

**PROPOSED MTA PARATRANSIT FACILITY
COMMERCE AVENUE
BRONX, NEW YORK**

Interim Remedial Measure Work Plan

NYSDEC Order on Consent Index Number: R2-20150206-62

NYSDEC Site Number: 203074

NYSDEC Spill Case Number: 1405821

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CERTIFICATIONS

I, Daniel Schmidt, certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measure Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law.

NYS Professional Engineer #

Date

Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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LIST OF ACRONYMS

Acronym	Definition
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
AGV	Air Guideline Value
amsl	above mean sea level
bgs	below ground surface
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
Class GA Values	Class GA Standards and Guidance Values
COC	Contaminant of Concern
CP	Commissioner Policy
CP-51	Soil Cleanup Guidance
DER	Department of Environmental Remediation
DER-10	DER Technical Guidance for Site Investigation and Remediation
DSHM	Division of Solid & Hazardous Materials
EC	Engineering Control
ELAP	Environmental Laboratory Approval Program
ESA	Environmental Site Assessment
HASP	Health and Safety Plan
IC	Institutional Control
IRM	Interim Remedial Measures
IRM CCR	Interim Remedial Measures Construction Completion Report
LNAPL	Light, non-aqueous phase liquid
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NPDES	National Pollutant Discharge Elimination System
NYCDCP	New York City Department of City Planning

LIST OF ACRONYMS

Acronym	Definition
NYCRR	New York Codes, Rules and Regulations
NYCEDC	New York City Economic Development Corporation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSWER	Office of Solid Waste and Emergency Response
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PDF	Portable Document Format
PID	Photo-Ionization Detector
PM-10	Particulate less than 10 microns in size
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objection
RCRA	Resource Conservation and Recovery Act
SCGs	Standards, Criteria and Guidance
SCL	Soil Cleanup Level
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SoMP	Soils Management Plan
SOP	Site Operations Plan
SPDES	State Pollutant Discharge Elimination System
SPOTS	Spill Prevention Operations Technology Series
SSDS	Sub-Slab Depressurization System
STARS	Spill Technology and Remediation Series
SWPPP	Stormwater Pollution Prevention Plan
SVOC	Semi-Volatile Organic Compound

LIST OF ACRONYMS

Acronym	Definition
TAGM	Technical and Administrative Guidance Series
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TOGS	Technical & Operational Series
TRC	TRC Engineers, Inc.
TWA	Time Weighted Average
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

On behalf of Environmental Planning & Management Inc. (EPM) and the New York City Economic Development Corporation (NYCEDC), TRC Engineers, Inc. (TRC) has prepared this Interim Remedial Measure (IRM) Work Plan for the Proposed Metropolitan Transportation Association (MTA) Paratransit Facility located on Commerce Avenue, Bronx, New York (hereafter referred to as the “Site”). Figure 1 presents a Site Location Map. The Site is an approximately 94,958 square-foot portion of Block 3838, Lot 60 and is proposed for development as an MTA Paratransit Bus Facility. Figure 2 presents a Site Plan. The remaining portion of Lot 60 is not part of the proposed development and will remain in its current commercial use.

A Phase I Environmental Site Assessment (ESA) was prepared in May 2013 by EPM. The Phase I ESA indicated that the Site was listed in the regulatory database as having a closed-status hazardous material spill reportedly associated with a scrap metal dealer improperly storing vehicles on the project site which lead to gasoline leaking onto the Site. The areas adjacent to the Site were historically occupied by commercial and industrial uses including bulk fuel and coal storage, metal works, and automotive repair. Additionally, an area to the southwest of the Site was once occupied by a manufactured gas plant (MGP) as Bronx Gas and Electric facility (which is also listed as a New York State Brownfield Site, a Major Oil Storage Facility, and Hazardous Material Spill site) and a bulk fuel storage facility known as Cirillo Brothers Petroleum Company.

EPM’s 2013 Phase I ESA also included a review of prior soil and groundwater investigations performed at the Site in 2002 (by TRC) and in 2005 (by GEI Consultants). The prior investigations identified volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals in soil samples collected from the Site at concentrations above comparison criteria. Additionally, VOCs and metals were detected in on-Site groundwater samples; however only iron, manganese, and magnesium were found in concentrations exceeding NYSDEC Technical & Operational Series (TOGS) Class GA Standards and Guidance Values (Class GA Values). A soil vapor sample collected in 2005 contained

concentrations of refrigerants and VOCs at elevated concentrations. Based on the results of the Phase I ESA, a Site Investigation was warranted as described below.

In 2013, EPM completed a Site Investigation on behalf of Hunter Roberts and the NYCEDC consisting of a geophysical survey, the advancement of soil borings and test pits, and collection of soil, groundwater, and soil vapor samples for laboratory analyses. In April 2015, the City of New York (the Site owner) entered into an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) for the Site (Index Number R2-20150206-62; Site Number 203074). Note that the Site is also listed in the NYSDEC Spill Response Program due to a spill (Spill Number 1405821 reported in August 2014) which was reported due to stained surface soils in the immediate area of several dumped 5-gallon plastic buckets that contained an apparent petroleum material.

Summary of the Site Characterization

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Site Characterization Work Plan. The Site Characterization Work Plan consisted of the advancement of soil borings, installation of groundwater monitoring wells, and collection and laboratory analysis of soil, soil vapor, and groundwater samples. The results of the Site Characterization were presented to the NYSDEC in a final report dated January 7, 2016.

Based on the results of the site characterization, SVOCs and metals were detected in soil samples collected from the Site at concentrations above Restricted Residential and Commercial Use Soil Cleanup Objectives (SCOs). PCBs were detected in soil above Commercial Use SCOs at two boring locations. There were no VOCs detected in soil samples above Restricted Residential Use SCOs.

The results of the groundwater sampling indicated that one VOC (p-isopropyltoluene) was detected in one groundwater sample at a concentration marginally above the Class GA Value. Several metals (iron, magnesium, manganese, and sodium) were detected in groundwater samples above Class GA Values. SVOCs, PCBs, and pesticides were not detected in any groundwater samples collected in 2015. The data collected from the upgradient off-Site wells does not indicate the potential for an upgradient contaminant source in groundwater, and the data collected from the on-Site permanent wells does not indicate that the Site is a source of groundwater impacts.

Petroleum and chlorinated-solvent related compounds were detected in soil vapor samples; however, the results for soil vapor samples collected from the upgradient off-Site locations along Commerce Avenue do not provide evidence of an off-Site source of soil vapor impacts to the Site. There appears to be a localized area on-Site with soil vapor impacted with tetrachloroethene (PCE) and trichloroethene (TCE).

Previous Site investigations have identified fill material throughout the Site between surface grade and depths of approximately 15 feet below ground surface (bgs). Bedrock was not encountered during previous investigations. Groundwater was measured at depths ranging from approximately 7 feet bgs to approximately 14 feet bgs. Based on calculated groundwater surface elevations, groundwater beneath the Site flows towards the southeast in the overburden aquifer.

Summary of the IRMs

The following IRMs are proposed for the Site:

1. The soil between grade and approximately 9 feet bgs in the vicinity of historic borings that exhibited elevated lead concentrations on the northwestern portion of the Site will be excavated and removed from the Site due to the presence of dissolved lead in groundwater downgradient of the elevated lead soils area at an order of magnitude above the groundwater standard. Work will be performed in accordance with applicable Federal, State, and local hazardous waste regulations. Additionally, this area overlaps with an area of stained surface soils related to the open spill case assigned to the Site; therefore, the stained surface soils area and lead-contaminated soil area will be remediated in one excavation area (refer to Figure 6 for the excavation area). Note that there is no excavation planned in the footprint of the new building.
2. Permanent groundwater monitoring wells located on-Site and off-Site will be decommissioned in accordance with NYSDEC Commissioner Policy 43 (CP-43) during the Site redevelopment phase of the work.
3. Collection and analysis of post-excavation end-point samples from the petroleum-contaminated soil excavation and the area which exhibited elevated lead concentrations on the northwestern portion of the Site to document post-IRM soil conditions. Post-

excavation soil samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and lead.

4. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.
5. Construction, operation and maintenance of an active sub-slab depressurization system (SSDS) for the new Paratransit building. The SSDS will go into operation immediately upon the building being put into service.
6. Construction and maintenance of an engineered composite cover system consisting of asphalt or concrete pavement, concrete building slabs, and a minimum of one foot of environmentally clean fill over a demarcation layer meeting the requirements of 6 NYCRR Part 375-6.7(d) in landscaped areas to prevent human exposure to residual contaminated soils/fill remaining beneath the Site.
7. Import of materials to be used for backfill and cover in compliance with: (1) NYSDEC requirements and (2) all Federal, State and local rules and regulations for handling and transport of material. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to backfill the excavation areas and establish the designed grades at the Site. The site will be re-graded to accommodate installation of a cover system as described in IRM Number 6 above.
8. Recording an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination at the Site.
9. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Site and details the steps and media-specific requirements necessary to ensure the institutional and/or engineering controls identified in this IRM Work Plan remain in place and effective, (2) a Monitoring Plan to assess the performance and effectiveness of the remedy, and (3) an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system(s).

The IRMs will be performed at the Site in accordance with this NYSDEC-approved IRM Work Plan. Implementation of the IRM, including all deviations from the IRM Work Plan, will be documented in the IRM Construction Completion Report (CCR).

1.0 INTRODUCTION

The City of New York entered into an Order on Consent (Index Number R2-20150206-62; Site Number 203074) with the New York State Department of Environmental Conservation (NYSDEC) in April 2015, to investigate and remediate an approximately 94,958 square-foot portion of Block 3838, Lot 60 located on Commerce Avenue in the Bronx, New York (the “Site”). The New York City Economic Development Corporation (NYCEDC) will construct a Metropolitan Transportation Authority (MTA) Paratransit Facility on the Site.

This Interim Remedial Measure (IRM) Work Plan summarizes the nature and extent of contamination as determined from data gathered during investigations performed between June 2013 and July 2015 (as summarized in the Site Characterization Findings Report prepared by EPM dated July 12, 2003 and the Site Characterization Findings Report prepared by EPM dated January 7, 2016), and presents the proposed IRMs. A formal Remedial Design document will not be prepared. The actions described in this document are consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. Additional plans (i.e., Contractor’s Construction Quality Assurance Project Plan and Site Operations Plan) will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The investigations for this Site did not identify fish and wildlife resources.

1.1 SITE LOCATION AND DESCRIPTION

The Site is located in Bronx County, New York and is identified as a portion of Block 3838, Lot 60 on the New York City Tax Map. A United States Geological Survey (USGS) topographical quadrangle (Figure 1) shows the Site location. The Site is bounded by Commerce Avenue to the northwest, an industrial building to the northeast, Westchester Creek to the southeast, and a parking lot/industrial building (a fuel oil corporation) to the southwest.

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The IRMs to be performed under the IRM Work Plan are intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed

redevelopment plan and end use is described here to provide the basis for this assessment. However, the IRMs contemplated under this IRM Work Plan may be implemented independent of the proposed redevelopment plan.

The proposed Paratransit Facility will comprise an approximate 5,000 square-foot building that will include a training room, administrative offices, and other back of house areas. The remainder of the Site will be completed as paved parking for approximately 150 paratransit vehicles, with small planting areas possible within the sidewalk area along Commerce Avenue. It is expected that the new facility will serve to receive new vehicles from manufacturers and retired vehicles from private operators for temporary storage on-Site until disbursed to new operators/owners, to perform asset recovery of selected vehicle equipment, and to train drivers and maintainers in the operation and maintenance of the vehicles. Upon completion, the facility will be turned over and operated by the MTA including responsibility for compliance with the Site-Specific Site Management Plan (SMP).

1.3 DESCRIPTION OF SURROUNDING PROPERTY

According to zoning information provided by the New York City Department of City Planning (NYCDCP), the Site is located within an “M1-1” manufacturing district. Neither “E” nor “D” restrictive declarations are associated with the Site or adjoining properties. An E-Designation is a NYC zoning map designation that indicates the presence of an environmental requirement pertaining to potential Hazardous Materials Contamination, Window/Wall Noise Attenuation, or Air Quality impacts on a particular tax lot. A “D” restrictive declaration places conditions on the future use and development of land.

The area northwest of the Site across Commerce Avenue consists of commercial buildings (including Concept 2000 (a stereo installation company) and a truck rental facility) followed by a public park with baseball fields (the Castle Hill Little League Field). Further northeast of the Site is a W.B. Mason warehouse facility and a manufacturer of steel doors (Atlantic Rolling Steel Doors). West and southwest of the Site across Zerega Avenue is an MTA bus depot facility, a Consolidated Bus Transit facility, and a tile and marble corporation. As noted above, Westchester Creek is present southeast of the Site.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Site Characterization Work Plan dated May 21, 2015. The investigation was completed in June 2015. The Site Characterization Findings Report was initially submitted to NYSDEC on August 7, 2015; and based on comments received from the NYSDEC on November 18, 2015, the revised Site Characterization Findings Report was submitted to the NYSDEC on January 7, 2016.

2.1 SUMMARY OF SITE CHARACTERIZATION PERFORMED

In June 2015, EPM completed a site characterization investigation on the Site, which consisted of the advancement of ten (10) soil borings, the advancement of six (6) temporary soil vapor probes, installation of eight (8) permanent groundwater monitoring wells, the collection of soil, soil vapor and groundwater samples for laboratory analysis, and the surveying and gauging of monitoring wells to determine groundwater surface elevations and flow direction. The objectives of the site characterization were to further characterize on-Site soil, groundwater, and soil vapor conditions; to investigate soil vapor and groundwater conditions off-Site along Commerce Avenue; and to determine overburden aquifer flow patterns. Figure 3 presents the soil sample locations containing elevated contaminant of concern (COC) concentrations, and the groundwater sampling results are presented on Figure 4. Figure 5 presents soil vapor sample locations containing elevated volatile organic compound (VOC) concentrations above comparison criteria.

The results of the Site Characterization indicated the following:

Urban fill was encountered in all of the soil borings to depths of up to 15 feet below grade. Based on test pits performed during the prior investigation, the fill includes construction and demolition debris as well as buried automobile parts. Photoionization detector (PID) readings on recovered soils ranged from non-detect to a maximum of 27.2 parts per million (ppm) at boring SB-7; however, laboratory analysis on soil samples collected from boring SB-7 did not identify any petroleum or solvent impacts at this location. Slight petroleum-like odors were observed at boring locations SB-5 and SB-10. No free-phase petroleum was observed in any of the groundwater monitoring wells. The overburden aquifer flows in a southeast direction

across the site towards Westchester Creek based on measurements collected from the permanent wells.

Soil Analysis

- No VOCs were detected in any of the soil samples at concentrations exceeding Restricted Residential SCOs. With exception of acetone, a common laboratory-introduced contaminant, only two samples contained VOCs above Unrestricted SCOs. Xylenes were detected in samples SB-7(1-1.5') and SB-10(13-15') at concentrations of 0.29 ppm and 1.2 ppm, respectively, which exceed the Unrestricted SCO for xylenes of 0.26 ppm, but below the Restricted Residential SCO of 100 ppm. Soil sample SB-10(13-15') also contained benzene at 0.12 ppm and ethylbenzene at 1.1 ppm, exceeding the respective Unrestricted SCOs for these compounds of 0.06 ppm and 1.0 ppm, but below the Restricted Residential SCOs for benzene of 4.8 ppm and for ethylbenzene of 41 ppm. All results for TCE in the soil samples were non-detect. The maximum concentration of PCE detected in the soil samples was 0.0055 ppm in sample SB-9(9-12'), which is below the Unrestricted Use SCO for PCE of 1.3 ppm, with the majority of PCE results at non-detectable levels.
- The majority of soil samples collected across the site contained one or more metals above Commercial SCOs, including lead, copper, barium, mercury, nickel, and arsenic. SVOCs, primarily polycyclic aromatic hydrocarbons (PAHs), were also detected in many of the soil samples at concentrations above their respective Restricted Residential or Commercial SCOs.
- PCBs and pesticides were detected in the majority of soil samples above their respective Unrestricted SCOs. No pesticides were detected above Restricted Residential SCOs. Total PCBs were detected in sample SB-8(0-0.5') at 3.8 ppm, and in sample SB-9(0-0.5') at 1.24 ppm, exceeding the Commercial SCO for PCBs of 1.0 ppm.

Groundwater Analysis

- No SVOCs, PCBs, or pesticides were detected in any of the groundwater samples collected from the permanent wells at concentrations above Class GA Values, with the majority of results below laboratory detection limits. One VOC, p-isopropyltoluene, was detected in off-Site monitoring well MW-8 at a concentration of 6.0 parts per billion (ppb), slightly exceeding its Class GA Value of 5 ppb. No other VOCs were detected in the groundwater samples above Class GA Values, with the majority of results below laboratory detection limits. All results for PCE and TCE in onsite and offsite groundwater were at non-detectable levels. The VOC carbon disulfide was detected in wells MW-5 and MW-6 at concentrations of 1.1 ppb and 1.3 ppb, respectively. There is no Class GA Value for carbon disulfide. Well MW-7 contained the VOC 1,2,4,5-tetramethylbenzene at 2.6 ppb, which is below the Class GA Value for this compound of 5 ppb.
- The only metals detected above Class GA values in groundwater collected from the permanent wells were iron, magnesium, manganese, and sodium. Several additional metals and SVOCs were detected in the grab groundwater samples collected from the temporary piezometers in 2013. It is apparent based on the results from the permanent wells that the elevated metals and SVOCs in the prior samples were likely due to suspended solids in the grab samples.

Soil Vapor Results

- PCE was detected in onsite soil vapor sample SS-V2 at a concentration of 130 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), above the NYSDOH guidance value of 100 $\mu\text{g}/\text{m}^3$. PCE was also detected in onsite sample SS-V1 at a concentration of 92.9 $\mu\text{g}/\text{m}^3$. No other VOCs were detected above their respective NYSDOH guidance values in the onsite or offsite soil vapor samples collected in 2015. In 2013, TCE and PCE were detected in soil vapor sample SV-2 at concentrations of 240 $\mu\text{g}/\text{m}^3$ and 28,000 $\mu\text{g}/\text{m}^3$, respectively. PCE was also detected in 2013 at a concentration of 239 $\mu\text{g}/\text{m}^3$ in sample SV-1.

2.2 SITE HISTORY

2.2.1 Phase I ESA and Site Investigation Findings Reports

A Phase I Environmental Site Assessment (Phase I ESA) and a Site Investigation Findings Report have been prepared for this Site by EPM on behalf of Hunter Roberts and the NYCEDC. Presented below are brief summaries of the results of these investigations.

Phase I Environmental Site Assessment

In May 2013, EPM completed a Phase I ESA for the Site. According to the Phase I ESA, the Site was listed as having a closed-status hazardous material spill. The spill was reported due to leaking gasoline on the Site which resulted from the occupant's (a scrap metal dealer) improper storage of vehicles. Note that a spill case was subsequently reported by NYSDEC in August 2014 (Spill Number 1405821) due to oil observed on the ground surface in an area where five gallon containers of waste oil were dumped on the Site.

The areas adjacent to the Site were historically occupied by commercial and industrial uses including bulk fuel and coal storage, metal works, and automotive repair. Additionally, an area to the southwest of the Site was once occupied by a manufactured gas plant (MGP) facility as Bronx Gas and Electric facility (which is also listed as a New York State Brownfield Site, a Major Oil Storage Facility, and Hazardous Material Spill site) and a bulk fuel storage facility known as Cirillo Brothers Petroleum Company.

EPM's 2013 Phase I ESA included a review of prior soil and groundwater investigations performed at the Site in 2002 (by TRC) and in 2005 (by GEI Consultants). The prior investigations identified VOCs, SVOCs, PCBs, and metals in soil samples collected from the Site above comparison criteria. Additionally, VOCs and metals were detected in on-Site groundwater samples; however, only iron, manganese, and magnesium were found in concentrations exceeding NYSDEC Class GA values. A prior soil vapor sample collected in 2005 contained concentrations of refrigerants and VOCs at elevated concentrations. Based on the results of the Phase I ESA, a Site Investigation was warranted as described below.

Site Investigation (2013)

In July 2013, EPM completed a Site Investigation for Hunter Roberts and the NYCEDC. Field activities completed as part of the Site Investigation consisted of a geophysical survey, the advancement of soil borings and test pits, and collection and laboratory analysis of soil vapor, soil, and groundwater samples.

The results of the Site Investigation indicated the following:

- A geophysical was completed in the vicinity of the proposed Paratransit Facility (refer to Figure 2) to investigate for buried tanks and to clear the soil boring locations of utilities and obstructions. The remainder of the Site was inaccessible due to overgrown vegetation. There were no anomalies indicative of buried tanks observed in the areas investigated. However, there was significant interference to the instrumentation due to the presence of scattered buried debris at the Site.
- Soils encountered in the borings and test pits generally consisted of urban fill with grey to dark brown sand and silt, and included glass, brick, masonry, plastic, textile, and automotive parts. SVOCs and metals were detected at concentrations exceeding the NYSDEC Part 375 Commercial Use SCOs in the majority of surface and subsurface soil samples collected from the Site. PCBs, pesticides, and the VOCs 1,2,4-trimethylbenzene and total xylenes were detected at concentrations exceeding Part 375 Unrestricted Use SCOs.
- SVOCs and metals were detected in the groundwater samples that were collected from temporary piezometers at concentrations above NYSDEC Class GA Values. There were no VOCs detected in the groundwater samples above Class GA Values.
- The VOCs TCE and PCE were detected in one (1) soil vapor sample at concentrations of 240 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and 28,000 $\mu\text{g}/\text{m}^3$, respectively. PCE was also detected at a concentration of 239 $\mu\text{g}/\text{m}^3$ in one (1) other soil vapor sample collected on the Site. Methane was not detected in any of the soil vapor samples.

2.3 GEOLOGICAL CONDITIONS

Information regarding topography, geology, Site soils, and hydrology was obtained from Site investigation activities and is summarized below.

2.3.1 Topography

The topography of the Site area slopes downwards towards the south toward Westchester Creek. According to the USGS 7.5-Minute Flushing, N.Y. Quadrangle Map dated 1967 and revised in 2013 (refer to Figure 1), the elevation of the Site is approximately 6 to 12 feet above mean sea level (amsl).

2.3.2 Geology

The geology of Bronx County consists of unconsolidated glacial deposits overlying crystalline bedrock. Based on available literature (Buxton, Soren, Posner, and Shernoff, 1981), the subsurface geology of the Site likely includes the following formations: Pleistocene upper glacial deposits, Gardiners Clay, Jameco Gravel, Cretaceous Raritan Formation consisting of sands and clays, and crystalline bedrock. The depth to crystalline bedrock for the area is estimated to be greater than approximately 30 feet below ground surface (bgs). Bedrock was not encountered during the Site investigations.

2.3.3 Soils

During the completion of previous investigations at the Site, fill material was observed throughout the Site between surface grade and depths of approximately 15 feet bgs. The historic fill generally consisted of grey to dark brown sand and silt, and included glass, brick, masonry, plastic and textile. The fill is underlain by medium to fine grained sand with silt and gravel.

2.3.4 Hydrogeology

The nearest surface water body is Westchester Creek, which is approximately 250 feet east/southeast of the Site. On July 17, 2015, groundwater was measured at depths ranging from approximately 7 feet bgs at MW-8 to approximately 14 feet bgs at MW-4 and MW-5. Based on calculated groundwater surface elevations, groundwater beneath the Site flows towards the

southeast in the overburden aquifer. Groundwater elevation and flow direction may vary due to seasonal fluctuations in precipitation, local usage demands, geology, underground structures, or dewatering operations. Groundwater surface elevation measurements and inferred groundwater surface elevation contours generated from the groundwater surface elevation measurements collected on December July 17, 2015 are shown on Figure 2.

2.4 CONTAMINATION CONDITIONS

2.4.1 Identification of Standards, Criteria and Guidance

This subsection identifies the regulatory standards, criteria and guidance (SCG's) that apply to Site Characterization, Spill Closure, IRMs, and Site Management.

Site Investigation and Characterization

The following standards and criteria apply to the Site Investigation and Site Characterization performed at the Site.

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 257 - Air Quality Standards
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response

The following guidance applies to site characterization and remedial investigations performed at the Site.

- CP 51 – Soil Cleanup Guidance (October 2010)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)

- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001)
- NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

Spill Closure

The following standards and criteria apply to spill closure at the Site.

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil (November 1998)
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

The following guidance applies to spill closure conducted at the Site.

- CP 51 – Soil Cleanup Guidance (October 2010)
- Spill Response Guidance Manual
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations

Interim Remedial Measures

The following standards and criteria apply to IRMs conducted at the Site.

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 10 NYCRR Part 67 – Lead
- 6 NYCRR Part 175 - Special Licenses and Permits-Definitions and Uniform Procedures
- 6 NYCRR Part 361 - Siting of Industrial Hazardous Waste Facilities
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)

The following guidance applies to IRMs conducted at the Site.

- CP-43: Groundwater Monitoring Well Decommissioning Policy (November 3, 2009)
- CP-51 – Soil Cleanup Guidance (October 2010)

- TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants

Site Management

The following standards and criteria apply to Site Management activities conducted at the Site.

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

2.4.2 Soil/Fill Contamination

The majority of soil samples collected across the Site contained one or more metals above Commercial Use SCOs, including lead, copper, barium, mercury, nickel, and arsenic. SVOCs, primarily polycyclic aromatic hydrocarbons (PAHs), were also detected in many of the soil samples at concentrations above their respective Restricted Residential or Commercial Use SCOs. Figure 3 presents the metals and SVOCs detected in soil at concentrations above the Restricted Residential or Commercial Use SCOs.

2.4.3 On-Site and Off-Site Groundwater Contamination

Groundwater at the Site is impacted primarily by metals and SVOCs. The Site Characterization Report prepared by EPM and dated January 7, 2016 stated that the data collected from the upgradient off-Site wells does not indicate the potential for an upgradient contaminant source and the data collected from the on-Site permanent wells does not indicate that the Site is a source of groundwater impacts, and does not indicate that contamination is migrating off-Site. The metals and SVOCs detected in groundwater at concentrations above Class GA Values is shown on Figure 4. Note that one VOC (p-isopropyltoluene) was marginally detected above the Class GA Value in one groundwater sample and this result is also shown on Figure 4.

2.4.4 On-Site and Off-Site Soil Vapor Contamination

PCE was detected in an on-Site soil vapor sample at a maximum concentration of 28,000 $\mu\text{g}/\text{m}^3$, which is above the New York State Department of Health (NYSDOH) Air Guideline Value (AGV) of 30 $\mu\text{g}/\text{m}^3$; and TCE was detected at a maximum concentration of 240 $\mu\text{g}/\text{m}^3$, which is above the NYSDOH AGV of 2 $\mu\text{g}/\text{m}^3$. The results for soil vapor samples collected from the upgradient off-Site locations along Commerce Avenue do not provide evidence of an off-Site source of soil vapor impacts to the Site. There appears to be a localized area on-Site with soil vapor impacted with PCE and TCE in the vicinity of the proposed Paratransit Facility. Additionally, various VOCs typically associated with petroleum were also detected in the majority of soil vapor samples. The compounds detected above ambient screening values included benzene, toluene, ethylbenzene, xylenes, 2-butanone (MEK), 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.

