	<0.014	<0.014	<0.014	<0.013	<0.015	<0.014	<0.014	<0.013	<0.013	<0.015	<0.015	<0.014	<0.012	<0.013
Chloroform	0.3	<0.0021	<0.0022	<0.0023	<0.0022	<0.0021	<0.0024	<0.0022	<0.0023	<0.0021	<0.0022	<0.0024	<0.0024	<0.0024	<0.0020	<0.0021
1,2-Dichlorobenzene	7.9	<0.0023	<0.0025	<0.0026	<0.0024	<0.0023	<0.0026	<0.0024	<0.0026	<0.0023	<0.0024	<0.0027	<0.0027	<0.0026	<0.0023	<0.0023
1,3-Dichlorobenzene	1.6	<0.0034	<0.0036	<0.0037	<0.0035	<0.0033	<0.0038	<0.0035	<0.0037	<0.0033	<0.0035	<0.0038	<0.0039	<0.0038	<0.0033	<0.0033
1,4-Dichlorobenzene	8.5	<0.0033	<0.0035	<0.0036	<0.0035	<0.0033	<0.0037	<0.0035	<0.0036	<0.0033	<0.0034	<0.0037	<0.0038	<0.0037	<0.0032	<0.0033
1,1-Dichloroethane	0.2	<0.0016	<0.0017	<0.0018	<0.0017	<0.0016	<0.0018	<0.0017	<0.0018	<0.0016	<0.0017	<0.0018	<0.0019	<0.0018	<0.0016	<0.0016
1,2-Dichloroethane	0.1	<0.0019	<0.002	<0.002	<0.0019	<0.0018	<0.0021	<0.0019	<0.0020	<0.0018	<0.0019	<0.0021	<0.0021	<0.0021	<0.0018	<0.0018
1,1-Dichloroethene	0.4	<0.0035	<0.0037	<0.0038	<0.0036	<0.0034	<0.0039	<0.0036	<0.0038	<0.0034	<0.0036	<0.0039	<0.0040	<0.0039	<0.0033	<0.0034
1,2-Dichloroethene (trans)	0.3	<0.0039	<0.0041	<0.0042	<0.0041	<0.0038	<0.0044	<0.0041	<0.0043	<0.0038	<0.0040	<0.0044	<0.0044	<0.0043	<0.0037	<0.0038
Ethylbenzene	5.5	<0.0021	<0.0023	<0.0024	<0.0022	<0.0021	<0.0024	<0.0022	<0.0024	<0.0021	<0.0022	<0.0024	<0.0025	0.014 J	<0.0021	<0.0021
113 Freon	6	<0.004	<0.0042	<0.0044	<0.0042	<0.0040	<0.0045	<0.0042	<0.0044	<0.0040	<0.0042	<0.0046	<0.0046	<0.0045	<0.0039	<0.0040
Methylene chloride	0.1	<0.011	<0.012	<0.012	<0.012	<0.011	<0.012	<0.012	<0.012	<0.011	<0.011	<0.013	<0.013	<0.012	<0.011	<0.011
4-Methyl-2-Pentanone	1	<0.012	<0.013	<0.013	<0.013	<0.012	<0.013	<0.013	<0.013	<0.012	<0.012	<0.014	<0.014	<0.013	<0.012	<0.012
Tetrachloroethene	1.4	<0.0044	<0.0047	<0.0049	<0.0046	<0.0044	<0.0050	<0.0046	<0.0049	<0.0044	<0.0046	<0.0050	<0.0051	<0.0050	<0.0043	<0.0044
1,1,1-Trichloroethane	0.8	<0.0025	<0.0027	<0.0028	<0.0027	<0.0025	<0.0029	<0.0027	<0.0028	<0.0025	<0.0026	<0.0029	<0.0029	<0.0028	<0.0024	<0.0025
1,1,2,2-Tetrachloroethane	0.6	<0.0019	<0.002	<0.0021	<0.002	<0.0019	<0.0021	<0.0020	<0.0021	<0.0019	<0.0019	<0.0021	<0.0022	<0.0021	<0.0018	<0.0019
1,2,4-trichlorobenzene	3.4	<0.0041	<0.0044	<0.0045	<0.0043	<0.0041	<0.0047	<0.0043	<0.0046	<0.0041	<0.0043	<0.0047	<0.0047	<0.0046	<0.0040	<0.0041
Toluene	1.5	<0.0024	<0.0026	<0.0027	<0.0026	<0.0024	<0.0028	<0.0026	<0.0027	<0.0024	<0.0025	<0.0028	<0.0028	0.014 J	<0.0024	<0.0024
Trichloroethene	0.7	<0.0019	<0.002	<0.002	<0.002	<0.0018	<0.0021	<0.0020	<0.0021	<0.0018	<0.0019	<0.0021	<0.0021	<0.0021	<0.0018	<0.0018
Vinyl Chloride	0.2	<0.005	<0.0053	<0.0055	<0.0052	<0.0049	<0.0056	<0.0052	<0.0055	<0.0049	<0.0051	<0.0057	<0.0057	<0.0056	<0.0048	<0.0049
Xylenes	1.2	<0.0075	<0.008	<0.0084	<0.0079	<0.0075	<0.0085	<0.0079	<0.0084	<0.0075	<0.0078	<0.0085	<0.0087	0.350	<0.0072	<0.0075
Methyl tert-butyl Ether	NE	<0.0022	<0.0024	<0.0024	<0.0023	<0.0022	<0.0025	<0.0023	<0.0025	<0.0022	<0.0023	<0.0025	<0.0026	<0.0025	<0.0021	<0.0022

Notes:
Shadeing identifies TAGM RSCO exceedance.
NE Not Established

APPENDIX O
Confirmatory Sampling Summary
Section 2
Semivolatile Organcic Compounds
Mott Haven Site, Bronx, New York
Samples Collected on May 14, 2007

Parameter (mg/kg)	NYSDEC TAGM 4046 RSCO (mg/kg)	SAMPLE DESIGNATION														
		EP-34	EP-35	EP-36	EP-37	EP-38	EP-39	EP-40	EP-41	EP-42	EP-43	EP-44	EP-45	EP-46	EP-47	EP-48
Acenaphthene	50.0	<0.071	<0.077	<0.080	<0.075	<0.072	<0.083	<0.075	<0.078	<0.072	<0.073	<0.081	<0.081	<0.080	<0.070	<0.071
Acenaphthalene	41.0	<0.065	<0.070	<0.073	<0.068	<0.065	<0.075	<0.069	<0.071	<0.066	<0.067	<0.074	<0.074	<0.073	<0.064	<0.065
Anthracene	50.0	<0.061	<0.065	<0.068	<0.064	<0.061	<0.070	<0.064	<0.066	<0.061	<0.062	<0.069	<0.069	<0.068	<0.059	<0.060
Benzo(a)anthracene	0.224/MDL	<0.056	<0.060	<0.063	<0.059	<0.056	<0.065	<0.059	<0.061	<0.057	<0.057	<0.064	<0.064	<0.063	<0.055	<0.056
Benzo (a) pyrene	0.061/MDL	<0.064	<0.069	<0.072	<0.067	<0.064	<0.074	<0.068	<0.070	<0.065	<0.066	<0.073	<0.073	<0.072	<0.063	<0.064
Benzo (b) fluoranthene	1.1	<0.044	<0.047	<0.050	<0.046	<0.044	<0.051	<0.046	<0.048	<0.045	<0.045	<0.050	<0.050	<0.050	<0.043	<0.044
Benzo (g,h,i) perylene	50.0	<0.066	<0.071	<0.075	<0.070	<0.067	<0.077	<0.070	<0.073	<0.067	<0.068	<0.075	<0.076	<0.075	<0.065	<0.066
Benzo (k) fluoranthene	1.1	<0.088	<0.095	<0.099	<0.093	<0.089	<0.100	<0.093	<0.097	<0.089	<0.090	<0.100	<0.100	<0.099	<0.087	<0.088
bis(2-ethylhexyl)phthalate	50.0	<0.077	<0.083	<0.087	<0.081	<0.077	<0.089	<0.081	<0.084	<0.078	<0.079	<0.087	<0.088	<0.087	<0.075	<0.077
Butylbenzylphthalate	50.0	<0.065	<0.070	<0.073	<0.068	<0.065	<0.075	<0.068	<0.071	<0.065	<0.066	<0.074	<0.074	<0.073	<0.064	<0.064
Chrysene	0.4	<0.072	<0.077	<0.081	<0.076	<0.072	<0.083	<0.076	<0.079	<0.073	<0.074	<0.082	<0.082	<0.081	<0.071	<0.072
4-Chloroaniline	0.220/MDL	<0.048	<0.051	<0.054	<0.050	<0.048	<0.055	<0.050	<0.052	<0.048	<0.049	<0.054	<0.054	<0.054	<0.047	<0.047
4-Chloro-3-methylphenol	0.240/MDL	<0.055	<0.060	<0.062	<0.058	<0.056	<0.064	<0.058	<0.061	<0.056	<0.057	<0.063	<0.063	<0.062	<0.054	<0.055
2-Chlorophenol	0.8	<0.064	<0.069	<0.072	<0.067	<0.064	<0.074	<0.067	<0.070	<0.065	<0.065	<0.073	<0.073	<0.072	<0.063	<0.064
Dibenzofuran	6.2	<0.066	<0.071	<0.075	<0.070	<0.067	<0.077	<0.070	<0.073	<0.067	<0.068	<0.075	<0.076	<0.075	<0.065	<0.066
Dibenzo(a,h)anthracene	0.014/MDL	<0.050	<0.054	<0.057	<0.053	<0.050	<0.058	<0.053	<0.055	<0.051	<0.051	<0.057	<0.057	<0.057	<0.049	<0.050
2,4-Dichlorophenol	0.4	<0.074	<0.080	<0.084	<0.078	<0.074	<0.086	<0.078	<0.081	<0.075	<0.076	<0.084	<0.085	<0.084	<0.073	<0.074
2,4-Dinitrophenol	0.200/MDL	<0.340	<0.370	<0.390	<0.360	<0.340	<0.400	<0.360	<0.380	<0.350	<0.350	<0.390	<0.390	<0.390	<0.340	<0.340
2,6-Dinitrotoluene	1.0	<0.057	<0.061	<0.064	<0.060	<0.057	<0.066	<0.060	<0.062	<0.057	<0.058	<0.064	<0.065	<0.064	<0.056	<0.056
Diethylphthalate	7.1	<0.069	<0.074	<0.078	<0.073	<0.069	<0.080	<0.073	<0.076	<0.070	<0.071	<0.078	<0.079	<0.078	<0.068	<0.069
Dimethylphthalate	2.0	<0.065	<0.069	<0.073	<0.068	<0.065	<0.075	<0.068	<0.071	<0.065	<0.066	<0.073	<0.074	<0.073	<0.063	<0.064
Di-n-butyl phthalate	8.1	<0.061	<0.066	<0.069	<0.064	<0.061	<0.071	<0.064	<0.067	<0.062	<0.062	<0.069	<0.070	<0.069	<0.060	<0.061
Di-n-octyl phthalate	50.0	<0.068	<0.073	<0.077	<0.072	<0.068	<0.079	<0.072	<0.075	<0.069	<0.070	<0.077	<0.078	<0.077	<0.067	<0.068
Fluoranthene	50.0	<0.060	<0.064	<0.067	<0.063	<0.060	<0.069	<0.063	<0.065	<0.060	<0.061	<0.068	<0.068	<0.067	<0.058	<0.059
Fluorene	50.0	<0.068	<0.073	<0.077	<0.071	<0.068	<0.078	<0.071	<0.074	<0.068	<0.069	<0.077	<0.077	<0.076	<0.066	<0.067
Hexachlorobenzene	0.41	<0.064	<0.069	<0.072	<0.067	<0.064	<0.074	<0.068	<0.070	<0.065	<0.066	<0.073	<0.073	<0.072	<0.063	<0.064
Indeno (1,2,3-cd) pyrene	3.2	<0.051	<0.055	<0.057	<0.054	<0.051	<0.059	<0.054	<0.056	<0.051	<0.052	<0.058	<0.058	<0.057	<0.050	<0.051
Isophorone	4.40	<0.060	<0.065	<0.068	<0.063	<0.060	<0.070	<0.063	<0.066	<0.061	<0.062	<0.068	<0.069	<0.068	<0.059	<0.060
2-methylnaphthalene	36.4	<0.067	<0.072	<0.076	<0.070	<0.067	<0.078	<0.071	<0.073	<0.068	<0.069	<0.076	<0.076	<0.076	<0.066	<0.067
2-Methylphenol	0.100/MDL	<0.067	<0.072	<0.075	<0.070	<0.067	<0.077	<0.070	<0.073	<0.067	<0.068	<0.076	<0.076	<0.075	<0.065	<0.066
4-Methylphenol	0.9	<0.063	<0.068	<0.071	<0.067	<0.063	<0.073	<0.067	<0.069	<0.064	<0.065	<0.072	0.074 J	<0.071	<0.062	<0.063
Naphthalene	13.0	<0.069	<0.074	<0.077	<0.072	<0.069	<0.079	<0.072	<0.075	<0.069	<0.070	<0.078	<0.078	<0.077	<0.067	<0.068
Nitrobenzene	0.200/MDL	<0.088	<0.094	<0.099	<0.092	<0.088	<0.100	<0.092	<0.096	<0.088	<0.090	<0.099	<0.100	<0.099	<0.086	<0.087
2-Nitroaniline	0.430/MDL	<0.051	<0.055	<0.057	<0.054	<0.051	<0.059	<0.054	<0.056	<0.051	<0.052	<0.058	<0.058	<0.057	<0.050	<0.051
2-Nitrophenol	0.330/MDL	<0.062	<0.066	<0.069	<0.065	<0.062	<0.071	<0.065	<0.068	<0.062	<0.063	<0.070	<0.070	<0.069	<0.061	<0.061
4-Nitrophenol	0.100/MDL	<0.050	<0.053	<0.056	<0.052	<0.050	<0.058	<0.052	<0.054	<0.050	<0.051	<0.056	<0.057	<0.056	<0.049	<0.049
3-Nitroaniline	0.500/MDL	<0.052	<0.056	<0.059	<0.055	<0.052	<0.061	<0.055	<0.057	<0.053	<0.053	<0.059	<0.060	<0.059	<0.051	<0.052
Pentachlorophenol	1.0/MDL	<0.093	<0.100	<0.100	<0.098	<0.093	<0.110	<0.098	<0.100	<0.094	<0.095	<0.110	<0.110	<0.100	<0.091	<0.092
Phenanthrene	50.0	<0.064	<0.069	<0.072	<0.067	<0.064	<0.074	<0.067	<0.070	<0.064	<0.065	<0.072	<0.073	<0.072	<0.063	<0.064
Phenol	0.03/MDL	<0.061	<0.065	<0.068	<0.064	<0.061	<0.070	<0.064	<0.066	<0.061	<0.062	<0.072	<0.069	<0.068	<0.060	<0.060
Pyrene	50.0	<0.071	<0.076	<0.080	<0.075	<0.071	<0.082	<0.075	<0.078	<0.072	<0.073	<0.080	<0.081	<0.080	<0.070	<0.070
2,4,5-Trichlorophenol	0.1	<0.061	<0.066	<0.069	<0.064	<0.062	<0.071	<0.065	<0.067	<0.062	<0.063	<0.070	<0.070	<0.069	<0.060	<0.061

APPENDIX O
Confirmatory Sampling Summary
Section 3
Volatile Organic Compounds
Mott Haven Site, Bronx, New York
Samples Collected on September 26, 2007

Parameter (mg/kg)	NYSDEC TAGM 4046 RSCO (mg/kg)	SAMPLE DESIGNATION															
		EP-19	EP-20	EP-21	EP-22	EP-23	EP-23A	EP-24	EP-25	EP-26	EP-27	EP-28	EP-29	EP-30	EP-31	EP-32	EP-33
Acetone	0.2	<0.021	<0.021	0.130 J	<0.023	<0.024	<0.017	<0.021	<0.021	<0.021	<0.022	0.350	<0.021	<0.021	<0.021	0.570	0.830
Benzene	0.06	<0.0025	<0.0025	<0.0025	0.030 J	0.078	<0.002	<0.0025	<0.0025	<0.0025	<0.0026	<0.0026	<0.0025	<0.0025	<0.0025	<0.0026	<0.0027
2-Butanone	0.3	<0.018	<0.017	<0.017	0.160 J	0.170 J	<0.014	<0.018	<0.017	<0.018	<0.018	<0.019	<0.018	<0.018	<0.018	0.130 J	0.140 J
Carbon Disulfide	2.7	<0.0023	<0.0023	<0.0023	<0.0025	<0.0026	<0.0019	<0.0024	<0.0023	<0.0023	<0.0024	<0.0024	<0.0023	<0.0023	<0.0023	<0.0024	<0.0025
Carbon Tetrachloride	0.6	<0.0028	<0.0027	<0.0027	<0.0030	<0.0031	<0.0023	<0.0028	<0.0027	<0.0028	<0.0028	<0.0029	<0.0028	<0.0028	<0.0027	<0.0029	<0.0030
Chlorobenzene	1.7	<0.0023	<0.0022	<0.0022	<0.0024	<0.0026	<0.0019	<0.0023	<0.0022	<0.0023	<0.0023	<0.0024	<0.0023	<0.0023	<0.0022	<0.0024	<0.0025
Chloroethane	1.9	<0.014	<0.013	<0.013	<0.014	<0.015	<0.0018	<0.014	<0.013	<0.013	<0.014	<0.014	<0.013	<0.013	<0.013	<0.014	<0.015
Chloroform	0.3	<0.0022	<0.0021	<0.0021	<0.0024	<0.0025	<0.0018	<0.0022	<0.0021	<0.0022	<0.0022	<0.0023	<0.0022	<0.0022	<0.0022	<0.0023	<0.0024
1,2-Dichlorobenzene	7.9	<0.0024	<0.0024	<0.0024	<0.0026	<0.0027	<0.002	<0.0025	<0.0024	<0.0024	<0.0025	<0.0025	<0.0024	<0.0024	<0.0024	<0.0026	<0.0026
1,3-Dichlorobenzene	1.6	<0.0035	<0.0034	<0.0034	<0.0038	<0.0039	<0.0029	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037	<0.0038
1,4-Dichlorobenzene	8.5	<0.0034	<0.0033	<0.0033	<0.0037	<0.0039	<0.0028	<0.0035	<0.0034	<0.0034	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0036	<0.0037
1,1-Dichloroethane	0.2	<0.0017	<0.0017	<0.0017	<0.0018	<0.0019	<0.0014	<0.0017	<0.0017	<0.0017	<0.0017	<0.0018	<0.0017	<0.0017	<0.0017	<0.0018	<0.0018
1,2-Dichloroethane	0.1	<0.0019	<0.0019	<0.0019	<0.0021	<0.0022	<0.0016	<0.0020	<0.0019	<0.0019	<0.0020	<0.0020	<0.0019	<0.0019	<0.0019	<0.0020	<0.0021
1,1-Dichloroethene	0.4	<0.0036	<0.0035	<0.0035	<0.0039	<0.0041	<0.0029	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036	<0.0038	<0.0039
1,2-Dichloroethene (trans)	0.3	<0.0040	<0.0039	<0.0039	<0.0043	<0.0045	<0.0033	<0.0041	<0.0039	<0.0040	<0.0041	<0.0042	<0.0040	<0.0040	<0.0040	<0.0042	<0.0044
Ethylbenzene	5.5	<0.0022	<0.0022	<0.0022	<0.0024	<0.0025	<0.0018	<0.0023	<0.0022	<0.0022	<0.0023	<0.0023	<0.0022	<0.0022	<0.0022	<0.0023	<0.0024
113 Freon	6	<0.0042	<0.0041	<0.0041	<0.0045	<0.0047	<0.0034	<0.0042	<0.0041	<0.0042	<0.0043	<0.0044	<0.0042	<0.0041	<0.0041	<0.0044	<0.0045
Methylene chloride	0.1	<0.012	<0.011	<0.011	<0.012	<0.013	<0.0093	<0.012	<0.011	<0.012	<0.012	<0.012	<0.011	<0.011	<0.011	<0.012	<0.012
4-Methyl-2-Pentanone	1	<0.012	<0.012	<0.012	<0.013	<0.014	<0.010	<0.013	<0.012	<0.012	<0.013	<0.013	<0.012	<0.012	<0.012	<0.013	<0.013
Tetrachloroethene	1.4	<0.0046	<0.0045	<0.0045	<0.0049	<0.0052	<0.0037	<0.0047	<0.0045	<0.0046	<0.0047	<0.0048	<0.0046	<0.0045	<0.0045	<0.0048	<0.0050
1,1,1-Trichloroethane	0.8	<0.0026	<0.0026	<0.0026	<0.0028	<0.0030	<0.0021	<0.0027	<0.0026	<0.0026	<0.0027	<0.0028	<0.0026	<0.0026	<0.0026	<0.0028	<0.0028
1,1,2,2-Tetrachloroethane	0.6	<0.0020	<0.0019	<0.0019	<0.0021	<0.0022	<0.0016	<0.0020	<0.0019	<0.0020	<0.0020	<0.0020	<0.0019	<0.0019	<0.0019	<0.0021	<0.0021
1,2,4-trichlorobenzene	3.4	<0.0043	<0.0042	<0.0042	<0.0046	<0.0048	<0.0035	<0.0044	<0.0042	<0.0043	<0.0044	<0.0045	<0.0043	<0.0043	<0.0042	<0.0045	<0.0047
Toluene	1.5	<0.0026	<0.0025	<0.0025	<0.0027	0.027 J	<0.0021	<0.0026	<0.0025	<0.0026	<0.0026	<0.0027	<0.0025	<0.0025	<0.0025	<0.0027	<0.0028
Trichloroethene	0.7	<0.0019	<0.0019	<0.0019	<0.0021	<0.0022	<0.0016	<0.0020	<0.0019	<0.0019	<0.0020	<0.0020	<0.0019	<0.0019	<0.0019	<0.0020	<0.0021
Vinyl Chloride	0.2	<0.0052	<0.0051	<0.0051	<0.0056	<0.0058	<0.0042	<0.0053	<0.0051	<0.0052	<0.0053	<0.0054	<0.0052	<0.0051	<0.0051	<0.0055	<0.0056
Xylenes	1.2	<0.0079	<0.0077	<0.0077	0.023 J	0.191	<0.0064	<0.0080	<0.0077	<0.0079	<0.0080	<0.0082	<0.0078	<0.0078	<0.0076	<0.0082	0.024 J
Methyl tert-butyl Ether	NE	<0.0023	<0.0023	<0.0023	<0.0025	<0.0026	<0.0019	<0.0024	<0.0023	<0.0023	<0.0024	<0.0024	<0.0023	<0.0023	<0.0023	<0.0024	<0.0025

Notes:

Shading identifies TAGM RSCO exceedance.

NE Not Established

Sample EP-23A was collected on October 1, 2007.

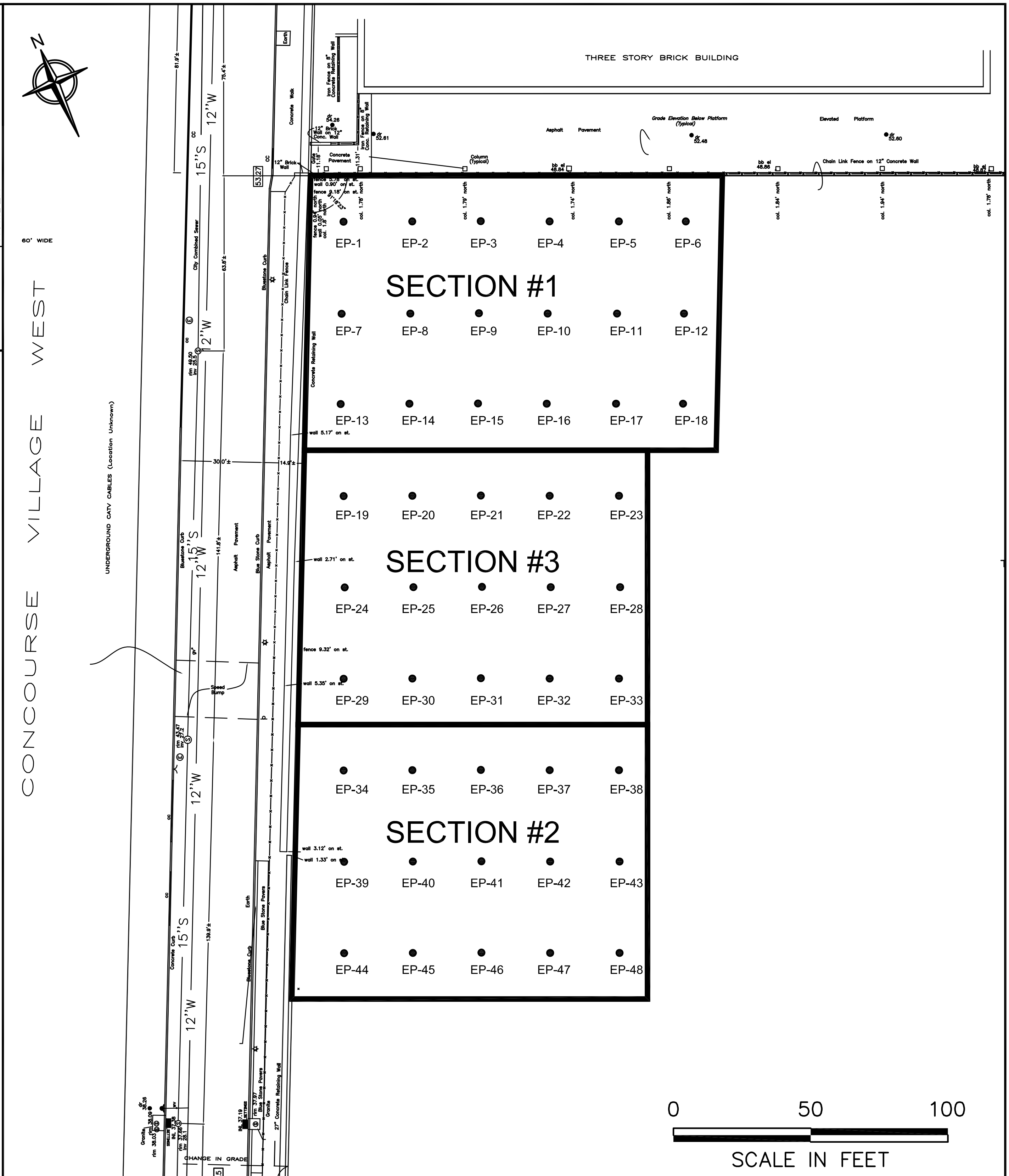
APPENDIX O
Confirmatory Sampling Summary
Section 3
Semivolatile Organcic Compounds
Mott Haven Site, Bronx, New York
Samples Collected on September 28, 2007

Parameter (mg/kg)	NYSDEC TAGM 4046 RSCO (mg/kg)	SAMPLE DESIGNATION															
		EP-19	EP-20	EP-21	EP-22	EP-23	EP-24	EP-25	EP-26	EP-27	EP-28	EP-29	EP-30	EP-31	EP-32	EP-33	EP-33A
Acenaphthene	50.0	<0.074	<0.074	<0.074	<0.079	<0.084	<0.077	<0.073	<0.073	<0.075	<0.077	<0.074	<0.075	<0.074	<0.079	0.260 J	<0.061
Acenaphthylene	41.0	<0.068	<0.068	<0.068	<0.072	<0.077	<0.070	<0.066	<0.067	<0.068	<0.070	<0.068	<0.069	<0.068	<0.072	0.180 J	<0.056
Anthracene	50.0	<0.063	<0.063	<0.063	<0.067	<0.071	<0.065	<0.062	<0.062	<0.063	<0.065	<0.063	<0.064	<0.063	<0.067	0.420 J	<0.052
Benzo(a)anthracene	0.224/MDL	<0.058	<0.058	<0.058	<0.062	<0.066	<0.060	<0.057	<0.058	<0.059	<0.061	<0.058	<0.059	<0.058	<0.062	1.300	<0.048
Benzo (a) pyrene	0.061/MDL	<0.067	<0.067	<0.067	<0.071	<0.075	<0.069	<0.065	<0.066	<0.067	<0.069	<0.067	<0.068	<0.067	<0.071	1.000	<0.055
Benzo (b) fluoranthene	1.1	<0.046	<0.046	<0.046	<0.049	<0.052	<0.048	<0.045	<0.045	<0.046	<0.048	<0.046	<0.047	<0.046	<0.049	1.200	<0.038
Benzo (g,h,i) perylene	50.0	<0.069	<0.069	<0.069	<0.073	<0.078	<0.071	<0.067	<0.068	<0.069	<0.072	<0.069	<0.070	<0.069	<0.073	0.450 J	<0.057
Benzo (k) fluoranthene	1.1	<0.092	<0.092	<0.092	<0.098	<0.100	<0.095	<0.090	<0.091	<0.092	<0.095	<0.092	<0.093	<0.092	<0.098	0.400 J	<0.076
bis(2-ethylhexyl)phthalate	50.0	<0.080	<0.080	<0.080	<0.085	<0.091	<0.083	<0.078	<0.079	<0.081	<0.083	<0.080	<0.081	<0.080	<0.085	<0.088	<0.066
Butylbenzylphthalate	50.0	<0.067	<0.067	<0.068	<0.072	<0.076	<0.070	<0.066	<0.067	<0.068	<0.070	<0.067	<0.069	<0.068	<0.072	<0.074	<0.056
Chrysene	0.4	<0.075	<0.075	<0.075	<0.080	<0.085	<0.078	<0.073	<0.074	<0.075	<0.078	<0.075	<0.076	<0.075	<0.080	1.200	<0.062
4-Chloroaniline	0.220/MDL	<0.050	<0.050	<0.050	<0.053	<0.056	<0.051	<0.049	<0.049	<0.050	<0.052	<0.050	<0.050	<0.054	<0.053	<0.055	<0.041
4-Chloro-3-methylphenol	0.240/MDL	<0.058	<0.058	<0.058	<0.061	<0.065	<0.060	<0.056	<0.057	<0.058	<0.060	<0.058	<0.059	<0.058	<0.061	<0.063	<0.048
2-Chlorophenol	0.8	<0.067	<0.066	<0.067	<0.071	<0.075	<0.069	<0.065	<0.066	<0.067	<0.069	<0.067	<0.068	<0.067	<0.071	<0.073	<0.055
Dibenzofuran	6.2	<0.069	<0.069	<0.069	<0.073	<0.078	<0.071	<0.067	<0.068	<0.069	<0.072	<0.069	<0.070	<0.069	<0.073	0.120 J	<0.057
Dibenzo(a,h)anthracene	0.014/MDL	<0.052	<0.052	<0.052	<0.056	<0.059	<0.054	<0.051	<0.052	<0.053	<0.054	<0.052	<0.053	<0.052	<0.056	0.060 J	<0.043
2,4-Dichlorophenol	0.4	<0.077	<0.077	<0.077	<0.082	<0.087	<0.080	<0.075	<0.076	<0.078	<0.080	<0.077	<0.078	<0.077	<0.082	<0.085	<0.064
2,4-Dinitrophenol	0.200/MDL	<0.360	<0.360	<0.360	<0.380	<0.400	<0.370	<0.350	<0.350	<0.360	<0.370	<0.360	<0.360	<0.360	<0.380	<0.390	<0.290
2,6-Dinitrotoluene	1.0	<0.059	<0.059	<0.059	<0.063	<0.067	<0.061	<0.058	<0.058	<0.059	<0.061	<0.059	<0.060	<0.059	<0.063	<0.065	<0.049
Diethylphthalate	7.1	<0.072	<0.072	<0.072	<0.077	<0.081	<0.075	<0.070	<0.071	<0.072	<0.075	<0.072	<0.073	<0.072	<0.077	<0.079	<0.059
Dimethylphthalate	2.0	<0.067	<0.067	<0.067	<0.071	<0.076	<0.069	<0.066	<0.066	<0.068	<0.070	<0.067	<0.068	<0.067	<0.071	<0.074	<0.055
Di-n-butyl phthalate	8.1	<0.064	<0.063	<0.064	<0.068	<0.072	<0.066	<0.062	<0.063	<0.064	<0.066	<0.063	<0.065	<0.064	<0.068	<0.070	<0.052
Di-n-octyl phthalate	50.0	<0.071	<0.071	<0.071	<0.076	<0.080	<0.073	<0.069	<0.070	<0.071	<0.074	<0.071	<0.072	<0.071	<0.076	<0.078	<0.059
Fluoranthene	50.0	<0.062	<0.062	<0.062	<0.066	<0.070	<0.064	<0.061	<0.061	<0.062	<0.064	<0.062	<0.063	<0.062	<0.066	2.900	<0.051
Fluorene	50.0	<0.070	<0.070	<0.070	<0.075	<0.080	<0.073	<0.069	<0.070	<0.072	<0.073	<0.070	<0.071	<0.070	<0.075	0.350 J	<0.058
Hexachlorobenzene	0.41	<0.067	<0.067	<0.067	<0.071	<0.075	<0.069	<0.065	<0.066	<0.067	<0.069	<0.067	<0.068	<0.067	<0.071	<0.073	<0.055
Indeno (1,2,3-cd) pyrene	3.2	<0.053	<0.053	<0.053	<0.056	<0.060	<0.055	<0.052	<0.052	<0.053	<0.055	<0.053	<0.054	<0.053	<0.056	0.440 J	<0.044
Isophorone	4.40	<0.063	<0.063	<0.063	<0.067	<0.071	<0.065	<0.061	<0.062	<0.063	<0.065	<0.063	<0.064	<0.063	<0.067	<0.069	<0.052
2-methylnaphthalene	36.4	<0.070	<0.070	<0.070	<0.074	<0.079	<0.072	<0.068	<0.069	<0.070	<0.072	<0.070	<0.071	<0.070	<0.074	0.078 J	<0.058
2-Methylphenol	0.100/MDL	<0.069	<0.069	<0.069	<0.074	<0.078	<0.072	<0.068	<0.069	<0.070	<0.072	<0.069	<0.070	<0.069	<0.074	<0.076	<0.057
4-Methylphenol	0.9	<0.066	<0.066	<0.066	<0.070	<0.074	<0.068	<0.064	<0.065	<0.066	<0.068	<0.066	<0.067	<0.066	<0.070	<0.072	<0.054
Naphthalene	13.0	<0.071	<0.071	<0.071	<0.076	<0.081	<0.074	<0.070	<0.070	<0.072	<0.074	<0.071	<0.072	<0.071	<0.076	0.210 J	<0.059
Nitrobenzene	0.200/MDL	<0.091	<0.091	<0.091	<0.097	<0.100	<0.094	<0.089	<0.090	<0.092	<0.095	<0.091	<0.093	<0.091	<0.097	<0.100	<0.075
2-Nitroaniline	0.430/MDL	<0.053	<0.053	<0.053	<0.056	<0.060	<0.055	<0.052	<0.052	<0.053	<0.055	<0.053	<0.054	<0.053	<0.056	<0.058	<0.044
2-Nitrophenol	0.330/MDL	<0.064	<0.064	<0.064	<0.068	<0.073	<0.066	<0.063	<0.063	<0.065	<0.067	<0.064	<0.065	<0.064	<0.068	<0.070	<0.053
4-Nitrophenol	0.100/MDL	<0.052	<0.052	<0.052	<0.055	<0.058	<0.054	<0.051	<0.051	<0.052	<0.054	<0.052	<0.053	<0.052	<0.055	<0.057	<0.043
3-Nitroaniline	0.500/MDL	<0.054	<0.054	<0.054	<0.058	<0.061	<0.056	<0.053	<0.054	<0.055	<0.056	<0.054	<0.055	<0.054	<0.058	<0.060	<0.045
Pentachlorophenol	1.0/MDL	<0.097	<0.096	<0.097	<0.100	<0.110	<0.100	<0.094	<0.095	<0.097	<0.100	<0.096	<0.098	<0.097	<0.100	<0.110	<0.080
Phenanthrene	50.0	<0.066	<0.066	<0.067	<0.071	<0.075	<0.069	<0.065	<0.066	<0.067	<0.069	<0.066	<0.068	<0.067	<0.071	2.000	<0.055
Phenol	0.03/MDL	<0.063	<0.063	<0.063	<0.067	<0.071	<0.065	<0.062	<0.062	<0.064	<0.066	<0.063	<0.064	<0.063	<0.067	<0.069	<0.052
Pyrene	50.0	<0.074	<0.074	<0.074	<0.079	<0.083	<0.076	<0.072	<0.073	<0.074	<0.077	<0.074	<0.075	<0.074	<0.079	2.800	<0.061
2,4,5-Trichlorophenol	0.1	<0.064	<0.064	<0.064	<0.068	<0.072	<0.066	<0.062	<0.063	<0.064	<0.066	<0.064	<0.065	<0.064	<0.068	<0.070	<0.053

Notes:
Shading identifies TAGM RSCO exceedance.
Sample EP-33A was collected on October 1, 2007.

Post Excavation Confirmatory Sample Location Figure

OFFICE New York, NY | DRAWING NUMBER APPENDIX O FIGURE-FER



LEGEND:

EP-1 ● CONFIRMATORY SAMPLE LOCATION

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: B. Snyder	CONFIRMATORY SAMPLE LOCATIONS
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	APPENDIX
	12/6/07	AS SHOWN	APPENDIX O FIGURE-FER	O

Appendix P

Supplemental On-Site Remedial Activities

APPENDIX P

SUPPLEMENTAL ON-SITE REMEDIAL ACTIVITIES

Two remedial actions beyond those required by the RAWP have been undertaken on the Non-BCP Area A as part of NYCSCA's voluntary efforts, as well as NYCSCA's proactive outreach to the community.

Spot Excavation Summary

Based on a recommendation in the Center for Public Environmental Oversight (CPEO) report entitled "Independent Review of the Cleanup of the Mott Haven Schools Complex, Bronx, New York", the NYCSCA voluntarily agreed to excavate additional historic urban fill soils at five (5) subsurface boring locations (SB-25, SB-30, SB-33, SB-35, and SB-42) with higher total SVOC concentrations than those detected in urban fill material across the site.

By evaluating the description of historic urban fill, its derivation, and its physical and chemical characteristics, a protocol was developed to compare all confirmatory soil samples to the average total SVOC concentrations calculated from the other historic urban fill samples collected across the Site. As a result of comparing SVOC concentrations in soils outside the BCP Area, a total of five (5) locations were identified that appeared to have higher SVOC concentrations than elsewhere on the Non-BCP Area A (see Figure P-1). The criteria established for comparison of the confirmatory sample results was the average of all detected SVOC results within the subsurface historic urban fill on the Non-BCP Area A, excluding samples from the five (5) Spot Excavations. An overall Site average concentration of 7,197 micrograms/ kilogram (µg/kg) was calculated using the total SVOC concentrations from each of the ten (10) samples with detected SVOCs, as shown in Table P-1 of this appendix.

At each of the five (5) Spot Excavations, confirmatory soil samples were collected from the four (4) sides and bottom center of each excavation to verify that the concentration of total SVOCs was within the established Site average. In some cases, sampling at each location continued outward--and downward in one location--until the concentration of total SVOCs in the fill material was less than the total average SVOC concentration for the remaining historic urban fill. All soil that exhibited total SVOC concentrations higher than the Site average was excavated in each area and replaced with environmentally clean fill.

The only exception to the number of samples per excavation was at SB-35 where the excavation terminated in bedrock (i.e., no bottom center confirmation sample). The confirmatory sample results, as well as the established Site average, are presented in Table P-2 of this appendix. These confirmatory sample results are all below the average of the total SVOCs remaining on Non-BCP Area A and document successful attainment of the stated voluntary goals.

Soil Gas Summary

Based on a recommendation in the CPEO report, the NYCSCA voluntarily agreed to collect soil gas samples in the BCP Area following soils excavation and backfilling. The post-remedial soil gas analytical results indicated that some VOCs were detected in the former BCP Area at relatively elevated concentrations. It is important to note, however, that the 2006 New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion does not have any standards, criteria, or guidance values for concentrations of volatile chemicals in subsurface vapors. Perchloroethene (dry cleaning) and BTEX (gasoline) compounds were detected in all samples. The presence of soil vapors was expected even though groundwater contaminant concentrations had been significantly reduced due to dewatering activities associated with soil excavation activities and the presence of the hydraulic barriers. Even very low concentrations of compounds in groundwater can result in elevated soil gas concentrations. Further, the porous, environmentally clean sand used to backfill the BCP Area has acted as a preferential pathway for soil gas accumulation. This is considered a temporary condition which will dissipate with time because the contamination in the BCP Area has been removed and the hydraulic barriers protect the site from recontamination. In addition, an ambient air sample collected concurrently with the soil gas samples confirmed that there was no impact to ambient air from the soil gas. The post-remedial soil gas analytical results are summarized in Table P-3, and the soil gas sampling locations are shown on Figure P-2, of this appendix.

The approved RAWP does not require groundwater treatment as a primary objective of the site remedy. However, the dewatering operations employed to facilitate excavation effectively served to remove a large portion of the compounds in the groundwater within the BCP Area. Upon completion of the excavation and dewatering operations, the temporary sheet piling in the BCP Area was removed. It was anticipated that this process would allow for some residual groundwater from the south and east of the BCP Area to flow back into the BCP Area. The soil gas data is evidence that this has occurred.

The SCA predicted and prepared for residual soil gas in its remedial design by incorporating engineering controls recognized by the NYSDOH. These include:

a. Vapor Barrier- continuous synthetic membrane applied immediately below the entire building foundation which is impermeable to vapors.

b. Active Sub-Slab Depressurization System- system of gas permeable gravel and perforated piping installed below the vapor barrier designed to evacuate potential soil gas vapors from beneath the building foundation and prevent vapor intrusion into the buildings.

These controls represent the best available technology and will fully protect the Mott Haven Campus buildings from any potential vapor intrusion. These ECs will be supplemented by the heating, ventilation, and air conditioning (HVAC) system in the schools which will help pressurize the buildings by exhausting less than the intake.

Appendix P

Tables

Appendix P
Table P-1
New York City School Construction Authority
Metro North/Mott Haven Site
Bronx, New York
Summary of Total SVOCs Detected in the Historic Urban Fill
Outside of BCP Area And Outside of Spot Locations

Soil Boring Number	Sample Depth (ft)	Total SVOC Concentration (μg/kg)
SB21	4 - 6	202
SB25	6 - 8	4990
SB25A	4 - 6	46360
SB25A	6 - 8	279
SB29	4 - 6	4010
SB-30	6 - 8	177
SB34	6 - 8	4028
SB36	2 - 4	1190
SB41	4 - 6	3814
SB43	2 - 4	6920
	Site Average:	7197

Appendix P
Table P-2
New York City School Construction Authority
Metro-North/Mott Haven Site
Bronx, New York
Summary of Detected SVOCs in Spot Excavation Confirmatory Samples

Compound (µg/kg)		SB25N	SB25S	SB25E	SB25W	SB25C
	Sample ID:	SB25N	SB25S	SB25E	SB25W	SB25C
	Sample Depth (ft.):	4 - 6	4 - 6	4 - 6	4 - 6	7 - 8
	Sample Date:	11/12/07	11/12/07	11/12/07	11/12/07	11/12/07
	Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL
Naphthalene		ND	ND	ND	ND	ND
2-Methylnaphthalene		ND	ND	ND	ND	ND
Acenaphthylene		ND	ND	ND	ND	ND
Acenaphthene		ND	ND	ND	ND	ND
Dibenzofuran		ND	ND	ND	ND	ND
Fluorene		ND	ND	ND	ND	ND
Phenanthrene		ND	ND	ND	ND	ND
Anthracene		ND	ND	ND	ND	ND
Carbazole		ND	ND	ND	ND	ND
Fluoranthene		ND	ND	ND	ND	ND
Pyrene		ND	ND	ND	ND	ND
Butylbenzylphthalate		ND	ND	ND	ND	ND
Benzo(a)anthracene		ND	ND	ND	ND	ND
Chrysene		ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate		ND	ND	ND	ND	ND
Benzo(b) fluoranthene		ND	ND	ND	ND	ND
Benzo(k)fluoranthene		ND	ND	ND	ND	ND
Benzo(a)pyrene		ND	ND	ND	ND	ND
Indeno (1,2,3-cd)pyrene		ND	ND	ND	ND	ND
Dibenz(a,h)anthracene		ND	ND	ND	ND	ND
Benzo(g,h,i)perylene		ND	ND	ND	ND	ND
Total Concentration of Detected SVOCs	7,197 µg/kg (average of SVOC concentration in urban fill at the site)	ND	ND	ND	ND	ND

Appendix P
Table P-2
New York City School Construction Authority
Metro-North/Mott Haven Site
Bronx, New York
Summary of Detected SVOCs in Spot Excavation Confirmatory Samples

Compound (µg/kg)	Sample ID:	SB30N	SB30S	SB30S2	SB30E	SB30W	SB30W2	SB30C	SB30C
	Sample Depth (ft.):	4 - 6	0 - 6	0 - 6	4 - 6	0 - 4	0 - 6	6 - 8	8 - 9
	Sample Date:	11/12/07	11/12/07	12/1/07	11/12/07	11/12/07	12/1/07	11/12/07	12/1/07
	Sample Classification:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Naphthalene		ND	ND	ND	ND	500 J	ND	140 J	ND
2-Methylnaphthalene		ND	ND	ND	ND	ND	ND	200 J	ND
Acenaphthylene		ND	1900 J	ND	ND	460 J	ND	270 J	ND
Acenaphthene		ND	ND	ND	ND	ND	ND	92 J	ND
Dibenzofuran		ND	ND	ND	ND	ND	ND	120 J	ND
Fluorene		ND	ND	ND	ND	ND	ND	210 J	ND
Phenanthrene		ND	990 J	ND	ND	970 J	ND	1800	ND
Anthracene		ND	1900 J	ND	ND	470 J	ND	460	ND
Carbazole		ND	1100 J	ND	ND	ND	ND	81 J	ND
Fluoranthene		83 J	9600	ND	ND	2600	ND	3000	ND
Pyrene		74 J	9900	ND	ND	2200	ND	3000	ND
Butylbenzylphthalate		ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene		67 J	8500	ND	ND	1500 J	ND	1700	ND
Chrysene		78 J	9500	ND	ND	1700 J	ND	1600	ND
bis(2-Ethylhexyl)phthalate		ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b) fluoranthene		98 J	13000	ND	ND	2100	ND	1800	ND
Benzo(k)fluoranthene		ND	3700 J	ND	ND	720 J	ND	570	ND
Benzo(a)pyrene		ND	6300	ND	ND	1200 J	ND	1300	ND
Indeno (1,2,3-cd)pyrene		ND	4500	ND	ND	1100 J	ND	960	ND
Dibenz(a,h)anthracene		ND	ND	ND	ND	ND	ND	110 J	ND
Benzo(g,h,i)perylene		ND	3900 J	ND	ND	890 J	ND	850	ND
Total Concentration of Detected SVOCs	7,197 µg/kg (average of SVOC concentration in urban fill at the site)	400	74,790	ND	ND	16,410	ND	18,263	ND

Appendix P
Table P-2
New York City School Construction Authority
Metro-North/Mott Haven Site
Bronx, New York
Summary of Detected SVOCs in Spot Excavation Confirmatory Samples

	Sample ID:	SB-33N	SB-33N2	SB-33S	SB-33E	SB33W	SB-33C
	Sample Depth (ft.):	0 - 4.5	0 - 4	4 - 6	4 - 6	4 - 6	7 - 8
	Sample Date:	11/12/07	12/1/07	11/12/07	11/12/07	11/12/07	11/12/07
Compound (µg/kg)	**Sample Classification:**	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Naphthalene		ND	ND	ND	ND	ND	ND
2-Methylnaphthalene		ND	ND	ND	ND	ND	ND
Acenaphthylene		790 J	ND	110 J	79 J	95 J	ND
Acenaphthene		ND	ND	ND	ND	ND	ND
Dibenzofuran		ND	ND	ND	ND	ND	ND
Fluorene		ND	ND	ND	ND	ND	ND
Phenanthrene		3400	ND	390	240 J	300 J	140 J
Anthracene		1300 J	ND	140 J	71 J	110 J	ND
Carbazole		470 J	ND	ND	ND	68 J	ND
Fluoranthene		8000	ND	890	650	760	270 J
Pyrene		8500	ND	1000	650	750	280 J
Butylbenzylphthalate		ND	ND	ND	ND	ND	ND
Benzo(a)anthracene		4800	ND	510	360 J	390 J	160 J
Chrysene		5100	ND	610	430	530	170 J
bis(2-Ethylhexyl)phthalate		ND	ND	190 J	360 J	180 J	ND
Benzo(b) fluoranthene		6400	ND	700	510	600	190 J
Benzo(k)fluoranthene		2200	ND	230 J	170 J	200 J	ND
Benzo(a)pyrene		4700	ND	460	310 J	350 J	140 J
Indeno (1,2,3-cd)pyrene		3600	ND	340 J	250 J	290 J	83 J
Dibenz(a,h)anthracene		300 J	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene		3200	ND	350 J	230 J	320 J	95 J
Total Concentration of Detected SVOCs	7,197 µg/kg (average of SVOC concentration in urban fill at the site)	52,760	ND	5,920	4,310	4,943	1,528

Appendix P
Table P-2
New York City School Construction Authority
Metro-North/Mott Haven Site
Bronx, New York
Summary of Detected SVOCs in Spot Excavation Confirmatory Samples

	Sample ID:	SB35N	SB35S	SB35S	SB35E	SB35E	SB35W	SB35W2
	Sample Depth (ft.):	1 - 2.5	0 - 6	0 - 5	0 - 6	0 - 4	0 - 25	0 - 5
	Sample Date:	11/12/07	11/12/07	12/2/07	11/12/07	12/2/07	11/12/07	12/2/07
Compound (µg/kg)	**Sample Classification:**	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Naphthalene		ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene		ND	ND	ND	ND	ND	ND	ND
Acenaphthylene		ND	ND	ND	ND	ND	ND	ND
Acenaphthene		ND	ND	ND	ND	ND	470 J	ND
Dibenzofuran		ND	ND	ND	ND	ND	ND	ND
Fluorene		ND	ND	ND	ND	ND	ND	ND
Phenanthrene		ND	ND	ND	ND	ND	3100	ND
Anthracene		ND	ND	ND	ND	ND	790 J	ND
Carbazole		ND	ND	ND	ND	ND	300 J	ND
Fluoranthene		450 J	ND	ND	1100 J	ND	5900	ND
Pyrene		500 J	ND	ND	1100 J	ND	6100	ND
Butylbenzylphthalate		ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene		ND	ND	ND	650 J	ND	3300	ND
Chrysene		ND	ND	ND	ND	ND	3500	ND
bis(2-Ethylhexyl)phthalate		ND	ND	ND	ND	ND	ND	ND
Benzo(b) fluoranthene		270 J	ND	ND	690 J	ND	3800	ND
Benzo(k)fluoranthene		ND	ND	ND	ND	ND	1400 J	ND
Benzo(a)pyrene		ND	ND	ND	ND	ND	3000	ND
Indeno (1,2,3-cd)pyrene		ND	ND	ND	ND	ND	2400	ND
Dibenz(a,h)anthracene		ND	ND	ND	ND	ND	250 J	ND
Benzo(g,h,i)perylene		ND	ND	ND	ND	ND	2100	ND
Total Concentration of Detected SVOCs	7,197 µg/kg (average of SVOC concentration in urban fill at the site)	1,220	ND	ND	3,540	ND	36,410	ND

Appendix P
Table P-2
New York City School Construction Authority
Metro-North/Mott Haven Site
Bronx, New York
Summary of Detected SVOCs in Spot Excavation Confirmatory Samples

	Sample ID:	SB42N	SB42S	SB42E	SB42E2	SB42E4	SB42E6	SB42E8	SB42E10	SB42W	SB42C
	Sample Depth (ft.):	4 - 6	4 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	4 -6	7 - 8
	Sample Date:	11/12/07	11/12/07	11/12/07	12/1/07	12/1/07	12/1/07	12/1/07	12/1/07	11/12/07	11/12/07
Compound (µg/kg)	**Sample Classification:**	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Naphthalene		ND	ND	600 J	150 J	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene		ND	ND	510 J	69 J	ND	ND	ND	ND	ND	ND
Acenaphthylene		ND	ND	790 J	67 J	ND	88 J	ND	ND	ND	ND
Acenaphthene		ND	ND	470 J	86 J	ND	ND	ND	ND	ND	ND
Dibenzofuran		ND	ND	ND	110 J	ND	ND	ND	ND	ND	ND
Fluorene		ND	ND	570 J	100 J	4800	ND	ND	ND	ND	ND
Phenanthrene		ND	250 J	6300	1700	ND	500	820	450	ND	ND
Anthracene		ND	ND	1400 J	300 J	1300 J	170 J	84 J	ND	ND	ND
Carbazole		ND	ND	360 J	180 J	690 J	ND	160 J	ND	ND	ND
Fluoranthene		ND	370 J	8800	2000	7100	1900	1400	690	68 J	170 J
Pyrene		ND	350 J	9400	2700	5900	2000	1300	590	ND	180 J
Butylbenzylphthalate		ND	ND	530 J	65 J	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene		ND	130 J	4600	1100	3100 J	1100	510	250 J	ND	180 J
Chrysene		ND	180 J	4700	1200	3100 J	1100	670	340 J	ND	170 J
bis(2-Ethylhexyl)phthalate		ND	ND	3500	ND	ND	ND	140 J	ND	ND	ND
Benzo(b) fluoranthene		ND	180 J	4600	1500	3400 J	1400	800	380 J	ND	150 J
Benzo(k)fluoranthene		ND	ND	1800 J	470	1400 J	380 J	300 J	120 J	ND	ND
Benzo(a)pyrene		ND	130 J	3900	1400	2600 J	1200	640	300 J	ND	130 J
Indeno (1,2,3-cd)pyrene		ND	81 J	3100	850	1600 J	710	420 J	200 J	ND	58 J
Dibenz(a,h)anthracene		ND	ND	ND	87 J	ND	88 J	ND	ND	ND	ND
Benzo(g,h,i)perylene		ND	89 J	2800	1100	1900 J	820	510	230 J	ND	ND
Total Concentration of Detected SVOCs	7,197 µg/kg (average of SVOC concentration in urban fill at the site)	ND	1,760	58730	15234	36890	11,456	7,754	3,550	68	1,038

Appendix P
Table P-2
New York City School Construciton Authority
Metro-North/Mott Haven Site
Bronx, New York
Summary of Detected SVOCs in Spot Excavation Confirmatory Samples

Notes:

General Comments

All results are in µg/kg (microgram per kilogram).
Only those compounds detected in at least one sample are reported on this table.
Shaded column indicates final confirmatory sample results

Laboratory Qualifiers - Organic

ND - Indicates the compound was analyzed for but was not detected.
J - Indicates an estimated value.

Sample ID Nomenclature

N= North; S= South; E= East; W= West; C= Center. These designations denote the direction of the confirmatory samples taken from each of the 5 areas.
The number following each specified direction, where applicable, represents the distance (in feet) from the original sample location.