2.5 REMEDIAL ACTION OBJECTIVES

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

2.5.1 Soil Vapor

RAO for Public Health Protection

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

2.5.2 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.

RAOs for Public Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

2.5.3 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Public Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

3.0 DESCRIPTION OF INTERIM REMEDIAL MEASURES

3.1 SUMMARY OF SELECTED INTERIM REMEDIAL MEASURES

The following IRMs are proposed for the Site:

1. The soil between grade and approximately 9 feet bgs in the vicinity of historic borings that exhibited elevated lead concentrations on the northwestern portion of the Site will be excavated and removed from the Site due to the presence of dissolved lead in groundwater downgradient of the elevated lead soils area at an order of magnitude above the groundwater standard. Work will be performed in accordance with applicable Federal, State, and local hazardous waste regulations. Additionally, this area overlaps with an area of stained surface soils related to the open spill case assigned to the Site; therefore, the stained surface soils area and lead-contaminated soil area will be remediated in one excavation area (refer to Figure 6 for the excavation area). Note that there is no excavation planned in the footprint of the new building.
2. Permanent groundwater monitoring wells located on-Site and off-Site will be decommissioned in accordance with NYSDEC Commissioner Policy 43 (CP-43) during the Site redevelopment phase of the work.
3. Collection and analysis of post-excavation end-point samples from the petroleum-contaminated soil excavation and the area which exhibited elevated lead concentrations on the northwestern portion of the Site to document post-IRM soil conditions. Post-excavation soil samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and lead.
4. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.
5. Construction, operation and maintenance of an active sub-slab depressurization system (SSDS) for the new Paratransit building. The SSDS will go into operation immediately upon the building being put into service.

6. Construction and maintenance of an engineered composite cover system consisting of asphalt or concrete pavement, concrete building slabs, and a minimum of one foot of environmentally clean fill over a demarcation layer meeting the requirements of 6 NYCRR Part 375-6.7(d) in landscaped areas to prevent human exposure to residual contaminated soils/fill remaining beneath the Site.
7. Import of materials to be used for backfill and cover in compliance with: (1) NYSDEC requirements and (2) all Federal, State and local rules and regulations for handling and transport of material. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to backfill the excavation areas and establish the designed grades at the Site. The site will be re-graded to accommodate installation of a cover system as described in IRM Number 6 above.
8. Recording an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination at the Site.
9. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Site and details the steps and media-specific requirements necessary to ensure the institutional and/or engineering controls identified in this IRM Work Plan remain in place and effective, (2) a Monitoring Plan to assess the performance and effectiveness of the remedy, and (3) an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system(s).

The IRMs will be performed at the Site in accordance with this NYSDEC-approved IRM Work Plan. Implementation of the IRM, including all deviations from the IRM Work Plan, will be documented in the IRM Construction Completion Report (CCR).

4.0 INTERIM REMEDIAL MEASURES PROGRAM

4.1 GOVERNING DOCUMENTS

4.1.1 Site-Specific Health & Safety Plan (HASP)

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

The NYCEDC and associated parties preparing the remedial documents submitted to the State and those performing the construction work are completely responsible for the preparation of an appropriate Health and Safety Plan (HASP) and for the appropriate performance of work according to that plan and applicable laws. The Contractor's Site-Specific HASP is presented in Appendix A.

The HASP and requirements defined in this IRM Work Plan pertain to IRMs performed at the Site.

4.1.2 Quality Assurance Project Plan (QAPP)

Environmental sampling and laboratory analysis will be performed in accordance with the Quality Assurance Project Plan (QAPP) presented in Appendix B. The QAPP presents the organization, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with field activities. The QAPP also describes specific protocols for field sampling, sampling handling and storage, and laboratory analysis. The Contractor's Quality Assurance Project Plan and Site Operations Plan will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work.

4.1.3 Soils Management Plan (SoMP)

The Soils Management Plan (SoMP) presents the methods for managing soil/materials disturbed at the Site. The SoMP is described in detail in Section 5.3 of the IRM Work Plan and is presented in Appendix C and includes plans for excavation, handling, storage, transport, and disposal of soil/materials. The Remedial Engineer is responsible for overseeing the implementation of the SoMP. It also includes the controls that will be applied to these efforts to

assure effective, nuisance-free performance in compliance with applicable Federal, State and local laws and regulations.

4.1.4 Stormwater Pollution Prevention Plan (SWPPP)

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. A SWPPP and Soil Erosion and Sediment Control Plan and Details are provided in Appendix D.

4.1.5 Community Air Monitoring Plan (CAMP)

During excavation activities, the requirements of the Community Air Monitoring Plan (CAMP) presented in Appendix E will be implemented by the Remedial Engineer. The CAMP requires real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of the Site. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities do not spread contamination off-site through the air.

4.2 GENERAL IRM CONSTRUCTION INFORMATION

4.2.1 Project Organization

EPM, on behalf of the NYCEDC, has contracted TRC Engineers, Inc. to prepare the IRM Work Plan and provide IRM design services associated with the IRM Work Plan. All Site monitoring will be completed by AKRF, the Remedial Engineer (refer to Section 4.2.2). Hunter Roberts Construction, the Contractor, will implement the IRMs during construction of the Proposed Paratransit Facility. An organization chart is included on Figure 7. Resumes of key personnel are provided in Appendix F.

4.2.2 Remedial Engineer

AKRF is assigned as the Remedial Engineer responsible for overseeing the IRMs. All Site monitoring will be completed by AKRF. The Remedial Engineer will be a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the IRM program for the Proposed Paratransit Facility (NYSDEC Order on Consent Index No. R2-20150206-62; Site No. 203074). The Remedial Engineer will certify in the IRM CCR that the remedial activities were observed by qualified environmental professionals under his/her supervision and that the remediation requirements set forth in the IRM Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this IRM Work Plan.

The Remedial Engineer will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation and stockpiling, post-excavation endpoint sampling and analysis, removal and disposal, air monitoring, emergency spill response services, and management of waste transport and disposal. The Remedial Engineer will confirm that the imported fill has been properly tested and meets the requirements of this IRM. The Contractor will be responsible for laboratory analysis of imported fill and for waste characterization for off-Site disposal. The Remedial Engineer will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this IRM Work Plan and will certify compliance in the IRM CCR.

The Remedial Engineer will provide the certifications listed in Section 9.1 in the IRM CCR.

4.2.3 IRM Construction Schedule

Refer to Section 10.

4.2.4 Work Hours

The anticipated work hours are from Monday to Friday 7:00 AM to 5:00 PM.

4.2.5 Site Security

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

4.2.6 Worker Training and Monitoring

Any individual working on the Site which could potentially be exposed to site soil must have current certifications documenting OSHA 40-hour and 8-hour refresher HAZWOPER training and medical monitoring in accordance with 29 CFR 1910.120 (for work on hazardous waste sites) and in accordance with 29 CFR 1926.62 (Lead Exposure in Construction). These certifications will be submitted to the NYSDEC for review prior to the start of work. The Contractor will maintain a medical monitoring and respiratory protection program. Documentation that all individuals which will perform work at the Site have appropriate training and that medical monitoring is being performed in accordance with the requirements of OSHA will be included as part of the Contractor's Site-Specific Health and Safety Plan and will be provided to the NYSDEC for review and approval prior to the start of work. Additionally, the Contractor's Site-Specific HASP will include a description and documentation of training, respirator fit testing, and medical monitoring for each individual proposed for IRM work.

4.2.7 Agency Approvals

All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction. The planned end use for the Site is in conformance with the current zoning for the property as determined by New York City Department of Planning. The contractor is in the process of obtaining required construction permits (i.e., FDNY Permit, Street Tree Planting Permit, and additional NYCDOB permits) for the project. The Contractor has obtained a NYCDEP Sewer Connection Permit. A complete list of all local, regional, and federal permits, certificates or other approvals or authorizations required to perform the remedial and development work will be provided to the NYSDEC prior to the start of work.

4.2.8 Pre-Construction Meeting with NYSDEC

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

4.2.9 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in Table 1. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.3 SITE PREPARATION

Available information regarding Site preparation activities as of the date of this IRM WP are presented below. Soil Erosion and Sediment Control Plan and Details are provided in Appendix D. Additional details regarding Site preparation will be provided in the Contractor's Quality Assurance Project Plan and Site Operations Plan, while will be submitted to NYSDEC for review and approval prior to the start of work.

4.3.1 Utility Marker and Easements Layout

The NYCEDC and its contractors are solely responsible for the identification of utilities that might be affected by work under the IRM Work Plan and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this IRM Work Plan. The NYCEDC and its contractors are solely responsible for safe execution of all invasive and other work performed under this IRM Work Plan. The NYCEDC and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this IRM Work Plan. Approval of this IRM Work Plan by NYSDEC does not constitute satisfaction of these requirements.

4.3.2 Sheeting and Shoring

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

4.3.3 Decontamination Area

Equipment Decontamination

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

A decontamination pad will be constructed in a location within the work site that has been approved by the NYCEDC's on-site representative for such use. The decontamination pad will be constructed of adequate size to provide for proper decontamination of all trucks and equipment used by the Contractor, without release of wash water to the ground surface. The decontamination pad will consist of a minimum of 10-inch by 10-inch timbers installed along both sides of the decontamination pad and a minimum 20-mil thick impermeable high-density polyethylene (HDPE) liner. The HDPE liner will be covered with a minimum 6-inch thick top layer of 2-inch stone and minimum underlying 12-inch thick layer of sand. The decontamination pad will be graded to allow truck wash waters to drain into a watertight sump and then transferred to a 55-gallon drum or a fractionation tank. Frequency of decontamination will be determined by the NYCEDC's on-site representative and will be required prior to equipment and supplies leaving the Site between stages of the work. All decontamination materials will be collected, containerized, tested, labeled, and disposed of in accordance with all applicable laws and regulations. A segregated truck staging and loading area on existing asphalt cover or over an area

of imported gravel near planned excavation areas may be constructed as an alternative to a decontamination pad to prevent truck/equipment contamination.

All transportation vehicles will be inspected, prior to leaving the Site, to ensure that no material adheres to the wheels, undercarriage, tailgates, covers or other areas of transport vehicles. All vehicles will be cleaned including tires, undercarriage, and any other contaminated parts, prior to leaving the Site.

4.4 REPORTING

4.4.1 Daily Reports

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

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including excursions;
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the IRM WP will be addressed directly to the NYSDEC Project Manager via personal communication.

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

A Site map that shows a predefined alpha-numeric grid for use in identifying locations will be provided with the daily reports. The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

The Remedial Engineer will submit monthly reports to NYSDEC and NYSDOH Project Managers within one week following the end of the month of the reporting period and will include:

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

4.4.3 Photographic Documentation

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

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

4.4.4 Deviations from the IRM Work Plan

If site work requires deviation from the IRM Work Plan, the proposed deviations will be identified and presented to the NYSDEC Project Manager. In a formal submission, the NYCEDC will identify the reason(s) for deviating from the approved IRM Work Plan and present the effect of the deviation(s) on the overall remedy. The NYCEDC will obtain written authorization from the NYSDEC Project Manager prior to deviating from the approved IRM Work Plan.

5.0 IRM: MATERIAL REMOVAL FROM SITE

Aside from the excavation necessary for remediation that is discussed below, construction of the new Paratransit Facility will require excavations to remove existing subsurface structures and to construct foundations and stormwater control features for the building and parking areas.

Lead-contaminated soil and petroleum contaminated soil will be excavated and disposed off-Site. The area of petroleum contaminated soil was identified by the NYSDEC in August 2014 following an inspection which noted stained surface soils in the immediate area of several dumped 5-gallon plastic buckets that contained an apparent petroleum material.

A spill case was opened and remains active. In accordance with NYSDEC's November 18, 2015 comments on the Site Characterization Findings Report prepared by EPM, excavation of lead contaminated soil in the northwestern portion of the Site is required due to the presence of dissolved lead in groundwater downgradient of the elevated lead soils area at an order of magnitude above the groundwater standard.

Soil containing elevated lead concentrations and petroleum-contaminated soil located within the planned excavation for the new building will be removed from the Site. Soil/material will be excavated to a depth of approximately 9 feet bgs in the northwestern portion of the Site (refer to Figure 6). This excavation area represents the lead-contaminated and petroleum contaminated soil areas. Since piles will be advanced for the construction of the building and the building will be elevated, there is no excavation proposed in the footprint of the new building; therefore, post-excavation samples will not be collected from this area.

Material proposed for reuse must be sampled in accordance with the requirements in DER-10 and meet the criteria listed in Appendix 5 of DER-10 (refer to Section 5.3.5). The Remedial Engineer will ensure that procedures defined for material reuse in this IRM are followed and that unacceptable material will not remain on-Site. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site. Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within one foot of the mean high groundwater table, within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines and will properly disposed of off-site at a facility(s) licensed to accept such material. Additional details

regarding material excavation and reuse will be presented in the Contractor's Quality Assurance Project Plan and Site Operations Plan which will be submitted to the NYSDEC by the Remedial Engineer (AKRF) for approval prior to the start of work.

Although unlikely, if dewatering is necessary during excavation, treatment of dewatering effluent will be required prior to discharge. Dewatering required during construction will be minimized to mitigate potential influx of contaminated water from off-site sources toward the Site. It is anticipated that if dewatering is required, fluids will be containerized on-Site in a fractionation tank for off-Site disposal. If a greater amount of dewatering fluids will be generated, alternate methods for handling fluids will be presented to the NYSDEC for approval. A cut and fill drawing is presented in Appendix I.

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

5.1 POST EXCAVATION END-POINT SAMPLING

Post-excavation end-point sampling will be performed by the Remedial Engineer in the petroleum-contaminated and lead contaminated soil excavation to document post-IRM soil conditions. Subsurface soil samples will be collected in accordance with DER-10 requirements. The soil samples will be submitted to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory for analysis. The perimeter of the excavation is approximately 175 linear feet and the area of the excavation encompasses approximately 1,845 square feet. Therefore, it is estimated that a total of six (6) post-excavation sidewall soil samples and three (3) bottom soil samples will be collected for laboratory analysis of VOCs, SVOCs, and lead. Additional details regarding sampling, including soil sampling methods, analysis, sampling frequency, and QA/QC requirements are presented in the QAPP (Appendix B).

The IRM CCR will provide a tabular and map summary of all soil end-point sample results and exceedances of Commercial Use SCOs and CP-51 SCLs.). The Soil Cleanup Objectives for this Site are the Industrial Use Soil Cleanup Objectives which are presented in NYCRR Part 375 Table 375-6.8(b) and are attached in Appendix I for reference. Post-excavation samples will be collected for documentation purposes only; however, if additional soil requires removal after consultation of endpoint results with NYSDEC, further excavation will occur and another round

of endpoint samples will be collected. It is proposed that all remedial excavations be terminated no deeper than the groundwater surface elevation.

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

A table that summarizes all soil samples that exceed the Industrial Use SCOs is presented in Appendix I. Figure 3 shows all soil samples that exceed the Industrial Use SCOs proposed for this Remedial Action.

5.2 ESTIMATED MATERIAL REMOVAL QUANTITIES

Soil required to construct the Paratransit Facility will be removed to the limits of the planned excavation. Excavation and disposal of the soil between grade and approximately 9 feet bgs in the northwestern portion of the Site is required due to the presence of dissolved lead in groundwater downgradient of the elevated lead soils area at an order of magnitude above the groundwater standard. Work will be performed in accordance with applicable Federal, State, and local hazardous waste regulations. Additionally, this area overlaps an area of stained surface soils related to the open spill case assigned to the Site; therefore, the stained surface soils area and lead-contaminated soil area will be remediated as one excavation area (refer to Figure 6 for the excavation area).

5.3 SOILS MANAGEMENT PLAN

5.3.1 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.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used, as needed, near catch basins, surface waters, and other discharge points. A SWPPP and Soil Erosion and Sediment Control Plan and Details are provided in Appendix D.

5.3.2 Materials Excavation and Load Out

The NYCEDC and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. Additional details regarding material excavation and load out will be presented in the Contractor's Quality Assurance Project Plan and Site Operations Plan which will be submitted to the NYSDEC for approval by the Remedial Engineer prior to the start of work.

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

The NYCEDC's Contractor, under the oversight of the Remedial Engineer (refer to Section 4.2.2), will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. The NYCEDC 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). Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point documentation sampling will be completed before excavation related to Site development commences proximal to the hotspot or structure. All primary contaminant sources (including but not limited to tanks and hotspots) identified during construction activities will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the IRM CCR.

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

5.3.3 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.

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. 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.

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. Additional details regarding truck transport routes will be presented in the Contractor's Site Operations Plan which will be submitted to the NYSDEC by the Remedial Engineer for approval prior to the start of work.

5.3.4 Materials Disposal Off-Site

Prior to start of work, NYSDEC will be provided with letters from the disposal facilities indicating each facility's acceptance of the waste. All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed of in accordance with all local, State (including 6 NYCRR Part 360) and Federal regulations. Material that does not meet Track 1 Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility). An estimated quantity of approximately 1,000 cubic yards of soil will be disposed of off-Site during construction activities.

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

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

The IRM CCR will include an accounting of the destination of all material removed from the Site as part of this IRM, including excavated soil, contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the IRM CCR.

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

Hazardous wastes derived from on-Site (if encountered) will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations. If disposal of soil/fill from the 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.

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

(1) A letter from the Remedial Engineer or Applicant to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data).

(2) A letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the IRM CCR. Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DMM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling

Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

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

The Contractor, under the oversight of the Remedial Engineer, will perform waste characterization for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the IRM CCR. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.3.5 Materials Reuse On-Site

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

Table 5.4(e)10			
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site			
Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➤ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

The Remedial Engineer will ensure that procedures defined for materials reuse in this IRM are followed and that unacceptable material will not remain on-Site.

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

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within one foot of the mean high groundwater table, within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the Site Management Plan.

5.3.6 Fluids Management

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

Dewatering is not expected to be completed on-Site. It is anticipated that if dewatering is required, fluids will be containerized on-Site in a fractionation tank for off-Site disposal. If a greater amount of dewatering fluids will be generated, alternate methods for handling fluids will

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

5.3.7 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 IRM Work Plan prior to receipt at the Site.

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

Backfill material will be comprised of soil or other unregulated material. Imported material for backfill will meet the requirements of 6 NYCRR Part 375-6.7(d) and Appendix 5 of DER-10. Imported material for the landscaped areas will meet the more stringent requirements of the Restricted Residential Use SCOs or Protection of Groundwater SCOs found in 6 NYCRR Part 375-6. The backfill source and associated analytical data will be provided to NYSDEC prior to importation to the Site. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Samples will be collected in accordance with the frequency and analyses listed in Table 5.4(e)10 of DER-10. Virgin, quarried stone will not be sampled if the material comes from sources approved by the NYSDEC.

Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved IRM Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

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

5.3.8 Community Air Monitoring Plan

The Remedial Engineer, under the oversight of Hunter Roberts and the NYCEDC, will implement the CAMP presented in Appendix E. Additionally, daily CAMP results will be provided to the NYCEDC for review. The CAMP was prepared in accordance with the

requirements of the Generic CAMP in Appendix 1A of DER-10 and describes the odor, organic vapor, and dust control and monitoring procedures that will be implemented during demolition and other activities that will disturb the Site soil.

The CAMP includes action limits for volatile organic compounds and particulates and provides justification for the proposed action limits. Dust or odor complaints from any owner of an adjacent or nearby property will be managed by the Remedial Engineer in a manner equivalent to an exceedance of an action level in the CAMP.

The CAMP explicitly identifies how air monitoring will be implemented during adverse weather conditions including high humidity, precipitation, strong winds, and cold. The CAMP explicitly identifies weather conditions during which it will be necessary to stop work due to the inability to properly implement the CAMP.

Any exceedance of a CAMP threshold or action level will be reported by the Remedial Engineer to the NYCEDC immediately and additionally in writing within 2 hours of the time it is recorded. The report will include the instrument readings; location of the monitoring station where the exceedance was recorded; readings at upwind locations; date, time and duration of elevated readings (i.e., number of 15-minute time-weighted exceedances); activities being performed at the time of the exceedances; and descriptions of countermeasures implemented to control the exceedance and prevent future occurrences. Exceedances observed in the CAMP will be reported by NYCEDC to NYSDEC and NYSDOH Project Managers.

The Remedial Engineer will determine wind direction and confirm proper positioning of upwind and downwind monitoring stations. Wind direction will be recorded by the Remedial Engineer's qualified environmental professional hourly during the work.

At a minimum, prior to the start of work each day two (2) downwind and one (1) upwind air monitoring stations will be established by the Remedial Engineer at the Site. The monitoring stations will be properly maintained and operated during all remediation, demolition, and soil disturbance activities, including load-out of excavated material.

Two (2) data logging PIDs set to collect readings on a 15-minute time-weighted average (TWA) and two (2) data logging particulate meters set to collect readings on a 15-minute TWA

will be operated at the downwind air monitoring stations. The particulate meters will be capable of measuring dust particulates that are less than 10 microns in size (PM-10) or respirable dust.

One (1) data logging PID that is set to collect readings on a 15-minute TWA and one (1) data logging particulate meter that is set to collect readings on a 15-minute TWA will be operated at the upwind air monitoring station. The particulate meter will be capable of measuring dust particulates that are less than 10 microns in size (PM-10) and respirable dust.

The dedicated CAMP monitoring equipment will not be used for personnel health and safety monitoring or soil screening activities. Additional equipment and instrumentation will be furnished by the Remedial Engineer for personnel health and safety monitoring and soil screening.

The Remedial Engineer's qualified environmental professional has "stop work authority" and will be responsible for the air monitoring and daily calibration and maintenance of the equipment in accordance with the manufacturers' specifications. The Remedial Engineer's qualified environmental professional is dedicated solely to implementation of the CAMP at the Site. The resume of the proposed Remedial Engineer's qualified environmental monitor will be provided to NYSDEC upon request. Copies of manufacturers' owner's manuals for instrumentation and equipment are included in the CAMP. All instrumentation and equipment will be maintained at all times in proper operating condition.

The Contractor will maintain at the Site at all times one (1) spare PID and one (1) spare particulate meter in fully operational condition, available for immediate service.

All PIDs used for CAMP will be of the same model and manufacturer. All particulate meters used for CAMP will be of the same model and manufacturer.

At the end of each work day the Remedial Engineer's qualified environmental professional will download the CAMP data collected to a field computer, and organize, review, and compare the data to action levels to verify proper controls were in place throughout the work day. Data will be available for inspection without advance notice.

The Remedial Engineer's qualified environmental professional will document in the dedicated project log book each calibration event, any equipment and instrument malfunctions, unusual

conditions, air monitoring station locations, any exceedances of action levels, and countermeasures implemented.

The Remedial Engineer will respond to exceedances of the CAMP action levels immediately and will immediately alert the NYCEDC following mitigative actions. The Remedial Engineer will provide to the NYCEDC CAMP monitoring data and a detailed summary of the mitigative actions for review.

5.3.9 Dust Control Plan

The IRM CCR will include the following certification by the Remedial Engineer: “I certify that invasive work performed during implementation of the IRMs was conducted in accordance with dust suppression methodology defined in the IRM Work Plan.”

- Dust suppression measures will include, at a minimum, the items listed below:
- Wetting of the soil prior to disturbance and during disturbance to prevent dust generation. In addition, at all times during the work, open excavations shall be controlled to prevent dust generation overnight and during holidays and weekends and any time when work is not actively being performed. Water will be available on-site at suitable supply and pressure for use in dust control.
- Maintaining appropriate low vehicle speeds in unpaved areas.
- Routing vehicles and equipment onto covered surfaces when possible.
- Minimizing traffic and unnecessary disturbances to ground surface in unpaved and unstabilized areas.
- Maintaining existing site ground coverings (e.g., existing pavement) until disturbance is required for construction and stabilizing exposed soil with ground surface covering as soon as practical.
- Discontinuing activities if generation of dust is observed and using alternate methods.

- Removing bulk soil from exteriors of vehicles and construction equipment prior to moving off work areas. Soil will be wetted prior to removal. It is expected that gravel will be used at the construction entrance to provide a clean and dust-free road surface.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

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

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have two primary EC systems. These are: (1) An active SSDS; and (2) a composite cover system consisting of asphalt and concrete pavement, concrete building slabs, and a minimum of one foot of environmentally clean fill over a demarcation layer meeting the requirements of 6 NYCRR Part 375-6 Unrestricted Use SCOs in landscaped areas. Permalon L30 Black will be installed as a continuous gas vapor barrier beneath the entire building slab.

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

7.0 ENGINEERING CONTROLS

7.1 COMPOSITE COVER SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the Site. This composite cover system will be comprised of structures (i.e., building), pavement and sidewalks or a soil cover which will consist of a minimum of one foot of environmental clean fill over a demarcation layer meeting the requirements of 6 NYCRR Part 375-6.7(d) in landscaped areas. A figure showing the proposed cover types is presented in Appendix I.

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

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

7.2 SUB-SLAB DEPRESSURIZATION SYSTEM

To prevent VOCs in sub-slab vapor from entering the new Paratransit building, engineering controls consisting of an SSDS will be installed. The active SSDS will depressurize the space beneath the gas vapor barrier and lowest level floor slabs of the building.

Design plans and specifications for the vapor barrier and SSDS are presented in Appendix G. As-built drawings (if available based on construction schedule), diagrams, and post-installation pressure field extensions testing will be presented in the IRM CCR. Post-mitigation/confirmation testing of SSDS will be completed in accordance with the NYSDOH Vapor Intrusion Guidance Document. The Contractor will collect vacuum reading measurements at the sub-slab monitoring points to show that a vacuum is being created beneath the entire building slab. The Contractor will demonstrate that the SSDS pressure switches are operating properly and are connected to the Building Management System (BMS). The pressure switches will signal notification on low vacuum conditions in each corresponding suction fan riser. Low vacuum conditions will be indicated on the BMS.

7.3 CRITERIA FOR TERMINATION OF ENGINEERING CONTROLS

7.3.1 Composite Cover System

The composite cover system is a permanent control and the quality and integrity of this system will be inspected on an annual basis in perpetuity.

7.3.2 Sub-Slab Depressurization System (SSDS)

The active SSDS will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSDS may be submitted by the property owner based on confirmatory data that justifies such request. The SSDS will go into operation immediately upon the building being put into service. The SSDS will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH. If future monitoring indicates soil vapor levels have decreased to a level acceptable to the Departments, allowance may be granted to transition to a passive system.