Appendix P
Table P-3
New York City School Construction Authority
Metro North/Mott Haven Site
Bronx, New York
Summary of VOCs in Post Remediation Soil Gas

Compound	PRSG-3		PRSG-4		PRSG-5		PRSG-6		Ambient Air	
	12/09/07		12/09/07		12/09/07		12/09/07		12/09/07	
Volatile Organic Compounds										
Vinyl Chloride	64	U	27	U	24	U	3.3	U	0.66	U
Chloroethane	64	U	27	U	24	U	3.3	U	0.66	U
1,1-Dichloroethene	64	U	27	U	24	U	3.3	U	0.66	U
Methylene chloride	64	U	27	U	24	U	3.3	U	0.66	U
trans-1,2-Dichloroethene	64	U	27	U	24	U	3.3	U	0.66	U
1,1-Dichloroethane	64	U	27	U	24	U	3.3	U	0.66	U
Methyl tert-Butyl Ether	64	U	27	U	24	U	3.3	U	0.66	U
cis-1,2-Dichloroethene	64	U	27	U	24	U	3.3	U	0.90	
1,2-Dichloroethane	64	U	27	U	24	U	3.3	U	0.66	U
1,1,1-Trichloroethane	64	U	27	U	24	U	3.3	U	0.66	U
Benzene	590		97		32		15		0.66	U
Trichloroethene	64	U	27	U	24	U	3.3	U	1.9	
Toluene	1500		340		120		53		0.66	U
Tetrachloroethene	140		77		36		16		0.66	U
Ethylbenzene	7700		1400		190		20		0.66	U
m,p -Xylenes	24000		5800		670		71		0.66	U
o-Xylene	8200		2000		190		17		0.66	U

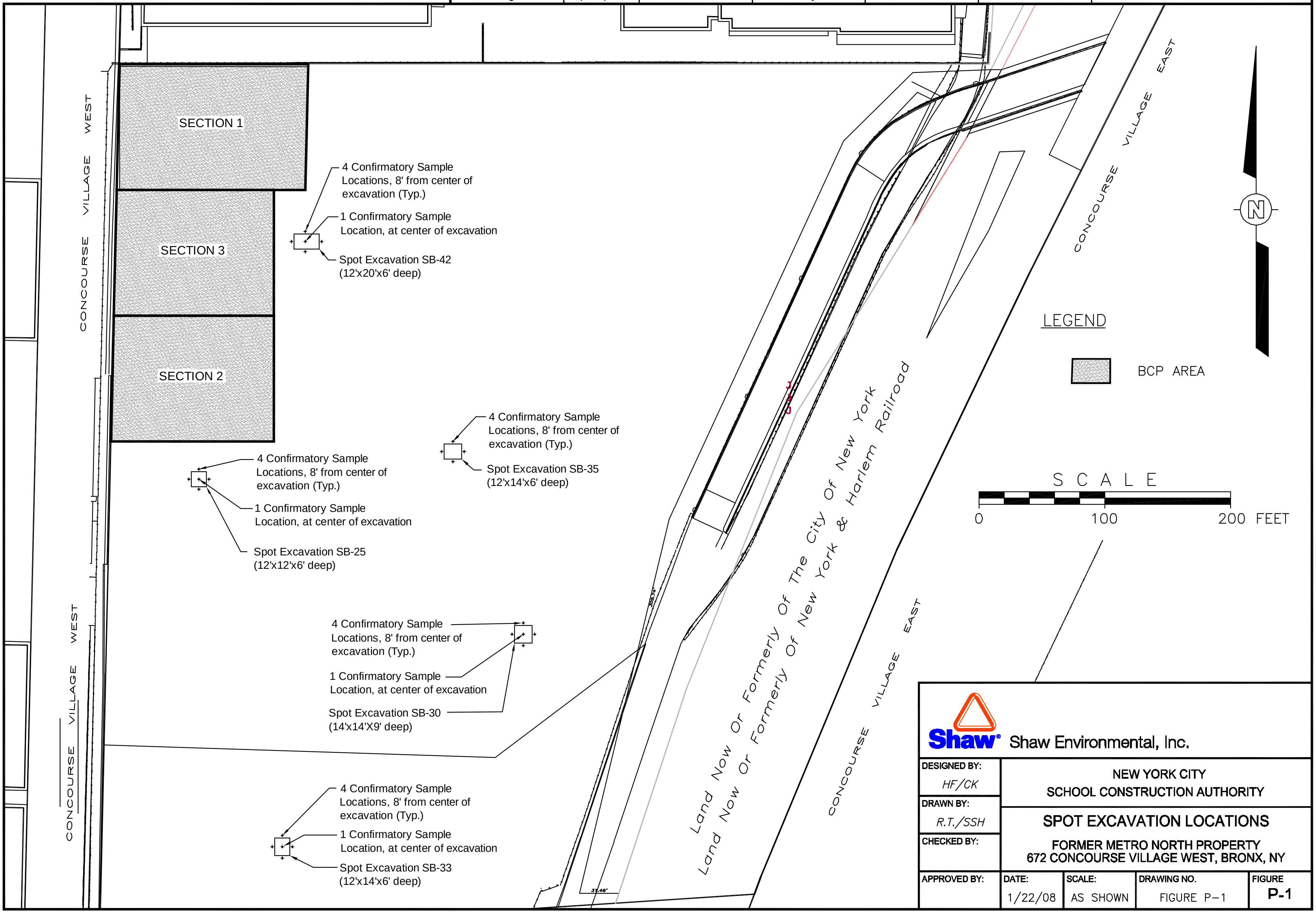
Notes:
All analytical results expressed in micrograms per cubic meter ($\mu g/m^3$)
U = Analyte not detected above laboratory reporting limit.

Appendix P

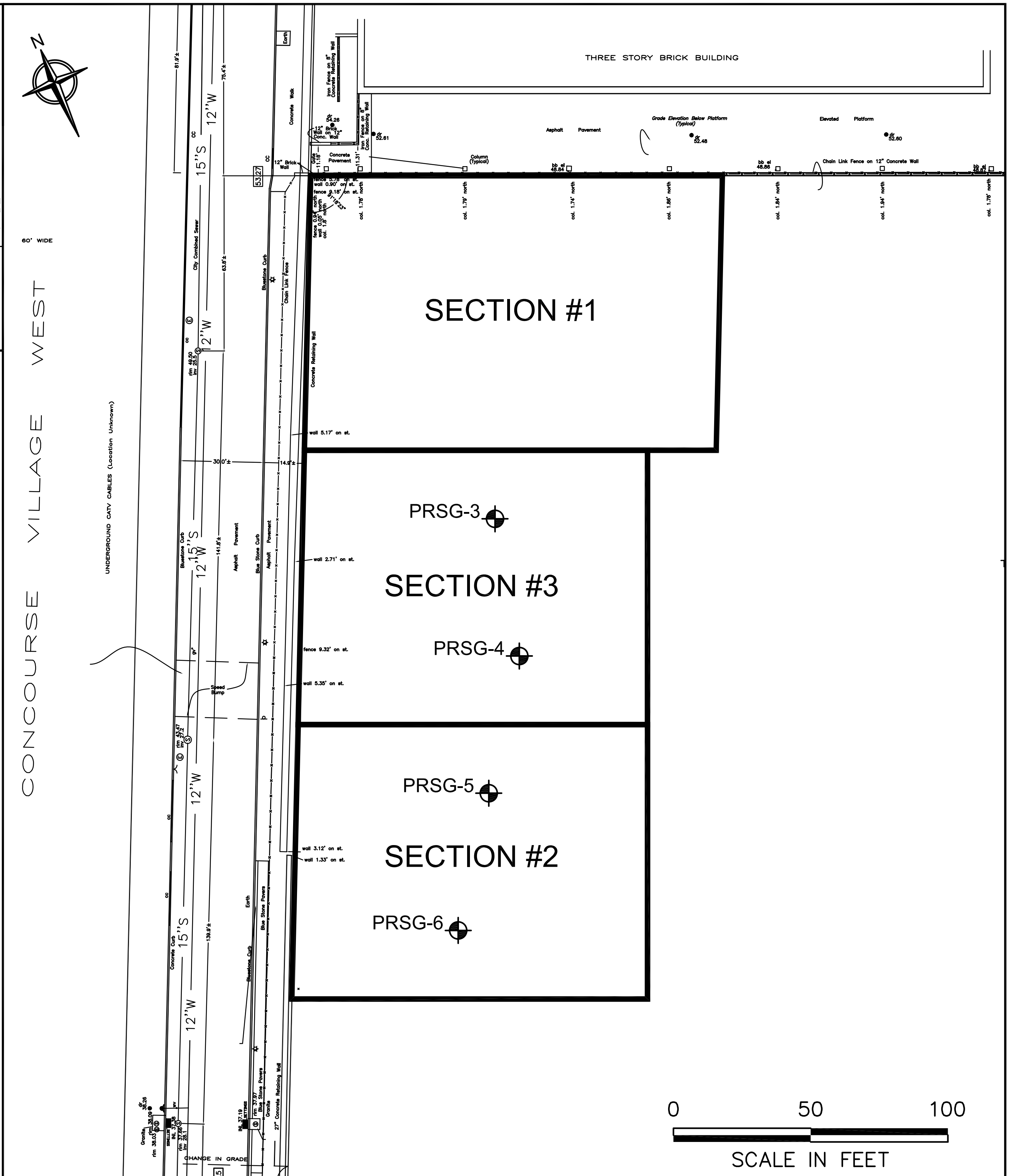
Figures

File: O:\Shaw Offices – CAD Files\Harriman NY\114926\FER – NOV 30 2007\Figure P-1.dwg
Plot Date/Time: Jan 22, 2008 – 11:13am
Plotted By: william.snyder
Xref :
Image :

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER	Figure P-1
Pittsburgh, PA	1/22/08	--	B. Snyder	C. Kraemer	--		



OFFICE New York, NY | DRAWING NUMBER FIGURE P-2 SMP



LEGEND:

PRSG-3 SOIL GAS SAMPLE LOCATION

Shaw® Shaw Environmental, Inc.

DESIGNED BY: HF/CK	NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
DRAWN BY: B. Snyder	SOIL GAS SAMPLE LOCATION PLAN
CHECKED BY:	FORMER METRO NORTH PROPERTY 672 CONCOURSE VILLAGE WEST, BRONX, NY

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	FIGURE
	12/12/07	AS SHOWN	FIGURE P-2 SMP	P-2

Appendix Q

SSDS Start-up Testing Results

Mott Haven - SSDS Pressure Field Extension (PFE) Performance Testing Results

	Vacuum (Inches of Water)		Acceptable Pressure	
PFE #	**7/29/2010**	**8/23/2010**		
A1	-1.471	-0.346	Yes	EF-1
A2	-1.347	-0.304	Yes	
A3	-	-	*	
A4	-	-	*	
A5	-1.472	-	Yes	
B1	-	-0.422	Yes	EF-6
B2	-	-	*	
B3	-1.611	-	Yes	
B4	-	-0.383	Yes	
B5	-	-0.393	Yes	
C1	-4.028	-3.204	Yes	EF-3
C2	-0.820	-3.193	Yes	
C3	-	-3.193	Yes	
C4	-	-3.193	Yes	
D1	-4.044	-	Yes	EF-4
D2	-3.981	-3.161	Yes	
D3	-3.995	-3.170	Yes	
D4	-4.009	-3.185	Yes	
D5	-4.020	-	Yes	
E1	-	-	*	EF-2
E2	-1.677	-0.560	Yes	
E3	-	-0.557	Yes	
E4	-1.587	-0.450	Yes	
E5	-	-0.416	Yes	
F1	-	-0.381	Yes	EF-5
F2	-1.530	-0.384	Yes	
F3	-	-0.354	Yes	
F4	-1.532	-0.385	Yes	
F5	-1.533	-0.383	Yes	

* Two SSDS performance testing events were conducted due to PFE access limitations during ongoing construction activities. Between the two events, 25 of 29 PFE monitoring points were tested and found to be at least 30 times greater than the New York State Department of Health performance criteria of 0.01 inches of water. The four remaining PFE points were inaccessible during both events, but based on the more than adequate vacuum and considering that the four points are not all in one place, Shaw has documented that the SSDS is working as designed across the entire footprint of the campus buildings.

Michael Sherwood

From: Helseth, Peter S <IMCEAEX-_O=THE+20SHAW+20GROUP+20INC+2E_OU=SHAW+20CORPORATE_CN=RECIPIENTS_CN=PETER+2EHELSETH@Cbimail.cbi.com>
Sent: Friday, September 03, 2010 10:35 AM
To: 'GOLDBERG, STEVEN'
Cc: Sherwood, Michael
Subject: RE: stack readings

Steve,

The velocity readings for the stacks at Mott Haven are:

Building "A" low roof = 1100 ft/min
Building "A" high roof = 990 ft/min

Building "B" low roof = 450 ft/min
Building "B" high roof = 1220 ft/min

Building "C" = 1130 ft/min
Building "D" = 750 ft/min

Peter S. Helseth, P.E.
Shaw Environmental & Infrastructure
92 North Avenue, Suite 106
New Rochelle, New York 10801
914.633.9324 x3762 direct
914.329.6449 cell
www.shawgrp.com

From: GOLDBERG, STEVEN [mailto:SGOLDBERG@nycsca.org]
Sent: Friday, September 03, 2010 8:40 AM
To: Helseth, Peter S
Subject: stack readings

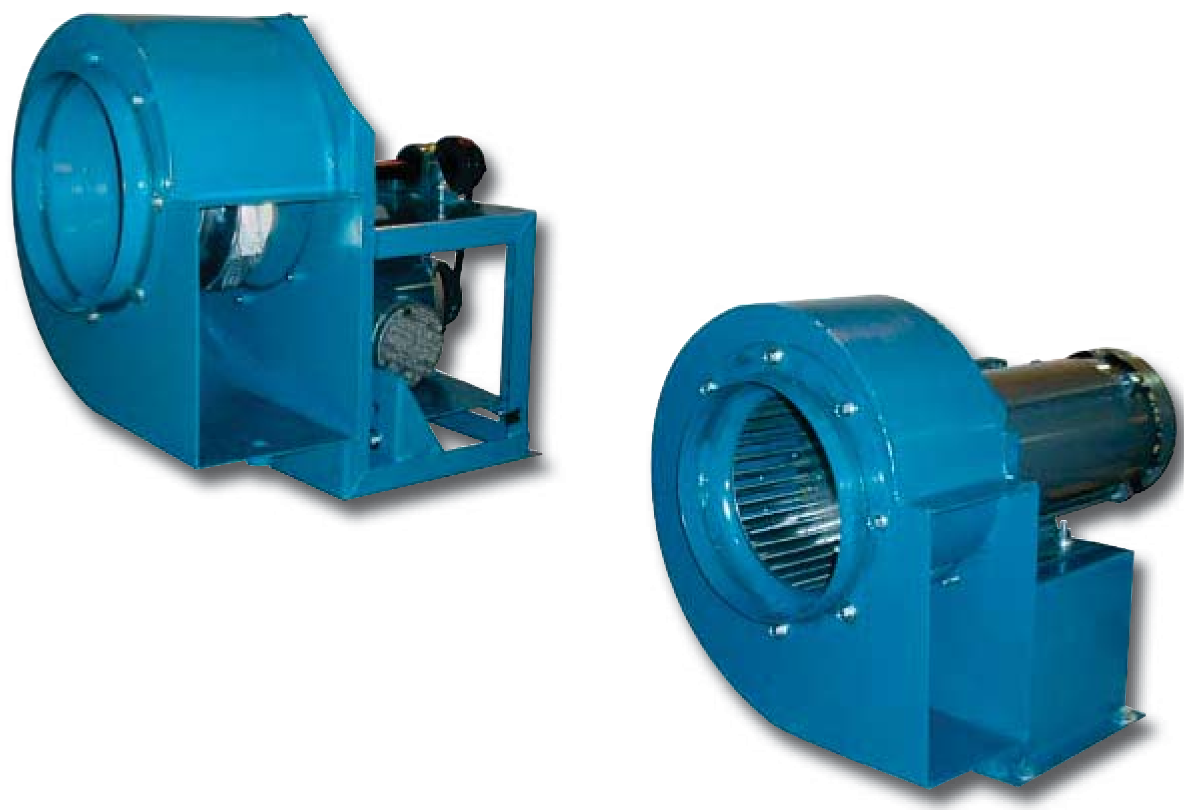
Peter
please send me the velocity readings of the ones that you were able to get yesterday

thank you

Appendix R

SSDS Manufacturer's Product Data, Manuals and Drawings

Fans & Blowers
Twin City
Air Moving Solutions.



JUNIOR VENTILATING SETS

DDF | FCJ | BCJ | BCJU5 | BCJU2

CATALOG 551
February 2013

Models

DDF I FCJ I BCJ I BCJU5 I BCJU2

Model DDF

Model BCJ

DDF - Direct Drive Ventilating Sets

Direct drive ventilating sets are ideal in applications where general ventilation or exhaust is required in small areas such as washrooms, restaurant counters, exhaust hoods, etc. Incorporating forward curved blades for maximum capacity, and available with steel, aluminum, or stainless steel construction, they provide optimal performance with minimal physical dimensions. Available in four sizes, direct drive ventilating sets are an economical solution for airflow requirements to 2100 CFM and static pressures to 1¾".

Accessories include:
- Weather cover
- Inlet and outlet screens
- Gravity backdraft dampers

FCJ/BCJ - Belt Driven Ventilating Sets

Belt driven ventilating sets are recommended where capacity and static pressure requirements are such that they cannot be met by direct drive sets, and where some variation in capacity may be required because of ductwork adjustments.

Belt driven ventilating sets are offered with both forward curved (FCJ) and non-overloading, backward inclined (BCJ) wheels. Fan housings are of heavy gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel. Housings are convertible to eight standard discharge configurations. Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed. Specialized design of the support base provides easy access for electrical wiring and adjustment of the drives.

Belt driven ventilating sets are available with airflow to 1900 CFM and static pressures to 5".

Accessories include:
- Weather cover
- Inlet and outlet screens
- Gravity backdraft dampers
- Spark resistant construction - Type B

Fans & Blowers
Twin City

75 FCJ Belt Driven Ventilating Set

Wheel Diameter: 7 11/16"   Tip Speed, FPM: 2.012 x RPM   Outlet Area: 0.325 ft^2

CFM	OV	1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
260	800	632	0.02	832	0.03	-996	0.05												
292	900	659	0.02	847	0.04	1008	0.05	1148	0.07	1273	0.09								
325	1000	691	0.03	866	0.04	1022	0.06	1159	0.08	1283	0.10	1396	0.12						
357	1100	728	0.03	887	0.05	1037	0.06	1172	0.08	1293	0.11	1405	0.13						
390	1200	769	0.04	912	0.05	1056	0.07	1187	0.09	1306	0.12	1416	0.14	1616	0.19				
422	1300	812	0.05	940	0.06	1075	0.08	1203	0.10	1320	0.13	1428	0.15	1626	0.20	1803	0.25		
455	1400	858	0.05	972	0.07	1099	0.09	1222	0.11	1336	0.14	1443	0.16	1637	0.22	1812	0.27	1973	0.33
487	1500	905	0.07	1008	0.08	1125	0.10	1242	0.13	1354	0.15	1458	0.18	1649	0.23	1823	0.29	1982	0.35
520	1600	954	0.08	1048	0.09	1154	0.11	1265	0.14	1373	0.16	1475	0.19	1663	0.25	1834	0.31	1992	0.37
552	1700	1003	0.09	1088	0.11	1185	0.13	1290	0.15	1393	0.18	1493	0.21	1678	0.26	1847	0.33	2003	0.39
585	1800	1054	0.11	1132	0.12	1222	0.14	1318	0.17	1417	0.19	1513	0.22	1695	0.28	1861	0.35	2015	0.42
617	1900	1104	0.12	1176	0.14	1259	0.16	1348	0.18	1443	0.21	1535	0.24	1713	0.30	1876	0.37	2029	0.44
650	2000	1156	0.14	1223	0.16	1299	0.18	1382	0.20	1470	0.23	1559	0.26	1732	0.33	1893	0.39		
682	2100	1206	0.16	1269	0.18	1340	0.20	1418	0.23	1499	0.25	1585	0.28	1751	0.35				
715	2200	1259	0.19	1319	0.20	1384	0.22	1457	0.25	1533	0.28	1613	0.31	1774	0.37				
747	2300	1310	0.21	1367	0.23	1428	0.25	1496	0.27	1568	0.30	1642	0.33	1798	0.40				
780	2400	1364	0.24	1417	0.26	1474	0.28	1538	0.30	1606	0.33	1675	0.36						
812	2500	1415	0.27	1466	0.29	1521	0.31	1580	0.33	1644	0.36								

90 FCJ Belt Driven Ventilating Set

Wheel Diameter: 9 3/16"   Tip Speed, FPM: 2.405 x RPM   Outlet Area: 0.451 ft^2

CFM	OV	1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
361	800	495	0.02	665	0.04	804	0.06	924	0.08	1032	0.10	1132	0.12						
406	900	511	0.03	673	0.04	809	0.06	927	0.08	1033	0.11	1130	0.13	1308	0.18				
451	1000	531	0.03	683	0.05	816	0.07	932	0.09	1036	0.12	1132	0.14	1305	0.20				
496	1100	554	0.04	695	0.06	824	0.08	938	0.10	1041	0.13	1135	0.15	1306	0.21	1460	0.27	1603	0.34
541	1200	579	0.04	710	0.06	834	0.09	946	0.12	1047	0.14	1140	0.17	1308	0.23	1459	0.29	1599	0.35
586	1300	607	0.05	728	0.07	845	0.10	954	0.13	1054	0.15	1146	0.18	1312	0.24	1461	0.31	1599	0.38
631	1400	636	0.06	748	0.08	859	0.11	964	0.14	1062	0.17	1153	0.20	1317	0.26	1465	0.33	1600	0.40
676	1500	666	0.07	770	0.10	875	0.12	976	0.15	1071	0.18	1161	0.22	1323	0.28	1469	0.35	1603	0.42
722	1600	698	0.09	795	0.11	893	0.14	990	0.17	1082	0.20	1170	0.23	1330	0.30	1475	0.38	1608	0.45
767	1700	730	0.10	820	0.12	913	0.15	1005	0.18	1094	0.22	1180	0.25	1338	0.33	1481	0.40	1612	0.48
812	1800	763	0.12	848	0.14	935	0.17	1022	0.20	1108	0.23	1191	0.27	1346	0.35	1487	0.43	1618	0.51
857	1900	796	0.13	876	0.16	958	0.19	1041	0.22	1124	0.26	1204	0.29	1356	0.37	1495	0.46	1624	0.54
902	2000	830	0.15	905	0.18	983	0.21	1062	0.24	1141	0.28	1218	0.32	1366	0.40	1504	0.48	1632	0.57
947	2100	864	0.17	936	0.20	1009	0.23	1085	0.26	1159	0.30	1234	0.34	1378	0.42	1513	0.51	1640	0.61
992	2200	899	0.20	967	0.22	1037	0.25	1108	0.29	1180	0.33	1251	0.37	1391	0.45	1523	0.54	1648	0.64
1037	2300	934	0.22	998	0.25	1065	0.28	1133	0.32	1202	0.36	1270	0.40	1405	0.48	1534	0.58	1658	0.68
1082	2400	969	0.25	1030	0.28	1094	0.31	1159	0.35	1225	0.39	1290	0.43	1421	0.52	1547	0.61	1668	0.71
1127	2500	1004	0.28	1063	0.31	1124	0.34	1186	0.38	1249	0.42	1312	0.46	1437	0.55	1561	0.65	1679	0.75

105 FCJ Belt Driven Ventilating Set

Wheel Diameter: 10 5/8"   Tip Speed, FPM: 2.782 x RPM   Outlet Area: 0.594 ft^2

CFM	OV	1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
475	800	404	0.04	519	0.06	617	0.08												
535	900	425	0.04	533	0.07	627	0.10	710	0.12										
594	1000	447	0.05	548	0.08	638	0.11	719	0.14	794	0.17	863	0.20						
653	1100	472	0.07	566	0.10	652	0.13	730	0.16	802	0.19	870	0.23						
713	1200	498	0.08	585	0.11	667	0.14	743	0.18	813	0.22	878	0.25	999	0.33				
772	1300	524	0.10	606	0.13	684	0.16	757	0.20	825	0.24	889	0.28	1006	0.36	1115	0.44		
832	1400	551	0.12	629	0.15	703	0.19	773	0.23	839	0.27	901	0.31	1016	0.39	1121	0.48	1220	0.57
891	1500	579	0.14	653	0.17	723	0.21	790	0.25	854	0.30	914	0.34	1026	0.43	1129	0.52	1226	0.62
950	1600	607	0.16	678	0.20	744	0.24	808	0.28	870	0.33	928	0.37	1038	0.47	1139	0.56	1233	0.66
1010	1700	636	0.19	704	0.23	767	0.27	828	0.32	887	0.36	944	0.41	1051	0.51	1150	0.61	1243	0.71
1069	1800	665	0.22	731	0.26	791	0.31	849	0.35	906	0.40	961	0.45	1065	0.55	1162	0.66	1253	0.77
1129	1900	695	0.25	758	0.30	816	0.34	872	0.39	926	0.44	979	0.49	1080	0.60	1175	0.71	1264	0.83
1188	2000	725	0.29	785	0.34	841	0.39	895	0.44	947	0.49	998	0.54	1096	0.65	1189	0.77	1277	0.89
1247	2100	754	0.33	813	0.38	867	0.43	919	0.48	969	0.54	1018	0.59	1113	0.71	1204	0.83	1290	0.95
1307	2200	785	0.37	841	0.43	894	0.48	944	0.53	992	0.59	1039	0.64	1132	0.77	1220	0.89	1304	1.02
1366	2300	815	0.42	870	0.48	920	0.53	969	0.59	1016	0.65	1061	0.70	1150	0.82	1237	0.96	1319	1.09
1426	2400	846	0.47	899	0.53	948	0.59	995	0.65	1040	0.71	1084	0.77	1170	0.89	1254	1.02	1335	1.16
1485	2500	876	0.53	928	0.59	975	0.65	1021	0.71	1065	0.77	1108	0.83	1191	0.96	1273	1.10	1351	1.24

DDF Direct Drive Ventilating Sets

MODEL NO.	MOTOR HP	RPM	1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP	
			CFM	OV	CFM	OV	CFM	OV	CFM	OV	CFM	OV	CFM	OV	CFM	OV
DDF60L	1/6	1150	324	1466	254	1149	—	—	—	—	—	—	—	—	—	—
DDF60H	1/6	1750	545	2466	506	2290	464	2100	421	1905	362	1638	292	1321	—	—
DDF75L	1/6	1150	668	2264	586	1986	516	1749	447	1515	—	—	—	—	—	—
DDF75M	1/3	1750	—	—	—	—	—	—	—	—	874	2963	828	2807	741	2512
DDF75H	1/2	1750	1085	3678	1033	3502	978	3315	923	3129	874	2963	828	2807	741	2512
DDF90L	1/3	1150	—	—	1216	2916	1129	2707	1042	2499	946	2269	802	1923	—	—
DDF90M	1/2	1150	1300	3118	1216	2916	1129	2707	1042	2499	946	2269	802	1923	—	—
DDF90J	1½	1750	2048	4911	1994	4782	1940	4652	1886	4523	1830	4388	1772	4249	1657	3974
DDF105L	1	1150	2127	3648	2036	3492	1945	3336	1855	3182	1766	3029	1681	2883	1484	2545

MODEL NO.	MOTOR HP	RPM	1" SP		1¼" SP		1½" SP		1¾" SP	
			CFM	OV	CFM	OV	CFM	OV	CFM	OV
DDF90H	1	1750	—	—	1543	3700	1408	3376	1205	2890
DDF90J	1½	1750	1657	3974	1543	3700	1408	3376	1205	2890

Model DDF is not licensed to bear the AMCA Seal.