8.0 INSTITUTIONAL CONTROLS

After the IRMs are complete, the Site will have residual contamination remaining in place. All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the IRM CCR. Engineering Controls (ECs) for the residual contamination have been incorporated into the IRM Work Plan to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan. These elements are described in this Section. A Site-Specific Environmental Easement will be recorded with Bronx County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

8.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the IRMs are complete. If the Site will have residual contamination after completion of all IRMs, an Environmental Easement is required. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Bronx County Clerk. The Environmental Easement will be submitted as part of the IRM CCR.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Bronx County Clerk. A series of Institutional Controls are required to implement, maintain and monitor the Engineering Control systems, prevent future

exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to Commercial or Industrial use only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of asphalt and concrete pavement, concrete building slabs, and one foot of environmentally clean fill in landscaped areas must be inspected, certified and maintained as required in the SMP (note that the backfill source and associated analytical data will be approved by the NYSDEC Project Manager prior to import);
- A soil vapor mitigation system consisting of an active SSDS under all building structures must be inspected, certified, operated and maintained as required by the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next

section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;
- The Controlled Property may be used for Commercial or Industrial use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as Restricted Residential or Unrestricted Use without an amendment or extinguishment of the Environmental Easement;
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

8.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the IRM CCR for the IRM. The Site Management Plan will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or

until released in writing by NYSDEC. Upon completion, the facility will be turned over and operated by the MTA, including responsibility for compliance with the Site-Specific SMP. The MTA is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the IRM in accordance with the Consent Order with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; and (3) 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 will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for the SSDS; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 3, 2010, and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually for the first year. Following the first year, ECs will be monitored through the building management system and O&M plans. Periodic review reports (PRRs) will be required annually, while the SSDS is in operation. PRRs will be prepared and certified by a QEP or New York State Professional Engineer, as appropriate, per DER-10. The building management system provides alarms should the SSDS fans become inoperable and the O&M Plan provides procedures for periodic inspections. The Site Management Plan will be based on the calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

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

9.0 IRM CONSTRUCTION COMPLETION REPORT

An IRM Construction Completion Report (CCR) will be prepared by the Remedial Engineer and submitted to NYSDEC following implementation of the IRMs defined in this IRM Work Plan. The IRM CCR provides the documentation that the remedial work required under this IRM Work Plan has been completed and has been performed in compliance with this plan. The IRM CCR will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The IRM CCR will include as-built drawings for all constructed elements, certifications, manifests, bills of lading, figures showing the remaining contamination (which are part of the as-built drawings), as well as the complete Site Management Plan. The IRM CCR will provide a description of the changes in the IRMs from the elements provided in the IRM Work Plan and associated design documents. The IRM CCR will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the IRMs. The IRM CCR will provide test results demonstrating that the SSDS is functioning properly. The IRM CCR will be prepared in conformance with DER-10. The results of the post-excavation sampling related to the active spill case and lead contaminated soil area will be presented in the IRM CCR; and, a petition to close the active spill case number will be included in the IRM CCR.

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

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

The IRM CCR will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also

include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of an IRM CCR, all project reports must be submitted in digital form on electronic media (PDF) and all data (including endpoints) submitted in EQUS format with DUSRs.

9.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the IRM CCR. The certification will be signed by a Remedial Engineer who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, [NAME], am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 1100 Commerce Avenue (Proposed Metropolitan Transportation Authority Paratransit Facility Site) (NYSDEC Consent Order Index No. R2-20150206-62; Site No. 203074).

I certify that the Site description presented in this IRM CCR is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Consent Order for the Proposed Metropolitan Transportation Authority Paratransit Facility Site and related amendments.

I certify that the IRM Work Plan dated [DATE] approved by the NYSDEC was implemented and that all requirements in those documents have been substantively complied with.

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

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan has been submitted by the NYCEDC for the continual and proper operation, maintenance, and

monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

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

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

I certify that invasive work performed during implementation of the IRMs was conducted in accordance with dust suppression methodology defined in the IRM Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

10.0 SCHEDULE

The IRMs will be implemented during construction of the Paratransit Facility. The NYCEDC has awarded Hunter Roberts Construction with a contract to prepare the Site and construct the Paratransit Facility. Hunter Roberts' construction schedule is presented in Appendix H.

TABLES

TABLE 1

EMERGENCY CONTACT NUMBERS – PROJECT PERSONNEL

Name	Affiliation	Office Telephone	Cell Phone
Brigid Keating	NYCEDC	212.312.3590	NA
Ryan Dinsmore	Hunter Roberts	212.699.4945	917.828.4529
Michelle Lapin	AKRF	212.696.0670	NA
Marc Godick	AKRF	212.696.0670	NA

An updated contact list will be provided to the NYSDEC prior to the start of work if any revisions are required.

EMERGENCY CONTACT NUMBERS – EMERGENCY SERVICES

Hospital: St. Barnabas Hospital
4422 Third Avenue, 1st Floor
Bronx, NY 10457
(718) 960 - 9000

Ambulance: 911

Fire Department: 911; (718) 999-2000

Police Department: 911; 43rd Precinct; (718) 542-0888

NYS Spill Hotline: 1-800-457-7362

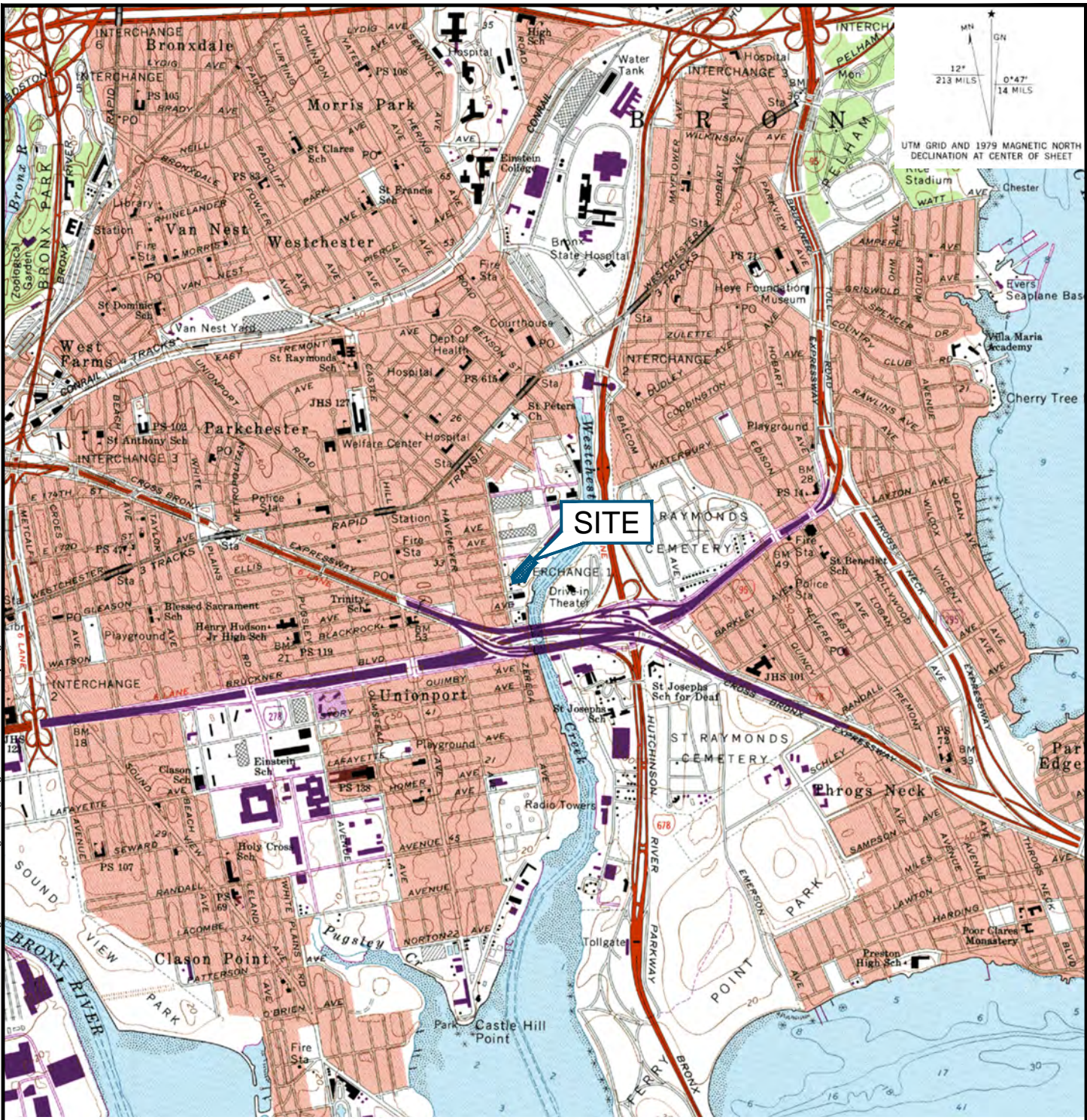
National Response Center: 1-800-424-8802

National Poison Control: 800-222-1222

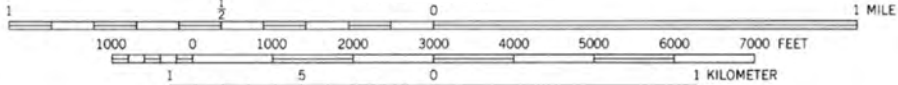
New York City Regional Poison Control Center: (212) 689-9014

FIGURES

8.541 - ATTACHED FILES: -- ATTACHED IMAGES: Reading: NYCEDC; DRAWING NAME: WTPA-NYC/Environmental/Shared/Projects/263418 - EPM Commerce Avenue/IRM Work Plan/figures/TRC Working Drawings/ Figure 1 - Site Location Map.dwg -- PLOT DATE: October 11, 2016 - 3:38PM -- LAYOUT: 8.5x11P



SCALE: 1:2400



CONTOUR INTERVAL 10 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929
 DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER



MAP INCLUDES INFORMATION FROM THE FOLLOWING MAP SHEET(S):
 TP, FLUSHING, NY, 7.5-MINUTE, DATED 1966, PHOTOREVISED 1979

MAP OBTAINED THROUGH USE OF TERRAIN NAVIGATOR PRO SOFTWARE.



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

PROJECT:
 NEW YORK CITY ENVIRONMENTAL DEVELOPMENT CORPORATION
 IRM WORK PLAN - PROPOSED PARATRANSIT FACILITY - COMMERCE AVENUE
 BLOCK: 3838, PORTION OF LOT: 60
 BRONX, NEW YORK 10462

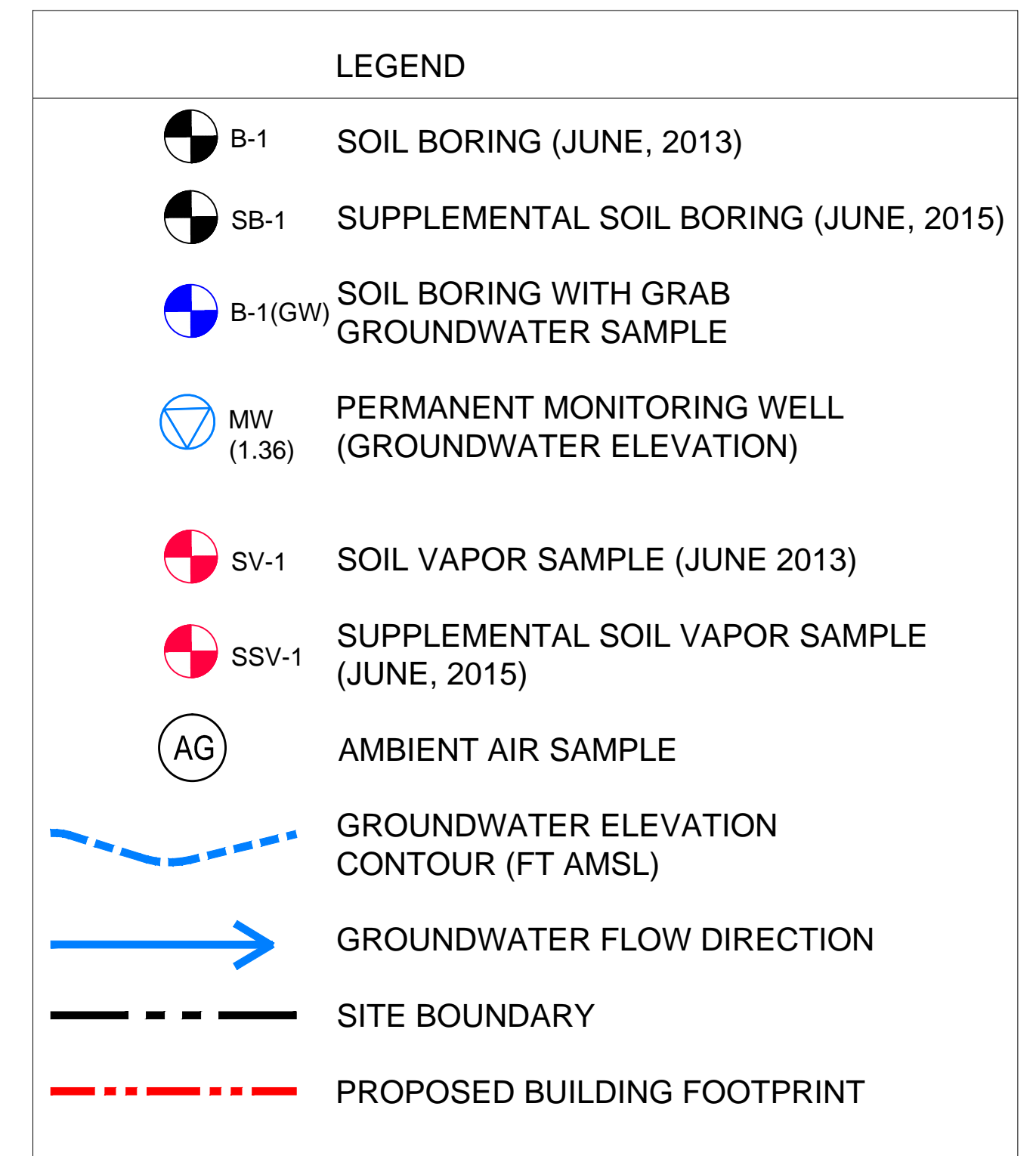
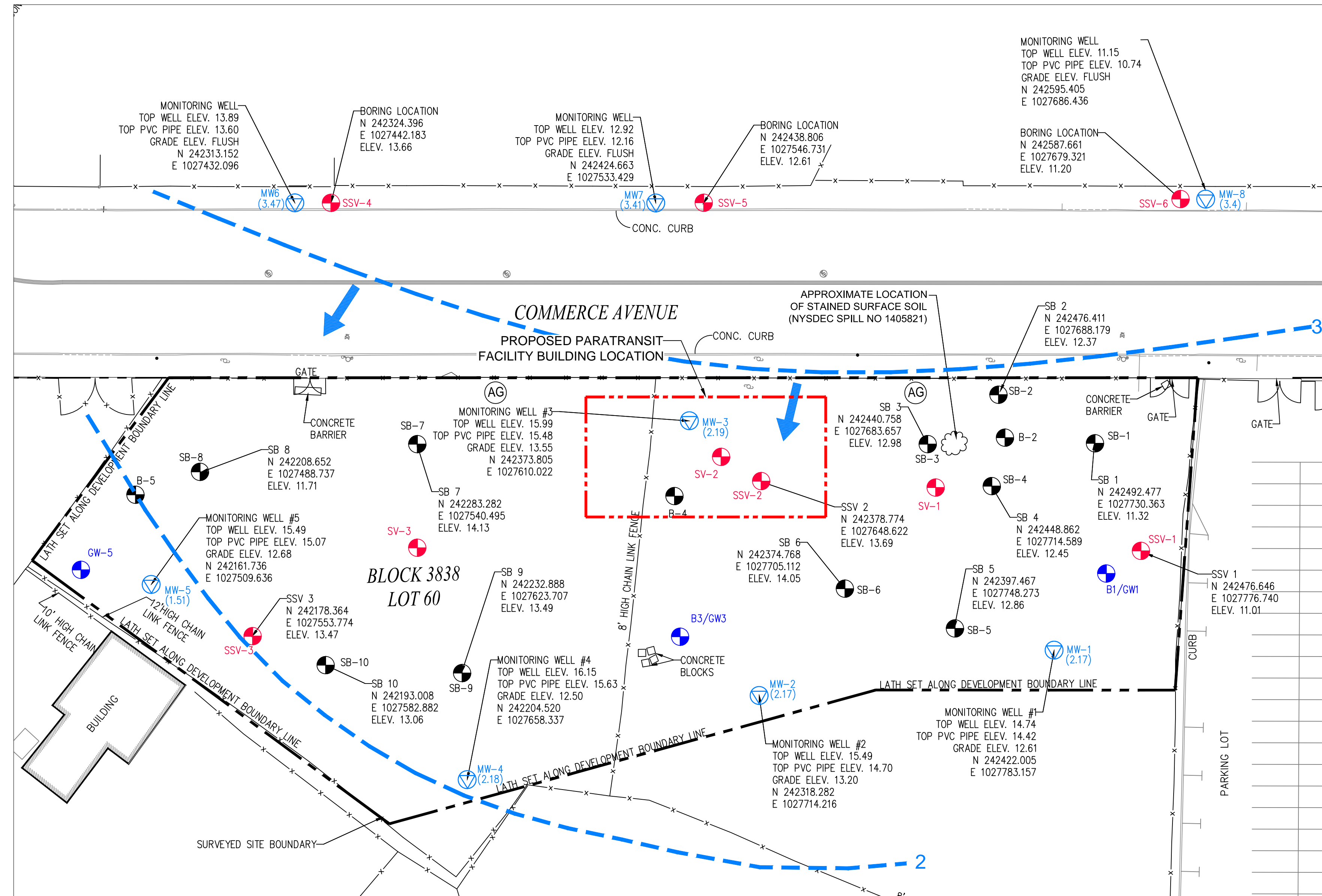


TITLE:

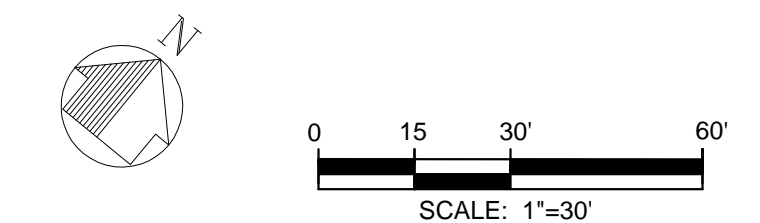
SITE LOCATION MAP

DRAWN BY:	HD
CHECKED BY:	DS
APPROVED BY:	LM
DATE:	OCTOBER 2016
PROJ. NO.:	263148.0000.0000
FILE:	Figure 1 - Site Location Map.dwg

FIGURE 1



- NOTE:**
- DRAWING SOURCE FROM THE FOLLOWING DOCUMENT TITLED "SITE CHARACTERIZATION FINDINGS REPORT FOR THE PROPOSED MTA PARATRANSIT FACILITY", AT COMMERCE AVENUE, BRONX, NEW YORK. PREPARED BY ENVIRONMENTAL PLANNING AND MANAGEMENT, INC. DATED JANUARY 2016.



PROJECT: NEW YORK CITY ENVIRONMENTAL DEVELOPMENT CORPORATION IRM WORK PLAN - PROPOSED PARATRANSIT FACILITY - COMMERCE AVENUE 	
BLOCK: 3838, PORTION OF LOT: 60 BRONX, NEW YORK 10462	
TITLE: SITE PLAN	
DRAWN BY: HD	PROJ. NO.: 263418.0000.0000
CHECKED BY: DS	FIGURE 2
APPROVED BY: LM	
DATE: FEBRUARY 2017	
1430 Broadway 10th Floor New York, NY 10018 Phone: 212.221.7822	
FILE NO.:	Figure 2 - Site Plan 02.03.17.dwg

DATE: 10/11/2016 3:46PM LAYOUT: Figure 3
 DRAWING NAME: W:\P\NYCE\Environmental\Shared\Projects\3838\18 - EPH\Commerces Avenue\BIA Work Plans\Figures\TRC Working Drawings\Figure 3 - Summary of Soil Sampling Results.dwg
 PLOT DATE: October 11, 2016, 3:46PM - LAYOUT: Figure 3

Parameter	B4		RRSCO	RCSCO
	B4 (0-4')	B4 (6-10')		
Benzo(a)anthracene	2.3	2.4	1.0	5.6
Benzo(a)pyrene	1.8	1.8	1.0	1.0
Benzo(b)fluoranthene	2.5	2.3	1.0	5.6
Dibenzo(a,h)anthracene	0.34		0.33	0.56
Indeno(1,2,3-cd)Pyrene	1.3	1.1	0.5	5.6
Lead, Total	490		400	1,000

Parameter	SB7			RRSCO	RCSCO
	SB7 (0-2')	SB7 (10-13')	SB7 (13-15')		
Barium, Total	450	520		400	400
Lead, Total	710		1,300	400	1,000

Parameter	SB8		RRSCO	RCSCO
	SB8 (0-2')	SB8 (6-9')		
Barium, Total	1,600		400	400
Cadmium, Total	7.3		4.3	9.3
Copper, Total	1,800	1,200	270	270
Lead, Total	1,500	2,700	400	1,000
Aroclor 1254	3.0		1.0	1.0
Total PCBs	3.80		1.0	1.0

Parameter	B5		RRSCO	RCSCO
	B5 (0-4')			
Indeno(1,2,3-cd)Pyrene	0.7 J	0.5		5.6
Cadmium, Total	5.4	4.3		9.3
Copper, Total	2,600	270		270
Lead, Total	2,400	400		1,000
Zinc, Total	18,000	10,000		10,000

Parameter	SB10			RRSCO	RCSCO
	SB10 (0-2')	SB10 (6-8.5')	SB10 (13-15')		
Benzo(a)anthracene	2.6	1.1	9.7	1.0	5.6
Benzo(a)pyrene	2.6	1.1	8.2	1.0	1.0
Benzo(b)fluoranthene	3.3	1.3	6	1.0	5.6
Chrysene			9.6	3.9	56
Dibenzo(a,h)anthracene	0.43		0.99	0.33	0.56
Indeno(1,2,3-cd)Pyrene	1.9	0.79	3.2	0.5	5.6
Barium, Total		450		400	400
Copper, Total	430	1,700	420	270	270
Lead, Total	1,100	2,100		400	1,000
Mercury, Total			1.2	0.81	2.8
Zinc, Total		13,000		10,000	10,000

Parameter	SB9			RRSCO	RCSCO
	SB9 (0-2')	SB9 (9-12')	SB9 (13-15')		
Benzo(a)anthracene		1.7	2.0	1.0	5.6
Benzo(a)pyrene		1.5	1.8	1.0	1.0
Benzo(b)fluoranthene		1.8	2.5	1.0	5.6
Dibenzo(a,h)anthracene			0.34	0.33	0.56
Indeno(1,2,3-cd)Pyrene	0.52	1.1	1.3	0.5	5.6
Arsenic, Total			18	16	16
Barium, Total		460		400	400
Cadmium, Total	5.1			4.3	9.3
Copper, Total	1,200			270	270
Lead, Total	800	650		400	1,000
Mercury, Total			2.0	0.81	2.8
Total PCBs	1.24			1.0	1.0

Parameter	SB3			RRSCO	RCSCO
	SB3 (0-2')	SB3 (5-10')	SB3 (13-15')		
Benzo(a)anthracene			3.0	1.0	5.6
Benzo(a)pyrene			2.6	1.0	1.0
Benzo(b)fluoranthene			3.9	1.0	5.6
Dibenzo(a,h)anthracene			0.44	0.33	0.56
Indeno(1,2,3-cd)Pyrene			1.7	0.5	5.6
Cadmium, Total	5.7			4.3	9.3
Copper, Total	320			270	270
Lead, Total	6,200		480	400	1,000
Mercury, Total			10	0.81	2.8

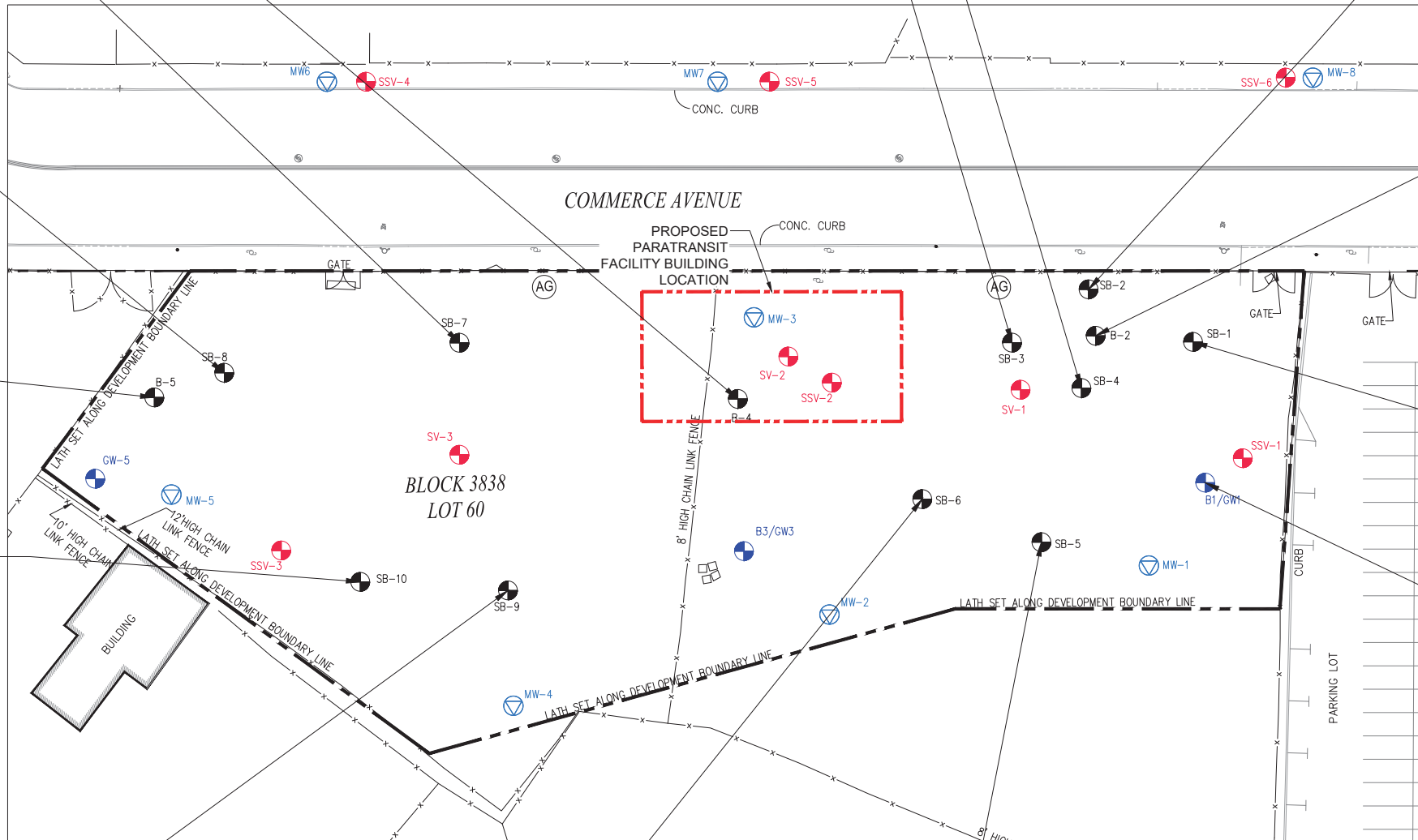
Parameter	SB4		RRSCO	RCSCO
	SB4 (0-2')	SB4 (5-8')		
Benzo(a)anthracene		68	1.0	5.6
Benzo(a)pyrene		58	1.0	1.0
Benzo(b)fluoranthene	1.7	75	1.0	5.6
Benzo(k)fluoranthene		34	3.9	56
Chrysene		67	3.9	56
Dibenzo(a,h)anthracene		8.8	0.33	0.56
Fluoranthene		170	100	500
Indeno(1,2,3-cd)Pyrene	0.88	39	0.5	5.6
Phenanthrene		150	100	500
Lead	4,500	5,000		

Parameter	SB2		RRSCO	RCSCO
	SB2 (5-9')	SB2 (11-13')		
Benzo(a)anthracene	2.6		1.0	5.6
Benzo(a)pyrene	3.3		1.0	1.0
Benzo(b)fluoranthene	4.2		1.0	5.6
Dibenzo(a,h)anthracene	0.61		0.33	0.56
Indeno(1,2,3-cd)Pyrene	2.6		0.5	5.6
Arsenic, Total	23		16	16
Barium, Total	680		400	400
Copper, Total	290		270	270
Lead, Total	2,700	1,400	400	1,000

Parameter	B2		RRSCO	RCSCO
	B2 (0-4')	B2 (5-9')		
Benzo(a)anthracene		1.1	1.0	5.6
Benzo(a)pyrene		1.2	1.0	1.0
Benzo(b)fluoranthene		1.3	1.0	5.6
Dibenzo(a,h)anthracene	0.42 J		0.33	0.56
Indeno(1,2,3-cd)Pyrene	0.69 J	0.85	0.5	5.6
Barium, Total		410	400	400
Cadmium, Total			4.3	9.3
Copper, Total	360	930	270	270
Lead, Total	590	9,100	400	1,000

Parameter	SB1			RRSCO	RCSCO
	SB1 (0-2')	SB1 (7-9')	SB1 (13-15')		
Barium, Total		630		400	400
Lead, Total	950	670	720	400	1,000
Mercury, Total	1.0			0.81	2.8

Parameter	B1		RRSCO	RCSCO
	B1 (0-4')	B1 (5-9')		
Indeno(1,2,3-cd)Pyrene		0.51 J	0.5	5.6
Barium, Total		480	400	400
Lead, Total	520		400	1,000



NOTE: COMPOUNDS/PARAMETERS HIGHLIGHTED IN RED EXCEED INDUSTRIAL USE SOIL CLEANUP OBJECTIVES. REFER TO APPENDIX I FOR THE CRITERIA

RESTRICTED RESIDENTIAL USE SOIL CLEANUP OBJECTIVE (SCO)

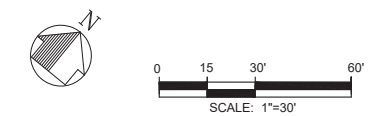
RESTRICTED COMMERCIAL SCO

NOTE:

- DRAWING SOURCE FROM THE FOLLOWING DOCUMENT TITLED "SITE CHARACTERIZATION FINDINGS REPORT FOR THE PROPOSED MTA PARATRANSIT FACILITY", AT COMMERCE AVENUE, BRONX, NEW YORK. PREPARED BY ENVIRONMENTAL PLANNING AND MANAGEMENT, INC. DATED JANUARY 2016.