90 BCJ SWSI Ventilating Set

Wheel Diameter: 10½" Tip Speed, FPM: 2.75 x RPM Outlet Area: 0.653 ft^2

CFM	OV	1/8" SP		1/4" SP		1/2" SP		3/4" SP		1" SP		1½" SP		2" SP		3" SP		4" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
261	400	829	0.01	970	0.02	1190	0.04												
327	500	964	0.02	1088	0.03	1305	0.05	1470	0.07	1626	0.09								
392	600	1095	0.03	1220	0.04	1409	0.06	1584	0.09	1722	0.12								
457	700	1232	0.04	1352	0.05	1527	0.08	1688	0.11	1836	0.14	2069	0.20						
522	800	1374	0.05	1483	0.07	1659	0.10	1799	0.13	1940	0.17	2184	0.24	2380	0.30				
588	900	1521	0.07	1618	0.09	1794	0.13	1927	0.16	2051	0.20	2295	0.28	2495	0.35	2840	0.50		
653	1000	1668	0.10	1756	0.11	1926	0.16	2059	0.20	2173	0.23	2399	0.32	2608	0.41	2938	0.57	3251	0.75
718	1100	1817	0.12	1898	0.14	2056	0.19	2193	0.23	2304	0.28	2508	0.36	2712	0.46	3052	0.65	3334	0.82
784	1200	1970	0.16	2044	0.18	2190	0.22	2327	0.28	2440	0.32	2631	0.42	2819	0.52	3168	0.73	3444	0.92
849	1300	2121	0.19	2190	0.22	2325	0.27	2457	0.32	2573	0.38	2760	0.48	2932	0.58	3274	0.81	3560	1.03
914	1400	2274	0.24	2338	0.26	2463	0.31	2588	0.37	2705	0.43	2893	0.54	3055	0.65	3377	0.89	3673	1.14
980	1500	2429	0.29	2489	0.32	2606	0.37	2723	0.43	2837	0.49	3029	0.62	3186	0.73	3485	0.98		
1045	1600	2582	0.35	2639	0.38	2749	0.43	2858	0.49	2968	0.56	3162	0.70	3319	0.82	3600	1.07		
1110	1700	2736	0.41	2789	0.44	2894	0.50	2996	0.57	3100	0.64	3294	0.78	3453	0.92				
1175	1800	2890	0.49	2940	0.52	3040	0.58	3137	0.65	3234	0.72	3424	0.87	3587	1.02				
1241	1900	3046	0.57	3094	0.60	3189	0.67	3282	0.74	3373	0.81	3556	0.97						

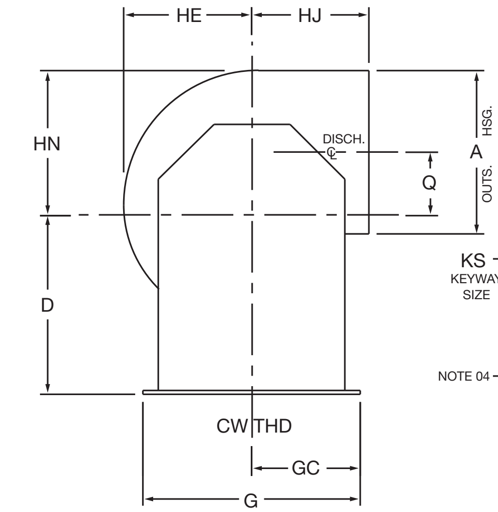
105 BCJ SWSI Ventilating Set

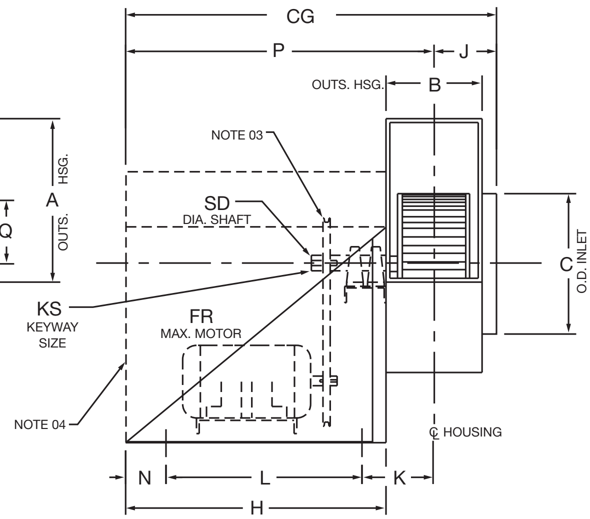
Wheel Diameter: 10½" Tip Speed, FPM: 2.75 x RPM Outlet Area: 0.653 ft2

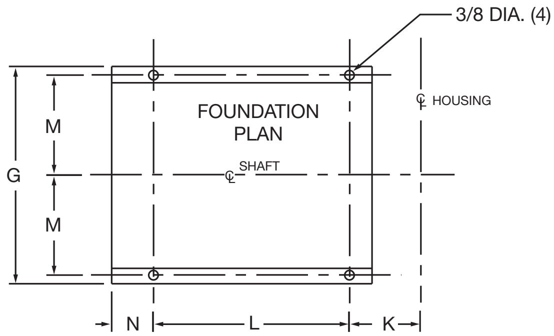
CFM	OV	1/4" SP		1/2" SP		3/4" SP		1" SP		1½" SP		2" SP		3" SP		4" SP		5" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
327	500	901	0.02	1151	0.04	1360	0.07												
392	600	980	0.03	1203	0.05	1403	0.08	1579	0.11										
457	700	1063	0.04	1267	0.06	1453	0.09	1623	0.12	1920	0.19								
522	800	1149	0.05	1346	0.08	1512	0.10	1674	0.14	1961	0.21	2214	0.29						
588	900	1239	0.06	1429	0.09	1585	0.12	1732	0.15	2009	0.24	2255	0.32						
653	1000	1330	0.07	1512	0.11	1665	0.14	1800	0.18	2061	0.26	2300	0.35	2720	0.55				
784	1200	1522	0.11	1686	0.14	1831	0.19	1961	0.23	2187	0.32	2405	0.41	2806	0.63	3158	0.87	3477	1.12
914	1400	1721	0.15	1868	0.20	2003	0.24	2126	0.30	2343	0.40	2535	0.49	2907	0.72	3246	0.98	3555	1.25
1045	1600	1927	0.21	2058	0.26	2183	0.31	2298	0.37	2509	0.49	2693	0.60	3025	0.83	3348	1.10	3647	1.40
1175	1800	2135	0.29	2253	0.34	2367	0.40	2476	0.45	2676	0.59	2857	0.72	3169	0.97	3462	1.24		
1306	2000	2347	0.38	2455	0.44	2559	0.50	2661	0.57	2850	0.70	3024	0.85	3331	1.14	3600	1.41		
1437	2200	2562	0.49	2660	0.56	2756	0.63	2850	0.70	3030	0.83	3196	0.99	3496	1.32				
1567	2400	2776	0.62	2867	0.70	2956	0.77	3043	0.85	3213	1.00	3371	1.15	3662	1.51				
1698	2600	2994	0.77	3078	0.86	3160	0.94	3241	1.02	3400	1.18	3553	1.34						
1828	2800	3210	0.95	3289	1.04	3366	1.13	3442	1.22	3591	1.39								
1959	3000	3429	1.15	3503	1.25	3575	1.35	3647	1.44										

Performance certified is for installation Type B & D: Free or ducted inlet, ducted outlet.
Power rating (bhp) does not include transmission losses.
Performance ratings do not include the effects of appurtenances (accessories).
Underlined numbers indicate maximum static efficiency.

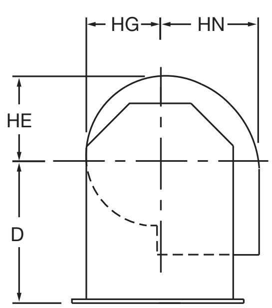
FCJ 75 & 90



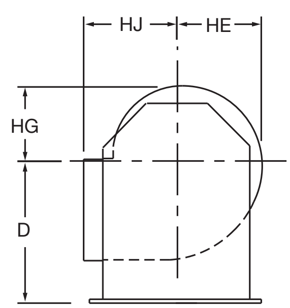




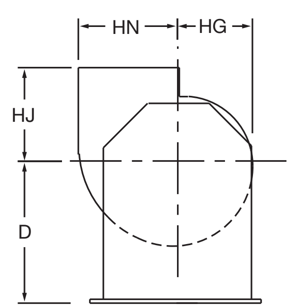
NOTES:
1. Housing sides and scroll are 14 GA.
2. 'CW' rotation is shown. 'CCW' rotation is similar but opposite.
3. Package includes adjustable speed v-belt drive.
4. Optional weather cover shown.
5. Optional inlet screens per AS15506.



CW DBD



CW BHD



CW UBD

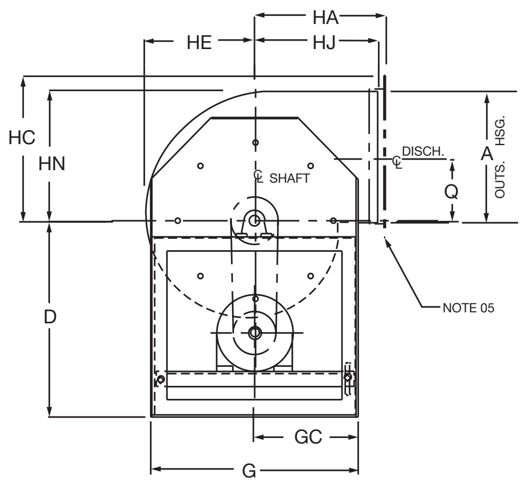
FAN SIZE	A	B	C	CG	D	FR	G	GC	H	HE	HG
75	8.50	5.00	7.50	25.19	13.00	56	12.25	6.13	18.88	6.56	5.81
90	10.00	6.00	9.00	26.19	13.00	56	14.00	7.00	18.88	8.00	6.81

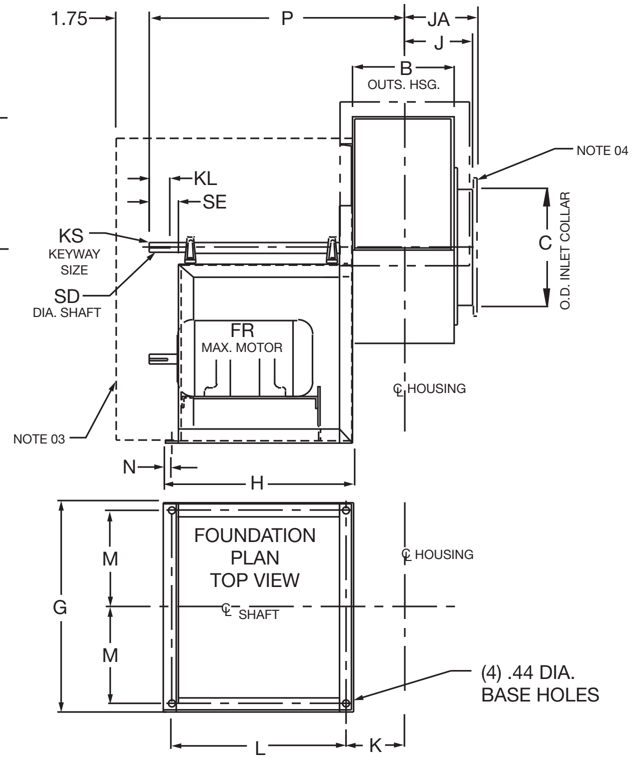
FAN SIZE	HJ	HN	J	K	KS	L	M	N	P	Q	SD
75	6.13	7.88	3.56	3.69	.19 x .09	14.75	5.63	3.06	21.63	3.63	0.625
90	7.00	9.25	4.06	4.19	.19 x .09	14.75	6.50	3.06	22.13	4.25	0.625

AC10748B

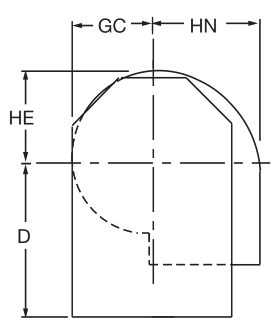
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE UPON REQUEST.

FCJ 105 / BCJ 90 & 105

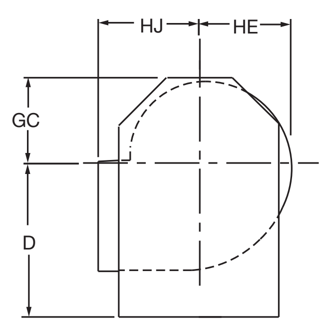




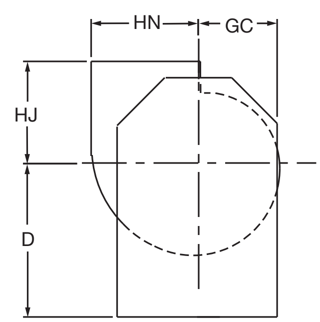
NOTES:
1. Housing sides and scroll are 14 GA.
2. 'CW' rotation is shown. 'CCW' rotation is similar but opposite.
3. Optional weather cover shown.
4. Optional inlet flange per AS363 (BCJ) & AS12403 (FCJ).
5. Optional discharge flange per AC14986 (BCJ) & AS11741 (FCJ).
6. Optional inlet screens per AS15506.



CW DBD



CW BHD



CW UBD

FAN SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN
90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13
105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13
105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56

FAN SIZE	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
90 BCJ	5.38	5.50	5.19	2	.25 x .13	12	6.75	0.56	19.19	5.53	1.00	2.75
105 BCJ	5.38	5.50	5.19	2	.25 x .13	12	6.75	0.56	19.19	5.53	1.00	2.75
105 FCJ	4.56	4.69	4.38	2	.25 x .13	12	6.75	0.56	18.38	4.56	1.00	2.75

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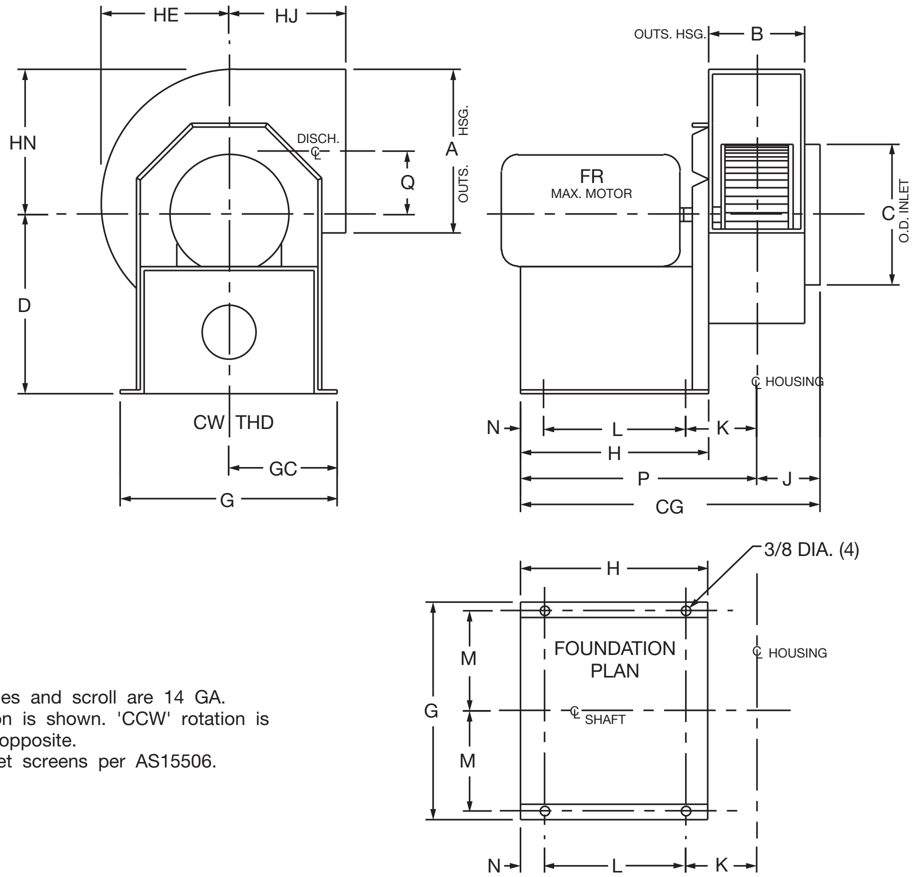
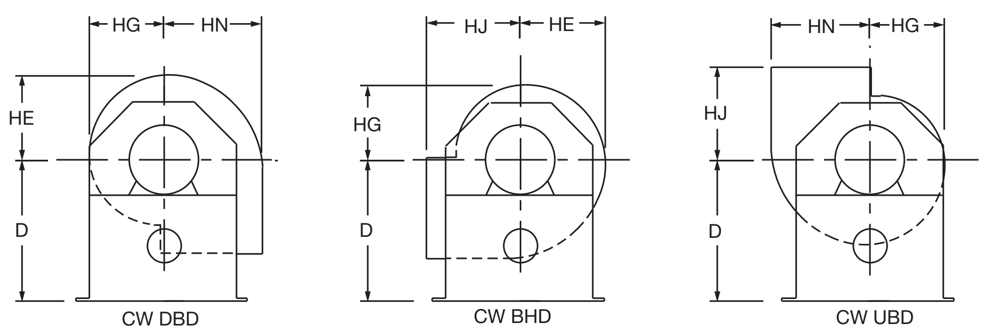
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE UPON REQUEST.

DDF



NOTES:
1. Housing sides and scroll are 14 GA.
2. 'CW' rotation is shown. 'CCW' rotation is similar but opposite.
3. Optional inlet screens per AS15506.



FAN SIZE	A	B	C	CG	D	FR	G	GC	H	HE
60	7.50	4.25	6.00	13.38	8.13	56	9.75	4.88	8.00	5.50
75	8.50	5.00	7.50	14.13	9.75	56	11.25	5.63	8.00	6.56
90	10.00	6.00	9.00	18.13	10.50	145T	12.63	6.31	11.00	8.00
105	12.00	7.00	10.50	20.13	12.63	145T	15.88	7.94	11.00	9.38

FAN SIZE	HG	HJ	HN	J	K	L	M	N	P	Q
60	4.75	5.50	6.63	3.19	3.19	6.00	4.31	1.00	10.19	2.88
75	5.81	6.13	7.88	3.56	3.56	6.00	5.13	1.00	10.56	3.63
90	6.81	7.00	9.25	4.06	4.06	9.00	5.81	1.00	14.06	4.25
105	7.94	9.00	10.56	4.56	4.56	9.00	7.44	1.00	14.56	4.56

AC10804B

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INDUSTRIAL & COMMERCIAL FANS

Centrifugal Fans | Utility Sets | Plenum & Plug Fans | Inline Centrifugal Fans

Mixed Flow Fans | Tubeaxial & Vaneaxial Fans | Propeller Wall Fans | Propeller Roof Ventilators

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1.5MSP03/11

Fans & Blowers Twin City

Centrifugal Fans

INSTALLATION, OPERATION & MAINTENANCE MANUAL

ES-52

November 2013

Contents

Introduction

The purpose of this manual is to provide instructions that complement good general practices when installing or operating fans manufactured by Twin City Fan & Blower. It is the responsibility of the purchaser to provide qualified personnel experienced in the installation, operation, and maintenance of air moving equipment.

Instructions given in the body of this manual are general in nature and apply to a variety of models manufactured by Twin City Fan & Blower. Most units can be installed and maintained with the instructions given. Additional product and engineering information is available at www.tcf.com.

Special applications may require additional information. These instructions are supplied in the form of attached appendices. Use the instructions in the appendix if the directions in this manual differ from instructions in the appendix.

As always, follow good safety practices when installing, maintaining and operating your air moving equipment. A variety of safety devices are available. It is the user's responsibility to determine adequate safety measures and to obtain the required safety equipment.

Shipping and Receiving

All Twin City Fan & Blower products are carefully constructed and inspected before shipment to insure the highest standards of quality and performance.

Compare all components with the bill of lading or packing list to verify that the proper unit was received.

Check each unit for any damage that may have occurred in transit. Any damage should be reported immediately to the carrier and the necessary damage report filed.

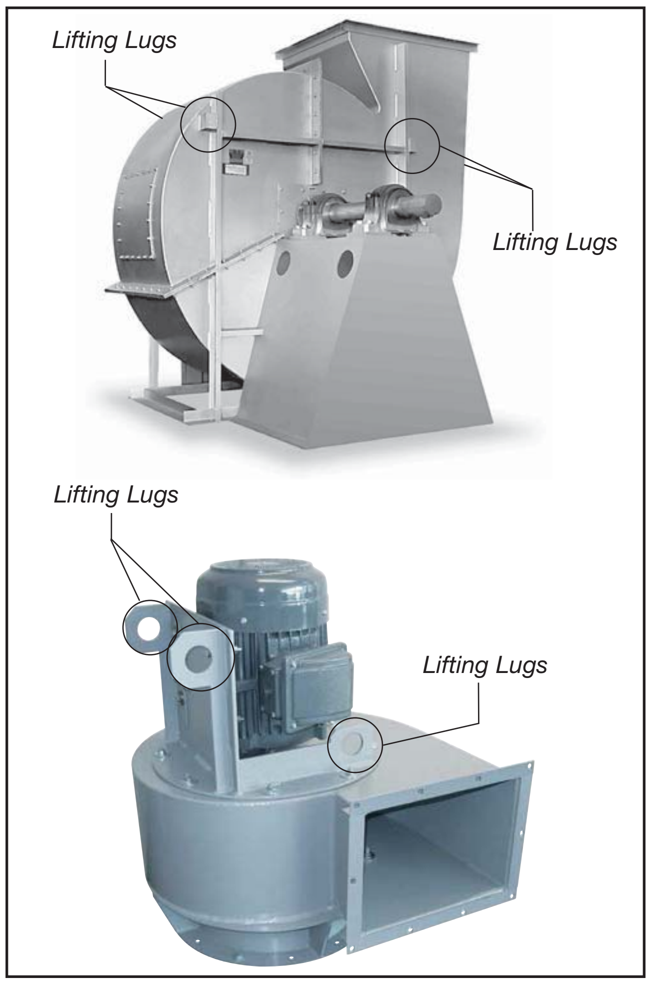
Handling

Handling of all air moving equipment should be conducted by trained personnel and be consistent with safe handling practices. Verify the lift capacity and operating condition of handling equipment. Maintain handling equipment to avoid serious personal injury.

Units shipped completely assembled may be lifted with slings and spreader bars. Use well-padded chains, cables or nylon straps. On most units, lifting lugs are provided for attaching chains (see Figure 1). Lift the fan in a fashion that protects the fan and fan coating from damage. Never lift a fan by the inlet or discharge flange, shafting or drives, wheel or impeller, motor or motor base, or in any other manner that may bend or distort parts.

Partial or disassembled units require special handling. All parts should be handled in a fashion which protects the coatings and parts from damage. Components should be handled such that forces are not concentrated and bending or distortion cannot occur.

Figure 1. Lifting Lug Locations

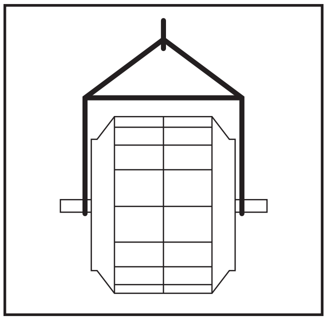


Housing should be lifted using straps and spreaders. Do not distort housing or side plates when lifting.

Bearing pedestals should be lifted using straps or padded chains. Under no circumstances should an attached or separated bearing pedestal be lifted by the shaft, bearings, drives, motor or wheel.

The shaft and wheel assembly may be lifted using a hoist and a spreader with a sling around the shaft at points nearest the wheel (see Figure 2). Take care not to scratch the shaft where the wheel or bearings will be mounted. Never lift or support the assembly by the wheel. Always support the assembly by the shaft when lifting or storing. Do not support the shaft or the wheel on housing sides. Use only the key provided with the shaft and wheel.

Figure 2. Moving Shaft and Wheel with Spreader Bar



Wheels shipped separately can be lifted by slings running through the blades and around the hub. Never lift the wheel by blades or flanges. Always transport wheels by lifting. Do not roll the wheel as this can damage coatings and change the balance of the wheel.

Bent shafting is a source of vibration and bearing failure, so handle the shaft with care. Any scratches on the shaft may be removed with fine emery cloth or a stone.

Short Term Storage

If fan installation is to be delayed, store the unit in a protected area. Protect the fan and motor bearings from moisture and vibration (or shock loading).

Long Term Storage

Prior to Storage – Fan bearings (and motor bearings per the motor manufacturer's specifications) are to be greased at the time of going into extended storage. On belt drive units the belt tension should be reduced to less than half the specified value for the fan's design to prevent a sag/set from forming in the shafts and belts.

If the unit was supplied with a motor, the motor windings should be measured at this time and recorded for comparison prior to placing in service. If the fan housing was supplied with a drain connection, this plug should be removed to prevent any moisture from accumulating in this portion of the unit during storage.

Storage Procedure – Fans should be stored indoors whenever possible where control over temperature, shock and dust is reasonably maintained. If units are to be stored outside in the elements, they should be covered with a water-resistant material. The bearings should be shielded individually from water and dirt; however, do not tightly seal to avoid trapping condensation. Stored equipment should be stored on a clean, dry floor or blocked up off the ground on blocks to prevent unit from setting in any water or directly on the ground. If shock or vibration will be present during storage, the unit may need to be placed on some type of vibration dampening material to aid in preventing brinelling of the bearing surfaces.

Periodic Check – On a monthly interval, the equipment should be checked to ensure that it has remained in an acceptable stored condition. The fan (and motor if supplied) should be rotated several times by hand while adding enough grease to replenish the bearing surfaces with fresh grease and to maintain a full bearing cavity. Grease used must be compatible with that already supplied in the motor and fan bearings. The fan impeller should be left at approximately 180 degrees from that of the previous month to prevent the shaft and impeller from taking a set in one position. Storage records should be maintained which indicate the above requirements have been followed. Consult the motor manufacturer for proper storage, space heater connection and lubrication if the unit was supplied with one.

Start-Up – When the unit is removed from storage, all fan bearing grease should be purged and replenished with fresh grease as per the lubrication decal. The motor should be measured to verify that the resistance is still at a satisfactory level compared to the value recorded prior to storage. Spherical roller bearings with split pillow block housings should be recharged with grease. The bottom half of the housing should be 1/3 full.

Foundations and Supporting Structures

Floor mounted fans should be installed on a flat, level, rigid concrete foundation with a mass at least three to five times that of the assembly supported as a guide, depending on the size and speed of the fan. Foundation shall be suitable for static and dynamic loads and foundation frequencies be separated at least 20% from the rotational speed/speed ranges. The plan area should be no more than twice that required by the equipment. Foundations with larger areas should have correspondingly larger mass. Anchor bolts should be "L" or "T" shaped with sufficient length for nuts, washers, shims, and threads for draw-down. Each bolt should be placed in a sleeve or pipe with a diameter larger than the bolt to allow for adjustment.

If the fans are mounted on a sub-structure, an inertia base with spring isolator system should be considered.

Fans mounted to or within a structure should be placed as close as possible to a rigid member such as a wall or column. The structure must be designed for rotating equipment; static design for strength is not sufficient to insure proper operation. Supports for suspended fans must be cross-braced to prevent side sway. Structural resonance should be at least 20% from fan operating speed. Vibration isolators should be used where applicable.

Any ducting should have independent support; do not use the fan to support ducting. Isolating the fan from ductwork with flex connections eliminates transmission of vibration. Fans handling hot gases require expansion joints at both the inlet and discharge to prevent excessive loads caused by thermal growth.

For fans requiring concrete filled bases or pedestals, please refer to Twin City Fan's installation and maintenance manual "Heavy Duty Centrifugal Fans - ES-995" for instructions.

Fan Installation – Factory Assembled Units

Follow proper handling instructions given earlier.

1. Move the fan to the final mounting position.
2. Remove skid, crates, and packing materials carefully.
3. If supplied, place vibration pads or isolation base on mounting bolts. Line up holes in fan base with bolts.
4. Place fan on mounting structure. Carefully level unit using shims as required at all mounting hole locations. Bolt down the unit. Be careful not to force the fan to conform to the mounting structure/foundation. This may cause the bearings to become misaligned or pinched causing vibration and premature failure.
5. Any grout may now be used. Bolt the fan in position before applying grout. Do not depend upon grout to support rotating equipment.
6. Continue with Operations Checklist.

Additional instructions may be given for some fan models, components and accessories in the appendix.

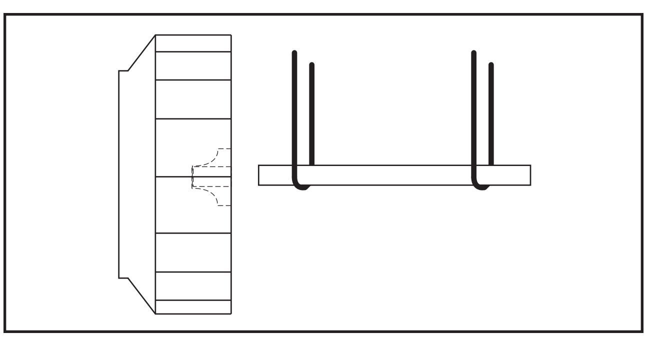
Fan Installation – Disassembled Units

A unit is considered "disassembled" if any component required for proper operation is shipped or supplied separately or in pieces. Reference earlier instructions concerning proper handling of fan components.