LEGEND

- B-1 SOIL BORING (JUNE, 2013)
- SB-1 SUPPLEMENTAL SOIL BORING (JUNE, 2015)
- B-1(GW) SOIL BORING WITH GRAB GROUNDWATER SAMPLE
- MW) PERMANENT MONITORING WELL
- SV-1 SOIL VAPOR SAMPLE (JUNE 2013)
- SSV-1 SUPPLEMENTAL SOIL VAPOR SAMPLE (JUNE, 2015)
- AG AMBIENT AIR SAMPLE
- SITE BOUNDARY



PROJECT: NEW YORK CITY ENVIRONMENTAL DEVELOPMENT CORPORATION
 IRM WORK PLAN - PROPOSED PARATRANSIT FACILITY - COMMERCE AVENUE
 BLOCK: 3838, PORTION OF LOT: 60
 BRONX, NEW YORK 10462

NYCEDC

TITLE: **SUMMARY OF SOIL SAMPLING RESULTS**

DRAWN BY: HD PROJ. NO: 263418.0000.0000
 CHECKED BY: DS
 APPROVED BY: LM
 DATE: OCTOBER 2016

FIGURE 3

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

FILE NO: Figure 3 - Summary of Soil Sampling Results.dwg

* ALL VALUES REPORTED AS PARTS PER MILLION (ppm)

C:\Users\jgarcia\Documents\NYCEDC\IRM Work Plan\Figures\TRC Working Drawings\Figure 4 - Summary of Groundwater Sampling Results.dwg ... PLOT DATE: October 11, 2016 3:48PM - LAYOUT: Figure 4

Parameter	Result	Class GA Value
	ppb	
Acenaphthene	40	20
Naphthalene	45	10
Benzo(a)anthracene	3.9	0.002
Benzo(a)pyrene	3.0	ND
Benzo(b)fluoranthene	4.6	0.002
Benzo(k)fluoranthene	1.8	0.002
Chrysene	3.4	0.002
Indeno(1,2,3-cd)Pyrene	2.5	0.002
Aluminum, Total	2,600	100
Iron, Total	6,380	300
Lead, Total	265.1	25
Manganese, Total	451.8	300
Sodium, Total	199,000	20,000
Vanadium, Total	65.33	14
Aluminum, Dissolved	458	100
Iron, Dissolved	1,060	300
Lead, Dissolved	50.04	25
Manganese, Dissolved	359.9	300
Sodium, Dissolved	200,000	20,000
Vanadium, Dissolved	25.08	14

Parameter	Result	Class GA Value
	ppb	
Benzo(a)anthracene	0.07 J	0.002
Chrysene	0.06 J	0.002
Aluminum, Total	2,590	100
Cobalt, Total	5.72	5.0
Iron, Total	4,880	300
Lead, Total	34.7	25
Magnesium, Total	221,000	35,000
Sodium, Total	1,810,000	20,000
Vanadium, Total	78.61	14
Magnesium, Dissolved	204,000	35,000
Sodium, Dissolved	1,740,000	20,000
Vanadium, Dissolved	32 J	14

Parameter	Result	Class GA Value
	ppb	
Iron, Total	681	300
Sodium, Total	150,000	20,000

Parameter	Result	Class GA Value
	ppb	
Magnesium, Total	262,000	35,000
Sodium, Total	2,260,000	20,000

Parameter	Result	Class GA Value
	ppb	
Iron, Total	6,090	300
Magnesium, Total	59,400	35,000
Manganese, Total	1,133	300
Sodium, Total	417,000	20,000

Parameter	Result	Class GA Value
	ppb	
Iron, Total	1,430	300
Magnesium, Total	68,700	35,000
Manganese, Total	723.4	300
Sodium, Total	468,000	20,000

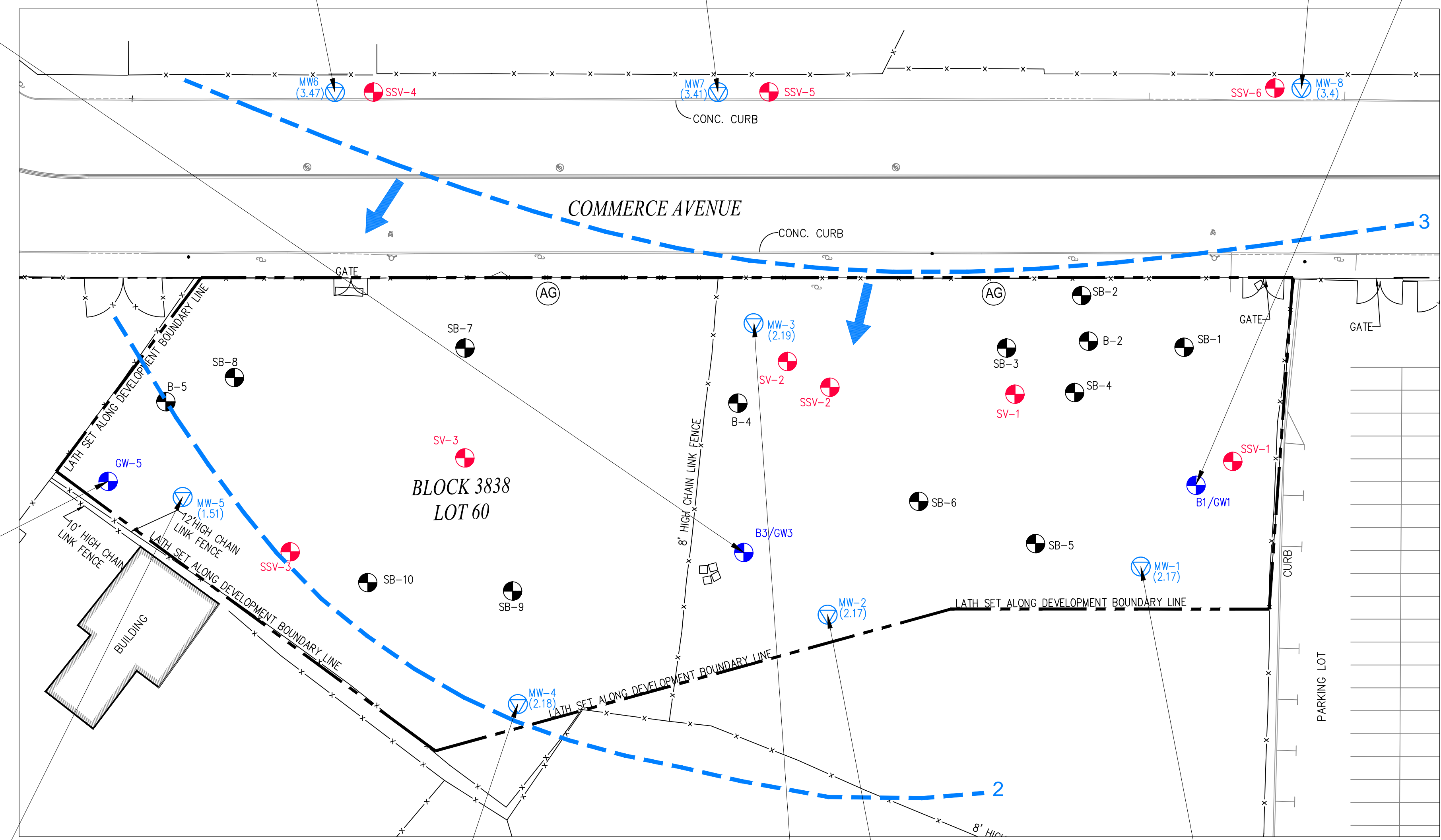
Parameter	Result	Class GA Value
	ppb	
Iron, Total	13,500	300
Magnesium, Total	52,300	35,000
Sodium, Total	325,000	20,000

Parameter	Result	Class GA Value
	ppb	
Iron, Total	832	300
Magnesium, Total	36,200	35,000
Manganese, Total	415.3	300
Sodium, Total	186,000	20,000

Parameter	Result	Class GA Value
	ppb	
Iron, Total	906	300
Sodium, Total	567,000	20,000

Parameter	Result	Class GA Value
	ppb	
p-Isopropyltoluene	6.0	5.0
Iron, Total	3,780	300
Magnesium, Total	45,100	35,000
Manganese, Total	851	300
Sodium, Total	717,000	20,000

Parameter	Result	Class GA Value
	ppb	
Benzo(a)anthracene	0.7	0.002
Benzo(a)pyrene	0.66	ND
Benzo(b)fluoranthene	0.83	0.002
Benzo(k)fluoranthene	0.55	0.002
Chrysene	0.89	0.002
Indeno(1,2,3-cd)Pyrene	0.45	0.002
Aluminum, Total	1,440	100
Antimony, Total	3.2	3.0
Iron, Total	7,490	300
Lead, Total	577.7	25
Magnesium, Total	44,700	35,000
Mercury, Total	1.81	0.7
Sodium, Total	234,000	20,000
Vanadium, Total	70.93	14
Aluminum, Dissolved	410	100
Antimony, Dissolved	4.88	3.0
Iron, Dissolved	1,380	300
Lead, Dissolved	255.9	25
Magnesium, Dissolved	42,700	35,000
Sodium, Dissolved	230,000	20,000
Vanadium, Dissolved	43	14



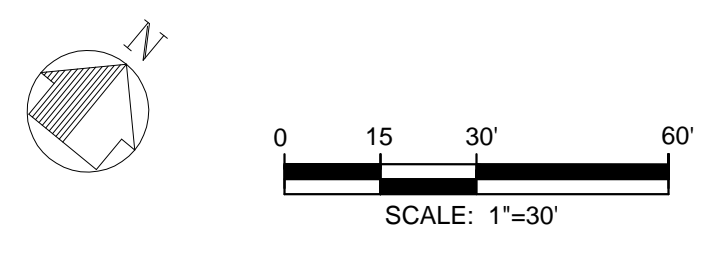
LEGEND

- B-1 SOIL BORING (JUNE, 2013)
- SB-1 SUPPLEMENTAL SOIL BORING (JUNE, 2015)
- B-1(GW) SOIL BORING WITH GRAB GROUNDWATER SAMPLE
- MW (1.36) PERMANENT MONITORING WELL (GROUNDWATER ELEVATION)
- SV-1 SOIL VAPOR SAMPLE (JUNE 2013)
- SSV-1 SUPPLEMENTAL SOIL VAPOR SAMPLE (JUNE, 2015)
- AG AMBIENT AIR SAMPLE
- GROUNDWATER ELEVATION CONTOUR (FT AMSL)
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

* ALL VALUES REPORTED AS PARTS PER BILLION (ppb)

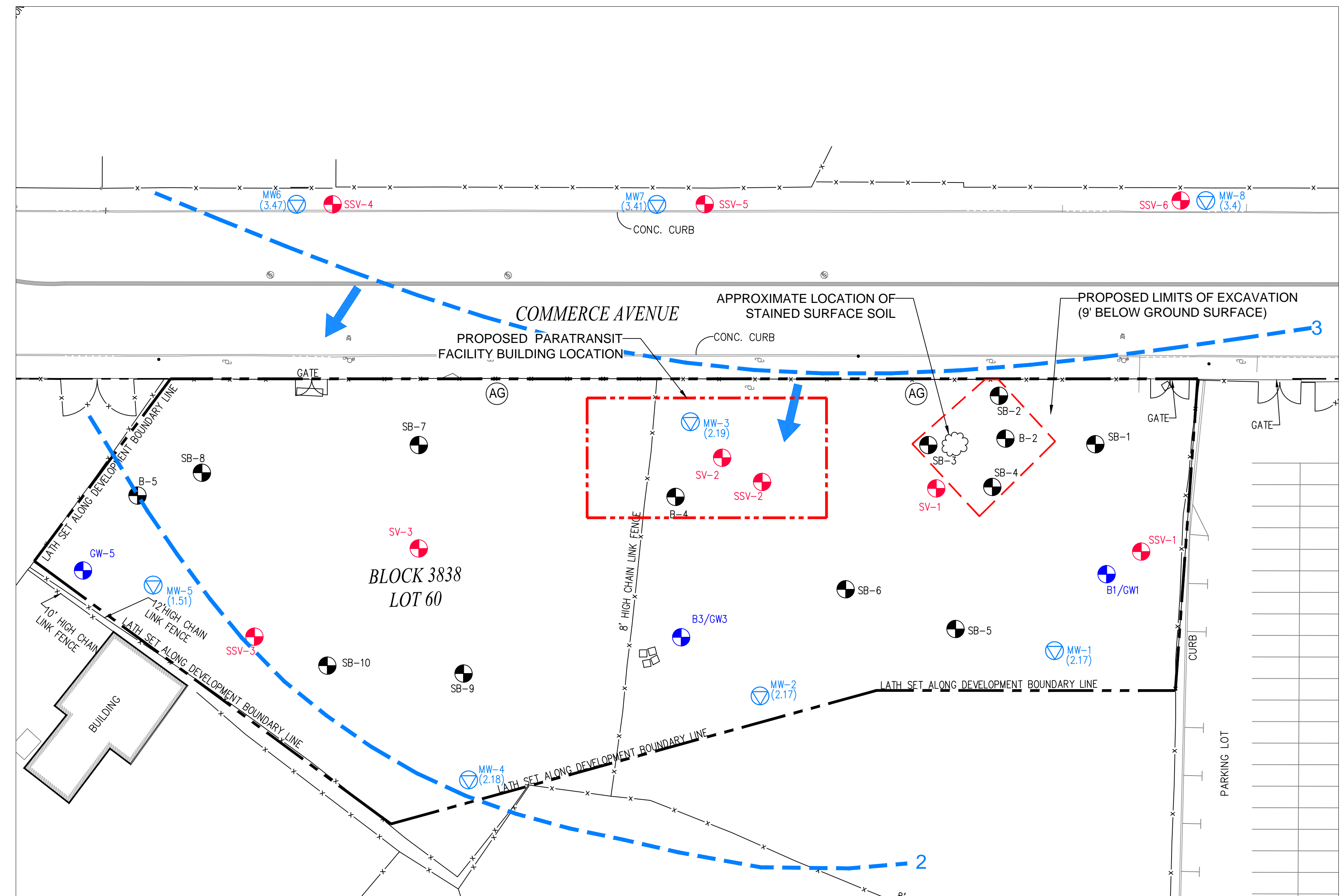
NOTE:

- DRAWING SOURCE FROM THE FOLLOWING DOCUMENT TITLED "SITE CHARACTERIZATION FINDINGS REPORT FOR THE PROPOSED MTA PARATRANSIT FACILITY", AT COMMERCE AVENUE, BRONX, NEW YORK. PREPARED BY PLANNING AND MANAGEMENT, INC. DATED JANUARY 2016.



PROJECT: NEW YORK CITY ENVIRONMENTAL DEVELOPMENT CORPORATION IRM WORK PLAN - PROPOSED PARATRANSIT FACILITY - COMMERCE AVENUE BLOCK: 3838, PORTION OF LOT: 60 BRONX, NEW YORK 10462	
TITLE: SUMMARY OF GROUNDWATER SAMPLING RESULTS	
DRAWN BY: HD	PROJ. NO.: 263418.0000.0000
CHECKED BY: DS	FIGURE 4
APPROVED BY: LM	
DATE: OCTOBER 2016	
1430 Broadway 10th Floor New York, NY 10018 Phone: 212.221.7822	
FILE NO.:	Figure 4 - Summary of Groundwater Sampling Results.dwg

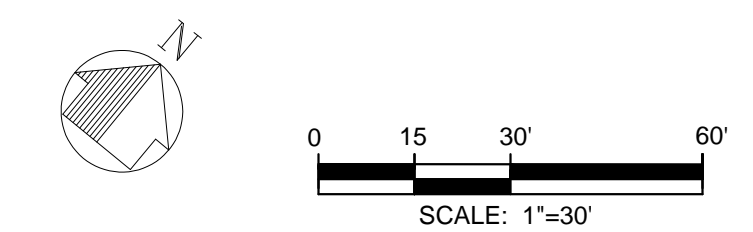
C:\Users\jgarcia\Documents\New York City Environmental Development Corporation\IRM Work Plan\Figures\TRC Working Drawings\Figure 6 - Proposed Excavation Plan 02.03.17.dwg - PLOT DATE: February 03, 2017 - 11:53AM - LAYOUT: FIGURE 6
 DRAWING NAME: C:\Users\jgarcia\Documents\New York City Environmental Development Corporation\IRM Work Plan\Figures\TRC Working Drawings\Figure 6 - Proposed Excavation Plan 02.03.17.dwg - PLOT DATE: February 03, 2017 - 11:53AM - LAYOUT: FIGURE 6



LEGEND

- B-1 SOIL BORING (JUNE, 2013)
- SB-1 SUPPLEMENTAL SOIL BORING (JUNE, 2015)
- B-1(GW) SOIL BORING WITH GRAB GROUNDWATER SAMPLE
- MW (1.36) PERMANENT MONITORING WELL (GROUNDWATER ELEVATION)
- SV-1 SOIL VAPOR SAMPLE (JUNE 2013)
- SSV-1 SUPPLEMENTAL SOIL VAPOR SAMPLE (JUNE, 2015)
- (AG) AMBIENT AIR SAMPLE
- GROUNDWATER ELEVATION CONTOUR (FT AMSL)
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY
- PROPOSED BUILDING FOOTPRINT

- NOTE:**
1. DRAWING SOURCE FROM THE FOLLOWING DOCUMENT TITLED "SITE CHARACTERIZATION FINDINGS REPORT FOR THE PROPOSED MTA PARATRANSIT FACILITY", AT COMMERCE AVENUE, BRONX, NEW YORK. PREPARED BY ENVIRONMENTAL PLANNING AND MANAGEMENT, INC. DATED JANUARY 2016.
 2. EXCAVATION IS NOT EXPECTED IN THE VICINITY OF THE PROPOSED BUILDING FOOTPRINT AS THE BUILDING WILL BE PILE SUPPORTED.



PROJECT: NEW YORK CITY ENVIRONMENTAL DEVELOPMENT CORPORATION IRM WORK PLAN - PROPOSED PARATRANSIT FACILITY - COMMERCE AVENUE BLOCK: 3838, PORTION OF LOT: 60 BRONX, NEW YORK 10462			
TITLE: PROPOSED EXCAVATION PLAN			
DRAWN BY:	HD	PROJ. NO.:	263418.0000.0000
CHECKED BY:	DS	FIGURE 6	
APPROVED BY:	LM		
DATE:	FEBRUARY 2017		
		1430 Broadway 10th Floor New York, NY 10018 Phone: 212.221.7822	
FILE NO.:	Figure 6 - Proposed Excavation Plan 02.03.17.dwg		



Figure 7: Project Organizational Chart



APPENDIX A
HEALTH AND SAFETY PLAN

**INTERIM REMEDIAL MEASURE WORK PLAN
APPENDIX A – SITE SPECIFIC HEALTH AND SAFETY PLAN
Proposed MTA Paratransit Facility (Site 203074)
Commerce Avenue, Bronx, New York
FEBRUARY 2017**

**INTERIM REMEDIAL MEASURE WORK PLAN – APPENDIX A
SITE SPECIFIC HEALTH AND SAFETY PLAN
PROPOSEED MTA PARATRANSIT FACILITY
COMMERCE AVENUE, BRONX, NEW YORK**

DISCLAIMER

STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THESE SITES. THE HEALTH AND SAFETY GUIDELINES IN THIS HEALTH AND SAFETY PLAN WERE PREPARED SPECIFICALLY FOR THIS PROJECT AND SHOULD NOT BE USED ON ANY OTHER SITE OR PROJECT WITHOUT PRIOR RESEARCH AND EVALUATION BY TRAINED HEALTH AND SAFETY SPECIALISTS.

INTERIM REMEDIAL MEASURE WORK PLAN – APPENDIX A
SITE SPECIFIC HEALTH AND SAFETY PLAN
PROPOSED MTA PARATRANSIT FACILITY
COMMERCE AVENUE, BRONX, NEW YORK

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2.0 SITE-SPECIFIC SAFETY PLAN	3
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2.2 Purpose.....	4
2.3 Site Description and History.....	4
3.0 SCOPE OF WORK.....	4
4.0 CONTAMINANTS OF CONCERN	5
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Appendices

Appendix A — Health and Safety Plan Acceptance

Appendix A — Safety Data Sheets

1.0 SITE-SPECIFIC TRAINING

Training should be provided to all employees whose work entails potential exposure to toxic chemicals or hazardous environments. The training is taught by experienced professionals and promotes safe work conditions through both classroom and field instruction.

Training should include the following:

1. 40-Hour Hazardous Materials Training
2. 8-Hour Hazardous Materials Annual Refresher Training
3. Training required under specific OSHA Standards

Supervisors receive additional training that is geared toward responsibilities and skills in project management.

2.0 SITE-SPECIFIC SAFETY PLAN

2.1 Introduction

This Health and Safety Plan (HASP) is developed for utilization during remedial activities for the Proposed Metropolitan Transportation Association (MTA) Paratransit Bus Facility, located on Commerce Avenue, Bronx, New York. The MTA Paratransit Bus Facility consists of an approximately 94,958 square- foot portion of Block 3838, Lot 60.

In accordance with the Interim Remedial Measure (IRM), the remedial activities to be performed on-site consist of soil excavation activities and construction of a vapor barrier and an active sub-slab depressurization system (SSDS). Following completion of the remedial action, engineering and institutional controls will be emplaced.

The site-specific safety plan was developed from preliminary Site visits and investigations as well as appropriate project documents. Revisions and/or alterations to this HASP may become necessary as more information becomes available. Any proposed changes to this HASP will be approved by the Health & Safety Coordinator (HSC) prior to implementation. All on-site

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personnel are required to read, review and strictly comply with the HASP. It is the responsibility of the Project Manager (PM) or designee to ensure that the HASP is implemented and enforced.

2.2 Purpose

The primary objective of the remedial activities will be to comply with the Interim Remedial Measure Work Plan for the Proposed MTA Paratransit Facility, Commerce Avenue, dated February 2017.

2.3 Site Description and History

The Site is located in Bronx County, New York and is identified as Block 3838 and Lot 60 on the New York City Tax Map. A United States Geological Survey (USGS) topographical quadrangle (Figure 1) shows the Site location. The Site is bounded by Commerce Avenue to the northeast, an industrial building to the northwest, Westchester Creek to the southeast, and a parking lot/industrial building (a fuel oil corporation) to the southwest.

According to zoning information provided by the New York City Department of City Planning (NYCDCP), the Site is located within an “M1-1” manufacturing district. Neither “E” nor “D” restrictive declarations are associated with the Site or adjoining properties. The Site consists of a portion of Block 3838, Lot 60.

The proposed Paratransit Facility will comprise of an approximately 5,000 square-foot building that will include a training room, administrative offices, and other back of house areas, as well as parking for approximately 150 Paratransit vehicles. The remainder of the Site will be completed as paved parking, with small planting areas possible within the sidewalk area along Commerce Avenue. It is expected that the new facility will serve to receive new vehicles from manufacturers and retired vehicles from private operators for temporary storage onsite until disbursed to new operators/owners, to perform asset recovery of selected vehicle equipment, and to train drivers and maintainers in the operation and maintenance of the vehicles.

3.0 SCOPE OF WORK

The project scope is detailed in the Interim Remedial Measure Work Plan, dated February 2017, which has been prepared to address contamination present at the Site associated with historic use

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of the Site. The overall objective of the remediation is to prepare the Site for use as a Paratransit Bus Facility and to remediate environmental conditions at the Site to the satisfaction of the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). The work will be performed in accordance with the Interim Remedial Measure Work Plan.

4.0 CONTAMINANTS OF CONCERN

Based on our understanding of the history of the Site and the results of previous environmental investigations performed at the Site, the following chemical hazards which require remediation have been identified: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and lead. Safety data sheet for contaminants of concern are presented in Appendix B.