Instructions for Mounting and Assembly of Unit:

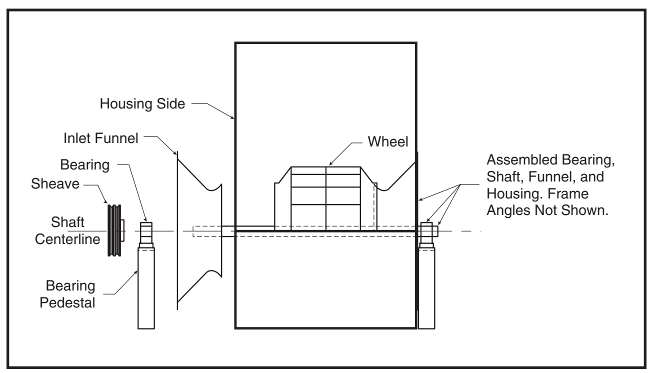
1. Move lower housing/framework to mounting location.
2. If vibration pads or bases are used, place on bolts first. Place lower housing assembly onto bolts.
3. Level and shim if required. Bolt into place.
4. If separated pedestal or bearing pedestal:
   a. Bring bearing pedestal to desired location.
   b. Place any vibration base or pads into place. Set bearing pedestal on bolts.
   c. Never distort bearing pedestal by forcing it to align with a non-level surface. Shim beneath the pedestal as required.
   d. Check bearing centerline height. Change centerline height to match centerline height of housing. High temperature units may require the housing centerline to be lower when cold so that it will be centered when hot.
   e. Measure from housing to bearing pedestal to bring bearing pedestal into square with housing (a large square may also suffice).
   f. Bolt into position.
5. Shaft and wheel assembly preparation:
   a. Clean protective coating off shaft with solvent. Do not touch clean areas of shaft with hands. Perspiration can cause rust or pitting over time.
   b. Remove keys from shaft.
   c. Clean inside of wheel bore with solvent. Make sure setscrews will not interfere when inserting shaft into wheel bore.
6. Arrangement 1, 9 or 10: Drive Component Assembly (See Figure 3):
   a. Insert shaft into wheel from back side of wheel.
   b. When shaft is flush with wheel hub, put key into keyway and tighten wheel setscrews.
   c. Insert shaft through opening in drive side. (If split housed unit, lower into position.)
   d. Install bearings onto shaft. Do not tighten bearing setscrews at this time. The bearing housing should be perpendicular and the bearing base parallel to the axis of the shaft to prevent loads caused by misalignment.
   e. Mount assembly, bolt bearings to drive stand. Shaft must be parallel with side of bearing pedestal. Precision shim bearings as required. After aligning and bolting bearings to pedestal, lock bearings. Be sure expansion bearing (if supplied) is set to allow for growth. Continue with step 8.

Figure 3. Drive Component Assembly



7. Arrangement 3 (Split-housed) units (See Figure 4):
   a. Parts on DWDI units are assembled in the following order as viewed from opposite drive side: Bearing bar assembly and opposite bearing, funnel, (housing side), wheel, (housing side), funnel, drive side bearing bar assembly, drive bearing and sheaves. Mount bearing bar assembly to housing. Center wheel in funnels.
   b. Parts on SWSI units are assembled in the following order as viewed from opposite drive side: Bearing bar assembly and opposite bearing, funnel, (housing side), wheel, (housing side), drive side bearing bar assembly, drive bearing and sheaves. Mount bearing bar assembly to housing. (See Figure 7 for wheel-funnel overlap.)
   c. Assemble parts in above order on shaft.
   d. Move assembly into position. Lightly bolt bearings into place.
   e. Shaft should be parallel with discharge of housing. Move bearings to accommodate.
   f. Level shaft; shim bearings if required. Lock bearings. Be sure expansion bearing (if supplied) is set to allow for shaft growth.
8. Install motor on base. Carefully align shafts for drive installation.

Figure 4. Split-housed Drive Component Assembly



9. Mount drives as follows:
   a. Slip (do not pound) proper sheave onto corresponding shaft. CAUTION: PLACING FAN SHEAVE ON MOTOR CAN OVERSPEED WHEEL AND CAUSE STRUCTURAL FAILURE.
   b. Position sheaves so they are placed on motor shaft and fan shaft as close as possible to the motor and/or bearing. Sheave must be placed so that it does not rub on the bearing, motor guard or other structures. On keyed shafts,

Figure 5. Sheave Position

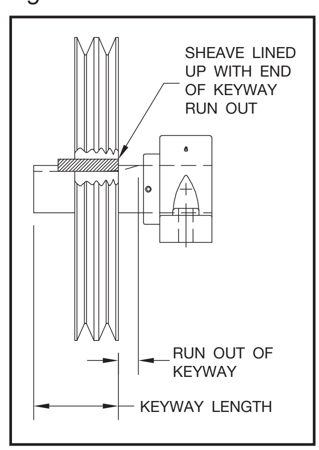
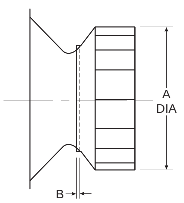


Figure 7. Wheel-Funnel Overlap

HIB, RTF, HRT, BC, BCS, TSL, BAF, BAE, EPF & EPQ



HIB, RTF, HRT* Wheel Placement									
Size	A	B	B*		Size	A	B	B*	
			19	23				19	23
180	20.50	0.31	—	—	**400**	45.25	0.69	1.03	0.97
200	22.50	0.34	—	—	**450**	50.00	0.75	1.13	1.06
220	25.00	0.38	—	—	**490**	55.13	0.81	1.25	1.13
240	27.50	0.44	—	—	**540**	61.00	0.91	1.38	1.25
270	30.38	0.47	0.50	0.50	**600**	67.50	1.00	1.31	1.31
300	33.50	0.50	0.69	0.69	**660**	74.25	1.13	1.56	1.44
330	37.00	0.56	0.69	0.69	**730**	82.00	1.22	1.75	1.63
360	41.00	0.63	0.81	0.81	**800**	90.75	1.34	1.06	1.31

*Use second 'B' columns for HRT-19 and HRT-23 dimensions

BC-SW, BC-DW, BCS, TSL, BAF SWSI & DWDI Wheel Placement											
Size	**122**	**135**	**150**	**165**	**182**	**200**	**222**	**245**	**270**	**300**	**330**
A	12.25	13.50	15.00	16.50	18.25	20.00	22.25	24.50	27.00	30.00	33.00
B	0.32	0.34	0.38	0.44	0.56	0.63	0.69	0.75	0.88	0.97	1.06

Size	365	402	445	490	542	600	660	730	807	890
A	36.50	40.25	44.50	49.00	54.25	60.00	66.00	73.00	80.75	89.00
B	0.94	1.03	1.13	1.25	1.38	1.56	1.69	1.88	2.09	2.28

EPF, EPQ Wheel Placement			
Size	**122**	**150**	**165**
A	13.00	14.13	16.16
B	0.25	0.25	0.25

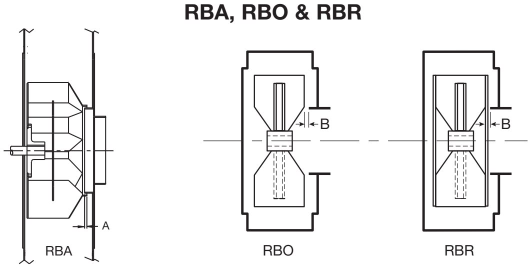
BAE SWSI & DWDI Wheel Placement				
Size	**122**	**135**	**150**	**165**
A	12.25	13.50	15.00	16.50
B	0.31	0.34	0.38	0.44

EPF, EPQ, BAE SWSI & DWDI Wheel Placement											
Size	**182**	**200**	**222**	**245**	**270**	**300**	**330**	**365**	**402**	**445**	**490**
A	19.00	20.82	23.16	25.51	28.11	31.23	34.36	38.00	41.90	46.33	51.01
B	0.38	0.41	0.46	0.50	0.55	0.62	0.68	0.75	0.83	0.91	1.01

Size	542	600	660	730	807
A	56.48	62.47	68.71	76.00	84.07
B	1.11	1.23	1.36	1.50	1.66

APF & APQ Wheel Placement																	
Size	**121**	**141**	**161**	**181**	**201**	**221**	**251**	**281**	**321**	**351**	**391**	**441**	**491**	**551**	**631**	**711**	**791**
A	13.00	14.13	16.16	18.44	19.94	22.78	25.06	28.25	31.81	35.81	39.81	44.56	50.06	55.75	63.69	71.69	79.63
B	0.25	0.25	0.25	0.31	0.31	0.31	0.50	0.50	0.56	0.63	0.63	0.75	0.78	0.81	1.03	1.28	1.38

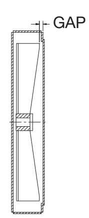
RBA, RBO & RBR



RBA Wheel Placement																		
Size	**907**	**909**	**911**	**913**	**915**	**917**	**919**	**921**	**923**	**926**	**929**	**933**	**937**	**941**	**945**	**949**	**954**	**960**
A	0.25	0.38	0.47	0.53	0.59	0.69	0.69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

RBO, RBR Wheel Placement															
Size	**913**	**915**	**917**	**919**	**921**	**923**	**926**	**929**	**933**	**937**	**941**	**945**	**949**	**954**	**960**
B	0.53	0.53	0.59	0.69	0.78	0.88	0.97	1.03	1.22	1.38	1.56	1.69	1.81	1.88	2.16

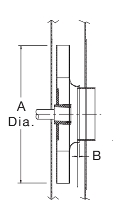
Note: On sizes 905-911 wheel is to be centered in housing.



MBW, MBO & MBR

MBW, MBO, MBR Wheel Placement											
Size	**196**	**224**	**252**	**280**	**308**	**336**	**365**	**421**	**477**	**533**	**589**
MBW	0.50	0.44	0.38	0.25	0.38	0.44	0.56	0.63	0.75	0.75	0.88
MBO	0.50	0.44	0.38	0.25	0.38	0.44	0.56	0.63	0.75	0.75	0.88
MBR	0.25	0.25	0.25	0.25	0.25	0.38	0.50	0.69	0.81	0.94	1.00

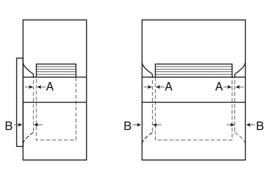
Note: On sizes 421-589 wheel is to be centered in housing.



BCN

BCN Wheel Placement											
Size	**270**	**300**	**330**	**365**	**402**	**445**	**490**	**542**	**600**	**660**	**730**
B	0.09	0.09	0.13	0.13	0.13	0.16	0.16	0.19	0.22	0.22	0.25

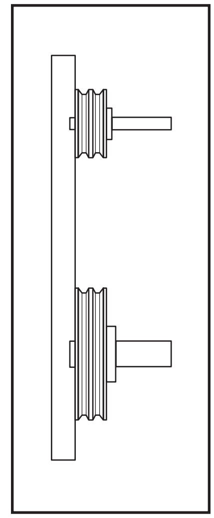
FC



FC Wheel Placement					
Size	**A**	**B**	**Size**	**A**	**B**
10.5	0.47	0.69	**30**	0.75	4.38
12	0.25	1.88	**33**	0.81	5.00
15	0.44	2.19	**36**	0.75	5.00
18	0.50	2.25	**39**	1.06	6.38
21	0.69	2.88	**42**	1.69	7.50
24	0.81	3.00	**48**	1.50	7.13
27	0.69	3.13	**54**	1.00	10.50

the key should be placed in the keyway pushed toward the bearing as far as the runout will allow without rubbing. The back of the sheave should be lined up with the end of the key (see Figure 5 on page 3). For sheaves without a key, the sheave should be placed as close to motor and/or bearing as possible without rubbing. Typically the sheave should be at least ¼" away from the motor, bearing, guard, structures, etc.

Figure 6. Sheave Alignment



c. Align sheaves with a straightedge extended along the perimeters of both sheaves, just making contact in two places on outside perimeters of both sheaves (see Figure 6).

d. Tighten down sheave bolts.

e. Install a matched set of belts. Slide the motor to obtain slack and tighten belts. Using a pry will damage belts.

f. Tighten belts to proper belt tension. Ideal tension is just enough tension so that belts do not slip under peak load. Recheck sheave alignment.

g. After initial installation of belts, recheck belt tension again after a few days to adjust belt tension. (New belts require a break-in period of operation.)

10. Install any safety devices or accessories supplied. (Accessories commonly used are inlet vanes, shaft seals and shaft coolers, plugs, dampers, and inlet or discharge screens. Refer to appropriate documents in appendix.)
11. Grout may now be applied. Grout is used to distribute loads and should not be used as the sole support of any rotating equipment.
12. When connecting the fan to the system, it is recommended that the inlet and discharge be isolated from the system with flex connections (where practical) to block transmitted vibration. All duct connections to the fan should be independently supported. Do not use fan to support duct.

Fan Operation - Safety

For general safety practices for air moving equipment, see AMCA Bulletin 410.

Twin City Fan & Blower has many safety accessories available. These safety devices include (but are not limited to) belt guards, shaft guards, inlet and discharge screens. The use, abuse, or non-use of safety devices is the responsibility of the purchaser.

Facility-related safety conditions include fan accessibility and location. How easily can non-service personnel access the unit? Is the fan in a hazardous duty environment? Was the unit ordered for this duty? Other concerns must also be addressed. All fans should be powered through switches which are easily accessible to service personnel from the fan. Every switch should have the ability to be "locked-off" by the service person and the key to be retained by this person to prevent accidental power of the fan while service is in process.

Operation Check List

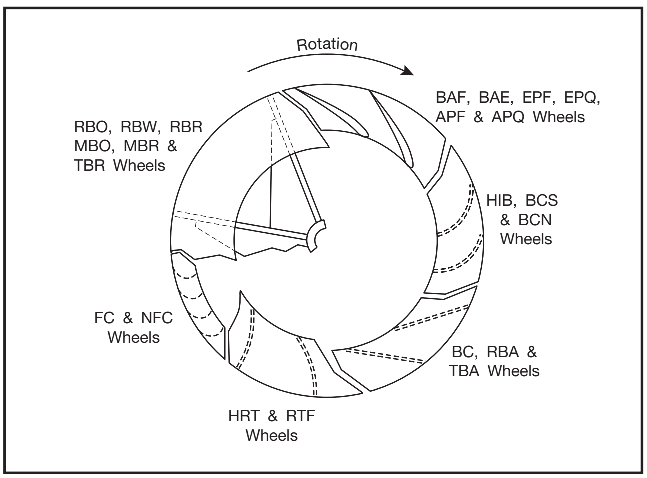
Verify that proper safety precautions have been followed:
- □ Electrical power must be locked off.

Check fan mechanism components:
- □ System connections are properly made and tightened.
- □ Bearings are properly lubricated.
- □ Wheel, drives and fan surfaces are clean and free of debris.
- □ Rotate the impeller by hand to verify it has not shifted in transit.
- □ Check fan/wheel overlap. (See Figure 7.)
- □ Drives on correct shafts (not reversed).
- □ Check position of guards to prevent rubbing.

Check fan electrical components:
- □ Motor is wired for proper supply voltage.
- □ Motor was properly sized for power and rotational inertia of rotating assembly.
- □ Motor is properly grounded.
- □ All leads are properly insulated.

Trial "bump":
- □ Turn on power just long enough to start assembly rotating.
- □ Check rotation for agreement with rotation arrow. Does the assembly make any unusual noise? (See Figure 8.)
- □ Check drive alignment and tension. Does this meet with drive manufacturer's recommendations?
- □ Correct any problems which may have been found. (Follow safety guidelines - shut power off.) Perform checklist again until unit is operating properly.
- □ Run unit up to speed.

Figure 8. Proper Wheel Rotation



Verify fastener tightness. These may have loosened during shipment or installation.
- □ Setscrews attaching wheel hub to shaft.
- □ Setscrews in drive sheaves or coupling.
- □ Nuts on inlet funnel.
- □ Nuts and bolts holding motor.
- □ Nuts holding housing frame to base and base to ground.
- □ Nuts on accessories including shaft seal, access doors and pie-splits.
- □ Bolts in taper-lock bushings.
- □ Grease line connections.
- □ After one week of operation, check all nuts, bolts and setscrews and tighten if necessary.

Maintenance of Fans

This section contains general maintenance instructions for your Twin City Fan & Blower unit. For specific information about maintenance of components, particularly for special application fans, see the attached documents.

General Motor Maintenance

The three basic rules of motor maintenance are keep the motor clean, dry and properly lubricated.

Keeping motors and windings clean is important because dirt and dust serve as thermal insulators. Heat normally dissipated by the motor is trapped causing overheating and/or premature failure. Blow dust and dirt out of windings and off the motor periodically. Use low pressure (50 psig) airstream so that winding damage does not occur. Keep the area surrounding the motor open so the air can circulate through the motor cooling fan. Follow normal maintenance schedule given to the right.

Motors should be kept dry to avoid electrical short circuits. Motors kept in storage for long periods of time can have moisture condense on the windings. Be certain the motor is dry before using.

Some smaller motors are lubricated for life. Motor bearing lubrication, if required, must follow a rigorous schedule. Motors less than 10 hp running about eight hours a day in a clean environment should be lubricated once every five years; motors 15 to 50 hp, every 3 years; and motors 50 to 150 hp, yearly. For motors in a dusty or dirty environment or running 24 hours a day, divide the service interval by 2. If the environment is very dirty or high temperatures exist, divide the service interval by 4. Lubrication requirements are normally attached to the motor. Do not overlubricate.

Motors controlled by variable frequency drives (VFDs) should be wired in accordance with VFD manufacturer's instructions. The motor must be grounded to earth and proper shielded cabling must be used. Grounding rings should be considered.

Drive Maintenance

V-belt drives need periodic inspection and occasional belt replacement. When inspecting drives, look for dirt buildup, burrs or obstructions which can cause premature belt or drive replacement. If burrs are found, use fine emery cloth or a stone to remove the burr. Be careful that dust does not enter the bearings.

Check the sheaves for wear. Excessive slippage of belts on sheaves can cause wear and vibration. Replace worn sheaves with new ones. Carefully align sheaves to avoid premature sheave failure.

Observe belts for wear. If fraying or other wear is observed to be mostly on one side of the belts, the drives may be misaligned. Reinstall the drives according to instructions given for Fan Installation – Disassembled Units. Never use belt dressing on any belts.

When replacing belts, replace the entire set. After initial replacement and tensioning, recheck belt tension after a few days to adjust belt tension again. (New belts require a break-in period of operation.)

Bearing Maintenance

For instructions covering special lubrication intervals, bearing assembly or disassembly, or installation details, see attached documents. Any bearing which is disassembled should be kept separate from other bearing parts as components may not be interchangeable. Maintain cleanliness of components and bearings to prevent bearing contamination.

Figure 9. Safety & Lubrication Instructions for Fans with Ball Bearings

WARNING

1. This equipment must not be operated without proper guarding of all moving parts. While performing maintenance be sure remote power switches are locked off. See installation manual for recommended safety practices.
2. Before starting: Check all setscrews for tightness and rotate wheel by hand to make sure it has not moved in transit.

Relubrication Schedule (Months)* Ball Bearing Pillow Blocks									
Shaft DIA	Speed (RPM)								
	500	1000	1500	2000	2500	3000	3500	4000	4500
½" thru $1\frac{11}{16}$" (13 – 45)	6	6	5	3	3	2	2	2	1
$1\frac{15}{16}$" thru $2\frac{7}{16}$" (50 – 60)	6	5	4	2	2	1	1	1	1
$2\frac{11}{16}$" thru $2\frac{15}{16}$" (65 – 75)	5	4	3	2	1	1	1		
$3\frac{7}{16}$" thru $3\frac{15}{16}$" (80 – 100)	4	3	2	1	1				

* Suggested lubrication interval under ideal continuous operating conditions. Relubricate while running, if safety permits, until some purging occurs at seals. Adjust lubrication frequency depending on conditions of purged grease. Use one-half of listed interval for vertical shaft applications or for 24 hour operation. Hours of operation, temperature, and surrounding conditions will affect the relubrication frequency required.

1. Lubricate with a high quality NLGI No. 2 lithium-base grease having rust inhibitors and antioxidant additives, and a minimum oil viscosity of 500 SUS at 100°F (38°C). Some greases having these properties are:
   Shell - Alvania RL   Exxon - Ronex MP
   Mobil - Mobilith SHC100   Mobil - Mobilith SHC220
2. Lubricate bearings prior to extended shutdown or storage and rotate shaft monthly to aid corrosion protection.

Figure 10. Safety & Lubrication Instructions for Fans with Unit Roller Bearings

WARNING

1. This equipment must not be operated without proper guarding of all moving parts. While performing maintenance be sure remote power switches are locked off. See installation manual for recommended safety practices.
2. Before starting: Check all setscrews for tightness and rotate wheel by hand to make sure it has not moved in transit.

Relubrication Schedule (Months)* Spherical Roller Bearing - Solid Pillow Blocks									
Shaft DIA	Speed (RPM)								
	500	1000	1500	2000	2500	3000	3500	4000	4500
1" thru $1\frac{7}{16}$" (25 – 35)	6	4	4	2	1	1	1	1	½
$1\frac{11}{16}$" thru $2\frac{3}{16}$" (40 – 55)	4	2	1½	1	½	½	½	½	½
$2\frac{7}{16}$" thru $3\frac{7}{16}$" (60 – 85)	3	1½	1	½	½	¼	¼		
$3\frac{15}{16}$" thru $4\frac{15}{16}$" (90 – 125)	2½	1	½	¼					

*Suggested lubrication interval under ideal continuous operating conditions. Relubricate while running, if safety permits, until some purging occurs at seals. Adjust lubrication frequency depending on conditions of purged grease. Use one-half of listed interval for vertical shaft applications or for 24 hour operation. Hours of operation, temperature, and surrounding conditions will affect the relubrication frequency required.

1. Lubricate with a high quality NLGI No. 2 lithium-base grease having rust inhibitors and antioxidant additives, and a minimum oil viscosity of 500 SUS at 100°F (38°C). Some greases having these properties are:
   Shell - Alvania RL2   Exxon - Ronex MP
   Mobil - Mobilith SHC100   Mobil - Mobilith SHC220
2. Lubricate bearings prior to extended shutdown or storage and rotate shaft monthly to aid corrosion protection.

Figure 11. Safety & Lubrication Instructions for Fans with Spherical Roller Bearings with Split Pillow Block Housings

WARNING

1. This equipment must not be operated without proper guarding of all moving parts. While performing maintenance be sure remote power switches are locked off. See installation manual for recommended safety practices.
2. Before starting: Check all setscrews for tightness, and rotate wheel by hand to make sure it has not moved in transit.

Relubrication Schedule (Months)* Spherical Roller Bearing - Split Pillow Blocks										Grease to be added at each interval
Shaft DIA	Speed (RPM)									
	500	750	1000	1500	2000	2500	3000	3500	4000	
$1\frac{7}{16}$" thru $1\frac{15}{16}$" (35 – 50)	6	4½	4	4	3½	2½	2½	1	1	0.50 oz.
$2\frac{3}{16}$" thru $2\frac{13}{16}$" (55 – 70)	5	4½	4	2½	2½	1½	½	¼	¼	0.75 oz.
$2\frac{15}{16}$" thru $3\frac{15}{16}$" (75 – 100)	4½	4	3½	2½	1½	1	½			2.00 oz.
$4\frac{7}{16}$" thru $4\frac{15}{16}$" (110 – 135)	4	4	2½	1	½					4.00 oz.
$5\frac{7}{16}$" thru $6\frac{15}{16}$" (140 – 180)	4	2½	1½							7.00 oz.

*Suggested lubrication interval under ideal continuous operating conditions. Remove bearing cap and observe condition of used grease after lubricating. Adjust lubrication frequency as needed. Use one-half of listed interval for vertical shaft applications or for 24 hour operation. Hours of operation, temperature, and surrounding conditions will affect the relubrication frequency required. Clean and repack bearings annually. Remove old grease, pack bearing full and fill housing reservoir on both sides of bearings to bottom of shaft.

1. Lubricate with a high quality NLGI No. 2 lithium-base grease having rust inhibitors and antioxidant additives, and a minimum oil viscosity of 500 SUS at 100°F (38°C). Some greases having these properties are:
   Shell - Alvania RL2   Exxon - Ronex MP
   Mobil - Mobilith SHC100   Mobil - Mobilith SHC220
2. Lubricate bearings prior to extended shutdown or storage and rotate shaft monthly to aid corrosion protection.
3. Purge or remove old grease when changing lubrication brands or types.

Static Oil Lubrication

1. Use only high quality mineral oil with a VG grade indicated on the customer submittal drawing.
2. Static oil level should be at the center of the lower-most roller (Do not overfill.)
3. Complete lubrication change should be made annually.

Bearing failure can occur from many causes. See Troubleshooting section for details.

Note: All speeds shown do not apply to all shaft sizes in that group. Consult the factory if in doubt of maximum speed for a particular bearing.

Lubrication

Proper lubrication of bearings helps assure maximum bearing life. All fans are equipped with decals indicating relubrication intervals for normal operating conditions. However, every installation is different and the frequency of lubrication should be established accordingly.

Experience has shown that airborne moisture and heavy dust will dramatically reduce the life of the bearing lubricant. If any of these adverse conditions exist, it is recommended that bearings be regreased after several days of operation. Lubrication intervals can then be adjusted based on the condition of the purged grease.

Figure 9 illustrates the decal for ball bearings, Figure 10 the decal for solid pillow block spherical roller bearings, and Figure 11 shows the decal for spherical roller bearings with split pillow block housings. Observation of the condition of the grease expelled from unit ball or roller bearings at the time of relubrication is the best guide as to whether regreasing intervals and the amount of grease added should be altered. This observation is particularly important when bearings operate continuously over 160°F. Spherical roller bearings with split pillow block housing should be lubricated until grease purges or overheating may result. Follow the lubrication interval and amount noted in Figure 11. Spherical roller bearings with split pillow block housings should be serviced once per year. Remove cap, clean out old grease and replace, filling the bottom half of the housing 1/3 full.

Greases are made with different bases. There are synthetic base greases, lithium base, sodium base, etc. Avoid mixing greases with different bases. They could be incompatible and result in rapid deterioration or breakdown of the grease.

All bearings are filled with grease before leaving the factory. When the fans are started, the bearings may discharge excess grease through the seals for a short period of time. Do not replace the initial discharge because leakage will cease when the excess grease has worked out. Sometimes the bearing has a tendency to run hotter during this period and one should not get alarmed unless it lasts over 48 hours or gets above 220ºF. When relubricating, use a sufficient amount of grease to purge the seals. Rotate bearings during relubrication where good safety practice permits.

For bearings with oil lubrication, sight gauges are installed so that a proper level can be reviewed and maintained. Sight gauges should be read with bearings not rotating.

Wheel and Shaft Maintenance

Periodically inspect the shaft and wheel for dirt buildup, corrosion, and signs of excess stress or fatigue. Clean the components and, when appropriate, apply new coatings. (Any addition of coatings or weld can create an imbalance.) Check the balance of the assembly.

Structural Maintenance

All structural components or devices used to support or attach the fan to a structure should be checked at regular intervals. Vibration isolators, bolts, foundations, etc., are subject to failure from corrosion, erosion, and other causes. Improper mounting can lead to poor operation characteristics or fan fatigue and failure.

Check metallic components for corrosion, cracks, or other signs of stress. Concrete should be checked to ensure the structural integrity of the foundation.

Troubleshooting Guidelines

Use current safety practices when investigating fan or system performance problems. General safe practices and performance troubleshooting guidelines can be found in AMCA Publications 410 and 202, respectively. Fan application and field measurement procedures can be found in AMCA Publications 201 and 203.

Troubleshooting Performance Problems

The lists below indicate possible areas to check when air or sound values do not match expectations. Most fan problems can be pinpointed to one of these common causes.

Air Capacity Problems:

1. Resistance of system not at design rating. If resistance is lower than expected, both airflow and horsepower may be up. If resistance is higher than anticipated, air volume will be down.
2. Fan speed is not at design speed.
3. Air density not at design values. Also check air performance measurement techniques/procedures.
4. Devices for air modulation are closed or plugged. Also check filters.
5. Wheel mounted improperly or is rotating in reverse.
6. Parts of system or fan have been damaged or need cleaning.

Noise Problems:

1. Air performance is incorrect and fan is not at design point of operation. Fan forced to operate in an unstable flow region.
2. Bearing failure. Check bearings (lubrication).
3. Supply voltage high or inconsistent supply frequency. Adjustable frequency controllers can generate motor noise.
4. Objects which are installed in a high velocity airstream can generate noise. This includes flow sensors, turning vanes, etc.
5. Poor fan inlet conditions.
6. Acoustics or sound measurement procedure incorrect.

Vibration Problems:

1. Misalignment of drive components.
2. Poor foundations or mounting structure (resonances).
3. Foreign material attached to rotating components.
4. Damaged rotating components (bearings, shaft, fan, wheel, sheaves).
5. Broken, loose or missing setscrews.
6. Loose bolts.
7. Vibration transmitted by another source.
8. Water accumulating in airfoil blades.
9. Fan is operating in stall or unstable flow region.

NOTE: All fans manufactured by Twin City Fan & Blower are factory balanced prior to shipment. Handling and movement of the fan during shipment may cause the rotating assembly to shift. Balance should be checked once the fan is installed. If a final trim balance is required, it is the end user's responsibility to bring the fan back to factory specifications. Final trim balancing is not the responsibility of Twin City Fan & Blower. Refer to Figure 12 for vibration guidelines.

Figure 12. Vibration Guidelines

Condition	Fan Application Category	Rigidly Mounted mm/s (in./s)	Flexibly Mounted mm/s (in./s)
Start-up	BV-3	6.4 (0.25)	8.8 (0.35)
	BV-4	4.1 (0.16)	6.4 (0.25)
Alarm	BV-3	10.2 (0.40)	16.5 (0.65)
	BV-4	6.4 (0.25)	10.2 (0.40)
Shutdown	BV-3	12.7 (0.50)	17.8 (0.70)
	BV-4	10.2 (0.40)	15.2 (0.60)

Value shown are peak velocity, mm/s (inches/s), Filter out.
Table taken from ANSI/AMCA Standard 204-05, Table 6.3.
AMCA defines BV-3 for applications up to 400 HP; BV-4 for applications over 400 HP.

Motor Problems:

1. Incorrect wiring.
2. Speed of fan too high.
3. Parts improperly installed - binding.
4. Bearings improperly lubricated.
5. WR^2 capability of motor too low for application.
6. Protection devices may be improperly sized.

Drive Problems:

1. Belts improperly tensioned.
2. Drive alignment is poor.

Bearing Problems:

Generally speaking, Twin City Fan & Blower uses three types of bearings:

1. Ball bearing with set screw lock.
2. Spherical roller bearings with set screw lock.
3. Spherical roller bearings with adapter lock/taper lock feature to attach them to the shaft.

Ball bearings – These are self-aligning bearings and should present no alignment problems with one exception: i.e., on Sealmaster bearings there is a pin beneath the grease fitting which prevents the bearings outer race from rotating. Should this pin jam, the bearing loses its alignment feature.

Common failure causes are (1) set screws loosening and shaft turning within the bearing, and (2) crowned bearing supports. Loosen one bolt and measure the clearance between the pillow block and the support. Add shim to compensate.

Spherical Roller Bearings with Set Screw Lock – The self-aligning characteristic of these bearings are inherent in the spherical roller design. The closer that these bearings are to perfect alignment, the cooler they will operate.

Common failure causes are the same as with ball bearings, mainly set screws loosening and crowned bearing supports.

Spherical Roller Bearings with Adapter Lock – Again, the self-aligning feature is inherent in the spherical design. Good alignment results in a cooler operating bearing. The faster the bearing operates the more critical this becomes.

A common cause of failure is improper installation practice. Removing too much clearance from the bearing can result in preloading the bearing, resulting in premature failure; and removing not enough can result in the shaft rotating within the bearing. Properly tightened, this method of attaching a bearing to a shaft is second only to a press fit. Crowned bearing supports can also preload these bearings and should be checked by loosening one side of the bearing and checking for clearance.

Lubrication – The major cause of bearing failure is contamination of grease, insufficient grease, or incompatibility of grease. If a fan is to be stored for any length of time at the job site, the bearings immediately should be filled with grease while rotating the shaft and then the bearings should be regreased and rotated monthly. This will prevent moisture, which condenses within the bearing, from corroding the raceways. Most greases used on fan pillow blocks are lithium base. Use the greases shown on the bearing decal. Do not mix the bases without completely purging out the initial grease.

Initially, follow the lubrication instruction on the side of the fan. The frequency of lubrication should be adjusted depending on the condition of the old grease being purged. This is the responsibility of the user. If the grease is dirty, the lubrication frequency should be more often.

a. Noise – If a bearing is increasing in noise intensity and/or vibration, it will probably result in failure.

b. Temperature – If a bearing temperature begins to gradually rise, it will generally result in failure. A bearing can operate up to 200 degrees and operate satisfactorily if the temperature remains constant and the bearing receives adequate lubrication. Remember that a roller bearing under the same load and speed will be somewhat more noisy and run warmer than a ball bearing. This is normal.

Rough handling and/or dropping a fan can result in brinelling the bearing. This appears as a clicking noise at first, then gradually worsens until failure.

When replacing a bearing, always align the bearings first, then bolt the pillow blocks to their support, rotate the shaft, fasten the bearings to it. If the bearing is fastened to the shaft first, tightening the pillow block bolts may bind the shaft and preload the bearings.

Limitation of Warranties and Claims

Seller warrants to the original purchaser that the goods sold hereunder shall be free from defects in workmanship and material under normal use and service (except in those cases where the materials are supplied by the buyer) for a period of one year from the date of original installation or eighteen (18) months from the date of shipment, whichever occurs first. The liability of seller under this warranty is limited to replacing, repairing, or issuing credit (at cost, F.O.B. factory and at seller's discretion) for any part or parts which are returned by buyer during such period provided that:

a. seller is notified in writing within ten (10) days following discovery of such defects by buyer, or within ten (10) days after such defects should reasonably have been discovered, whichever is less;

b. the defective unit is returned to seller, transportation charges prepaid by buyer.

c. payment in full has been received by seller or said products; and

d. seller's examination of such unit shall disclose to its satisfaction that such defects have not been caused by misuse, neglect, improper installation, repair, alteration, act of God, or accident.

e. seller cannot guarantee sound pressure levels or dBA.

No warranty made hereunder shall extend to any seller product whose serial number is altered, effaced or removed. Seller makes no warranty, express or implied, with respect to motors, switches, controls, or other components of seller's product, where such components are warranted separately by their respective manufacturers. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER STATUTORY OR OTHERWISE, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. In no event shall seller be liable to buyer for indirect, incidental collateral, or consequential damages of any kind. (BUYER'S FAILURE TO PAY THE FULL AMOUNT DUE WITHIN SIXTY (60) DAYS OF DATE OF INVOICE SHALL OPERATE TO RELEASE SELLER FROM ANY AND ALL LIABILITY OR OBLIGATION ARISING PURSUANT TO ANY WARRANTY, EXPRESS OR IMPLIED, WHETHER STATUTORY OR OTHERWISE, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, MADE IN CONNECTION WITH ANY CONTRACT FORMED HEREUNDER. BUYER AGREES THAT SUCH FAILURE TO PAY SHALL CONSTITUTE A VOLUNTARY WAIVER OF ANY AND ALL SUCH WARRANTIES ARISING PURSUANT TO SUCH CONTACT.)

Product Specifications – Model BCJ
Backward Inclined Junior Utility Set

Fans shall be Type BCJ Backward Inclined Junior Utility Set, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

PERFORMANCE — Performance ratings shall conform to AMCA Standard 205 (fan efficiency grade), 211 (air performance) and 311 (sound performance). Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and 300 (sound performance) in an AMCA accredited laboratory. Fans shall be licensed to bear the AMCA certified ratings seal for both sound and air, and fan efficiency grade (FEG).

Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise beyond the peak efficiency to ensure quiet and stable operation. Fans shall have a non-overloading design with self-limiting horsepower characteristics and shall reach a peak in the normal selection area. All fans shall be capable of operating over the minimum pressure class limits as specified in AMCA Standard 99.

HOUSING — Fan housings shall be of heavy gauge, continuously welded construction. Housings with lock seams or partially welded construction are not acceptable. Housings shall be suitably braced to prevent vibration or pulsation. Housings shall have tapered spun, aerodynamically designed inlet cones or funnels providing stable flow and high rigidity.

WHEEL — Backward inclined wheels shall be single thickness plate type designed for maximum efficiency and quiet operation and shall be of the non-overloading type. Wheels shall be constructed of aluminum, with blades riveted and welded to the spun wheel cone and backplate. All wheels shall be statically and dynamically balanced.

SHAFT — Shafts shall be AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished, and ring gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

BEARINGS — Bearings shall be heavy duty, grease lubricated, anti-friction ball, self-aligning, pillow block type and selected for a minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum fan RPM.

DRIVE — Motor sheaves shall be cast iron, and supplied as either variable pitch or fixed pitch. Drives and belts shall be rated for a minimum of 120% of the required motor HP.

FINISH AND COATING — The entire fan assembly, excluding the shaft, shall be thoroughly degreased and deburred before application of a rust-preventative primer. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly. The fan shaft shall be coated with a petroleum-based rust protectant.

ACCESSORIES — When specified, accessories such as belt guards, weather covers, access doors, companion flanges, discharge shutters, shaft coolers, shaft seals, inlet screens, etc., shall be provided by Twin City Fan & Blower to maintain one source responsibility.

FACTORY BALANCE AND RUN TESTING — All fan wheels shall be statically and dynamically balanced in accordance with ANSI/AMCA 204 “Balance Quality and Vibration Levels for Fans” to Fan Application Category BV-3. This corresponds to a Balance Quality Grade G6.3. All assembled fans are test run at the rated operating speed or at the maximum RPM of the fan. Vibration readings are recorded in the horizontal, vertical and axial directions on both bearings. Trim balancing is performed if necessary to maintain BV-3 vibration limits. Records shall be maintained and a written copy shall be available upon request.

GUARANTEE — The manufacturer shall guarantee the workmanship and materials for its BCJ Backward Inclined Junior Utility Sets for at least one (1) year from startup or eighteen (18) months from shipment, whichever occurs first.

Centrifugal Utility Set Usage Guide

Twin City Fan's centrifugal utility sets offer users numerous discharge and rotation options. Models can be easily configured to job specific criteria by modifying two fields within Revit.

How It Works

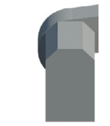
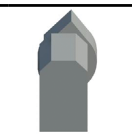
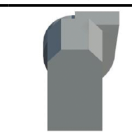
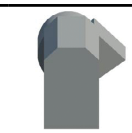
Refer to the **Twin City Fan Revit Family Usage Guide** for details on how to load a family into a project. Once the specific utility set model and size has been loaded into the project there are two parameters which the user must modify; the Discharge and the Rotation. The default values for the Discharge and Rotation will be set at '0' (Top Horizontal Discharge) and 'CW' (Clockwise) respectively. The user can change the Discharge to any one of the 7 available options by changing the numeric value in the Discharge field. **Table 1** describes each configuration in detail. To change the Rotation from CW to CCW, uncheck the box titled 'Clockwise Rotation'. Note that the Rotation is always determined by viewing the fan from the drive side as opposed to the inlet side. **Figure 1** below shows the difference between the drive and inlet sides of a fan. **Table 2** lists the available discharges by model.

Table 2: Available Discharges by Model

Model	Available Discharges						
	THD	DBD	TAD	TAU	UBD	BAU	BHD
BCV	0	1	2	3	4	5	6
BCVU5	0	1	2	3	4	5	6
BCVU2	0	–	–	3	4	5	6
BCVSH	0	–	–	3	4	5	6
FCV	0	1	2	3	4	5	6
BAV	0	1	2	3	4	5	6
BCJ	0	1	–	–	4	–	6
BCJU5	0	1	–	–	4	–	6
BCJU2	0	–	–	–	4	–	6
FCJ	0	1	–	–	4	–	6
DDF	0	1	–	–	4	–	6

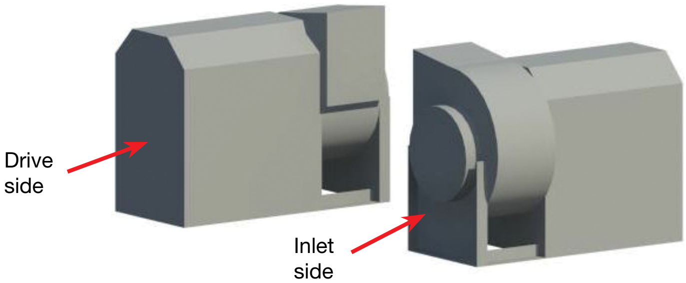
For assistance with Twin City Fan Revit models, please send an email to revithelp@tcf.com.

Table 1: Configurations*

Discharge	Description	Image	
		CW	CCW
0	Top Horizontal Discharge (THD)		
1	Downblast Discharge (DBD)		
2	Top Angular Downblast (TAD)		
3	Top Angular Upblast (TAU)		
4	Upblast Discharge (UBD)		
5	Bottom Angular Upblast (BAU)		
6	Bottom Horizontal Discharge (BHD)		

*Note: Rotation is as viewed from fan drive side.

Figure 1: Drive Side and Inlet Side Views



Drive side view (left) and inlet side view (right) of a model BCV with Top Horizontal Discharge Rotation (0) and Clockwise Rotation (CW).

5959 Trenton Lane North • Minneapolis, MN 55442-3237
Phone: 763-551-7600 • Fax: 763-551-7601
www.tcf.com

RECEIVED
MAR 0 1 2010
WSP FLACK + KURTZ, INC.
SHOP DWG. DEPT.

ANRON

HEATING & AIR CONDITIONING * SHEET METAL * SERVICE

440 Wyandanch Avenue
North Babylon, New York 11704-1506
Phone: 631.643.3433 Fax: 631.491.6983

NO EXCEPTIONS NOTED
EXCEPTIONS NOTED:
[ ] RESUBMIT FOR RECORD
[ ] NO RESUBMISSION REQUIRED
REVISE AND RESUBMIT

Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of This Part of the Project and general compliance with the information given in the contract documents. The contractor is responsible for providing all information necessary for this review, counting and correlating all quantities and dimensions; selecting fabrication processes, techniques and sequences of construction; coordinating work with that of other trades and performing this work in a safe and satisfactory manner. Notations on this drawing do not authorize changes in the contract documents without written authorization from the owners representative.

WSP FLACK + KURTZ INC.

Date ________ By ________

MOTT HAVEN CAMPUS

730 Concourse Village East, Bronx, NY

Contract - HVAC

Anron Project # 2007-220

Shaw Environmental & Infrastructure Engineering of New York, P.C.

WORKING DRAWING REVIEW

☐ ACCEPTED ☐ REVISE AND RESUBMIT
☒ ACCEPTED AS NOTED ☐ NOT ACCEPTED

PROJECT: Mott Haven
DATE SUBMITTED: 3/17/10
DATE REVIEWED: 3/18/10
CHECKED BY: August Arrigo, P.E.

Acceptance is only for general compliance with the design concept. Contractor is responsible for errors, omissions, and deviations from plans and specifications. Deviations must be noted by the Contractor on the working drawing submittal.

Starters for SSDS Fans
(EF-1 thru 6)

Notes:

Being submitted per Bulletin #58 for approval

NOT REVIEWED

SSDS FANS AND SYSTEM NOT DESIGNED OR SPECIFIED BY WSP F+K

SUBMITTED BY ANRON HEATING & AIR CONDITIONING, INC.	
JOB NAME:	Mott Haven Campus
DATE:	02/24/10
SECTION:	02221-1
DIVISION:	15
	2

RECEIVED
FEB 2 4 2010
... CORP.

Corrections required
EF-1 should be 1 1/2 HP
EF-2 Can be 1.0 HP
EF-4 Should be 1 1/2 HP
EF-5 Can be 1.0 HP

DEM SUBMITTAL # 15860-003.002

MCA SMACNA ASHRAE ACCA SPIDA

Michael Sherwood

Subject: FW: SSDS Fans

From: Sherwood, Michael
Sent: Wednesday, March 31, 2010 9:02 AM
To: CARRION, RAMON; 'Edward Allen'
Cc: Michael DiGiuseppi; SHAH, ANJAYKUMAR; Tim Murphy; Rich Pennella; Kraemer, Curtis
Subject: RE: SSDS Fans

Ray/Ed,

The fan submittal 15860-003.002 should be accepted as it was submitted without comment. Our engineer mixed up the order of the fans.

Michael Sherwood
Client Program Manager
Shaw Environmental & Infrastructure
92 North Avenue, Suite 106
New Rochelle, New York 10801
914.633.9324 x3756 direct
516.650.5290 cell
www.shawgrp.com

From: CARRION, RAMON [mailto:RCARRION@nycsca.org]
Sent: Tuesday, March 30, 2010 9:58 PM
To: 'Edward Allen'
Cc: Michael DiGiuseppi; SHAH, ANJAYKUMAR; Tim Murphy; Rich Pennella; Kraemer, Curtis; Sherwood, Michael
Subject: RE: SSDS Fans

I was able to forward your suppliers colorful comments to the engineering firm that will review and respond.

Ramon Carrion
Construction Management-Project Officer

NYC SCHOOL CONSTRUCTION AUTHORITY

Office 718 401-6752
Fax 718 402-8133
Cell 917 642-7205

Twin City Fan & Blower
A Twin City Fan Company

SUBMITTAL

Customer: Anron A/C ATTN: Mike DiGiuseppi

Job Name: Mott Haven Bulletin# 58

Job ID: MAP-10-045-1 Your PO# 1811

Date: February 24, 2010

Submitted By: Samantha A. Mikus
111 Omni Drive
Hillsborough, NJ 07852
Phone: 908-431-5556
Fax: 908-431-5562

02/24/10- Please see the attached revised submittal based on the requested S.P. of 3.0" & 4.0".

At time of release please indicate rotation and discharge needed for each fan.

Twin City Fan & Blower
A Twin City Fan Company

Fan Tag: **EF-1**
Job Name: Mott Haven Bulletin# 58
Job ID: MAP-10-045-1
Date: February 24, 2010

BCJ - Backward Inclined Junior Utility Set

CONSTRUCTION FEATURES

Non-overloading, backward inclined wheels
Fan housings are of heavy-gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel.
Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed.
Support base provides easy access for electrical wiring and adjustment of the drives.

FAN DESCRIPTION

Qty	Type	Size	Width	Wt (lb.)
1	BCJ	105	SWSI	128

Approximate weight each, includes fan, motor and accessories.

FAN CONFIGURATION

Class	Rotation	Arr.	Disch
I	W/A	10	W/A

FAN PERFORMANCE

CFM	SP (in.wg)	RPM	Oper. BHP
600	4.0	3287	0.64

Temperature: 70°F, Altitude: 0ft

MOTOR DATA

HP	RPM	Volt/Ph/Hz	Encl
1-1/2	3600	230/460/3/60	TEFC

Efficiency: Standard/EPACT

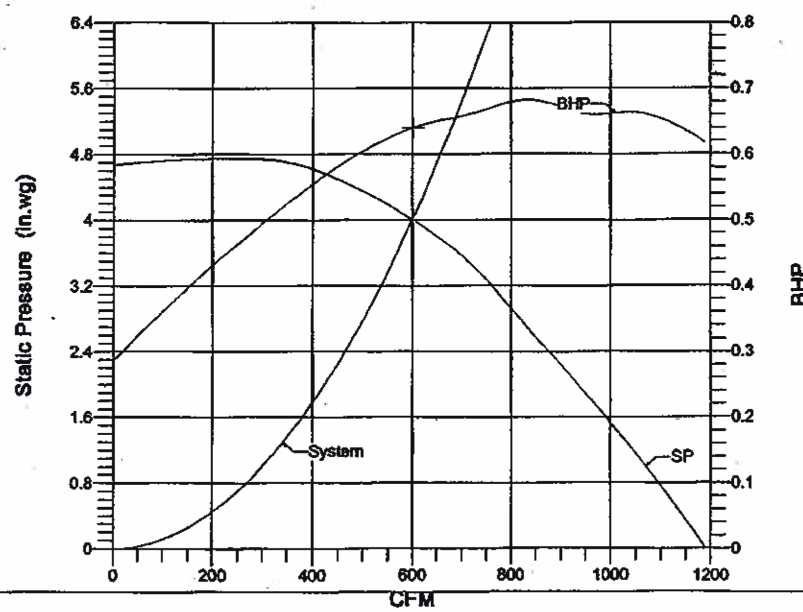
SOUND DATA

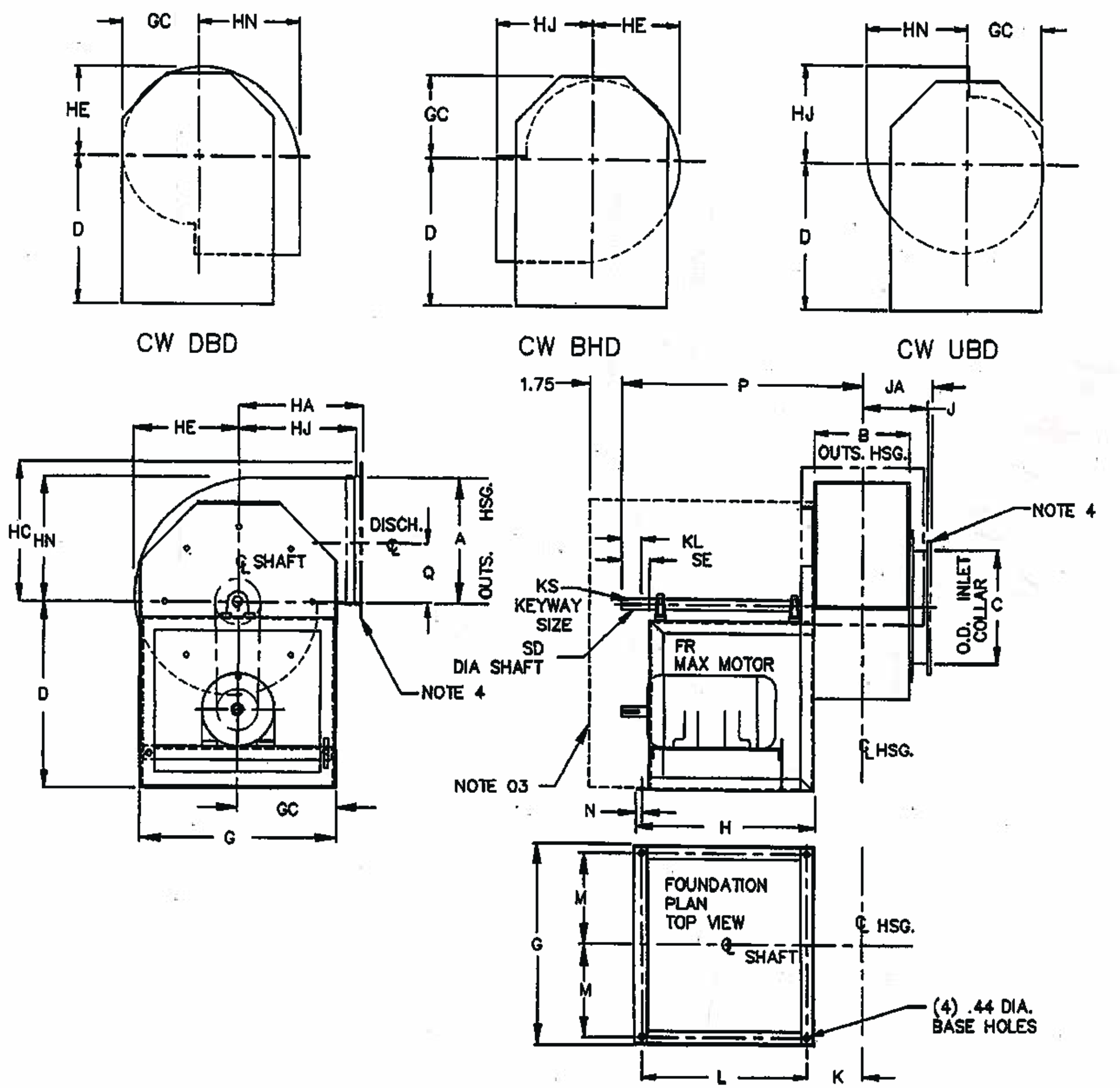
Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
Level at Inlet	93	84	78	77	77	75	72	65	82	68	21

LwA: The overall (single value) fan sound power level in dB re. 10^{-12} Watts, 'A' weighted.
dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

ACCESSORIES INCLUDED

- Access Door - Bolted
- Drain - 3/4"
- Weather Cover - Std Type
- Screen - Inlet, Std Type
- Shutter - Gravity, Std Duty
- Vibration Isolators - RIS
- Special Width Construction
- Disc Switch - Unfused, Not Wired - Type ST (NEMA 1) E5-93
- Extended Lube Lines
- Spare set of belts
- Group 3E Epoxy - Entire Fan
- Mount TCF Motor





90–105 BCJ AND 105 FCJ VENTILATING SET ARR. 10 ROTATABLE

TWIN CITY FAN & BLOWER
MINNEAPOLIS, MINNESOTA 55442

DRAWN 6-13-88
REVISED 1/29/02
DWG NO AC-134850

JOB: Mott Haven Campus H.S.

LOC.

ENG./ARCH.

CERT BY:

S.O. NO. 278443

SIZE	DISCH	ROT.	UNIT NO.
105			EF-1

CFM	SP	RPM	BHP	OV	TS
600	4.0	3287	.64		

ACCESSORIES REQ'D

See data sheets

NOTES
01 HOUSING MATERIAL 14 GA. SIDES & SCROLL
02 CW ROT SHOWN, CCW ROT SIMILAR BUT OPPOSITE
03 WEATHER COVER OPTIONAL
04 OPTIONAL FLANGES:
INLET PER AS363 (BCJ) & AS12403 (FCJ)
DISCHARGE PER AC14986 (BCJ) & AS11741 (FCJ)
05 OPTIONAL INLET SCREENS PER AS15506

	SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
	90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
*	105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
	105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56	4.56	4.69	4.38	2	.25X.13	12	6.75	.56	18.38	4.56	1.00	2.75

Twin City Fan & Blower
A Twin City Fan Company

Fan Tag:	**EF-2**
Job Name:	Mott Haven Bulletin# 58
Job ID:	MAP-10-045-1
Date:	February 24, 2010

BCJ - Backward Inclined Junior Utility Set

CONSTRUCTION FEATURES

Non-overloading, backward inclined wheels
Fan housings are of heavy-gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel.
Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed.
Support base provides easy access for electrical wiring and adjustment of the drives.

FAN DESCRIPTION

Qty	Type	Size	Width	Wt (lb.)
1	BCJ	105	SWSI	100

Approximate weight each, includes fan, motor and accessories.