5.0 EMERGENCY CONTACT NUMBERS

5.1 Emergency Contact Information

Hospital: St. Barnabas Hospital Phone No.: (718) 960 - 9000

Hospital Address: 4422 Third Avenue, 1st Floor, Bronx, NY 10457

Ambulance: 911 Fire Department: 911 (718) 999-2000 Police Department: 911;
43rd Precinct; (718) 542-0888

NYS Spill Hotline: 1-800-457-7362

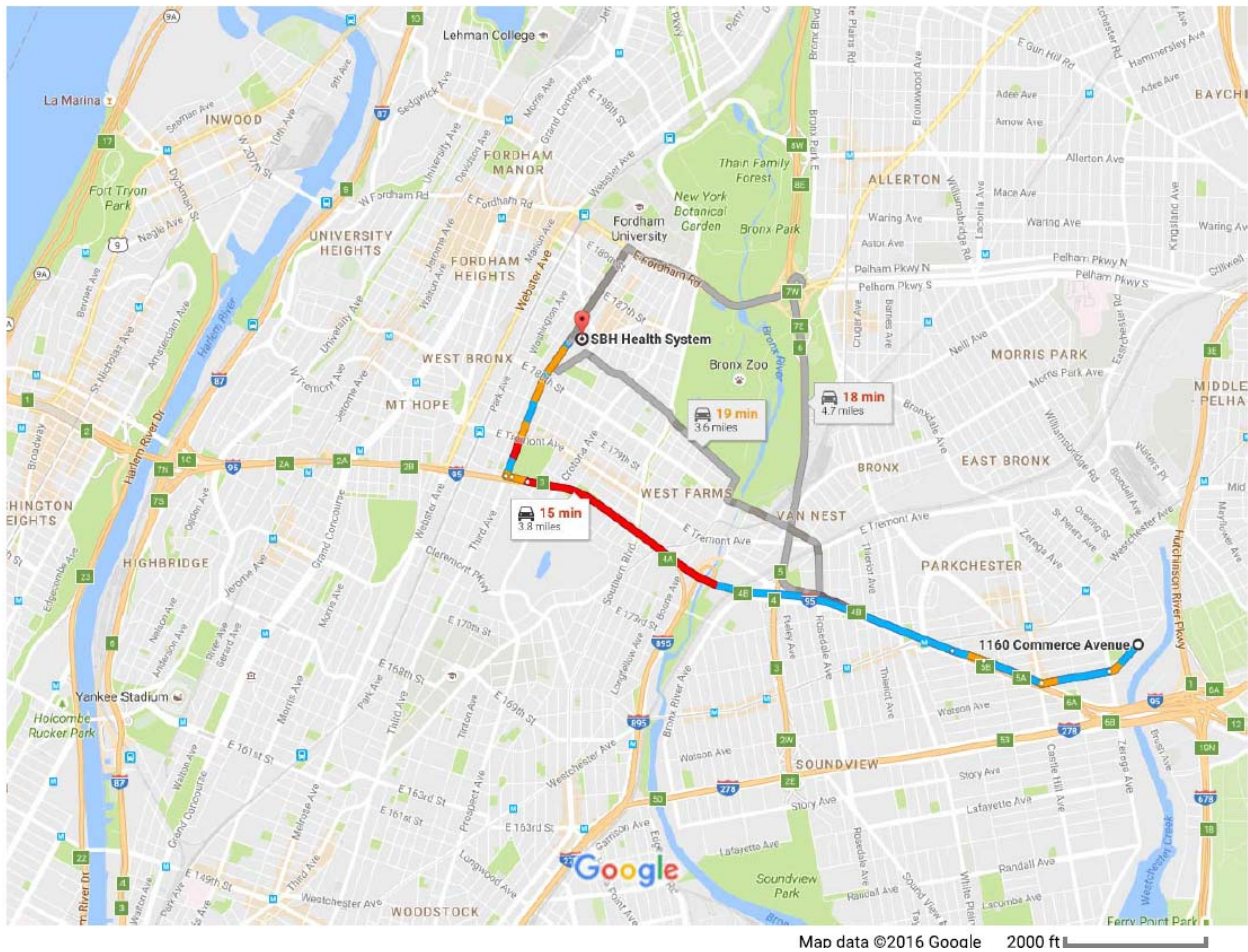
National Response Center: 1-800-424-8802

Poison Control: 800-222-1222; Local Number: (212) 689-9014

HOSPITAL DIRECTIONS

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

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1. Head southwest on Commerce Avenue toward Zerega Avenue
2. Continue onto Haviland Avenue
3. Slight right onto Cross Bronx Expressway, then use the left lane to merge onto I-95 S/Cross Bronx Expressway via the ramp to the George Washington Bridge
4. Stay on I-95S for approximately 2.2 miles; take Exit 3 for 3rd Avenue
5. Continue onto Cross Bronx Expressway
6. Turn right onto Firefighters Blvd/Third Avenue

Note: The St. Barnabas Health System is approximately 3.8 miles east of the Site.

5.2 Level of Protection

The Project Manager (PM) will continually evaluate levels of protection to be utilized by on-site personnel, with assistance from the Health & Safety Coordinator (HSC) and the Industrial Hygienist. The levels of protection may be downgraded or upgraded, as necessary, with approval by the PM.

5.3 Personal Protective Equipment (PPE)

As described in Standard 1910.120 Appendix B of the Occupational Safety and Health Standards, PPE is divided into four categories based on the degree of protection offered. The levels are designated as A, B, C, and D. Level A is the highest level of protection and Level D is the lowest level of protection.

The different levels are primarily dependent upon the degree of respiratory protection necessary, in conjunction with appropriate protective clothing. Levels of protection mandate a degree of respiratory protection. However, flexibility exists within the lower levels (B, C, and D) concerning proper protective clothing.

The four levels of protection were developed for utilization in situations which involve suspected or known atmospheric and/or environmental hazards including airborne contamination and skin-affecting substances. It is anticipated that most work will be performed under Level D protection. Level D protection is applicable when no respiratory protection and minimal skin protection is required. Level D can be used in the following circumstances:

- The atmosphere contains no known hazard
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

The Level D recommended equipment for this site includes:

- Work clothes (no shorts or cutoffs)
- Safety boots/shoes
- Safety glasses or chemical splash goggles: Eye protection will be worn when personnel are exposed to flying debris, liquids, chemical vapors or particulates.

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- Hard hats: Appropriately rated hard hats will be worn by personnel for protection against overhead hazards, when present.
- Hearing protection: To be worn by all personnel exposed to at least 85 dB of sound during the workday.
- Work gloves or chemically protective gloves when potentially exposed to contaminants (i.e., during soil and groundwater sampling).

Level D may be modified by the HSC to include protective clothing or equipment (Saran-coated disposable coveralls or PVC splash suits, safety glasses, hard hat with face shield, and chemically resistant boots) based upon physical hazards, skin contact concerns, and real-time monitoring.

6.0 ON-SITE OPERATION

Chemical hazards are expected to be low. These chemical hazards potentially can include VOCs, SVOCs, and metals.

First Aid Procedures for Chemical Exposures

EYE: If any chemicals come in contact with eyes, immediately wash the eyes with large amounts of water, occasionally lifting lower and upper lids. Get medical attention immediately.

BREATH: If person breathes large amounts of any chemicals, remove person to fresh air. If breathing has stopped, perform artificial respiration. Keep affected person warm and rested. Get medical attention as soon as possible.

SKIN: If any chemicals except those listed below come in contact with the skin, immediately wash skin with soap and water. Get medical attention promptly. If chemical penetrates clothing, immediately remove clothing and wash with soap and water.

Soap should not be used if the following chemicals (sample preservatives) potentially encountered at the site contact skin or clothing, water wash only:

Hydrochloric acid

Nitric acid

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Sodium hydroxide

Sulfuric acid

Special attention must be paid to not using soap with these chemicals.

SWALLOW: If any chemicals are swallowed get medical attention immediately.

6.1 Air Monitoring Requirements

Real-time air monitoring for VOCs and observations of particulate levels at the perimeter of the work areas will be completed during intrusive activities. Community air monitoring will be performed in accordance with the Community Air Monitoring Plan (CAMP) dated February 2017 (refer to Appendix D of the Interim Remedial Measure Work Plan).

6.2 Biological Hazards

There may be a possible hazard arising from poisonous plants, such as poison ivy, and from some animals, such as snakes, rats, and insects such as ticks. Personnel shall avoid all contact with animals.

All personnel will be trained to identify poison ivy during the preliminary site safety meetings.

Insects, including bees, wasps, hornets and spiders, may be present at the Site making the chance of a bite possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition. Personnel that have been bitten or stung by an insect at the Site should notify the HSC of such immediately. The following is a list of preventive measures:

- Apply insect repellent prior to fieldwork and or as often as needed throughout the shift.
- Wear proper protective clothing (work boots, socks and light colored pants).
- When walking in wooded areas, to the extent possible avoid contact with bushes, tall grass, or brush.

Field personnel who may have insect allergies (i.e., bee sting) should provide this information to the HSC or his designee prior to commencing work, and shall have allergy medication on Site.

The HSC will instruct the project personnel in the recognition and procedures for encountering potentially hazardous insects at the Site.

Mosquitoes infected with the West Nile Virus have been identified in the New York City Metropolitan area. Field personnel will acquaint themselves with the symptoms associated with

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West-Nile Virus and will contact a physician, as well as the HSC, if the disease is suspected.

Lyme disease is caused by infection from a deer tick that carries a spirochete. During the painless tick bite, the spirochete may be transmitted into the bloodstream, which could lead to the worker contracting Lyme disease. This flu like illness commonly happens between May and October when ticks are more active. Symptoms can include a stiff neck, chills, fever, sore throat, headache, fatigue and joint pain. Early signs may include an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve or heart problems as well as a disabling type of arthritis. If personnel feel sick or have signs similar to those above, they should notify the HSC immediately.

It is recommended that personnel check themselves when in areas that could harbor deer ticks, wear light color clothing and visually check themselves and their buddy when coming from wooded or vegetation-covered areas. If a tick is found biting an individual, the HSC should be contacted immediately. The tick can be removed by pulling gently at the head with tweezers. The affected area should then be disinfected with an antiseptic wipe.

6.3 Physical Hazards

The physical hazards are anticipated to be low and are outlined in Table A-1 below.

**TABLE A-1
 PHYSICAL HAZARDS**

HAZARD TYPE	KNOWN	POTENTIAL
Heat Stress/Cold Stress		X
Severe Weather (lightning, snow, sleet)		X
Excessive Noise		X
Facility Operations (machinery, structures)		X
Unstable ground (wet areas)		X

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Site Operations (drilling, excavation, hand and power tool use, steam cleaning)	X	
Heavy lifting/moving	X	
Hazardous materials use & storage		X
Fire		X
Slips, trips, and falls		X
Cuts, punctures		X

Personnel can avoid most of the hazards listed above including hand tools, hazardous materials use, slips, trips and falls, and punctures and cuts by remaining alert and performing safe work practices during all site activities. Other proper work practices are outlined below.

1. To avoid falling objects:

- a. Do not walk or stand under suspended/overhead loads (including scaffolding).
- b. Be aware of falling objects in the work area.
- c. Secure overhead objects.

2. When using hand tools:

- a. Hand tools will meet the manufacturer's safety standards.
- b. Hand tools will not be altered in any way.
- c. Makeshift tools will not be used.
- d. At a minimum, eye protection will be used when working with hand tools.
- e. Wrenches, including adjustable, pipe, end and socket wrenches, will not be used when jaws are sprung to the point that slippage occurs.
- f. Impact tools such as drift pins, wedges and chisels, will be kept free of mushroom heads.
- g. Wooden handles will be free of splinters or cracks and secured tightly to the tool.

3. Overhead Wires:

If contact is possible (i.e., ladder, equipment, crane lift, etc.) one or more of the following will be done:

- Power sources will be disconnected by the utility;
- Power sources will be shielded by the utility; and
- Object will get no closer than 12 feet to prevent arcing.

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4. Slips, Trips and Falls:

- a. Proper lighting will be maintained at all times.
- b. Walkways will remain clear and unobstructed at all times.
- c. When possible, cords, hose lines, etc., will be raised to reduce or eliminate trip hazards.

5. Noise

Approved hearing protection will be required in work areas involving heavy equipment, impact tools, drilling, etc. In general, hearing protection should be worn if an individual cannot be heard in a normal speaking voice at a distance of two feet.

6.4 Electrical Utility Hazards

The following subsurface utility clearance procedure will be implemented:

- Available site plans for work involving activities at or near utilities will be reviewed.
- For environmental investigation work, the utility mark-out subcontractor will conduct a geophysical survey around all proposed sampling locations to identify subsurface electric utilities and mark the centerline of underground lines.
- The drilling or excavation contractor will notify the NYC One Call Center at (800) 272-4480, in accordance with Code 753, a minimum of 5 working days prior to any drilling or excavation on streets and sidewalks.

6.5 Mechanical Hazards

Depending on the particular machinery employed, excavation activity can present exposure to the following:

- Flying objects (chipped asphalt or concrete, soil) and dust. Measures used to control such exposures will include use of water misting apparatus to keep dust down, or use of a guard installed around excavator to protect against flying objects and dust.
- Underground utilities present fire, electrocution, burn and explosion hazards. Positions of gas, electric and steam utility lines will be verified as described in Section 6.4. If possible, all lines in the area of excavation will be de-energized, locked-out, and tested before work begins.

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- Assembling and disassembling excavators, rigs, rotary and auger drilling.
- Perimeter protection in the form of barricades is necessary for the protection of employees and subcontractor personnel and the public. Such protection will meet requirements set forth in 29 CFR 1926, as well as in the New York City Building Code, Article 19.
- All subsurface utility lines in the area of drilling will be identified jointly with the utility mark-out subcontractor and NYC One-Call Center.

6.6 Vehicular Traffic

When working in or near active streets, all project personnel shall wear orange safety vests. All New York City requirements indicated in the codes on the work permit shall also be followed without deviation. Control procedures will include one or more of the following:

- Advance warning signs, warning flashers, message arrows or flashing arrows to alert motorists of physical conditions ahead;
- Manhole guard rails to protect personnel and pedestrians;
- Stanchions and boundary tape, barricades, cones to outline the boundaries of the work area and to limit public access;
- Signaling devices such as signal flags, signal lights and paddles to signal oncoming traffic;
- Safety vests worn by personnel to alert oncoming traffic to their presence; and
- Low intensity lights placed on barricades to outline excavations.

6.7 Communication

Personnel shall be equipped with cellular telephones. If an emergency occurs, and the team members are not in close proximity to each other, communication will occur via telephone.

6.8 Heat and Cold Stress

COLD STRESS

Ambient air temperatures during site activities may create cold stress for on-site workers. Procedures for recognizing and avoiding cold stress must be followed. Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress are listed below.

Frostbite is defined as the actual freezing of one or more layers of skin. In severe cases, organs and structures below the skin can become frozen. Usually, body areas exposed to the most cold, and least body warmth, are affected first. These areas include fingers, toes, ears, and the tip of your nose. Frostbite is characterized by pain and loss of dexterity in the affected limb. The tissue initially appears reddened, but may progress to white, blue, or black.

FIRST AID: Bring the affected employee indoors and call the local emergency clinic. Rewarming of frostbitten parts is best left to a medical doctor in a controlled setting.

Hypothermia is the condition that occurs when the body's natural warming mechanisms (muscle activity and shivering) cannot counteract the loss of body heat to the environment. The onset of hypothermia is greatly hastened by being wet. Hypothermia is marked by severe, uncontrollable shivering. The patient will show signs of excessive fatigue, drowsiness, irritability, or euphoria. As hypothermia progresses, the patient will begin to lose consciousness, blood pressure will drop, shivering will cease, and the patient may slip into a coma and possibly die.

FIRST AID: If these symptoms occur, remove the patient to a warm, dry place. If clothing is wet, remove and replace with dry clothing. Keep the patient warm, but not overheated. The patient should be gradually rewarmed to prevent shock. If the patient is conscious and alert, warm liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Notify the emergency clinic if conditions worsen, the patient loses consciousness, or the patient has an altered mental status. Have the patient transported to an emergency facility.

General Precautions. The reduction of adverse health effects from cold exposure can be achieved by adopting the following work practices.

- Provide adequate insulating clothing to maintain core temperature at 98.6° F if work is to be performed in air temperatures below 40° F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the air temperature in the work area, the greater the

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insulation value of the protective clothing should be.

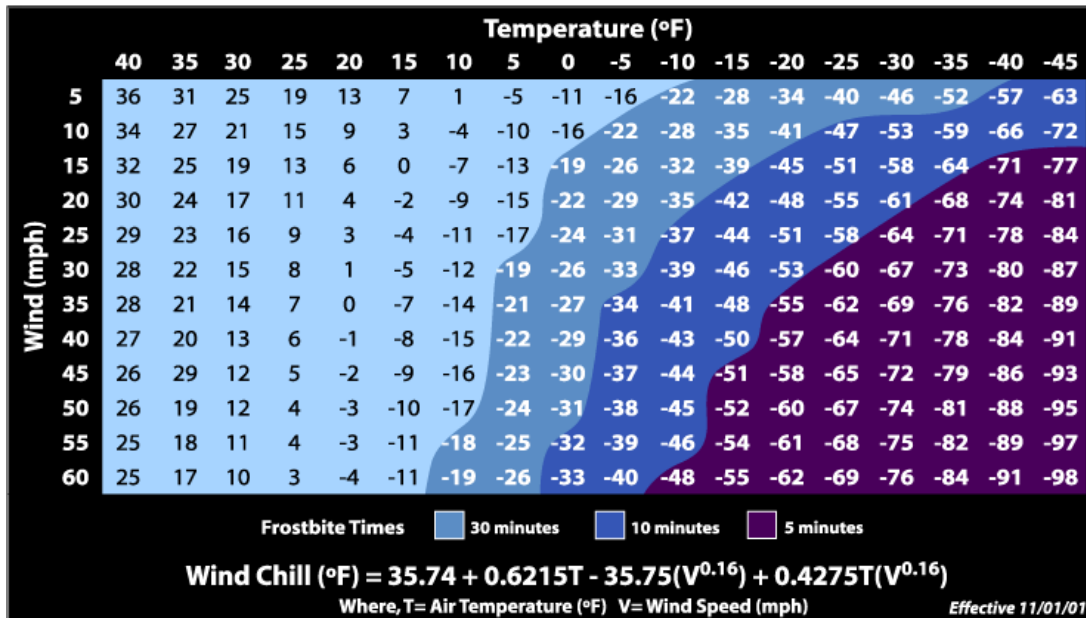
- If the air temperature is 32° F or less, hands should be protected by mittens/gloves.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of clothing should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer layer should be changed as it becomes wet. The outer garments should include provisions for easy ventilation in order to prevent wetting of the inner layer by sweat.
- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is available, or until weather conditions improve.
- For prolonged work, heated shelters should be available. Workers should be encouraged to use these at regular intervals, with the frequency depending on the severity of the environmental exposure. When entering the shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit heat evaporation, or a change of work clothing should be provided.
- Warm, sweet drinks, such as hot cocoa or soup, should be available at the work site to provide caloric intake and fluid volume. The intake of coffee should be limited because of diuretic and circulatory effects.
- The weight and bulk of cold-weather gear should be included in estimating the required work performance and weights to be lifted in the field.

Workers should be instructed in safety and health procedures regarding cold work environments as part of the pre-work safety meeting. The training program should include instruction in preventing, recognizing, and treating cold stress conditions.

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Wind Chill Chart



HEAT STRESS

There is a potential for heat stress from the use of protective clothing and climate conditions. One or more of the following procedures may be employed to alleviate potential heat stress problems in the event that site conditions warrant the use of personal protective equipment (PPE), or ambient temperatures exceed 85° F. Heat stress training must be emphasized during the daily safety meetings, and adequate supplies of potable water must be provided to workers each day.

General Precautions. Provide plenty of liquids. To replace body fluids (water and electrolytes) lost because of sweating, use a 0.1 percent saltwater solution, more heavily salted foods, or commercial drink mixes. The commercial mixes may be preferable for those employees on a low sodium diet. Employees on low sodium diets, or other special diets, are advised to contact their personal physician for recommendations regarding appropriate electrolyte replacement fluids/beverages.

In extremely hot weather, conduct operations in early morning or evening and rotate shifts of workers wearing impervious clothing. Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.

Ensure that adequate shelter is available for breaks to protect personnel against heat, which can decrease

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physical efficiency and increase the probability of accidents.

Acclimatization for workers not accustomed to working in elevated temperature environments will be considered and implemented as appropriate in accordance with American Conference of Governmental and Industrial Hygienists (ACGIH) Guidelines.

Heat Stress Monitoring.

For monitoring the body's recuperative ability toward excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing impervious clothing should commence when the ambient temperature is 70° F or above. Frequency of monitoring should increase as the ambient temperature increases or as slow recovery rates are indicated. When temperatures exceed 80° F, regardless of the use of Personal Protective Equipment (PPE), workers will be monitored for heat stress after every work period.

Good hygienic standards must be maintained by the employee to aid in the prevention of heat stress illnesses. At a minimum, frequent changes of clothing and daily showering should occur with clothing being allowed to dry during rest periods. Persons who notice skin problems should immediately inform their supervisor.

Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 25 percent. The HR is then measured again, once each minute for 2 minutes (a total of three measurements), after the initial rest period measurement. The HR should decrease by ten beats per minute between each measurement (a total reduction of 20 beats). If the HR does not decrease, the work period should be reduced by an additional 25 percent.

Body temperature can be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99°F. If it is greater than 99°F, the next work period should be shortened by 25 percent. The OT should be measured again at the end of the rest period to make sure that it has dropped below 99° F.

Effects of Heat Street

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat loading, a number of physical reactions can occur. The severity of these reactions ranges from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to severe (fatal).

Heat-related illnesses include:

Heat rash (also known as prickly heat rash) is caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Heat rash decreases the ability to tolerate heat as well as being a nuisance. Signs are not limited to, but may include, a red prickly rash.

Appendix A
Health and Safety Plan Acceptance

Appendix B
Safety Data Sheets

SAFETY DATA SHEET


Airgas

Benzene

Section 1. Identification

GHS product identifier	: Benzene
Chemical name	: benzene
Other means of identification	: benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol
Product use	: Synthetic/Analytical chemistry.
Synonym	: benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol
SDS #	: 001062
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Emergency telephone number (with hours of operation)	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE LIQUIDS - Category 2 SKIN CORROSION/IRRITATION - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2 GERM CELL MUTAGENICITY - Category 1B CARCINOGENICITY - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (bone marrow) - Category 1
GHS label elements	
Hazard pictograms	: 
Signal word	: Danger
Hazard statements	: Highly flammable liquid and vapor. May form explosive mixtures with air. Causes serious eye irritation. Causes skin irritation. May cause genetic defects. May cause cancer. Causes damage to organs through prolonged or repeated exposure. (bone marrow)
Precautionary statements	
General	: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Date of issue/Date of revision : 4/26/2015. **Date of previous issue** : 10/16/2014. **Version** : 0.03 1/14

Section 2. Hazards identification

- Prevention** : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
- Response** : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
- Storage** : Store locked up. Store in a well-ventilated place. Keep cool.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Hazards not otherwise classified** : None known.

Section 3. Composition/information on ingredients

- Substance/mixture** : Substance
- Chemical name** : benzene
- Other means of identification** : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

CAS number/other identifiers

- CAS number** : 71-43-2
- Product code** : 001062

Ingredient name	%	CAS number
benzene	100	71-43-2

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Section 4. First aid measures

- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : Causes skin irritation.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : Harmful if swallowed. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO₂, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
benzene	<p>ACGIH TLV (United States, 3/2012). Absorbed through skin. STEL: 8 mg/m³ 15 minutes. STEL: 2.5 ppm 15 minutes. TWA: 1.6 mg/m³ 8 hours. TWA: 0.5 ppm 8 hours.</p> <p>NIOSH REL (United States, 1/2013). STEL: 1 ppm 15 minutes. TWA: 0.1 ppm 10 hours.</p> <p>OSHA PEL (United States, 6/2010). STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours.</p> <p>OSHA PEL Z2 (United States, 11/2006). AMP: 50 ppm 10 minutes. CEIL: 25 ppm TWA: 10 ppm 8 hours.</p>

Section 8. Exposure controls/personal protection

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.
- Individual protection measures**
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Liquid. [Watery liquid.]
- Color** : Colorless. Yellowish.
- Molecular weight** : 78.12 g/mole
- Molecular formula** : C₆-H₆
- Boiling/condensation point** : 80.09°C (176.2°F)
- Melting/freezing point** : 5.49°C (41.9°F)
- Critical temperature** : 288.95°C (552.1°F)
- Odor** : Characteristic.
- Odor threshold** : Not available.

Section 9. Physical and chemical properties

pH	: Not available.
Flash point	: Closed cup: -11°C (12.2°F)
Burning time	: Not applicable.
Burning rate	: Not applicable.
Evaporation rate	: 3.5 (butyl acetate = 1)
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 1.2% Upper: 7.8%
Vapor pressure	: 10 kPa (75.006094245 mm Hg) [room temperature]
Vapor density	: 2.7 (Air = 1)
Specific Volume (ft³/lb)	: 1.1403
Gas Density (lb/ft³)	: 0.877 (20°C / 68 to °F)
Relative density	: 0.88
Solubility	: Not available.
Solubility in water	: 1.88 g/l
Partition coefficient: n-octanol/water	: 2.13
Auto-ignition temperature	: 498°C (928.4°F)
Decomposition temperature	: Not available.
SADT	: Not available.
Viscosity	: Dynamic (room temperature): 0.604 mPa·s (0.604 cP)

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Incompatibility with various substances	: Highly reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
benzene	LC50 Inhalation Gas.	Rat	10000 ppm	7 hours
	LD50 Oral	Rat	930 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
benzene	Eyes - Moderate irritant	Rabbit	-	88 milligrams	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
benzene	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
benzene	Category 1	Not determined	bone marrow

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Section 11. Toxicological information

- Skin contact** : Causes skin irritation.
- Ingestion** : Harmful if swallowed. Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Not available.

- General** : Causes damage to organs through prolonged or repeated exposure.
- Carcinogenicity** : May cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenicity** : May cause genetic defects.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Date of issue/Date of revision : 4/26/2015. *Date of previous issue* : 10/16/2014. *Version* : 0.03 9/14

Section 12. Ecological information

Product/ingredient name	LogP _{ow}	BCF	Potential
benzene	2.13	11	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.






Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Benzene (I,T)	71-43-2	Listed	U019

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1114	UN1114	UN114	UN1114	UN1114
UN proper shipping name	BENZENE	BENZENE	BENZENE	BENZENE	BENZENE
Transport hazard class(es)	3 	3 	3 	3 	3 
Packing group	II	II	II	II	II
Environment	No.	No.	No.	No.	No.
Additional information	Reportable quantity 10 lbs / 4.54 kg [1.3675 gal / 5.1767 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	Explosive Limit and Limited Quantity Index 1 Passenger Carrying Road or Rail Index 5	-	-	Passenger and Cargo Aircraft Quantity limitation: 5 L Cargo Aircraft Only Quantity limitation: 60 L Limited Quantities - Passenger Aircraft Quantity limitation: 1 L

Section 14. Transport information

	<u>Limited quantity</u> Yes.				
	<u>Packaging instruction</u> Passenger aircraft Quantity limitation: 5 L Cargo aircraft Quantity limitation: 60 L				
	<u>Special provisions</u> IB2, T4, TP1				

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Special precautions for user : **Transport within user’s premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): This material is listed or exempted.
Clean Water Act (CWA) 307: benzene
Clean Water Act (CWA) 311: benzene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
 Immediate (acute) health hazard
 Delayed (chronic) health hazard

Composition/information on ingredients

Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
benzene	100	Yes.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	benzene	71-43-2	100
Supplier notification	benzene	71-43-2	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

- Massachusetts** : This material is listed.
New York : This material is listed.
New Jersey : This material is listed.
Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)

- Canada inventory** : This material is listed or exempted.

International regulations

- International lists** :
- Australia inventory (AICS):** This material is listed or exempted.
 - China inventory (IECSC):** This material is listed or exempted.
 - Japan inventory:** This material is listed or exempted.
 - Korea inventory:** This material is listed or exempted.
 - Malaysia Inventory (EHS Register):** Not determined.
 - New Zealand Inventory of Chemicals (NZIoC):** This material is listed or exempted.
 - Philippines inventory (PICCS):** This material is listed or exempted.
 - Taiwan inventory (CSNN):** Not determined.

- Chemical Weapons Convention List Schedule I Chemicals** : Not listed

- Chemical Weapons Convention List Schedule II Chemicals** : Not listed

- Chemical Weapons Convention List Schedule III Chemicals** : Not listed

Canada

Date of issue/Date of revision : 4/26/2015. Date of previous issue : 10/16/2014. Version : 0.03 12/14

Section 15. Regulatory information

- WHMIS (Canada)** : Class B-2: Flammable liquid
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).
CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

- Canada Label requirements** : Class B-2: Flammable liquid
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).

Hazardous Material Information System (U.S.A.)

Health	*	2
Flammability		3
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

- Date of printing** : 4/26/2015.
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Date of previous issue : 10/16/2014.
Version : 0.03

Section 16. Other information

- Key to abbreviations**
- : ATE = Acute Toxicity Estimate
 - BCF = Bioconcentration Factor
 - GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 - IATA = International Air Transport Association
 - IBC = Intermediate Bulk Container
 - IMDG = International Maritime Dangerous Goods
 - LogPow = logarithm of the octanol/water partition coefficient
 - MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 - UN = United Nations
 - ACGIH – American Conference of Governmental Industrial Hygienists
 - AIHA – American Industrial Hygiene Association
 - CAS – Chemical Abstract Services
 - CEPA – Canadian Environmental Protection Act
 - CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
 - CFR – United States Code of Federal Regulations
 - CPR – Controlled Products Regulations
 - DSL – Domestic Substances List
 - GWP – Global Warming Potential
 - IARC – International Agency for Research on Cancer
 - ICAO – International Civil Aviation Organisation
 - Inh – Inhalation
 - LC – Lethal concentration
 - LD – Lethal dosage
 - NDSL – Non-Domestic Substances List
 - NIOSH – National Institute for Occupational Safety and Health
 - TDG – Canadian Transportation of Dangerous Goods Act and Regulations
 - TLV – Threshold Limit Value
 - TSCA – Toxic Substances Control Act
 - WEEL – Workplace Environmental Exposure Level
 - WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

 Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

LEAD METAL SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product Identity: Lead Metal

Trade Names and Synonyms: Lead; Pb; Plumbum; Metallic Lead; Inorganic Lead; ASTM B29; TADANAC Lead, Low-Alpha Lead.

Manufacturer:

Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:

In U.S.:
Teck American Metal Sales
Incorporated
501 North Riverpoint Blvd, Suite 300
Spokane, WA
USA, 99202

Preparer:

Teck Metals Ltd.
Suite 3300 – 550 Burrard Street
Vancouver, British Columbia
V6C 0B3

Other than U.S.:

Teck Metals Ltd.
#1700 – 11 King Street West
Toronto, Ontario
M5H 4C7

Date of Last Review: June 29, 2015.

Date of Last Edit: June 29, 2015.


Product Use: Used as a construction material for tank linings, piping, and equipment used in the manufacture of sulphuric acid and the refining and processing of petroleum; used in x-ray and atomic radiation shielding; used in the manufacture of paint pigments, organic and inorganic lead compounds, lead shot, lead wire for bullets, ballast, and lead solders; used as a bearing metal or alloy; used in the manufacture of storage batteries, ceramics, plastics, and electronic devices; used in the metallurgy of steel and other metals; and used in the form of lead oxide for batteries.

SECTION 2. HAZARDS IDENTIFICATION

CLASSIFICATION:

Health	Physical	Environmental
Acute Toxicity (Oral, Inhalation) – Does not meet criteria Skin Corrosion/Irritation – Does not meet criteria Eye Damage/Eye Irritation – Does not meet criteria Respiratory or Skin Sensitization – Does not meet criteria Mutagenicity – Does not meet criteria Carcinogenicity – Category 2 Reproductive Toxicity – Category 1A Specific Target Organ Toxicity Chronic Exposure – Category 1	Does not meet criteria for any Physical Hazard	Aquatic Toxicity – Short Term (Acute) Category 3

LABEL:

Symbols: 	Signal Word: DANGER
Hazard Statements DANGER! Causes damage to kidneys, blood-forming systems, central nervous system and digestive tract through prolonged or repeated exposure. May damage the unborn child. May cause harm to breast-fed children. Suspected of damaging fertility. Suspected of causing cancer. Harmful to aquatic life.	Precautionary Statements: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection. Do not breathe dust or fumes. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. If exposed or concerned or you feel unwell: Get medical advice/attention. Avoid release to the environment.

Emergency Overview: A bluish-white to silvery-grey, heavy, soft metal that does not burn in bulk. Finely-divided lead dust clouds are a moderate fire and explosion hazard, however. When heated strongly in air, highly toxic lead oxide fumes can be generated. Inhalation or ingestion of lead may produce both acute and chronic health effects. Possible cancer and reproductive hazard. SCBA and full protective clothing are required for fire emergency response personnel.

Potential Health Effects: Inhalation or ingestion of lead may result in headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia and leg, arm, and joint pain. Prolonged exposure may also cause central nervous system damage, hypertension, gastrointestinal disturbances, anemia, kidney dysfunction and possible reproductive effects. Pregnant women should be protected from excessive exposure in order to prevent lead crossing the placental barrier and causing infant neurological disorders. Lead and inorganic lead compounds are listed as an *A3 Carcinogen (Confirmed Animal Carcinogen with Unknown Relevance to Humans)* by the ACGIH. IARC has listed lead compounds as *Group 2A Carcinogens (Probably Carcinogenic to Humans)* while lead metal is listed as *Group 2B (Possibly Carcinogenic to Humans)*. The NTP lists lead and lead compounds as *Reasonably Anticipated to be a Human Carcinogen*. OSHA and the EU does not currently list lead as a human carcinogen (see Toxicological Information, Section 11).

Potential Environmental Effects: Lead metal has relatively low bioavailability; however, compounds which it forms with other elements can be toxic to both aquatic and terrestrial organisms at low concentrations. These compounds can be particularly toxic in the aquatic environment. Lead bioaccumulates in plants and animals in both aquatic and terrestrial environments (see Ecological Information, Section 12).

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENT	CAS Registry No.	CONCENTRATION (% wgt/wgt)
Lead	7439-92-1	99+%

Note: See Section 8 for Occupational Exposure Guidelines.

SECTION 4. FIRST AID MEASURES

Eye Contact: *Symptoms:* Eye irritation, redness. Gently brush product off face if necessary. Do not rub eye(s). Let the eye(s) water naturally for a few minutes. Look right and left, then up and down. If particle/dust does not dislodge, cautiously rinse eye(s) with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, get medical advice/attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Symptoms:* Skin soiling, mild irritation. Gently brush away excess dust. Wash gently and thoroughly with lukewarm, gently flowing water and non-abrasive soap for 5 minutes, or until product is removed. If skin irritation occurs or you feel unwell, get medical advice/attention. *Molten Metal:* Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: *Symptoms:* Respiratory irritation. Remove source of exposure or move person to fresh air and keep comfortable for breathing. Seek medical attention if you feel unwell.

Ingestion: *Symptoms:* Stomach upset. If you feel unwell or are concerned, get medical advice/attention.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable or combustible. Finely-divided lead dust or powder is a moderate fire hazard and moderate explosion hazard when dispersed in the air at high concentrations and exposed to heat, flame, or other ignition sources. Explosions may also occur upon contact with certain incompatible materials (see Stability and Reactivity, Section 10).

Extinguishing Media: Use any means of extinction appropriate for surrounding fire conditions such as water spray, carbon dioxide, dry chemical, or foam.

Fire Fighting: Do not use direct water streams on fires where molten metal is present, due to the risk of a steam explosion that could potentially eject molten metal uncontrollably. Use a fine water mist on the front-running edge of the spill and on the top of the molten metal to cool and solidify it. If possible, move solid material from fire area or cool material exposed to flame to prevent melting of the metal ingots. Highly toxic lead oxide fumes may evolve in fires. Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Restrict access to the area until completion of clean-up. Clean up spilled material immediately, observing precautions outlined below. Molten metal should be allowed to solidify before cleanup. If solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment (see below) and use methods which will minimize dust generation (e.g., vacuum solids). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Personal Precautions: Persons responding to an accidental release should wear protective clothing, gloves and a respirator (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust and fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from hot-metal splash as well as a respirator to protect against inhalation of lead fume. Workers should wash and change clothing following cleanup of a lead spill to prevent personal contamination with lead dust.

Environmental Precautions: Lead metal has low bioavailability; however, compounds which it forms with other elements can be toxic to aquatic and terrestrial organisms. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store in a DRY, covered area, separate from strong acids, other incompatible materials, active metals and food or feedstuffs. Solid metal suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. No special packaging materials are required. Lead metal, in contact with wood or other surfaces, may leave traces of lead particulate that can accumulate over time. Cleaning or disposal of these surfaces requires review to ensure that any effluent or solid waste disposal meets the requirements of regulations in the applicable jurisdiction.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines:

<u>Component</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>NIOSH REL</u>
Lead	0.05 mg/m ³	0.05 mg/m ³	0.05 mg/m ³

NOTE: OEGs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OEGs in your jurisdiction.

ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV – Threshold Limit Value, PEL – Permissible Exposure Limit, REL – Recommended Exposure Limit.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Ventilation: Use adequate local or general ventilation to maintain the concentration of lead fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Local exhaust is recommended for melting, casting, welding, grinding, flame cutting or burning, and use of lead powders.

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when lead is processed. Appropriate eye protection should be worn where fume or dust is generated. Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, and clothing to protect from radiant heat and hot metal splash should be worn. Safety type boots are recommended.

Respirators: Where lead dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge). When exposure levels are obviously high but the actual concentration is unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn.

General Hygiene Considerations: Do not eat, drink or smoke in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas as well as at the end of the workday. A double locker-shower system with separate clean and dirty sides is usually required for lead handling operations to avoid cross-contamination of street clothes. Contaminated clothing should be changed frequently and laundered before each reuse. Inform laundry personnel of contaminants' hazards. Workers should not take dirty work clothes home and launder them with other personal clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Malleable, bluish-white to silvery-grey solid metal	Odour: None	Odour Threshold: Not Applicable	pH: Not Applicable
Vapour Pressure: (negligible @ 20°C)	Vapour Density: Not Applicable	Melting Point/Range: 328°C	Boiling Point/Range: 1,740°C
Relative Density (Water = 1): 11.34	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Applicable	Solubility: Insoluble in water
Flash Point: None	Flammable Limits (LEL/UEL): Not Flammable	Auto-ignition Temperature: None	Decomposition Temperature: None

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur. Freshly cut or cast lead surfaces tarnish rapidly due to the formation of an insoluble protective layer of basic lead carbonate.

Incompatibilities: Lead reacts vigorously with strong acids (e.g., hot concentrated nitric acid, boiling concentrated hydrochloric acid, etc.), strong oxidizers such as peroxides, chlorates, nitrates and halogen or interhalogen compounds such as chlorine trifluoride. Powdered lead metal in contact with disodium acetylide, chlorine trifluoride, sodium carbide or fused ammonium nitrate poses a risk of explosion. Solutions of sodium azide in contact with lead metal can form lead azide, which is a detonating compound. Vigorous reactions can also occur between molten lead and active metals, such as sodium, potassium, lithium and calcium. A lead-zirconium alloy (10-70% Zr) will ignite when struck with a hammer.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting or burning, electric arc welding or overheating a molten bath will generate highly toxic lead oxide fume. Lead oxide is highly soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Lead accumulates in bone and body organs once it enters the body. Elimination from the body is slow. Initial and periodic medical examinations are advised for persons repeatedly exposed to levels at or above the exposure limits of lead dust or fumes. Once lead enters the body, it can affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal system. The primary routes of exposure to lead are inhalation or ingestion of dust and fumes.

Acute:

Skin/Eye: Contact with dust or fume may cause local irritation but would not cause tissue damage.

Inhalation: Exposure to lead dust or fume may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints. An intense, short-term exposure to lead could cause acute encephalopathy with seizures, coma, and death. However, short-term exposures of this magnitude are unlikely in industry today. Kidney damage, as well as anemia, can occur from acute exposure.

Ingestion: Symptoms due to ingestion of lead dust or fume would be similar to those from inhalation. Other health effects such as metallic taste in the mouth and constipation or bloody diarrhea might also occur.

Chronic:

Prolonged exposure to lead dust and fume may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and, rarely, wrist drop. Reduced hemoglobin production has been associated with low lead exposures. Symptoms of central nervous system damage due to moderate lead exposure include fatigue, headaches, tremors and hypertension. Very high lead exposure can result in lead encephalopathy with symptoms of hallucinations, convulsions, and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity. Pregnant women should be protected from excessive exposure as lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure. Teratogenic and mutagenic effects from exposure to lead have been reported in some studies but not in others. The literature is inconsistent and no firm conclusions can be drawn at this time. Lead and lead compounds are listed as an *A3 Carcinogen (Confirmed Animal Carcinogen with Unknown Relevance to Humans)* by the ACGIH. IARC has listed lead compounds as *Group 2A Carcinogens (Probably Carcinogenic to Humans)* while lead metal is listed as *Group 2B (Possibly Carcinogenic to Humans)*. The NTP lists lead and lead compounds as *Reasonably Anticipated to be a Human Carcinogen*. OSHA and the EU do not currently list lead as a human carcinogen.

Animal Toxicity:

<u>Hazardous Ingredient:</u>	<u>Acute Oral Toxicity:</u>	<u>Acute Dermal Toxicity:</u>	<u>Acute Inhalation Toxicity:</u>
Lead	No Data	No Data	No Data

SECTION 12. ECOLOGICAL INFORMATION

While lead metal is relatively insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of lead compounds in more bioavailable forms. While lead compounds are not particularly mobile in the aquatic environment, they can be toxic to aquatic organisms, especially fish, at low concentrations. Water hardness, pH and dissolved organic carbon content are three major factors which regulate the degree of lead toxicity. Lead in soil is generally neither very mobile nor bioavailable, as it can become strongly sorbed onto soil particles, increasingly so over time, to a degree related to physical properties of the soil. Lead bioaccumulates in plants and animals in both aquatic and terrestrial environments.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME Not a regulated product in ingot form.
 TRANSPORT CANADA AND U.S. DOT CLASSIFICATION Not Applicable

TRANSPORT CANADA AND U.S. DOT PIN Not Applicable
MARINE POLLUTANT No
IMO CLASSIFICATION Not Regulated

SECTION 15. REGULATORY INFORMATION

U.S.

Ingredient Listed on TSCA Inventory Yes
Hazardous Under Hazard Communication Standard Yes
CERCLA Section 103 Hazardous Substances Lead RQ: 10 lbs. (4.54 kg.)*
*reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers (0.004 inches).
EPCRA Section 302 Extremely Hazardous Substance No
EPCRA Section 311/312 Hazard Categories Delayed (chronic) health hazard - Carcinogen
Delayed (chronic) health hazard – Reproductive toxin
EPCRA Section 313 Toxic Release Inventory Lead CAS No. 7439-92-1
Percent by Weight - At least 99%

SECTION 16. OTHER INFORMATION

Date of Original Issue: July 23, 1997 **Version:** 01 (*First edition*)
Date of Latest Revision: June 29, 2015 **Version:** 13

The information in this Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2015, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, Guide to Occupational Exposure Values – 2015.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urban, Ed), 1995.
- Canadian Centre for Occupational Health and Safety, Hamilton, ON, CHEMINFO Record No. 608 - Lead (Rev. 2009-05).
- European Regulation (EC) No. 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (REACH).
- Health Canada, SOR/2015-17, Hazardous Products Regulations, 30 January 2015.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – present, (multi-volume work), World Health Organization, Geneva.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0052 - Lead.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank (online version).
- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohrssen & C.H. Powell, Ed.
- U.S. Dept. of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 13th Report on Carcinogens, October 2014.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards, on-line edition.
- U.S. Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Lead, September 2005.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

Notice to Reader

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Teck American Metal Sales Incorporated and Teck Metals Ltd. extend no warranty and assume no responsibility for the accuracy of the content and expressly disclaim all liability for reliance thereon. This safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

SAFETY DATA SHEET

Nonflammable Gas Mixture: Isobutylene / Nitrogen / Oxygen

Section 1. Identification

GHS product identifier	: Nonflammable Gas Mixture: Isobutylene / Nitrogen / Oxygen
Other means of identification	: Not available.
Product use	: Synthetic/Analytical chemistry.
SDS #	: 002103
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Emergency telephone number (with hours of operation)	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms



Signal word	: Warning
Hazard statements	: Contains gas under pressure; may explode if heated.
Precautionary statements	

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture
Other means of identification : Not available.

CAS number/other identifiers

CAS number : Not applicable.
Product code : 002103

Ingredient name	%	CAS number
Nitrogen	75 - 80.5	7727-37-9
oxygen	19.5 - 23.5	7782-44-7
2-methylpropene	0.0001 - 1.13	115-11-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : Contact with rapidly expanding gas may cause burns or frostbite.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

- Eye contact** : No specific data.
- Inhalation** : No specific data.
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Section 4. First aid measures

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Section 8. Exposure controls/personal protection

- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Gas.
- Color** : Not available.
- Melting/freezing point** : -140.7°C (-221.3°F) This is based on data for the following ingredient: 2-methylpropene. Weighted average: -211.14°C (-348.1°F)
- Critical temperature** : Lowest known value: -146.95°C (-232.5°F) (nitrogen).
- Odor** : Not available.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : Not available.
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : Highest known value: 1.94 (Air = 1) (2-methylpropene). Weighted average: 1.01 (Air = 1)
- Gas Density (lb/ft³)** : Weighted average: 0.07
- Relative density** : Not applicable.
- Solubility** : Not available.
- Solubility in water** : Not available.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- SADT** : Not available.
- Viscosity** : Not applicable.

Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : No specific data.
- Incompatibility with various substances** : Extremely reactive or incompatible with the following materials: reducing materials and combustible materials.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Section 11. Toxicological information

Potential acute health effects

- Eye contact** : Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : Contact with rapidly expanding gas may cause burns or frostbite.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : No specific data.
- Inhalation** : No specific data.
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Not available.

- General** : No known significant effects or critical hazards.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Section 12. Ecological information

Not available.

Mobility in soil






Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1956	UN1956	UN1956	UN1956	UN1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	-	<u>Explosive Limit and Limited Quantity Index</u> 0.125 <u>Passenger Carrying Road or Rail Index</u> 75	-	-	-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Special precautions for user : **Transport within user’s premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.
Clean Air Act (CAA) 112 regulated flammable substances: 2-methylpropene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

No products were found.

State regulations

Massachusetts : The following components are listed: NITROGEN; OXYGEN (LIQUID); 2-METHYLPROPENE

New York : None of the components are listed.

New Jersey : The following components are listed: NITROGEN; OXYGEN; ISOBUTYLENE; 1-PROPENE, 2-METHYL-

Pennsylvania : The following components are listed: NITROGEN; OXYGEN; 1-PROPENE, 2-METHYL-

Canada inventory : All components are listed or exempted.

International regulations

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: Not determined.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Section 15. Regulatory information

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

WHMIS (Canada) : Class A: Compressed gas.
CEPA Toxic substances: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Butene (all isomers)
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)

Health	1
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 1/23/2015.
Date of issue/Date of revision : 1/23/2015.
Date of previous issue : No previous validation.
Version : 0.01

Section 16. Other information

- Key to abbreviations**
- : ATE = Acute Toxicity Estimate
 - BCF = Bioconcentration Factor
 - GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 - IATA = International Air Transport Association
 - IBC = Intermediate Bulk Container
 - IMDG = International Maritime Dangerous Goods
 - LogPow = logarithm of the octanol/water partition coefficient
 - MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 - UN = United Nations
 - ACGIH – American Conference of Governmental Industrial Hygienists
 - AIHA – American Industrial Hygiene Association
 - CAS – Chemical Abstract Services
 - CEPA – Canadian Environmental Protection Act
 - CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
 - CFR – United States Code of Federal Regulations
 - CPR – Controlled Products Regulations
 - DSL – Domestic Substances List
 - GWP – Global Warming Potential
 - IARC – International Agency for Research on Cancer
 - ICAO – International Civil Aviation Organisation
 - Inh – Inhalation
 - LC – Lethal concentration
 - LD – Lethal dosage
 - NDSL – Non-Domestic Substances List
 - NIOSH – National Institute for Occupational Safety and Health
 - TDG – Canadian Transportation of Dangerous Goods Act and Regulations
 - TLV – Threshold Limit Value
 - TSCA – Toxic Substances Control Act
 - WEEL – Workplace Environmental Exposure Level
 - WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

 Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Hydrochloric Acid, 31 – 36.7%

Product Name: Hydrochloric Acid, 31 – 36.7%

Identified Uses: acid etching, steel pickling, oil and gas, ore and mineral, food processing, pharmaceutical, organic chemical synthesis

Company Information:

ASHTA Chemicals Inc.

P.O. Box 858

Ashtabula Ohio 44005

Phone: (440) 997-5221

Fax: (440) 998-0286

24-hour Emergency Phone: CHEMTREC: (800) 424-9300

SECTION 2: HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

GHS label elements, including precautionary statements:

Signal Word: **Danger**

Pictogram(s):



Hazard Statements	
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
Precautionary Statements	
P234	Keep only in original container.
P261	Avoid breathing dust/ fume/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water. Shower.



P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P403 + P233	Store in a well-ventilated place. Keep container with a resistant inner liner.
P405	Store locked up.
P406	Store in corrosive resistant stainless steel container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms:

CHEMICAL NAME: Hydrochloric acid
TRADE NAME: Hydrochloric acid, 31 – 36.7%
SYNONYMS: Muriatic acid, Chlorohydric acid, Hydrogen Chloride

C.A.S: 7647-01-0
EC: 231-595-7
WHMIS: D2A, E

CHEMICAL FORMULA: HCl (in aqueous solution)
CHEMICAL FAMILY: Inorganic Acid

SECTION 4 FIRST AID MEASURES

Description of first aid measures:

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. If breathing is difficult, give humidified air. Give oxygen, but only by a certified physician. Consult a physician.

In case of skin contact

Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Remove contact lenses if present and easy to do. Continue rinsing eyes during transport to medical facility.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth thoroughly with water. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Consult a physician.



SECTION 5 FIRE FIGHTING MEASURES

Flash Point (Method):	Non-combustible.
Extinguishing Media:	Use extinguishing agents compatible with acid and appropriate for the burning material. Use water spray to keep fire-exposed containers cool.
Auto Ignition Temp:	Non-combustible.
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus and full protective clothing. In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials.
Unusual Fire/Explosion Hazards:	Releases flammable hydrogen gas when reacting with metals.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Environmental Precautions:

Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Avoid discharge into drains, water courses or onto the ground.

Containment and Cleaning:

Follow preplanned emergency procedures. Only properly equipped, trained, functional personnel should attempt to contain a leak. All other personnel should be evacuated from the danger area. Using full protective equipment, apply appropriate emergency device or other securement technology to stop the leak if possible.

Small Spill:	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: neutralize the residue with a dilute solution of sodium carbonate.
Large Spill:	Corrosive liquid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to knock down vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that vapor is not present at a concentration level above TLV.

SECTION 7: HANDLING AND STORAGE

Precautions to be taken for handling and storage:

Wear appropriate personal protective equipment. Do not get in eyes, on skin, on clothing. Do not breathe mist or vapor. Observe good industrial hygiene practices. Do not empty into drains. Use caution when combining with water; DO NOT add water to acid, ALWAYS add acid to water while stirring to prevent release of heat, steam and fumes. Store in a well-ventilated place. Store away from incompatible materials. Store closed containers in a clean, cool, open or well ventilated area. Keep out of sun.



SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Principal Component: Hydrochloric Acid

Occupational Exposure Limits:

Regulatory Limits:

Component	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Hydrochloric Acid Mixture	---	---	5 ppm 7.59 mg/m ³

ACGIH TLV = 5 ppm (7.59 mg/m³) TWA

NIOSH IDLH = 50 ppm (as HCl, 2010)

Exposure Controls:

Eye Protection:

Tightly fitting safety goggles. Face shield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Respiratory Protection:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Other Protection:

Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Ventilation Recommended:

Exhaust ventilation is required to meet PEL limits.

Glove Type Recommended:

Wear neoprene, nitrile, butyl rubber or PVC gloves to prevent exposure.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties:

Appearance	Colorless to light yellow liquid
Odor	Pungent (irritating/strong)
Odor Threshold	0.3ppm (can cause olfactory fatigue)
pH	<1 (in aqueous solution)
Melting point/freezing point	-30°C (-22°F)
Initial boiling point	>100°C (>212°F)
Flash point	Not applicable
Auto-ignition Temp	Not applicable
Evaporation rate	No data available



Decomposition temperature	No data available
Flammability (solid, gas)	Not combustible
Upper/lower flammability or explosive limits	Not combustible
Water solubility	100%
Molecular Weight	36.46
Relative Density (Specific Gravity)	1.16 (32% HCl solution) 1.19 (36.5% HCl solution)
Bulk Density	8.75 lbs/gal (32% HCl solution) 9.83 lbs/gal (36.5% HCl solution)
Vapor Density (air = 1)	1.267 at 20 °C
Vapor Pressure	84 mm Hg @ 20°C
Partition Coefficient: n-octanol/water	No data available

SECTION 10: STABILITY AND REACTIVITY

- Stability: Hydrochloric acid is stable under normal conditions and pressures.
- Conditions to avoid: Incompatible materials, metals, excess heat, bases.
- Incompatibility: Bases, amines, metals, permanganates, (e.g. potassium permanganate), fluorine, metal acetylides, hexalithium disilicide.
- Hazardous decomposition products: Hydrogen chloride, chlorine, hydrogen gas.
- Polymerization: Hazardous polymerization WILL NOT occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

- Inhalation: Vapors and mist will irritate throat and respiratory system and cause coughing.
- Skin contact: Causes skin burns.
- Eye contact: Causes eye burns.
- Ingestion: Harmful if swallowed. Causes digestive tract burns. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract.

Symptoms related to the physical, chemical and toxicological characteristics:

Contact with this material will cause burns to the skin, eyes and mucous membranes. Permanent eye damage including blindness could result.

Information on toxicological effects:

- Acute toxicity: Harmful if swallowed.
- Skin corrosion/irritation: Causes severe skin burns and eye damage.
- Serious eye damage/eye irritation: Causes serious eye damage.
- Respiratory sensitization: Not available.