FAN CONFIGURATION

Class	Rotation	Arr.	Disch
I	W/A	10	W/A

FAN PERFORMANCE

CFM	SP (in.wg)	RPM	Oper. BHP
600	3.0	2953	0.47

Temperature: 70°F, Altitude: 0ft

EF-1 should be 1.1/2 HP

MOTOR DATA

HP	RPM	Volt/Ph/Hz	Encl
1	3600	230/460/3/60	TEFC

Efficiency: Standard/EPACT

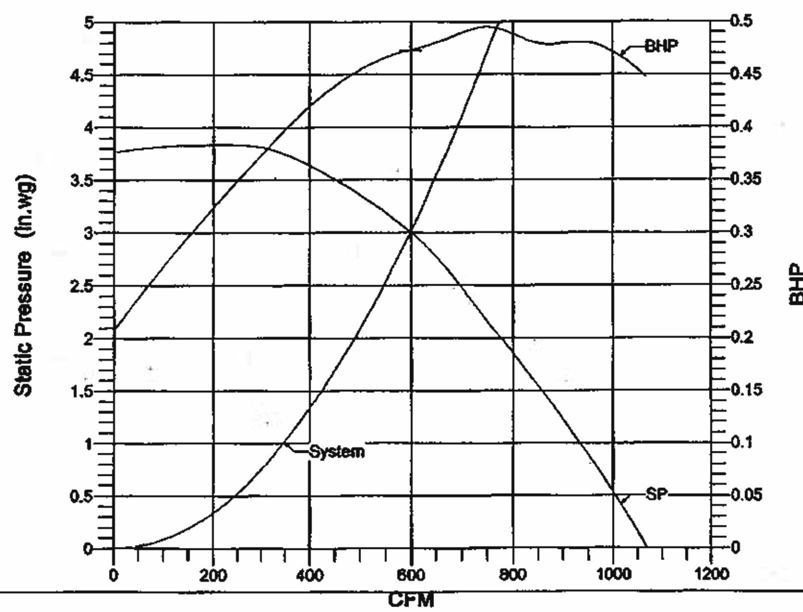
SOUND DATA

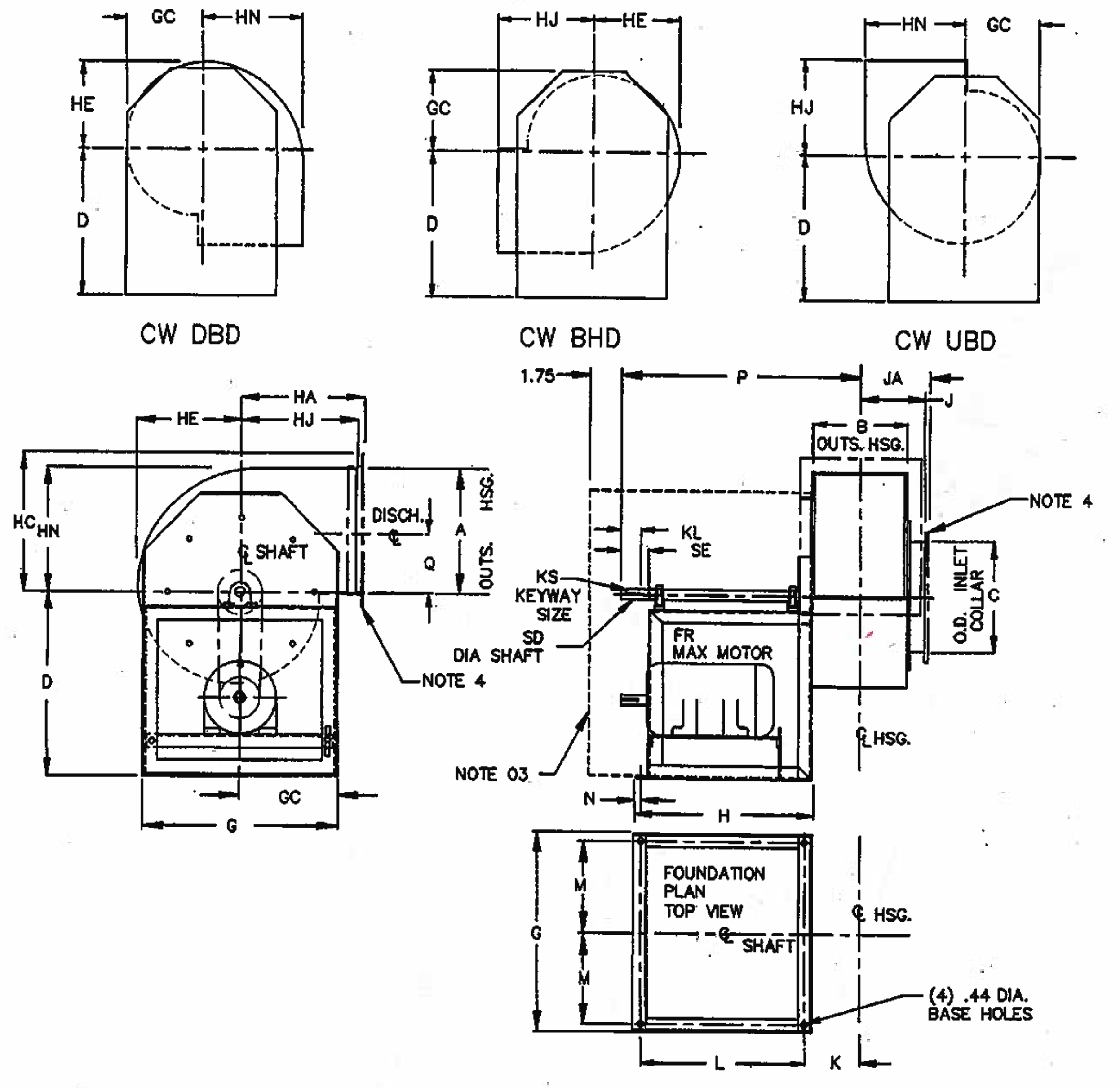
Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
Level at Inlet	88	80	75	75	75	73	70	62	80	66	17.2

LwA: The overall (single value) fan sound power level in dB re. 10^{-12} Watts, 'A' weighted.
dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

ACCESSORIES INCLUDED

Access Door - Bolted
Drain - 3/4"
Weather Cover - Std Type
Screen - Inlet, Std Type
Shutter - Gravity, Std Duty
Vibration Isolators - RIS
Special Width Construction
Disc Switch - Unfused, Not Wired - Type ST (NEMA 1) E5-93
Extended Lube Lines
Spare set of belts
Group 3E Epoxy - Entire Fan
Mount TCF Motor





90–105 BCV AND 105 FCJ VENTILATING SET ARR. 10 ROTATABLE					
TWIN CITY FAN & BLOWER, MINNEAPOLIS, MINNESOTA 55442				DRAWN 6-13-88 / REVISED 1/29/02 / DWG NO AC-134850	
JOB: Mott Haven Campus					
LOC.					
ENG./ARCH.					
CERT BY:					
S.O. NO. 278443					
SIZE 105	DISCH	ROT.		UNIT NO. EF-2	
CFM 600	SP 3.0	RPM 2953	BHP .47	OV	TS
ACCESSORIES REQ'D					
See data sheets.					

NOTES
01 HOUSING MATERIAL 14 GA. SIDES & SCROLL
02 CW ROT SHOWN, CCW ROT SIMILAR BUT OPPOSITE
03 WEATHER COVER OPTIONAL
04 OPTIONAL FLANGES:
INLET PER AS363 (BCJ) & AS12403 (FCJ)
DISCHARGE PER AC14986 (BCJ) & AS11741 (FCJ)
05 OPTIONAL INLET SCREENS PER AS15506

SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
* 105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56	4.56	4.69	4.38	2	.25X.13	12	6.75	.56	18.38	4.56	1.00	2.75

Twin City Fan & Blower

A Twin City Fan Company

Fan Tag:	**EF-3**
Job Name:	Mott Haven Bulletin# 58
Job ID:	MAP-10-045-1
Date:	February 24, 2010

BCJ - Backward Inclined Junior Utility Set

CONSTRUCTION FEATURES

Non-overloading, backward inclined wheels

Fan housings are of heavy-gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel.

Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed.

Support base provides easy access for electrical wiring and adjustment of the drives.

FAN DESCRIPTION

Qty	Type	Size	Width	Wt (lb.)
1	BCJ	105	SWSI	128

Approximate weight each, includes fan, motor and accessories.

FAN CONFIGURATION

Class	Rotation	Arr.	Disch
I	CW	10	W/A

EF-2

Can be 1.0 HP

FAN PERFORMANCE

CFM	SP (in.wg)	RPM	Oper. BHP
600	4.0	3287	0.64

Temperature: 70°F, Altitude: 0ft

MOTOR DATA

HP	RPM	Volt/Ph/Hz	Encl
1-1/2	3600	230/460/3/60	TEFC

Efficiency: Standard/EPACT

SOUND DATA

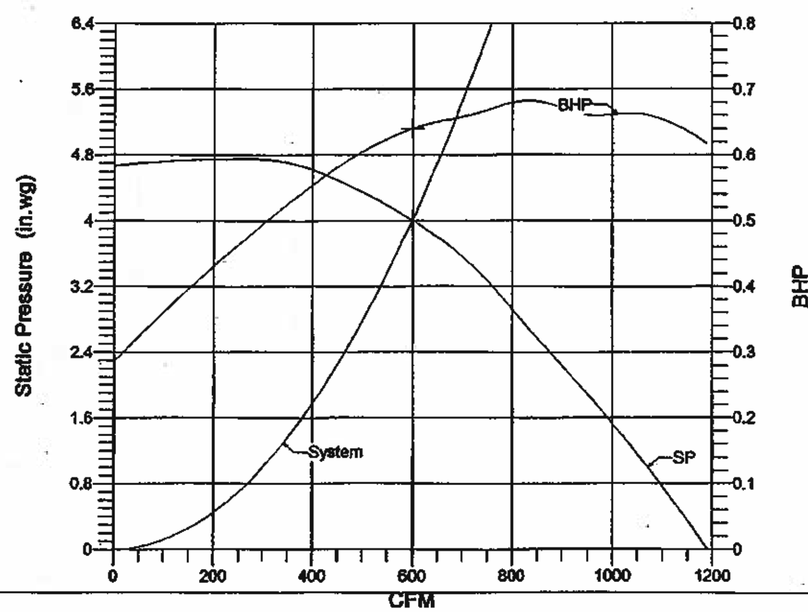
Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
Level at Inlet	93	84	78	77	77	75	72	65	82	68	21

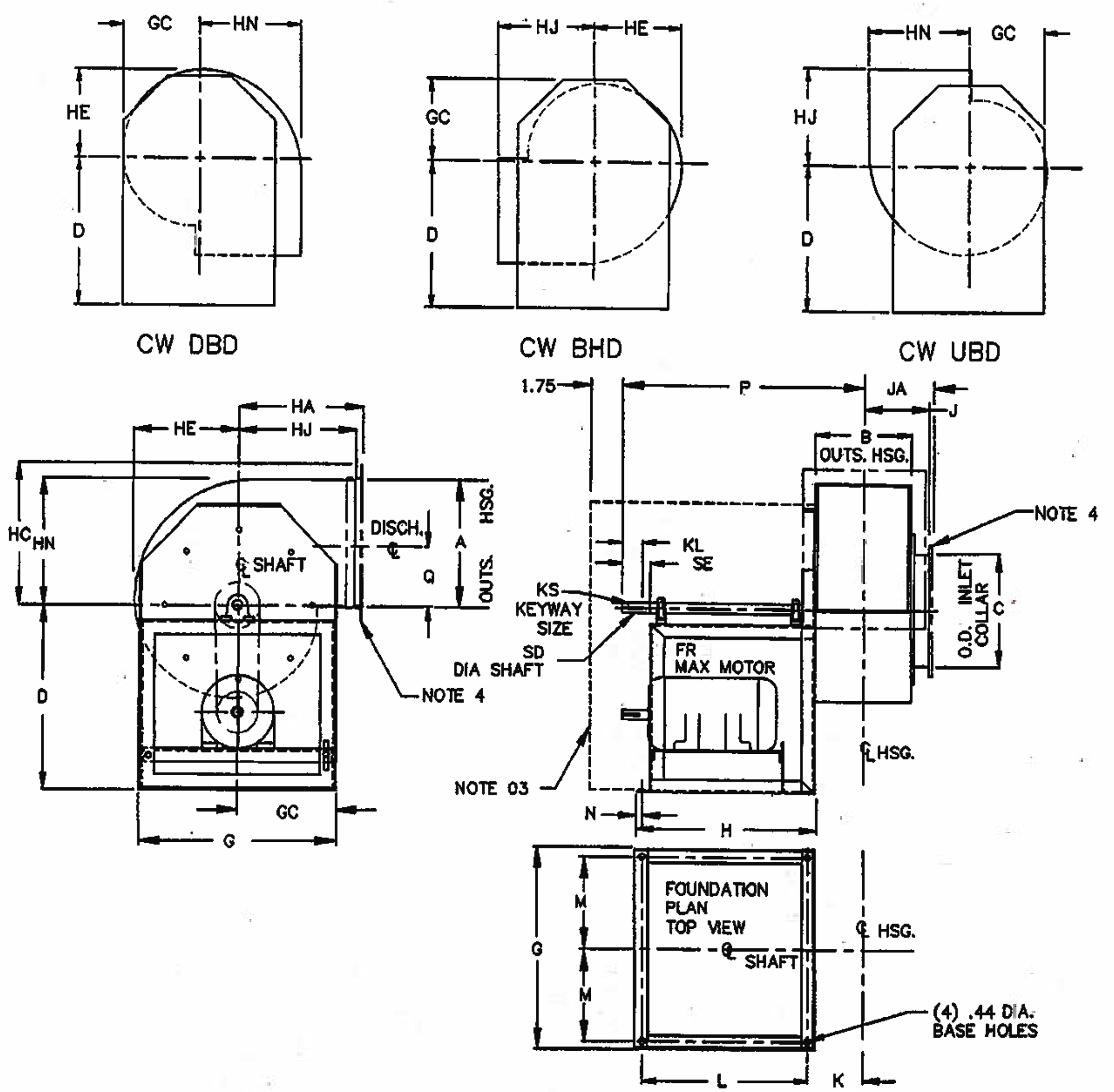
LwA: The overall (single value) fan sound power level in dB re. 10^{-12} Watts, 'A' weighted.

dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

ACCESSORIES INCLUDED

- Access Door - Bolted
- Drain - 3/4"
- Weather Cover - Std Type
- Screen - Inlet, Std Type
- Shutter - Gravity, Std Duty
- Vibration Isolators - RIS
- Special Width Construction
- Disc Switch - Unfused, Not Wired - Type ST (NEMA 1) E5-93
- Extended Lube Lines
- Spare set of belts
- Group 3E Epoxy - Entire Fan
- Mount TCF Motor





90–105 BCV AND 105 FCJ VENTILATING SET ARR. 10 ROTATABLE

TWIN CITY FAN & BLOWER
MINNEAPOLIS, MINNESOTA 55442

DRAWN 6-13-88
REVISED 1/29/02
DWG NO AC-134850

JOB: Mott Haven Campus
LOC.
ENG./ARCH.
CERT BY:
S.O. NO. 278443

SIZE	DISCH	ROT.	UNIT NO.
105			EF-3

CFM	SP	RPM	BHP	OV	TS
600	4.0	3287	.64		

ACCESSORIES REQ'D

See data sheets.

NOTES
01 HOUSING MATERIAL 14 GA. SIDES & SCROLL
02 CW ROT SHOWN, CCW ROT SIMILAR BUT OPPOSITE
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INLET PER AS363 (BCJ) & AS12403 (FCJ)
DISCHARGE PER AC14986 (BCJ) & AS11741 (FCJ)
05 OPTIONAL INLET SCREENS PER AS15506

SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
* 105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56	4.56	4.69	4.38	2	.25X.13	12	6.75	.56	18.38	4.56	1.00	2.75

Twin City Fan & Blower
A Twin City Fan Company

Fan Tag:	**EF-4**
Job Name:	Mott Haven Bulletin# 58
Job ID:	MAP-10-045-1
Date:	February 24, 2010

BCJ - Backward Inclined Junior Utility Set

CONSTRUCTION FEATURES

Non-overloading, backward inclined wheels
Fan housings are of heavy-gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel.
Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed.
Support base provides easy access for electrical wiring and adjustment of the drives.

FAN DESCRIPTION

Qty	Type	Size	Width	Wt (lb.)
1	BCJ	105	SWSI	128

Approximate weight each, includes fan, motor and accessories.

FAN CONFIGURATION

Class	Rotation	Arr.	Disch
I	CW	10	W/A

FAN PERFORMANCE

CFM	SP (in.wg)	RPM	Oper. BHP
600	4.0	3287	0.64

Temperature: 70°F, Altitude: 0ft

MOTOR DATA

HP	RPM	Volt/Ph/Hz	Encl
1-1/2	3600	230/460/3/60	TEFC

Efficiency: Standard/EPACT

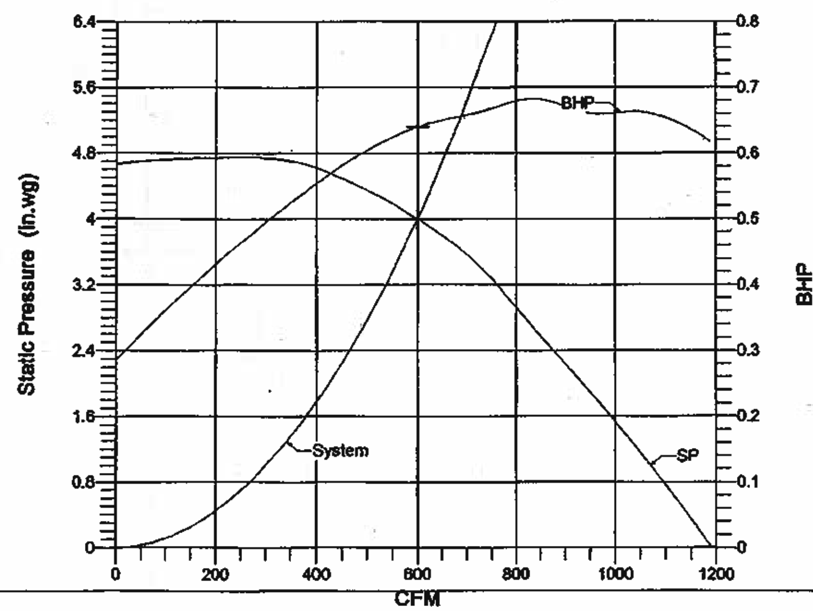
SOUND DATA

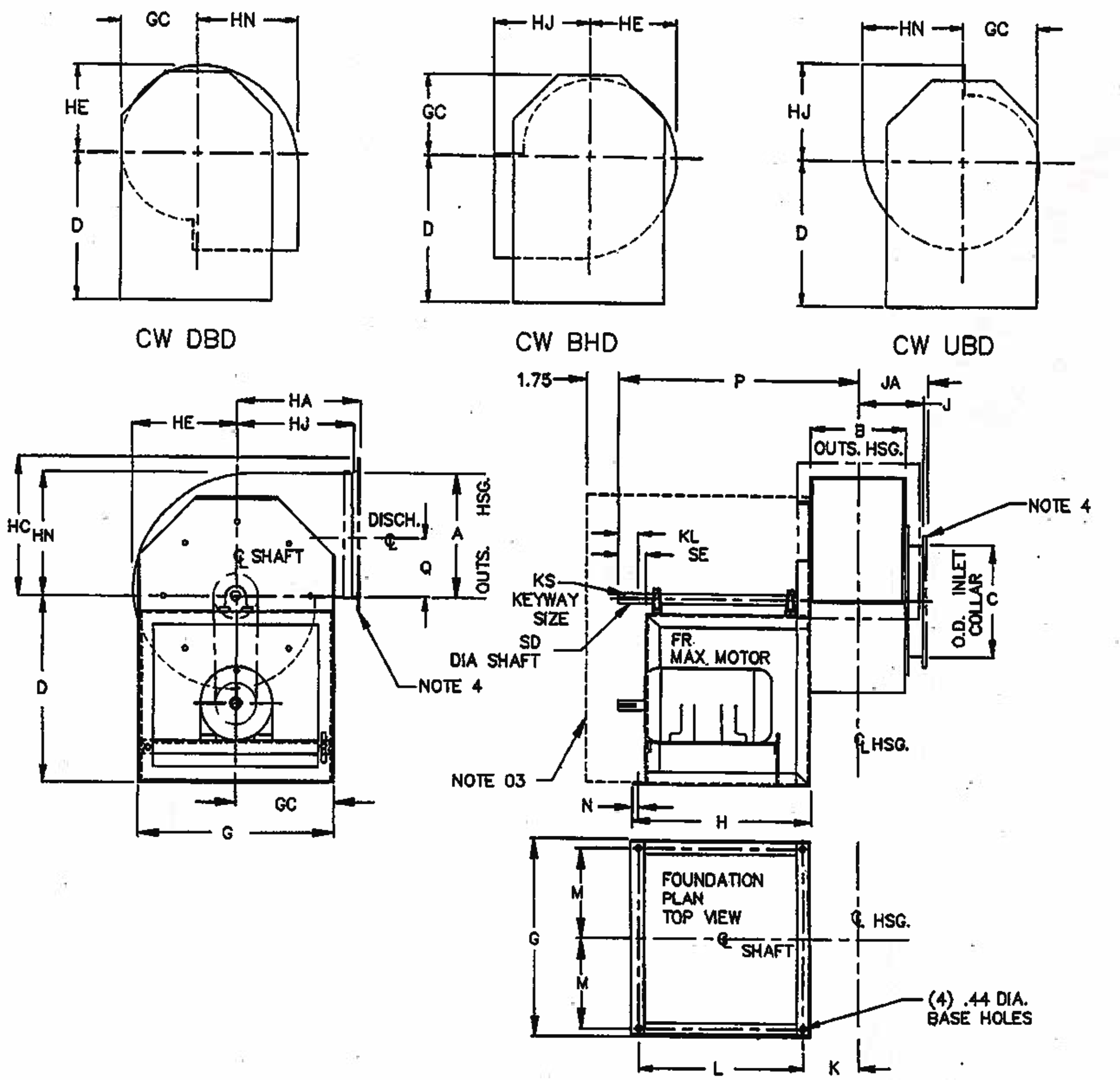
Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
Level at Inlet	93	84	78	77	77	75	72	65	82	68	21

LwA: The overall (single value) fan sound power level in dB re. 10^{-12} Watts, 'A' weighted.
dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

ACCESSORIES INCLUDED

- Access Door - Bolted
- Drain - 3/4"
- Weather Cover - Std Type
- Screen - Inlet, Std Type
- Shutter - Gravity, Std Duty
- Vibration Isolators - RIS
- Special Width Construction
- Disc Switch - Unfused, Not Wired - Type ST (NEMA 1) E5-93
- Extended Lube Lines
- Spare set of belts
- Group 3E Epoxy - Entire Fan
- Mount TCF Motor





90–105 BCV AND 105 FCJ VENTILATING SET ARR. 10 ROTATABLE

TWIN CITY FAN & BLOWER
MINNEAPOLIS, MINNESOTA 55442

DRAWN 6–13–88
REVISED 1/29/02
DWG NO AC–134850

JOB: Mott Haven Campus

LOC.

ENG./ARCH.

CERT BY:

S.O. NO. 278443

SIZE	DISCH	ROT.	UNIT NO.
105			EF-4

CFM	SP	RPM	BHP	OV	TS
600	4.0	3287	.64		

ACCESSORIES REQ'D

See data sheets.

NOTES
01 HOUSING MATERIAL 14 GA. SIDES & SCROLL
02 CW ROT SHOWN, CCW ROT SIMILAR BUT OPPOSITE
03 WEATHER COVER OPTIONAL
04 OPTIONAL FLANGES:
INLET PER AS363 (BCJ) & AS12403 (FCJ)
DISCHARGE PER AC14986 (BCJ) & AS11741 (FCJ)
05 OPTIONAL INLET SCREENS PER AS15506

SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
* 105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56	4.56	4.69	4.38	2	.25X.13	12	6.75	.56	18.38	4.56	1.00	2.75

Twin City Fan & Blower
A Twin City Fan Company

Fan Tag: **EF-5**
Job Name: Mott Haven Bulletin# 58
Job ID: MAP-10-045-1
Date: February 24, 2010

BCJ - Backward Inclined Junior Utility Set

CONSTRUCTION FEATURES

Non-overloading, backward inclined wheels
Fan housings are of heavy-gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel.
Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed.
Support base provides easy access for electrical wiring and adjustment of the drives.

FAN DESCRIPTION

Qty	Type	Size	Width	Wt (lb.)
1	BCJ	105	SWSI	100

Approximate weight each, includes fan, motor and accessories.

FAN CONFIGURATION

Class	Rotation	Arr.	Disch
I	W/A	10	W/A

FAN PERFORMANCE

CFM	SP (in.wg)	RPM	Oper. BHP
600	3.0	2953	0.47

Temperature: 70°F, Altitude: 0ft

EF-4 should be 1 1/2 HP

MOTOR DATA

HP	RPM	Volt/Ph/Hz	Encl
1	3600	230/460/3/60	TEFC

Efficiency: Standard/EPACT

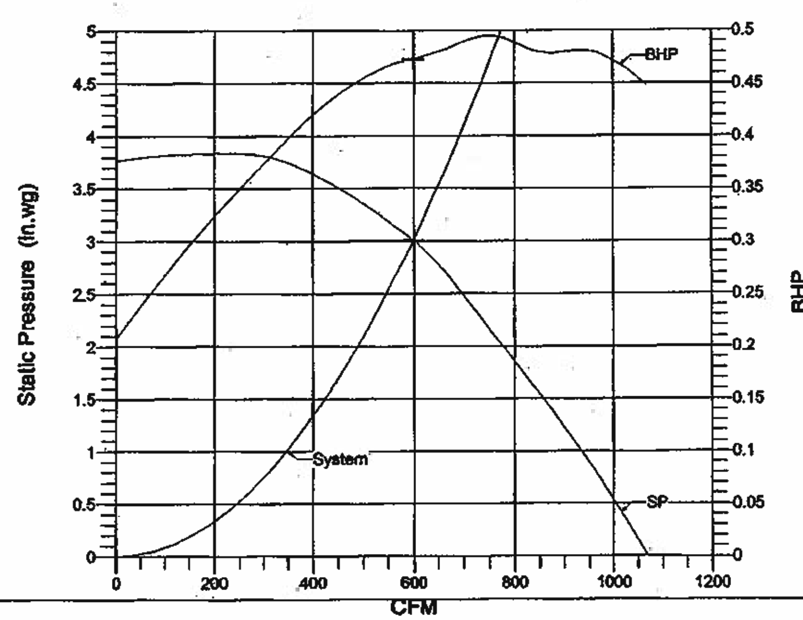
SOUND DATA

Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
Level at Inlet	88	80	75	75	75	73	70	62	80	66	17.2

LwA: The overall (single value) fan sound power level in dB re. 10^{-12} Watts, 'A' weighted.
dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

ACCESSORIES INCLUDED

Access Door - Bolted
Drain - 3/4"
Weather Cover - Std Type
Screen - Inlet, Std Type
Shutter - Gravity, Std Duty
Vibration Isolators - RIS
Special Width Construction
Disc Switch - Unfused, Not Wired - Type ST (NEMA 1) E5-93
Extended Lube Lines
Spare set of belts
Group 3E Epoxy - Entire Fan
Mount TCF Motor



90–105 BCV AND 105 FCJ VENTILATING SET ARR. 10 ROTATABLE

TWIN CITY FAN & BLOWER
MINNEAPOLIS, MINNESOTA 55442

DRAWN 6-13-88
REVISED 1/29/02
DWG NO AC-13485D

JOB: Mott Haven Campus

LOC.

ENG./ARCH.