Skin sensitization:	No data available.
Germ cell mutagenicity:	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity:	This product is not considered to be a carcinogen by IARC, ACGIH, NTP or OSHA.
Reproductive toxicity:	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure:	May cause respiratory irritation.
Specific target organ toxicity - repeated exposure:	No data available.
Aspiration hazard:	Not available.
Chronic effects:	Prolonged inhalation may be harmful.

Components Species Test Results:

Hydrochloric acid (CAS# 7647-01-0)

Rat - Inhalation LC ₅₀ :	3124 ppm, (1 hour)
Rabbit - Dermal LD ₅₀ :	5010 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:	Because of the low pH of this product, it would be expected produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
Aquatic Toxicity:	This material is toxic to fish and aquatic organisms. Most aquatic species do not tolerate pH lower than 5.5 for any extended period.
Fish Toxicity:	Fish LC ₅₀ Mosquito fish: 282 mg/l, 96 hours Fish LC ₅₀ Bluegill: 3.6 mg/l, 48 hours
Persistence and degradability:	Not biodegradable. Hydrochloric acid will likely be neutralized to chloride by alkalinity present in natural environment..
Bioaccumulative Potential:	No data available.
Mobility in soil:	Hydrochloric acid will be neutralized by naturally occurring alkalinity. The acid will permeate soil, dissolving some soil material and will then neutralize.
Other adverse effects:	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation)

SECTION 13: DISPOSAL CONSIDERATIONS

Collect and reclaim or dispose in sealed containers at a properly licensed waste disposal site. This material , if not neutralized, must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national or international regulations.



SECTION 14: TRANSPORT INFORMATION

Shipping:

Usual Shipping Containers: Tank cars, bulk tankers.
Usual Shelf Life: Indefinite (life of containers).
Storage/Transport Temperatures: Ambient.

Suitable Storage:

Materials/Coatings: Teflon, Tygon, Rubber, PVC and polypropylene materials.

D.O.T. Information:

Labeling: Corrosive
D.O.T. Identification Number: UN 1789
D.O.T. Shipping Name: Hydrochloric Acid
Hazard Class: 8
Packing Group: II
Hazard Guide: 157
Placard: UN 1789

SECTION 15 REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Hydrochloric Acid CAS#: 7647-01-0

SARA 311/312 Hazards

Acute health hazard, reactive hazard.

Massachusetts Right To Know Components

Hydrochloric Acid CAS#: 7647-01-0

Pennsylvania Right To Know Components

Hydrochloric Acid CAS#: 7647-01-0

New Jersey Right To Know Components

Hydrochloric Acid CAS#: 7647-01-0

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other reproductive harm.

OSHA PSM TPQ:

CAS# 7647-01-0 is regulated under OSHA PSM *only* if anhydrous or >37% HCl.



Toxic Substances Control Act (TSCA):

Hydrochloric Acid

CAS#: 7647-01-0

Comprehensive Environmental Response Compensation Liability Act: (CERCLA)

Hydrochloric Acid

CAS#: 7647-01-0

SECTION 16

OTHER INFORMATION

NFPA Rating:

Health hazard: 3

Fire Hazard: 0

Reactivity Hazard: 1

This information is drawn from recognized sources believed to be reliable. ASHTA Chemicals, Inc. Makes no guarantees or assumes any liability in connection with this information. The user should be aware of changing technology, research, regulations, and analytical procedures that may require changes herein. The above data is supplied upon the condition that persons will evaluate this information and then determine its suitability for their use. Only U.S.A regulations apply to the above.

Version 1.0	For the new GHS SDS Standard
Version 1.1	Graphics updated
Version 1.2	Title updated
Version 1.3	Section 9 changes

Revision Date: 12/31/2014
Revision Date: 3/9/2015
Revision Date: 6/2/2015
Revision Date: 7/30/2015

MATERIAL SAFETY DATA SHEET

ALCONOX®

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations



SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **ALCONOX®**
CHEMICAL FAMILY NAME: Detergent.
PRODUCT USE: Critical-cleaning detergent for laboratory, healthcare and industrial applications
U.N. NUMBER: Not Applicable
U.N. DANGEROUS GOODS CLASS: Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME: Alconox, Inc.
ADDRESS: 30 Glenn St., Suite 309, White Plains, NY 10603. USA
EMERGENCY PHONE: **TOLL-FREE in USA/Canada** 800-255-3924
International calls 813-248-0585
BUSINESS PHONE: 914-948-4040
DATE OF PREPARATION: May 2011
DATE OF LAST REVISION: February 2008

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS



EUROPEAN and (GHS) Hazard Symbols



Signal Word: **Warning!**

EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1

EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 207-638-8 Index# 011-005-00-2

EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC

GHS Hazard Classification(s):

Eye Irritant Category 2A

Hazard Statement(s):

H319: Causes serious eye irritation

Precautionary Statement(s):

P260: Do not breath dust/fume/gas/mist/vapors/spray

P264: Wash hands thoroughly after handling

P271: Use only in well ventilated area.

P280: Wear protective gloves/protective clothing/eye protection/face protection/

Hazard Symbol(s):

[Xi] Irritant

MATERIAL SAFETY DATA SHEET

ALCONOX®

Risk Phrases:

R20: Harmful by inhalation
R36/37/38: Irritating to eyes, respiratory system and skin

Safety Phrases:

S8: Keep container dry
S22: Do not breath dust
S24/25: Avoid contact with skin and eyes

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

CHRONIC: This product contains an ingredient which may be corrosive.

TARGET ORGANS:

ACUTE: Eye, respiratory System, Skin

CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Sodium Bicarbonate	144-55-8	205-633-8	1044	33 - 43%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	268-356-1	Not Listed	10 – 20%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Tripolyphosphate	7758-29-4	231-838-7	1469	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Tetrasodium Pyrophosphate	7722-88-5	231-767-1	1140	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Carbonate	497-19-8	207-638-8	1135	1 - 10%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Sodium Alcohol Sulfate	151-21-3	205-788-1	0502	1 – 5%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard JIS Z 7250: 2000.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing difficulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or eye problems may be aggravated by prolonged contact.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT:

Not Flammable

AUTOIGNITION TEMPERATURE:

Not Applicable

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): NA Upper (UEL): NA

FIRE EXTINGUISHING MATERIALS:

As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

This product is non-flammable and has no known explosion hazards.

Explosion Sensitivity to Mechanical Impact:

Not Sensitive.

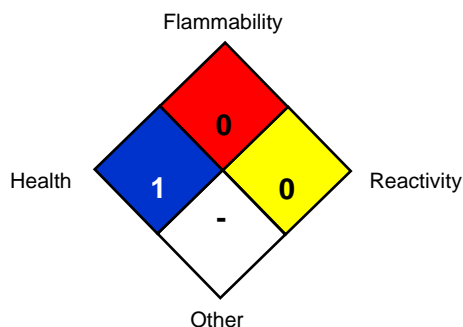
Explosion Sensitivity to Static Discharge:

Not Sensitive

SPECIAL FIRE-FIGHTING PROCEDURES:

Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD (BLUE)			1
FLAMMABILITY HAZARD (RED)			0
PHYSICAL HAZARD (YELLOW)			0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8
For Routine Industrial Use and Handling Applications			

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.

SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sodium Bicarbonate	144-55-8	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Sodium Tripolyphosphate	7758-29-4	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Tetrasodium Pyrophosphate	7722-88-5	5 mg/m ³	5 mg/m ³	5 mg/m ³
Sodium Carbonate	497-19-8	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Sodium Alcohol Sulfate	151-21-3	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Solid
APPEARANCE & ODOR:	White granular powder with little or no odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR=1):	Not Applicable.
BY WEIGHT:	Not Available
EVAPORATION RATE (nBuAc = 1):	Not Applicable.
BOILING POINT (C°):	Not Applicable.
FREEZING POINT (C°):	Not Applicable.
pH:	9.5 (1% aqueous solution)
SPECIFIC GRAVITY 20°C: (WATER =1)	0.85 – 1.1
SOLUBILITY IN WATER (%)	>10% w/w
COEFFICIENT OF WATER/OIL DIST.:	Not Available
VOC:	None
CHEMICAL FAMILY:	Detergent

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SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable

DECOMPOSITION PRODUCTS: When heated to decomposition this product produces Oxides of carbon (COx)

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids and strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials and dust generation.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

CAS# 497-19-8 LD50 Oral (Rat)	4090 mg/kg
CAS# 497-19-8 LD50 Oral (Mouse)	6600 mg/kg
CAS# 497-19-8 LC50 Inhalation (Rat)	2300 mg/m ³ 2H
CAS# 497-19-8 LC50 Inhalation (Mouse)	1200 mg/m ³ 2H
CAS# 7758-29-4 LD50 Oral (Rat)	3120 mg/kg
CAS# 7758-29-4 LD50 Oral (Mouse)	3100 mg/kg
CAS# 7722-88-5 LD50 Oral (Rat)	4000 mg/kg

SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.

SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: No Data available at this time.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Non-Regulated Material

HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable

UN IDENTIFICATION NUMBER: Not Applicable

PACKING GROUP: Not Applicable.

DOT LABEL(S) REQUIRED: Not Applicable

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable

MARINE POLLUTANT: None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:

This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):

This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:

This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

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This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

MATERIAL SAFETY DATA SHEET

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Disclaimer: To the best of Alconox, Inc. knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type either express or implied are provided. The information contained herein relates only to this specific product.

ANNEX:

IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

Used to clean: Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

Used to remove: Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

Surfaces cleaned: Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

Cleaning method: Soak, brush, sponge, cloth, ultrasonic, flow through clean-in-place. Will foam—not for spray or machine use.

Directions: Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

APPENDIX B - QUALITY ASSURANCE PROJECT PLAN

This Section presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the field activities described in the scope of work. The Section also describes specific protocols for field sampling, sampling handling and storage, and laboratory analysis. The data generated from the analysis of samples will be used to document post-IRM soil conditions.

Project Organization and Responsibility

A qualified person will coordinate and manage the sampling and analysis program, data reduction, QA/QC, data validation, analysis, and reporting. The contractor will direct the sampling activities and coordinate laboratory and drilling activities.

A qualified person will insure that the QAPP is implemented and will oversee data validation. A qualified person will provide oversight and technical support for the sampling and analytical procedures followed in this project. This individual has the broad authority to approve or disapprove project plans, specific analyses, and final reports. The Project QA Officer is independent from the data generation activities. In general, the QA officer will be responsible for reviewing and advising on all QA/QC aspects of this program.

Laboratories used will be NYSDOH ELAP certified laboratories. The laboratories will communicate directly with the sampler regarding the analytical results and reporting and will be responsible for providing all labels, sample containers, trip blanks, shipping coolers, and laboratory documentation.

QA Objectives for Data Management

The analytical data will be provided by the laboratory using the New York State ASP Category B deliverable format.

All analytical measurements will be made so that the results are representative of the media sampled and the conditions measured. Data will be reported in consistent dry weight units for solid samples (i.e., $\mu\text{g}/\text{kg}$ and/or mg/kg) and in $\mu\text{g}/\text{L}$ or mg/L for aqueous samples. Table 1 presents the proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements, containers and QA/QC samples.

Quantitation Limits (QLs) are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. Data Quality Levels (DQLs) are those reporting limits required to meet the objectives of the program (i.e., program action levels, cleanup standards, etc.). Data Quality Objectives (DQOs) define the quality of data and documentation required to support decisions made in the various phases of the data collection activities. The DQOs are dependent on the end uses of the data to be collected and are also expressed in terms of objectives for precision, accuracy, representativeness, completeness, and comparability.

The analytical methods to be used at this site provide the highest level of data quality and can be used for purposes of risk assessment, evaluation of remedial alternatives and verification that cleanup standards have been met. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy and precision.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet DQOs.

For quantitation limits for parameters associated with soil samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits listed in 6 NYCRR Part 375 and CP-51.

The QA objectives are defined as follows:

- **Accuracy** is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being.

The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of “standards,” materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. Tables 2a, 2b, and 2c summarize the laboratory accuracy requirements.

- **Precision** is the agreement among a set of replicate measurements without consideration of the “true” or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation.

Precision in the field is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Field duplicates will be collected at a frequency of one per twenty investigative samples per matrix per analytical parameter. Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be ≤ 50 for soil samples and ≤ 30 for aqueous samples. These criteria apply only if the sample and/or duplicate results are $>5x$ the quantitation limit; if both results are $\leq 5x$ the quantitation limit, the criterion will be doubled. Due to the uncertainty of available representative soil gas volume, field duplicates will not be collected for this matrix.

Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic soil analyses, laboratory precision will be assessed through the analysis of field duplicates.

- **Completeness** is a 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. “Normal conditions” are defined as the conditions expected if the sampling plan was implemented as planned.

Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

- **Representativeness** is a qualitative parameter that expresses the degree to which data accurately and precisely represents either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plan are followed and that proper sampling, sample handling, and sample preservation techniques are used.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

- **Comparability** expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plan are followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

Comparability is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

**Table 1
Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements**

Sample Matrix	Analytical Parameter	Sample Type¹	No. of Samples²	No. of QA/QC Samples	EPA Analytical Method	Sample Preservation	Holding Time³	Sample Container⁴
Soil	VOCs	Grab	TBD	Trip Blank: as necessary Equipment Blank: 1/20 Duplicate: 1/20	SW-846 Method 8260B	Cool to 4 ⁰ C; no headspace	14 days to analysis	(1) 2-oz. glass jar and three 5 gram En Core® samplers
Soil	SVOCs	Grab	TBD	Equipment Blank: 1/20 Duplicate: 1/20	SW-846 Methods 8270	Cool to 4 ⁰ C	7 days until extraction; 40 days after extraction.	(1) 8-oz. glass jar
Soil	Lead	Grab	TBD	Equipment Blank: 1/20 Duplicate: 1/20	SW-846 Methods 1311 and 6010B	Cool to 4 ⁰ C	6 months to analysis	(1)8-oz jar

¹ For soil samples, a six-inch sampling interval is the preferred sample size; however, sample volume recovery, analytical method requirements, and field conditions can affect the actual sample interval size. For these reasons, the actual sampling interval may change in order to obtain adequate volume.

² Actual number of samples may vary depending on field conditions, sample material availability, and field observations. It is estimated that nine (9) post-excavation soil samples and one duplicate sample (refer to Table 2) will be collected for all analyses listed above as part of the remedial action.

³ From date of sample collection

⁴ Trip blank bottleware = (3) 40 mL VOA vials

TBD = To Be Determined

Table 2a
Laboratory Data Quality Objectives: Precision and Accuracy: Soil Samples

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs (TCL)	SW-846 Method 8260B	Soil	<u>Surrogates</u> 1,2-Dichloroethane-d4 4-Bromofluorobenzene Dibromofluoromethane Toluene-d8 <u>% Rec.</u> 55-158 53-156 68-122 25-144	Surrogates: All samples, standards, QC samples	<u>Field Duplicates</u> RPD ≤50	Field Duplicates: One per 20 per soils
SVOCs (TCL)	SW-846 Method 8270	Soil	<u>Surrogates</u> 2,4,6-Tribromophenol 2-Fluorobiphenyl 2-Fluorophenol Nitrobenzene-d5 Phenol-d5 Terphenyl-d14 <u>% Rec.</u> 15-110 30-130 15-110 30-130 15-110 30-130	Surrogates: All samples, standards, QC samples	<u>Field Duplicates</u> RPD ≤50	Field Duplicates: One per 20 per matrix
Lead	SW-846 Method and 6010B	Soil	<u>Matrix Spikes</u> 75-125% recovery	<u>Matrix Spikes:</u> One per 20 per matrix per batch	<u>Field Duplicates</u> RPD ≤ 30	Field Duplicates: One per 20 per matrix

Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Sampling Plan

Environmental sampling will include soil sampling. Post-excavation grab soil samples will be collected using disposable or decontaminated sampling equipment.

Soil Sampling

Post-excavation samples will be collected following removal of the stained soils associated with open spill 1405821 and lead contaminated soil areas.

A photoionization detector (PID) and visual observations will be used to initially determine the extent of impacted soil removal. Once the impacted area is assumed to be fully removed, post excavation soil samples will be collected from the bottom and sides of the petroleum-contaminated soil excavation for laboratory analysis at the frequency described in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation. According to DER-10 Section 5.4(b)5, for excavations less than 20 feet in perimeter, include one bottom sample and one sidewall sample biased in the direction of surface runoff. For excavations 20 to 300 feet in perimeter, collect one sidewall sample for every 30 linear feet of sidewall, and one bottom sample for every 900 square feet of excavation bottom.

The perimeter of the excavation is approximately 175 linear feet and the area of the excavation encompasses approximately 1,845 square feet. Refer to Figure 6 of this IRM Work Plan for the excavation area. It is estimated that a total of six (6) post-excavation sidewall soil samples and three (3) bottom soil samples will be collected for laboratory analysis of VOCs, SVOCs, and lead. The sampling frequency will be increased as necessary per DER-10 guidelines if the final excavation limits are greater than assumed. The post excavation samples will be laboratory analyzed for Target Compound List (TCL) and CP-51 semi-volatile organic compounds (SVOCs) by EPA Method 8270C, for TCL and CP-51 volatile organic compounds (VOCs) by EPA Method 8260b and for lead via USEPA Method 6010C.

The samples will be collected with a disposable scoop and placed in the sample bottles. Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Only clean instruments will be allowed to touch the sample.

QC Sample Collection

QC samples will include trip blanks and field duplicates for soil samples.

Trip blanks will consist of distilled water (supplied by the laboratory) and will be used to assess the potential for volatile organic compound contamination of soil samples due to contaminant migration during sample shipment and storage. Trip blanks will be transported to the site unopened, stored with the investigative samples, and kept closed until analyzed by the laboratory. Trip blanks will be submitted to the laboratory at a frequency of one per cooler that contains soil samples for analysis for VOCs.

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. Field

duplicates will be collected by alternately filling sample bottles from the source being sampled. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters.

Refer to Table 1 for a summary of QC sample preservation and container requirements.

Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's *Specifications and Guidance for Contaminant-Free Sample Containers*. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. Soil samples will be placed in iced coolers immediately after collection.

Equipment Decontamination

Re-usable Teflon[®], stainless steel, and aluminum sampling equipment shall be cleaned between each use in the following manner:

- Wash and scrub with Alconox and water mixture
- Tap water rinse
- Wash/scrub with a biodegradable degreaser ("ZEP") if there is oily residue on equipment surface
- Tap water rinse
- Distilled/deionized water rinse
- Air dry

Field Custody Procedures

Sample chain-of-custody and packaging procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.
- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.
- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files.
- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.
- If the samples are sent by common carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.
- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory sample custodian, and signature of the laboratory sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

APPENDIX C
SOILS MANAGEMENT PLAN

APPENDIX C – SOILS MANAGEMENT PLAN (SoMP)

C-1 SOIL SCREENING METHODS

Visual, olfactory and instrument-based soil screening will be performed under the supervision of a qualified environmental professional representing the Remedial Engineer during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed by qualified environmental professionals during all excavation and invasive work performed during development and implementation of the IRMs. Resumes will be provided for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

Soils will be segregated based on previous environmental data and screening results into material that requires off-Site disposal and material that requires testing.

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

C-2 STOCKPILE METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points. Water will be available on-site at suitable supply and pressure for use in dust control.

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.

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.

C-3 MATERIALS EXCAVATION AND LOAD OUT

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

The owner of the 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 qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SoMP is posed by utilities or easements on the Site.

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

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site soil tracking. A truck wash will be operated on-Site. The Remedial Engineer will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete.

The qualified environmental professional representing the Remedial Engineer will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The owner 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).

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

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

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan. Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

C-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.

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. 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.

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. Additional details regarding truck transport routes will be presented in the Contractor's Site Operations Plan which will be submitted to the NYSDEC for approval prior to the start of work.

C-5 MATERIALS DISPOSAL OFF-SITE

Prior to start of work, NYSDEC will be provided with letters from the disposal facilities indicating each facility's acceptance of the waste. All soil/fill/solid waste excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6 NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated off-Site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-Site management of materials from this Site will not occur

without formal NYSDEC approval. Off-Site disposal locations for excavated soils and estimated quantities will be identified in the Contractor's Scope of Work and submitted to NYSDEC for approval prior to intrusive work.

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

C-6 MATERIALS REUSE ON-SITE

Material proposed for reuse must be sampled in accordance with the requirements in DER-10 and meet the criteria listed in Appendix 5 of DER-10. The Remedial Engineer will ensure that procedures defined for material reuse in this IRM are followed and that unacceptable material will not remain on-Site. The potential excavation areas for material reuse and associated soil quantities have not been established as of the date of this IRM Work Plan. The Contractor will coordinate with the NYSDEC for approval of reuse material during construction activities, as applicable. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the Site Management Plan.

C-7 FLUIDS MANAGEMENT

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

Dewatering is not expected to be completed on-Site. It is anticipated that if dewatering is required, fluids will be containerized on-Site in a fractionation tank for off-Site disposal. If a greater amount of dewatering fluids will be generated, alternate methods for handling fluids will be presented to the NYSDEC for approval. Discharge of water generated during remedial

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

C-8 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the Order on Consent. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy. A figure showing the proposed layout of the cover is provided in Appendix I of this IRM Work Plan.

C-9 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional 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 following DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 5, “Allowable Constituent Levels for Imported Fill or Soil” criteria.

Representative samples of the proposed backfill material will be collected at a frequency in accordance with Table 5.4(e)10 and analyzed for parameters listed in Appendix 5 of NYSDEC DER-10. The sampling frequency and analyses are presented below for reference:

Table 5.4(e)10			
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site			
Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➤ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Acceptable laboratory reporting limits (below the regulatory comparison criteria) have been achieved to demonstrate that the fill/backfill complies with the requirements for environmentally clean fill.

Soils that meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

C-10 STORMWATER POLLUTION PREVENTION

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. A SWPPP and Soil Erosion and Sediment Control Plan and Details are provided in Appendix D of the IRM Work Plan.

C-11 CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the Site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

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. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the FER.

C-12 COMMUNITY AIR MONITORING PLAN

The Community Air Monitoring Plan is provided in Appendix D of this IRM Work Plan. The air monitoring locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. Additional stations will be added based on the area to be disturbed with a maximum of four locations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers. CAMP data will be included in Daily Reports.

C-13 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis as necessary will include the use of foams, neutralizing agents, encapsulants and tarps. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the

project. Implementation of all odor controls, including the halt of work, is the responsibility of the property owner's Remediation Engineer, and any measures that are implemented will be discussed in the FER.

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

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

C-14 DUST CONTROL PLAN

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

- Dust suppression will be achieved through the use of a dedicated 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.

C-15 OTHER NUISANCES

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

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances. These plans will be provided to the NYSDEC for approval prior to the start of work.

APPENDIX D

**STORMWATER POLLUTION
PREVENTION PLAN (SWPPP) AND SOIL
EROSION AND SEDIMENT CONTROL
DETAILS**

STORMWATER POLLUTION PREVENTION PLAN

**MTA PARATRANSIT TRAINING FACILITY
1000 COMMERCE STREET
BRONX, NY 10462**

Prepared for:

**New York City Economic Development Corporation
110 William Street
New York, New York 10038**



Prepared by:
**McLaren Engineering Group
100 Snake Hill Road
West Nyack, NY 10994
(845) 353-6400**

**December 23, 2013
MEG Project No. 120536.00**

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- G. NOTICE OF INTENT (DRAFT)

1.0 SCOPE OF REPORT

This Report has been prepared to provide the Preliminary Stormwater Pollution Prevention Plan (SWPPP) for the MTA Paratransit Training Facility that is located at 1000 Commerce Avenue, Bronx, New York. This Report addresses the requirements set forth in the New York State Department of Environmental Protection's (NYSDEC) Pollution Discharge Elimination System (SPDES) for Discharges for Construction Activities, General Permit GP-0-10-001 (General Permit), and the New York City Department of Environmental Protection.

The General Permit covers discharges that are associated with construction activity, specifically activities that result in the disturbance of one (1) acre or more of total land area. Permit coverage requires conformance with the technical standards for stormwater quantity and quality controls presented in the New York State Stormwater Management Design Manual (NYSDEC Design Manual).

1.1 Responsibilities of the Participants

It is the responsibility of the Owner/operator, General Contractor, and Subcontractors to comply with the measures set forth in this SWPPP and implement pollutant control measures, which retain surface water quality and prevent sediment-laden runoff from entering rivers, streams, estuaries, wetlands and other sensitive environments. The responsibilities of the owner's engineer, owner/operator, and the contractors and subcontractors are outlined, but are not exclusively detailed within this section.

1.1.1 Owner's Engineer

1. Prepare the SWPPP using good Engineering practices, best management practices and in compliance with the General Permit.
2. Prepare Notice of Intent (NOI) for the Owner for submission to the NYSDEC.
3. Provide copies of the SWPPP and the "Acknowledgement of Notice of Intent" to the local government agencies having jurisdiction or regulatory control over the project.
4. Review the site prior to the beginning of construction and certify in an inspection report that the appropriate pre-construction erosion and sediment control measures, as detailed in this report, and control measures required by the General Permit have been installed, and will operate as designed.

5. Provide a "qualified inspector" to conduct site inspections in conformance with the requirements of the General Permit who is in conformance with the following requirements:
 - Licensed Professional Engineer,
 - Certified Professional in Erosion and Sediment Control (CPESC),
 - Registered Landscape Architect, or
 - Someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity

6. Conduct on-site inspections as follows:
 - Where soil disturbance activities are on going, conduct a site inspection at least once every seven (7) calendar days.
 - Where the project has received authorization to disturb greater than five (5) acres of soil at any one time, conduct at least two (2) site inspections every seven (7) calendar days, separated by a minimum of two (2) full calendar days.
 - For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, conduct a site inspection at least once every thirty (30) calendar days. Notify the Regional Office stormwater contact person in writing prior to reducing the frequency of inspections. The inspections shall begin again as soon as soil disturbance activities resume.
 - For construction sites where soil disturbance activities have been shut down with partial project completion, inspections can be stopped if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. Notify the Regional Office stormwater

contact person in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the Notice of Termination (NOT). Submit the completed NOT form to the NYSDEC.

7. Update the SWPPP each time there is a significant modification to the design or construction which may have a significant effect on the potential for discharge of pollutants into receiving waters.
8. When construction is complete, provide the Owner with certification that an inspection has been completed verifying that the site has undergone final stabilization.
9. When the site has undergone final stabilization, prepare the Notice of Termination (NOT) for the Owner for submission to the NYSDEC.