CERT BY:

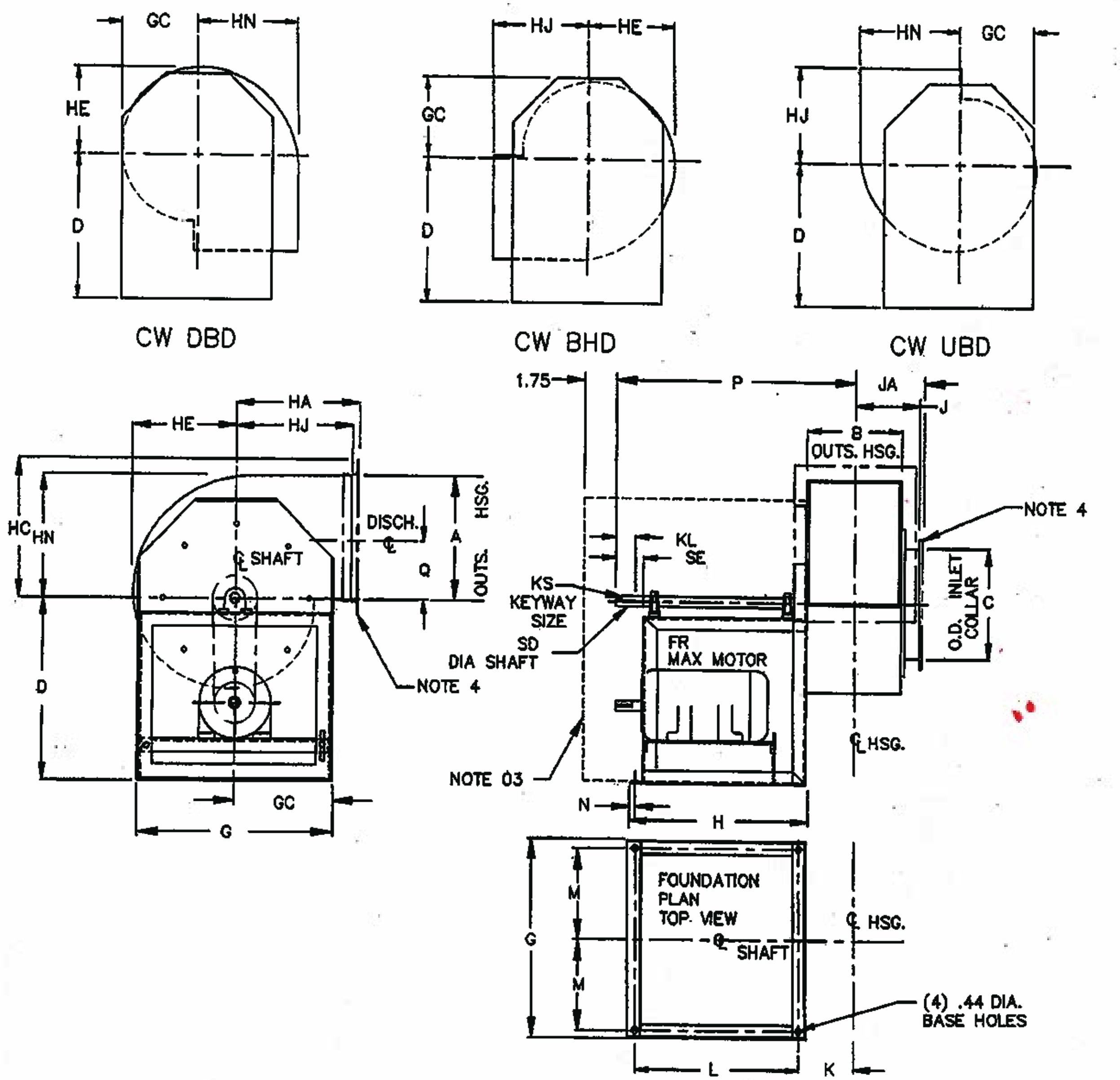
S.O. NO. 278443

SIZE	DISCH	ROT.	UNIT NO.
105			EF-5

CFM	SP	RPM	BHP	OV	TS
600	3.0	2953	.47		

ACCESSORIES REQ'D

See data sheets.



NOTES
01 HOUSING MATERIAL 14 GA. SIDES & SCROLL
02 CW ROT SHOWN, CCW ROT SIMILAR BUT OPPOSITE
03 WEATHER COVER OPTIONAL
04 OPTIONAL FLANGES:
INLET PER AS363 (BCJ) & AS12403 (FCJ)
DISCHARGE PER AC14986 (BCJ) & AS11741 (FCJ)
05 OPTIONAL INLET SCREENS PER AS15506

SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
* 105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56	4.56	4.69	4.36	2	.25X.13	12	6.75	.56	18.38	4.56	1.00	2.75

Twin City Fan & Blower
A Twin City Fan Company

Fan Tag:	**EF-6**
Job Name:	Mott Haven Bulletin# 58
Job ID:	MAP-10-045-1
Date:	February 24, 2010

BCJ - Backward Inclined Junior Utility Set

CONSTRUCTION FEATURES

Non-overloading, backward inclined wheels
Fan housings are of heavy-gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel.
Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed.
Support base provides easy access for electrical wiring and adjustment of the drives.

FAN DESCRIPTION

Qty	Type	Size	Width	Wt (lb.)
1	BCJ	105	SWSI	128

Approximate weight each, includes fan, motor and accessories.

FAN CONFIGURATION

Class	Rotation	Arr.	Disch
I	CW	10	W/A

FAN PERFORMANCE

CFM	SP (in.wg)	RPM	Oper. BHP
600	4.0	3287	0.64

Temperature: 70°F, Altitude: 0ft

EF-5
Can be 1.0 HP

MOTOR DATA

HP	RPM	Volt/Ph/Hz	Encl
1-1/2	3600	230/460/3/60	TEFC

Efficiency: Standard/EPACT

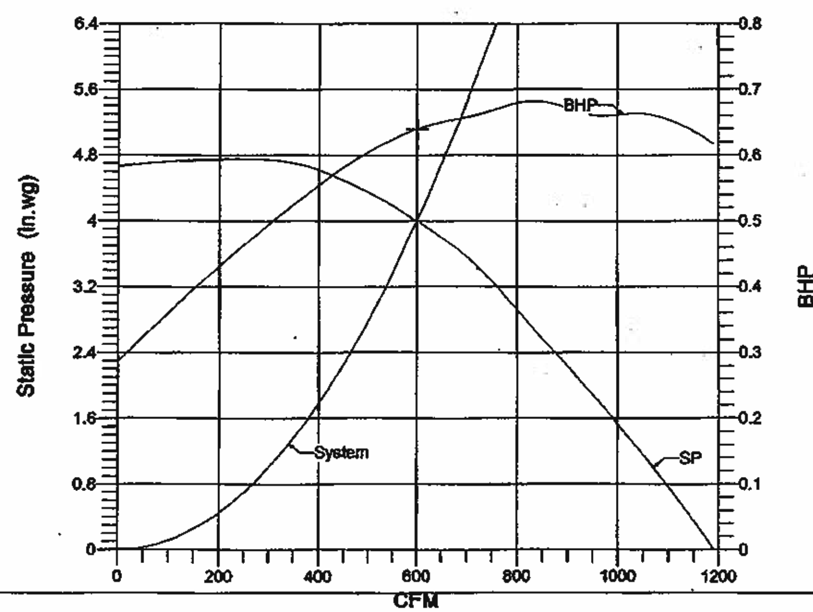
SOUND DATA

Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
Level at Inlet	93	84	78	77	77	75	72	65	82	68	21

LwA: The overall (single value) fan sound power level in dB re. 10^{-12} Watts, 'A' weighted.
dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

ACCESSORIES INCLUDED

- Access Door - Bolted
- Drain - 3/4"
- Weather Cover - Std Type
- Screen - Inlet, Std Type
- Shutter - Gravity, Std Duty
- Vibration Isolators - RIS
- Special Width Construction
- Disc Switch - Unfused, Not Wired - Type ST (NEMA 1) E5-93
- Extended Lube Lines
- Spare set of belts
- Group 3E Epoxy - Entire Fan
- Mount TCF Motor



90-105 BCV AND 105 FCJ VENTILATING SET ARR. 10 ROTATABLE

TWIN CITY FAN & BLOWER
MINNEAPOLIS, MINNESOTA 55442

DRAWN 6-13-88
REVISED 1/29/02
DWG NO AC-134850

JOB: Mott Haven Campus

LOC.

ENG./ARCH.

CERT BY:

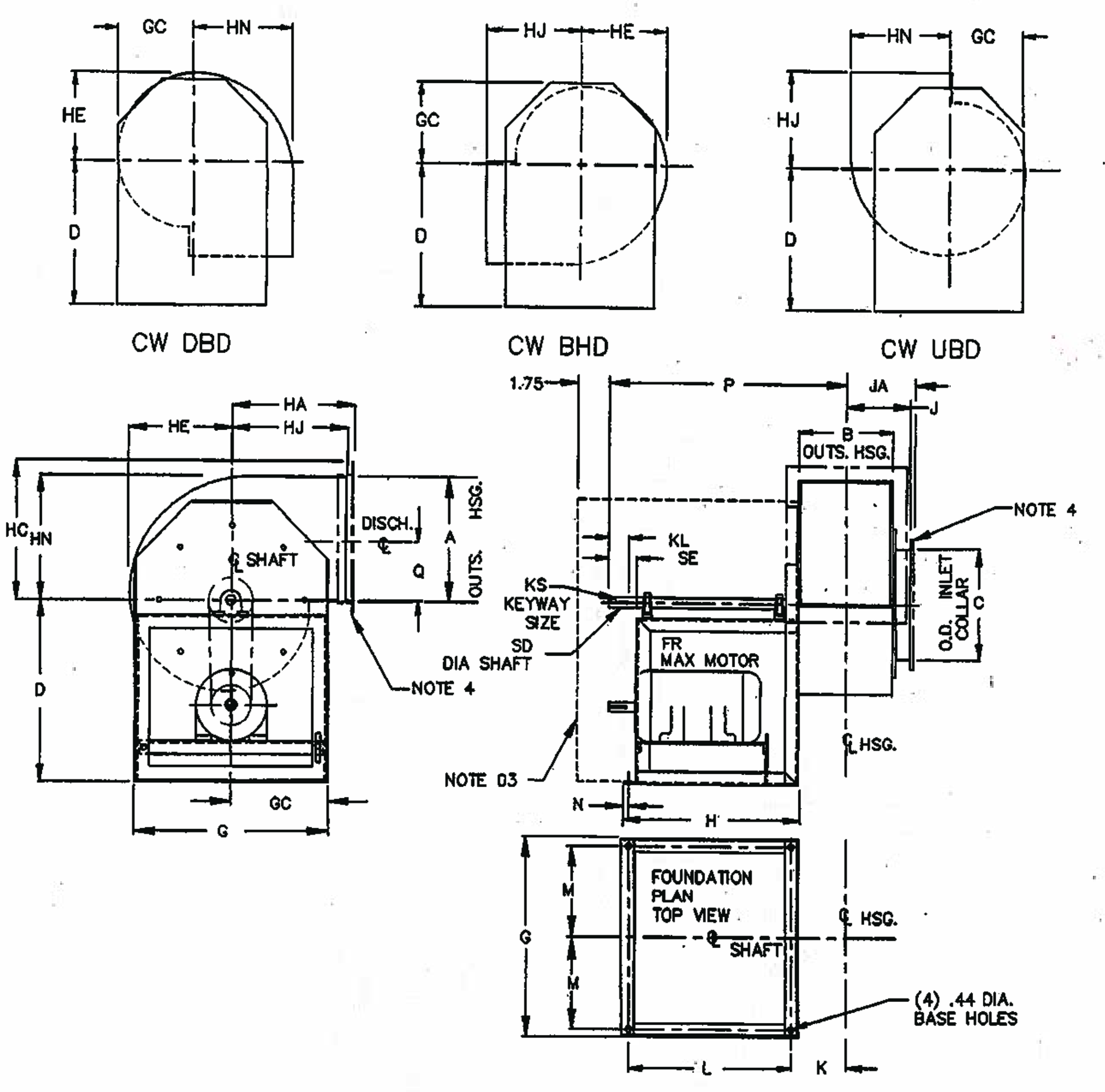
S.O. NO. 278443

SIZE	DISCH	ROT.	UNIT NO.
105			EF-6

CFM	SP	RPM	BHP	OV	TS
600	4.0	3287	.64		

ACCESSORIES REQ'D

See data sheets.



NOTES
01 HOUSING MATERIAL 14 GA. SIDES & SCROLL
02 CW ROT SHOWN, CCW ROT SIMILAR BUT OPPOSITE
03 WEATHER COVER OPTIONAL
04 OPTIONAL FLANGES:
INLET PER AS363 (BCJ) & AS12403 (FCJ)
DISCHARGE PER AC14986 (BCJ) & AS11741 (FCJ)
05 OPTIONAL INLET SCREENS PER AS15506

SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
*105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56	4.56	4.69	4.38	2	.25X.13	12	6.75	.56	18.38	4.56	1.00	2.75

Twin City Fan & Blower
A Twin City Fan Company

Fan Tag:	**Extra Fan**
Job Name:	Mott Haven Bulletin# 58
Job ID:	MAP-10-045-1
Date:	February 24, 2010

BCJ - Backward Inclined Junior Utility Set

CONSTRUCTION FEATURES

Non-overloading, backward inclined wheels
Fan housings are of heavy-gauge, continuously welded construction and are available constructed of steel, aluminum, or stainless steel.
Adjustable pitch V-belt drives are used so capacity corrections can be readily made when needed.
Support base provides easy access for electrical wiring and adjustment of the drives.

FAN DESCRIPTION

Qty	Type	Size	Width	Wt (lb.)
1	BCJ	105	SWSI	128

Approximate weight each, includes fan, motor and accessories.

FAN CONFIGURATION

Class	Rotation	Arr.	Disch
I	CW	10	W/A

FAN PERFORMANCE

CFM	SP (in.wg)	RPM	Oper. BHP
600	4.0	3287	0.64

Temperature: 70°F, Altitude: 0ft

MOTOR DATA

HP	RPM	Volt/Ph/Hz	Encl
1-1/2	3600	230/460/3/60	TEFC

Efficiency: Standard/EPACT

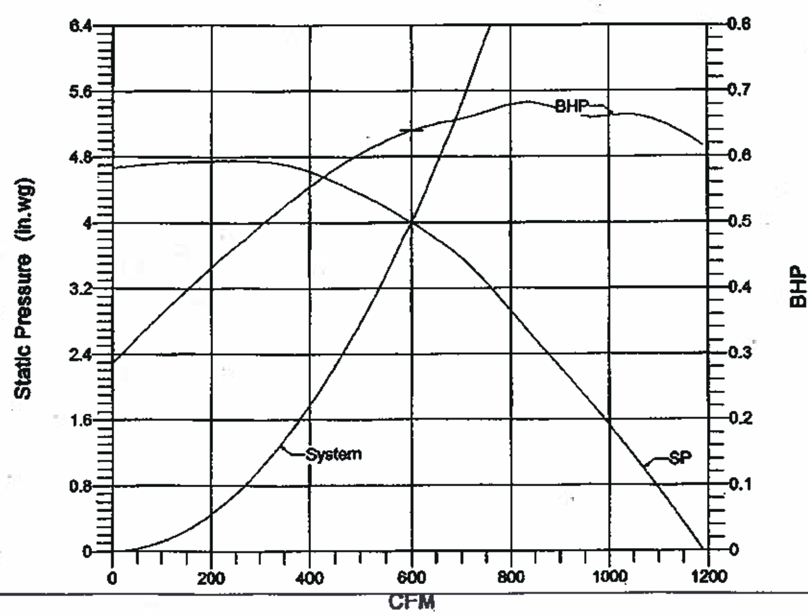
SOUND DATA

Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
Level at Inlet	93	84	78	77	77	75	72	65	82	68	21

LwA: The overall (single value) fan sound power level in dB re. 10^{-12} Watts, 'A' weighted.
dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

ACCESSORIES INCLUDED

- Access Door - Bolted
- Drain - 3/4"
- Weather Cover - Std Type
- Screen - Inlet, Std Type
- Shutter - Gravity, Std Duty
- Vibration Isolators - RIS
- Special Width Construction
- Disc Switch - Unfused, Not Wired - Type ST (NEMA 1) E5-93
- Extended Lube Lines
- Spare set of belts
- Group 3E Epoxy - Entire Fan
- Mount TCF Motor



90-105 BCV AND 105 FCJ VENTILATING SET ARR. 10 ROTATABLE

TWIN CITY FAN & BLOWER
MINNEAPOLIS, MINNESOTA 55442

DRAWN 6-13-88
REVISED 1/29/02
DWG NO AC-134850

JOB: Mott Haven Campus

LOC.

ENG./ARCH.

CERT BY:

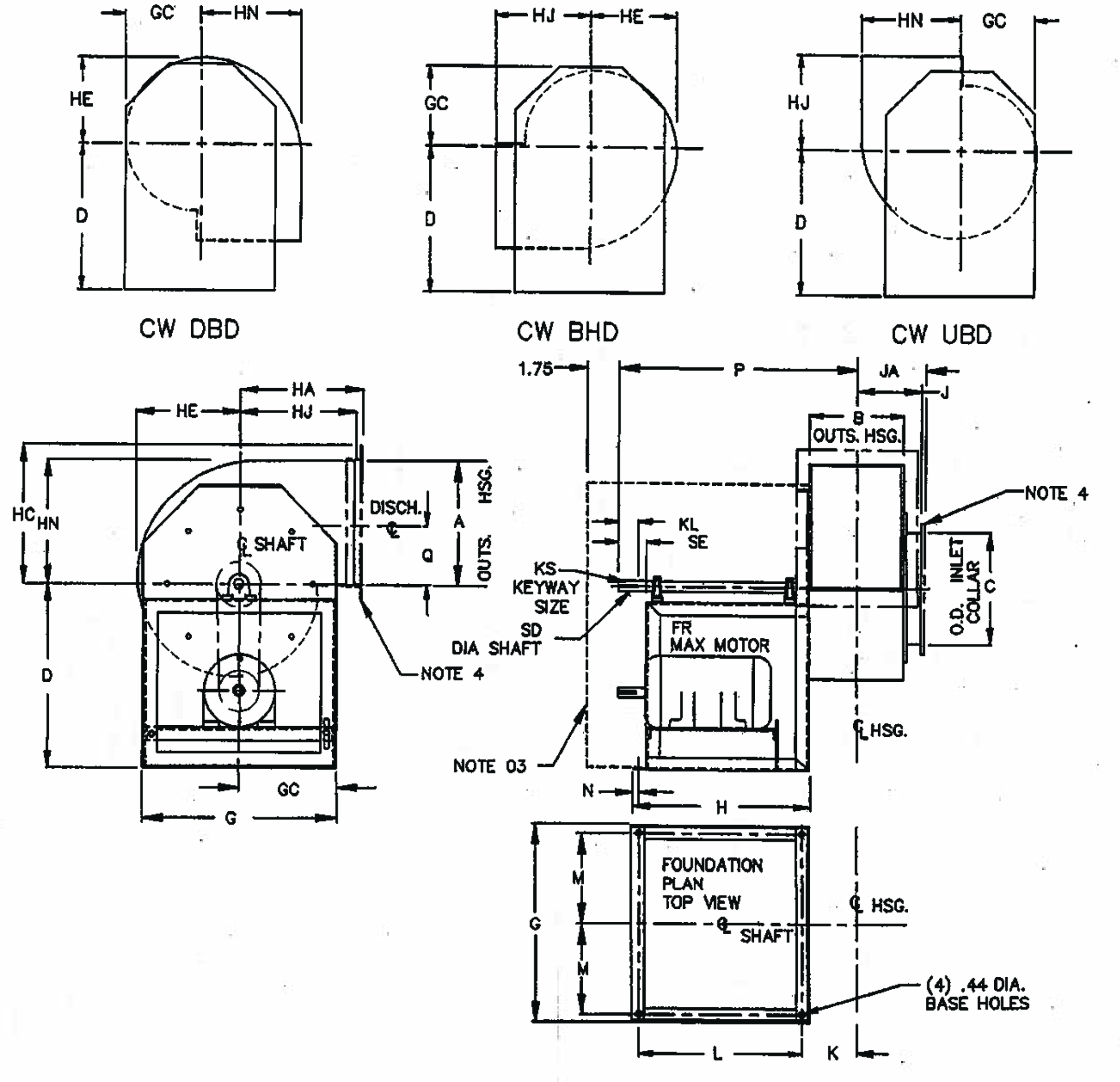
S.O. NO. 278443

SIZE	DISCH	ROT.	UNIT NO.
105			Extra Fan

CFM	SP	RPM	BHP	OV	TS
600	4.0	3287	.64		

ACCESSORIES REQ'D

See data sheets.



NOTES
01 HOUSING MATERIAL 14 GA. SIDES & SCROLL
02 CW ROT SHOWN, CCW ROT SIMILAR BUT OPPOSITE
03 WEATHER COVER OPTIONAL
04 OPTIONAL FLANGES:
INLET PER AS363 (BCJ) & AS12403 (FCJ)
DISCHARGE PER AC14986 (BCJ) & AS11741 (FCJ)
05 OPTIONAL INLET SCREENS PER AS15506

SIZE	A	B	C	D	FR	G	GC	H	HA	HC	HE	HJ	HN	J	JA	K	KL	KS	L	M	N	P	Q	SD	SE
90 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
* 105 BCJ	11.19	8.63	11.13	14.50	145T	16	8	13.44	9.50	12.13	9.06	9	11.13	5.38	5.50	5.19	2	.25X.13	12	6.75	.56	19.19	5.53	1.00	2.75
105 FCJ	12.00	7.00	10.50	14.50	145T	16	8	13.44	9.50	11.56	9.38	9	10.56	4.56	4.69	4.38	2	.25X.13	12	6.75	.56	18.38	4.56	1.00	2.75

AMCA Statements

Tag : EF-1

1. Twin City Fan and Blower certifies that the model BCJ is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B & D: Free or ducted inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. The AMCA licensed air and sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
6. Values shown are for inlet Lwi and LwiA sound power levels for Installation Type B: Free inlet, Ducted outlet.
7. Ratings do not include the effects of duct end correction.
8. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Tag : EF-2

1. Twin City Fan and Blower certifies that the model BCJ is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B & D: Free or ducted inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. The AMCA licensed air and sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
6. Values shown are for inlet Lwi and LwiA sound power levels for Installation Type B: Free inlet, Ducted outlet.
7. Ratings do not include the effects of duct end correction.
8. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Tag : EF-3

1. Twin City Fan and Blower certifies that the model BCJ is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B & D: Free or ducted inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. The AMCA licensed air and sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
6. Values shown are for inlet Lwi and LwiA sound power levels for Installation Type B: Free inlet, Ducted outlet.
7. Ratings do not include the effects of duct end correction.
8. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Tag : EF-4

1. Twin City Fan and Blower certifies that the model BCJ is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B & D: Free or ducted inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. The AMCA licensed air and sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.

AMCA Statements

6. Values shown are for inlet Lwi and LwiA sound power levels for Installation Type B: Free inlet, Ducted outlet.
7. Ratings do not include the effects of duct end correction.
8. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Tag : EF-5

1. Twin City Fan and Blower certifies that the model BCJ is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B & D: Free or ducted inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. The AMCA licensed air and sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
6. Values shown are for inlet Lwi and LwiA sound power levels for Installation Type B: Free inlet, Ducted outlet.
7. Ratings do not include the effects of duct end correction.
8. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

Tag : EF-6

1. Twin City Fan and Blower certifies that the model BCJ is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B & D: Free or ducted inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. The AMCA licensed air and sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
6. Values shown are for inlet Lwi and LwiA sound power levels for Installation Type B: Free inlet, Ducted outlet.
7. Ratings do not include the effects of duct end correction.
8. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

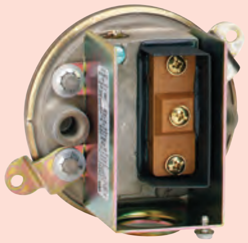
Tag : Extra Fan

1. Twin City Fan and Blower certifies that the model BCJ is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type B & D: Free or ducted inlet, Ducted outlet.
3. Power rating (BHP) does not include transmission losses.
4. The AMCA licensed air and sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.
5. The sound power level ratings shown are in decibels, referred to 10 E-12 watts calculated per AMCA Standard 301.
6. Values shown are for inlet Lwi and LwiA sound power levels for Installation Type B: Free inlet, Ducted outlet.
7. Ratings do not include the effects of duct end correction.
8. The A-weighted sound ratings shown have been calculated per AMCA Standard 301.

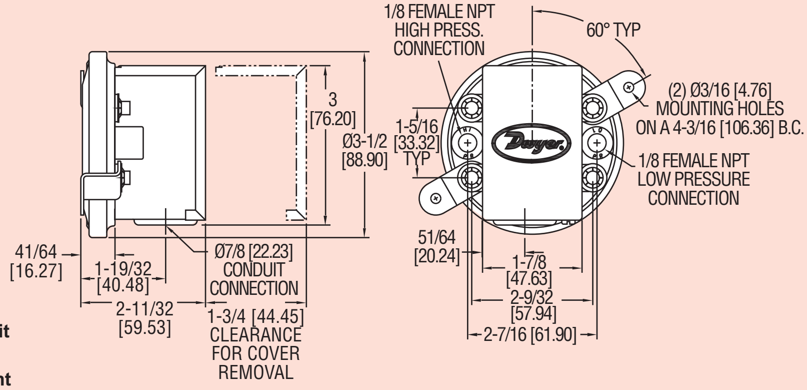
Series 1900

Compact Low Differential Pressure Switches

Set Points from 0.07" to 20" W.C. Repetitive Accuracy within 3%



Series 1910 switch with conduit enclosure off. Shows electric switch and set point adjustment screw located on same side for easy installation.



The Dwyer-engineered force-motion amplifier increases the leverage of diaphragm movement and results in a switch with excellent sensitivity and repeatability.

Our most popular series combines advanced design and precision construction to make these switches able to perform many of the tasks of larger, costlier units. Designed for air conditioning service, they also serve many fluidics, refrigeration, oven and dryer applications. For air and non combustible compatible gases, Series 1900 switches have set points from 0.07 to 20˝ (1.8 to 508 mm) w.c. Set point adjustment is easy with range screw located inside conduit enclosure. Internal location helps prevent tampering. UL, CE, CSA listed, and FM approved.

CAUTION: For use only with air or compatible gases.

Series 1910 Switches
Operating Ranges, Deadbands

Model	Operating Range, Inches W.C.	Approximate Dead Band At Min. Set Point	Approximate Dead Band At Max. Set Point
1910-00	0.07 to 0.15	0.04	0.04
1910-0	0.15 to 0.55	0.10	0.10
1910-1	0.40 to 1.6	0.15	0.16
1910-5	1.40 to 5.5	0.30	0.30
1910-10	3.0 to 11.75	0.40	0.40
1910-20	4.0 to 20.0	0.40	0.50

SPECIAL MODELS & ACCESSORIES

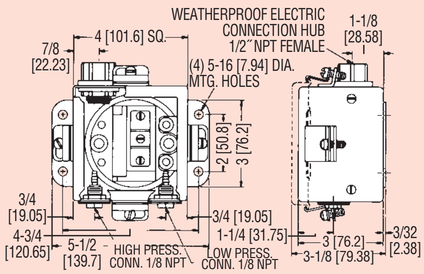
Manual reset Model 1900 MR includes special snap switch which latches on pressure increase above the setpoint. Switch must be manually reset after pressure drops below the setpoint. To order, change base model to 1900 and add MR suffix after range number. Example: 1900-10-MR. Available on -1, -5,-10 or -20 ranges only. Option is not UL, CSA or FM listed

Note: Manual Reset (MR) Option for use only in single positive pressure applications.

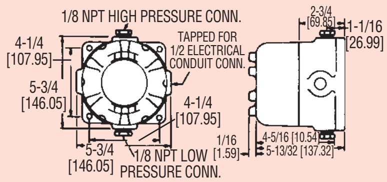
A-399, Duct Pressure Monitor Kit — For use with standard or manual reset model switches. Includes mounting flange, tubing and adapters.
A-329, Street Ell — Brass adapter for applications requiring right angle connections. Two required for differential pressures.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Temperature Limits: -30 to 180°F (-34 to 82.2°C).
Pressure Limits: 45˝ w.c. (11.2 kPa) continuous, 10 psig (68.95 kPa) surge.
Switch Type: Single-pole double-throw (SPDT).
Repeatability: ±3%.
Electrical Rating: 15 A @ 120-480 VAC, 60 Hz. Resistive 1/8 HP @125 VAC, 1/4 HP @ 250 VAC, 60 Hz. Derate to 10 A for operation at high cycle rates.
Electrical Connections: 3 screw type, common, normally open and normally closed.
Process Connections: 1/8˝ female NPT.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Set Point Adjustment: Screw type inside conduit enclosure.
Weight: 1lb, 4.5 oz (581 g).
Agency Approvals: CE , UL, CSA, and FM. Optional-EXPL explosion-proof enclosure does not possess any agency approvals.



Weatherproof Housing
16 ga. steel enclosure with gasketed cover (NEMA 4, IP66) for wet or oily conditions. Withstands 200 hour salt spray test. Wt. 5 lbs. (2.3 kg). Switch must be factory installed. Change 1910 base number to 1911 and add -WP suffix. Example: 1911-1-WP.



Explosion-Proof Housing
Cast iron base with brass cover. Rated Class I, Groups D; Class II, Div. 2, Groups E, F, G; Class III and NEMA 7, 9 NEMA 3. (7 lbs). Switch must be factory installed. Change model to 1911 and add -EXPL suffix. Example: 1911-1-EXPL