1.1.2 Owner/Operator

The following is a summary of the Owner's responsibilities:

1. Sign the NOI and certify the SWPPP by signing the Owner's Certification statement. Submit the NOI to NYSDEC "Notice of Intent", Bureau of Water Permits Region 2, 625 Broadway, Albany, NY 12233-3505.
2. Upon receiving the letter of "Acknowledgement of Notice of Intent" from the NYSDEC, the owner must post a copy of this letter at the site in a prominent place for public viewing. A record copy shall also be forwarded to the owner's Engineer.
3. Maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. The site logbook shall contain the following documents:
 - a. NYSDEC Notice of Intent
 - b. NYSDEC Notice of Acknowledgement

- c. Stormwater Pollution Prevention Plan (SWPPP)
 - d. Owner/Operator SPDES Permit Certification (Signed copy)
 - e. Contractor/Subcontractor SPDES Permit Certification (Signed copy)
 - f. Site Inspection Reports
 - g. Final Certification
 - i. SWPPP Modifications
 - j. SPDES General Permit GP-0-10-0001 for Stormwater Discharges from Construction Activity
5. The owner or operator must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site.
 6. The owner or operator shall have each contractor and subcontractor identify at least one trained individual from their company that will be responsible for implementation of the SWPPP. The owner or operator shall ensure that at least one trained individual is on site on a daily basis when soil disturbance activities are being performed. The contractor shall certify the SWPPP, and all Subcontractors involved with earth disturbance during construction, by signing the certifying statement.
 7. Upon project completion and when the site has reached final stabilization, the Owner should sign the Notice of Termination (NOT) prepared by the Owner's Engineer and submit to NYSDEC.
 8. Retain all site records and documentation including Engineering reports, SWPPP reports, SWPPP inspection reports and all records of data used to complete the NOI for a minimum of five (5) years from the date the site reached final stabilization.
 9. Provide an Operation & Maintenance (O&M) manual for future property Owners.

1.1.3 Contractors and Subcontractors

The following is summary of the Contractor's responsibilities:

1. Signing the Contractor's Certification statement and identify the name and title of the trained individual(s) responsible for SWPPP implementation

2. Full and complete compliance and implementation of this SWPPP, as well as the requirements set forth in the SPDES General Permit.
3. Provide the names and addresses of all sub-contractors involved in construction activities that disturb site soils for inclusion in the SWPPP.
4. Provide a Trained Contractor in accordance with the General Permit. A Trained Contractor means an employee from the contracting (construction) company that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* will be responsible for the day to day implementation of the SWPPP.

5. Ensure all subcontractors involved in construction activities that disturb site soils to implement fully the SWPPP and the requirements set forth in the SPDES General Permit. All subcontractors must certify the SWPPP by signing the Contractor's Certification statement contained in *Appendix B* of this report.
6. Conduct regular inspections of the erosion and sedimentation controls installed on site. Maintain and repair as necessary all erosion and sedimentation controls.

1.1.4 Contact Information

- Owner/Operator
New York City Economic Development Corporation
110 William Street
New York, New York 10038

- Construction Manager
Hunter Roberts
2 World Financial Center, 6th Floor
New York, New York 10281

- Owner's Engineer
McLaren Engineering Group
100 Snake Hill Road
West Nyack, NY 10994

- SWPPP Inspection
To be determined

- Contractor & Subcontractors
To be determined

2.0 SITE DESCRIPTION

The site is located west of the Westchester Creek in Castle Hill, Bronx, NY. The total parcel area is 2.85 acres. Only 1.60 acres will be used in this project, with an area of asphalt parking. There are no existing buildings on the project site. It is currently covered in grass/brush and slopes 1-2 percent towards the Westchester Creek.

2.1 Location

The subject property is located along Commerce Avenue near the corner of Zerega Avenue and bounded on the East by the Westchester Creek. The adjacent land uses are commercial office buildings to the North and Southwest and there is a scrap facility to the South. (See Site Location Map, Figure 1)

2.2 Watercourses/Wetlands

The project site is located directly adjacent to the Westchester Creek. The Westchester Creek is a tidal water body that flows into the East River.

The NYSDEC Tidal wetland limit is located at the Mean High Water level (3.28' NAVD88 of Westchester Creek. The wetland buffer zone is the inland area within 150 feet of the). No development/disturbance will occur within the wetland buffer zone during construction activities.

2.3 Land Cover

The entire project site has been historically a junk yard. The current condition is an open area with numerous concrete obstructions present above grade, remnants of asphalt and debris such as metal and wood.

Under approved future Site Plan conditions, the total impervious coverage on the site will be 1.60 acres. Impervious areas will include the building structure and surrounding parking area. Approximately 0.03 acres will be composed of grassed area, and the remaining area will be comprised of brush, shoreline and wetland buffer.

2.4 Soils

A review of the New York City Soil Maps indicates that there is one type of soil present on the proposed site. Table I below summarizes the characteristics of the soil present on the site and the respective areas.

Table 1
Soil Characteristics

Map Unit	Area (acres)	Soil Names	Water Table (ft)	Depth to Bedrock	Hydrologic Group
Uf (2)	Entire Project	Urban Lawn	10' (1)	25' to 30'	D

Source:

1. Based on borings developed for project and NYC Soil Survey maps. *USDA had no soil data for the project site

2.5 Floodplain

The site is located within the Westchester Creek drainage basin. The current Preliminary FEMA FIRM maps, post Superstorm Sandy, indicates that the site is Zone X. The flood elevation adjacent to the site is Elevation 13 (NAVD88 Datum) or 11.4 (Bronx Vertical Datum).

2.6 Rainfall Data

Rainfall data utilized in the analysis was obtained in Figures 4.2 through 4.5 in the New York State Department of Environmental Conservation publication entitled, "New York State Stormwater Management Design Manual", June 2010. The data used specific to the Project site and various 24-hour storm events are presented in Table 2 below.

Table 2
Rainfall Data

24-Hour Storm Event	Type III, 24-Hour Rainfall (inches)
Water Quality, Rainfall	1.3
2-Year	3.5
10-Year	5.0
25-Year	6.0
100-Year	7.5

3.0 METHODOLOGY

3.1 Stormwater Management

The Stormwater Management (SWM) Plan has been designed in accordance with Appendix D of the General Permit and the following publications:

- “Urban Hydrology for Small Watershed” (Technical Release No. 55), published by the United States Department of Agriculture, Soil Conservation Service, dated June 1986.
- New York State Stormwater Management Design Manual, June 2010.

The pre and post-development runoff rates provided in this Report were calculated using the computer software program entitled “WinTR-55” published by USDA National Resources Conservation Service and “Hydraflow Hydrographs” published by Autodesk Inc. These programs incorporate the methodology used in SCS TR-20 and TR-55 to compute and route flood hydrographs.

4.0 Green Infrastructure Practices

4.1 Planning Practices for Preservation of Natural Features and Conservation Design

The project is a redevelopment project with an increase in impervious area. The following practices have been implemented to avoid or minimize land disturbance by preserving natural areas. The techniques covered include in the project include the following:

4.1.1 Conservation of Natural Areas

1. Preservation of Buffers – The project will not encroach into the NYSDEC tidal wetland buffer along Westchester Creek.
2. Locating Development in Less Sensitive Areas – The project is located in a prior developed area and out of floodplains.

4.1.2 Reduction of Impervious Cover

1. Parking Reduction - The project will does not use drive aisles for the bus parking, requiring a “valet” type parking arrangement, significantly reducing impervious area

4.2 Runoff Reduction by Applying Green Infrastructure Techniques and Stand SMP’s with RPZ Capacity

The computation for runoff reduction fall under two general methods. The first group of practices includes site design techniques that factor in by subtracting conserved areas from the total site area, resulting in reduced WQv and CPv. The second group of green infrastructure includes practices provides runoff reduction by storage of volume runoff and are computed accordingly.

4.2.1 Runoff Reduction Techniques

The following is a listing of the runoff reduction practices with an assessment of applicability to the proposed project:

1. Sheet flow to riparian buffers or filter strips - Undisturbed natural areas such as stream buffers and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.

5.0 HYDROLOGIC AND HYDRAULIC ANALYSIS

5.1 Existing Conditions

A detailed investigation of the existing site and surrounding area was undertaken to allow an understanding of the surface runoff patterns on, and adjacent to the project site. Following a review of existing topography and site conditions three separate study areas

were defined for the Project site and surrounding area for the stormwater management analysis (see Figure No. 3). The study areas include the following:

- Drainage Area A-1 - This area is comprised of approximately 0.81 acres of brush and grass (see Figure No. 3). Stormwater runoff from portions of this site flow toward Drainage Area A-2.
- Drainage Area A-2 - This area is comprised of approximately 0.83 acres of buildings, trails, pavements and highly disturbed area, and 1.01 acres of brush and grass (see Figure No. 3). Stormwater runoff from portions of this site flow towards the Westchester Creek (Design Point B).
- Drainage Area A-3 - This area is comprised of approximately 0.26 acres of pavement and 0.68 acres of brush and grass (see Figure No. 3). Stormwater runoff from portions of this site flow toward the Design Point A.

Design Points were identified for each of the existing drainage areas. The Design Points represent the location where the majority of runoff from the respective drainage area exits the site. The same design points are identified in post-development conditions so that a comparison can be made between the pre- and post-development conditions. The design points are shown on the above referenced drawings. A description of each of the design points follows:

- Design Point A – Stormwater from Drainage Area A-3 exits the site at this point, which has a total area of 0.94 acres.
- Design Point B – Stormwater from Drainage Areas A-1 and A-2 exits the site at this point, which has a total area of 2.65 acres.

A summary of the existing peak discharge rates from the Project Site is shown in Table 3.

Table 3
Existing Peak Stormwater Discharge Rates

Location	Design Year Storm (CFS)			
	1-Year	10-Year	25-Year	100-Year
Design Point A	0.9	2.5	3.2	4.4
Design Point B	2.4	5.6	7.1	9.5
Design Point C	--	--	--	--
<i>Site Total) (1)</i>	<i>2.13</i>	<i>7.81</i>	<i>10.61</i>	<i>14.99</i>

(1) Total Discharge is based on sum of hydrographs

5.2 Proposed Conditions

5.2.1 Proposed Condition Stormwater Runoff

Based on the building program for the Project, an analysis of the proposed runoff conditions was performed to determine the impact of the stormwater runoff from the project site and to determine the measures required to meet the General Permit and New York City Department of Environmental Protection requirements. The analysis utilized the same study area as used for the existing condition analysis.

A description of the impact of the development on the stormwater runoff from each of the study areas is as follows:

- Drainage Area P-1 - This proposed area is comprised of approximately 0.61 acres of buildings, road and parking (see Figure No. 4). Stormwater runoff from this portion of the site flows toward DI 2-4.
- Drainage Area P-2 - This area is comprised of approximately 0.09 acres of buildings, road and parking (see Figure No. 4). Stormwater runoff from this portion of the site flows toward a trench drain which is connected to MH 2-3.
- Drainage Area P-3 - This area is comprised of approximately 0.23 acres of buildings, road and parking (see Figure No. 4). Stormwater runoff from this portion of the site flows toward DI 2-2 CDS Water Quality Structure 2.
- Drainage Area P-4 - This area is comprised of approximately 0.19 acres of buildings, road and parking (see Figure No. 4). Stormwater runoff from this portion of the site flows toward the CDS Water Quality Structure 3-1.
- Drainage Area P-5 - This area is comprised of approximately 0.11 acres of buildings, road and parking (see Figure No. 4). Stormwater runoff from this portion of the site flows toward a trench drain which is connected to the CDS Water Quality Structure 3-1.
- Drainage Area P-6 - This area is comprised of approximately 0.06 acres of buildings and roof runoff (see Figure No. 4). Stormwater runoff from this portion of the site flows to a roof leader which is connected to MH 2-3.

- Drainage Area P-7 - This area is comprised of approximately 0.09 acres of buildings and sidewalk, and roof runoff (see Figure No. 4). Stormwater runoff from this portion of the site flows to a roof leader which is connected to a trench drain that flows to CDS Water Quality structure 3-1.
- Drainage Area P-8 - This area is comprised of approximately 0.19 acres of brush (see Figure No. 4). Stormwater runoff from this portion of the site flows to Design Point A.
- Drainage Area P-9 - This area is comprised of approximately 0.83 acres of buildings, trails, pavements and highly disturbed area, and 1.01 acres of brush and grass (see Figure No. 4). Stormwater runoff from portions of this site flow towards the Westchester Creek (Design Point B).

5.2.2 Water Quality

Water Quality is provided by meeting the Runoff Reduction Volume through protection of the riparian buffer. Onsite pretreatment of runoff of water to the storm drain system is provided by use of two (2) Hydrodynamic Systems. Hydrodynamic systems such as gravity and vortex separators are devices that move water in a circular, centrifugal manner to accelerate the separation and deposition of primary sediment from the water. These measures shall include, but not be limited to, "proprietary" oil/grit separators/hydrodynamic chambers such as devices manufactured by Contech or Vortechs® systems. These devices contain both the isolation/diversion mechanism and a treatment chamber for capturing and treating the water quality flow. These devices can be installed in line with the storm drainage system and contain a bypass for flows in excess of the water quality flow. These devices meet the goal of the DEC criteria to provide at least 80% removal of total suspended sediment (TSS) from the first flush post-construction runoff.

Catch Basins

All catch basins and drain inlets will be provided with an 18-inch sump. The catch basins will act as pretreatment devices by removing coarse grit, sand and debris. The use of sumps will extend the life and performance of the selected water quality treatment system.

5.2.3 Water Quantity

Westchester Creek in this area is a tidal watercourse and therefore stormwater discharge control is not required. New York City Department of Environmental Protection requires that the flow to the stormwater system be regulated. As a result of their regulations, an

underground storage system with 1,218 lf of 24" pipe (3,800 +/- cf of storage) is provided onsite.

5.3 Storm Drainage System

Storm water runoff from the site will be directed to the existing stormwater system by way off the onsite storm drainage systems. The storm drainage system were designed using the rational method and are sized for a 10-yr. design storm.

6.0 EROSION AND SEDIMENT CONTROL

6.1 Erosion and Sediment Control Measures

During construction of the Project, the potential for soil erosion and sedimentation will be controlled through the use of temporary soil erosion and sediment control measures. These measures will be designed and installed in accordance with New York Guidelines for Urban Erosion and Sediment Control dated October 2005, and [local code if applicable]. The soil erosion and sediment control plan will minimize the downstream erosion by controlling runoff at its source, minimizing runoff from disturbed areas and de-concentrating storm water runoff. Temporary and permanent stabilization methods will be implemented before construction begins and will be continuously modified throughout the project to provide the best methods for stormwater management and pollution prevention.

Phasing of activities shall be as follows:

Pre-Construction Activities

- Identify all natural resources and mark and protect them as necessary i.e. trees, vegetation.
- Identify on-site and downstream surface water bodies and install controls to protect them from sedimentation.
- Establish temporary stone construction entrance pads to capture mud and debris from the tires of construction vehicles.
- Install perimeter sediment controls such as silt fence as shown on the project plans.
- All earth disturbances during this phase should be limited to work necessary to install erosion and sedimentation controls.

During Construction Activities

- Install runoff and drainage controls as shown on the project plans and as necessary. These controls should reduce run-off flow rates and velocities as well as divert off site and clean run-off.

- Stabilize the conveyance system (i.e. ditches, swales, berms etc.) by seeding, mulching, installing rock check dams.
- Stabilize all stormwater runoff outlets as shown on the project plans and as necessary.
- Stabilization measures should be initiated as soon as practical in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days. Where activities will resume within 21 days in that portion of the site, measures need not be initiated.
- Limit soil disturbance and exposure of bare earth to a minimum.
- All topsoil stockpiles should be staged in an area away from surface waters and storm drains and should be protected and stabilized.
- Construction vehicles shall enter and exit the site at the stabilized construction entrance. The construction entrances will be maintained during the life of the construction and repaired and/or cleaned periodically to ensure proper function.
- Water trucks will be used as needed during construction to reduce dust generated on the site. The contractor will provide dust control in compliance with applicable local and state dust control regulations.
- At any location where surface run-off from disturbed or graded areas may flow off-site, sedimentation control measures must be installed to prevent sedimentation from being transported.
- Regular inspections and maintenance should be performed as described in the following section.

Post-Construction Activities

- Identify the permanent structural or non-structural practices that will remain on the site.

6.2 Construction Sequence Scheduling

A phased construction sequence schedule of the Project will limit the acreage of exposed soils to 5-acres or less at any given time. The construction sequence and phasing is provided on the sediment and erosion control plans. Limiting the exposed soils will reduce the amount of sediments in runoff water and ultimately preserve the quality of surface waters. The construction phasing method selected will be designed to combine development with responsible land management as well as protection of sensitive environments both within the proposed Project and the surrounding area.

6.3 Implementing the SWPPP

The General Permit requires that site assessment and inspections for all construction activities in excess of one (1) acre. The site assessment and inspections insure the implementation of the SWPPP to retain surface water quality and prevent sediment laden runoff from entering rivers, streams, estuaries, wetlands and other sensitive environments.

The site assessment and inspections required for this project will include the following:

1. The operator shall have a "qualified inspector" conduct site inspections in conformance with the requirements of the General Permit. "Qualified inspector" means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed Landscape Architect, or other Department endorsed individual(s). Someone working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing a site inspection has received four (4) hours of training, endorsed by the Department, from a Soil and Water Conservation District, CPESC, Inc. or other Department endorsed entity. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four (4) hours of training every three (3) years. Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.
2. Following the commencement of construction, site inspections shall be conducted by the qualified inspector as follows:
 - a. Where soil disturbance activities are on going, conduct a site inspection at least once every seven (7) calendar days.
 - b. Where the project has received authorization to disturb greater than five (5) acres of soil at any one time, conduct at least two (2) site inspections every seven (7) calendar days, separated by a minimum of two (2) full calendar days.
 - c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, conduct a site inspection at least once every thirty (30) calendar days. Notify the Regional Office stormwater contact

person in writing prior to reducing the frequency of inspections. The inspections shall begin again as soon as soil disturbance activities resume.

- d. For construction sites where soil disturbance activities have been shut down with partial project completion, inspections can be stopped if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. Notify the Regional Office stormwater contact person in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the Notice of Termination (NOT). Submit the completed NOT form to the NYSDEC.
3. The qualified inspector shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:
 - a. Date and time of inspection.
 - b. Name and title of person(s) performing inspection.
 - c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection.
 - d. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow. Identification of all erosion and sediment control practices that need repair or maintenance.
 - e. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced.

- f. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection.
 - g. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards.
 - h. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s).
4. The operator shall maintain a record of all inspection reports in a site logbook. The site logbook shall be maintained on site and be made available to the permitting authority upon request.
5. Prior to filing of the Notice of Termination or the end of permit term, the operator shall have the qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.
6. The SWPPP must clearly identify the contractor(s) and subcontractor(s) that will implement the measure(s). All contractors and subcontractors identified in a SWPPP must sign a copy of certification statement (see Appendix B) before undertaking any construction or activity at the site identified in the SWPPP. All certifications must be included in the SWPPP. The certification must include the name and title of the person providing the signature; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

6.4 Best Management Practices

Throughout construction, care shall be taken to ensure sediment does not enter surface water bodies and chemicals do not enter stormwater, potentially contaminating surface and groundwater supplies. The following Best Management Practices (BMP) shall be observed to maintain responsible environmental practices on the construction site.

Good Housekeeping

Good housekeeping is essential to reducing the risk of contaminating runoff waters during every stage of construction. The General Contractor shall ensure supervisors train each employee in good housekeeping practices as they pertain to the implementation of this SWPPP.

Immediately following mobilization, the General Contractor shall take an inventory of all equipment and containers containing hazardous or toxic materials and submit this inventory to the Owner to keep on-site with this Stormwater Pollution Prevention Plan. This inventory shall be updated regularly to reflect changes in the quantity or type of hazardous and toxic materials stored on site. In the event of a spill, the Spill Response Team can refer to the inventory if the contents of the spill are unknown.

All equipment shall be operational while it is stored on site. Inspections shall be conducted regularly to ensure all equipment is free of leaks and that oil and grease are not in contact with soils or stormwater. Portable equipment such as chain saws, drills as well as hand tools must be placed within a trailer or under cover at the end of each work day.

A storage area shall be designated on-site where all hazardous or toxic materials are stored. Each employee shall return the materials to the designated storage area following use. Chemicals, including oil, grease, solvents and detergents shall be stored on-site in approved containers only. Used chemicals shall be disposed of in refuse containers and removed periodically. Containers shall be regularly inspected to ensure the integrity of the container and seals to prevent leaks.

Paints and Solvents

During construction, temporary structures such as construction trailers may be moved on site to store items such as paints, solvents and gasoline pertinent to the continuation of construction activities. The intention of these structures is to shelter such items and reduce the potential of entering the stormwater runoff due to construction activities. After use, solvents shall be disposed of in approved containers and removed from site at scheduled intervals.

Fuels

Fuel for construction equipment shall either be obtained from a licensed distributor of petroleum products or from an approved above ground storage tank on site. Fuel from

construction vehicles may come into contact with stormwater when vehicles are stored outside. Good housekeeping and preventative maintenance procedures shall be implemented to ensure fuel spills and leaks are minimized during refueling and storage.

Temporary Facilities

Temporary sanitary facilities may be located on site for construction workers. This facility shall be located in an accessible and visible location. A waste management company may be contracted to arrive on site and provide the routine pumping and sanitization of the facility.

Solid Waste

No solid materials are allowed to be discharged from the site with stormwater. All solid waste shall be collected and placed in containers. The containers will be emptied periodically by a contract trash disposal service and hauled away from the site.

7.0 LONG TERM MAINTENANCE AND OPERATIONS

Periodic long-term inspection and maintenance of the Stormwater Management Practices (SMP) will be required by the owner and operator of the facility. These components consist of the water quality/detention ponds and devices, drainage swales and the storm drainage collection system (pipes, drain inlets and manholes). The descriptions of the long term maintenance requirements for this project are provided below.

Catch Basins

Catch Basins shall be cleaned out at least once a year. Inlet structures usually are cleaned out with a vacuum truck and the slurry of water, sediment and other debris transported to an approved landfill for disposal.

Hydrodynamic Structures

Hydrodynamic structures shall be cleaned out at least once a year. They will need to be inspected twice a year during the first two years of operation to ensure that the frequency of the cleaning will be adequate. These devices are cleaned out with a vacuum truck and the slurry disposed of at the landfill. Failure to routinely clean these facilities will cause the detention facilities to fill with sand.

8.0 CONCLUSION

The proposed stormwater management system reduces and/or eliminates the impacts of the proposed development by treating stormwater through the use of hydrodynamic structures, protection of riparian buffers (tidal wetland buffer), and stormwater piping. The stormwater management system will function adequately and will not adversely effect adjacent or downstream properties provided it is constructed and maintained as outlined in this plan and as shown on the site plans. The system as designed will address the requirements of the New York City Department of Environmental Protection and the treatment requirements of the New York State Department of Environmental Conservation.

This report is respectfully submitted in accordance with our contract, and is to the best of our knowledge accurate and complete. Any questions regarding its content may be directed to the undersigned.

Respectfully submitted by,

The Office of
McLaren Engineering Group
M.G. McLAREN, P.C.



Steven L. Grogg, P.E.
Vice President Site-Civil Division

SLG/rjk

FIGURES

FILE NAME: P:\Proj\20\120536.03\10_Dwgs\CADD\Boring Location & Sections.dwg PLOT TIME: Mon, 23 Dec 2013 - 11:19am LAST SAVE: Mon, 23 Dec 2013 - 11:19am BY: BKelly



McLaren
ENGINEERING GROUP
applied ingenuity

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www.mgmclaren.com

SHEET TITLE	SITE LOCATION MAP	
	PROJECT	
MTA PARATRANSIT BUILDING COMMERCE AVENUE, BRONX, NEW YORK		

PROJ. NO.	120536.03
SCALE	N.T.S.
DATE	5-16-2013
DRAWN BY	JMV
CHECKED BY	LAD

DRAWING NO.	FIGURE-1
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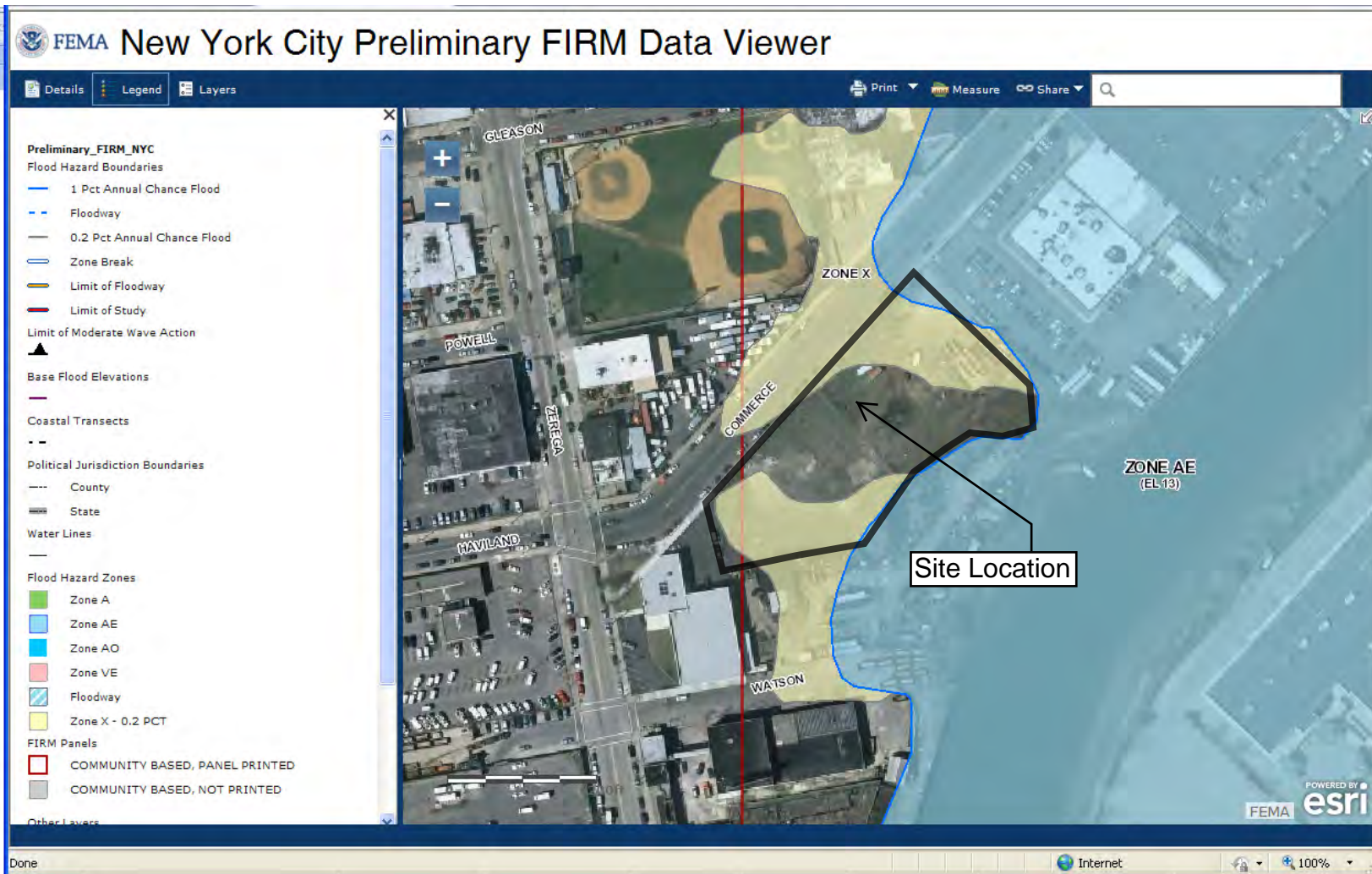
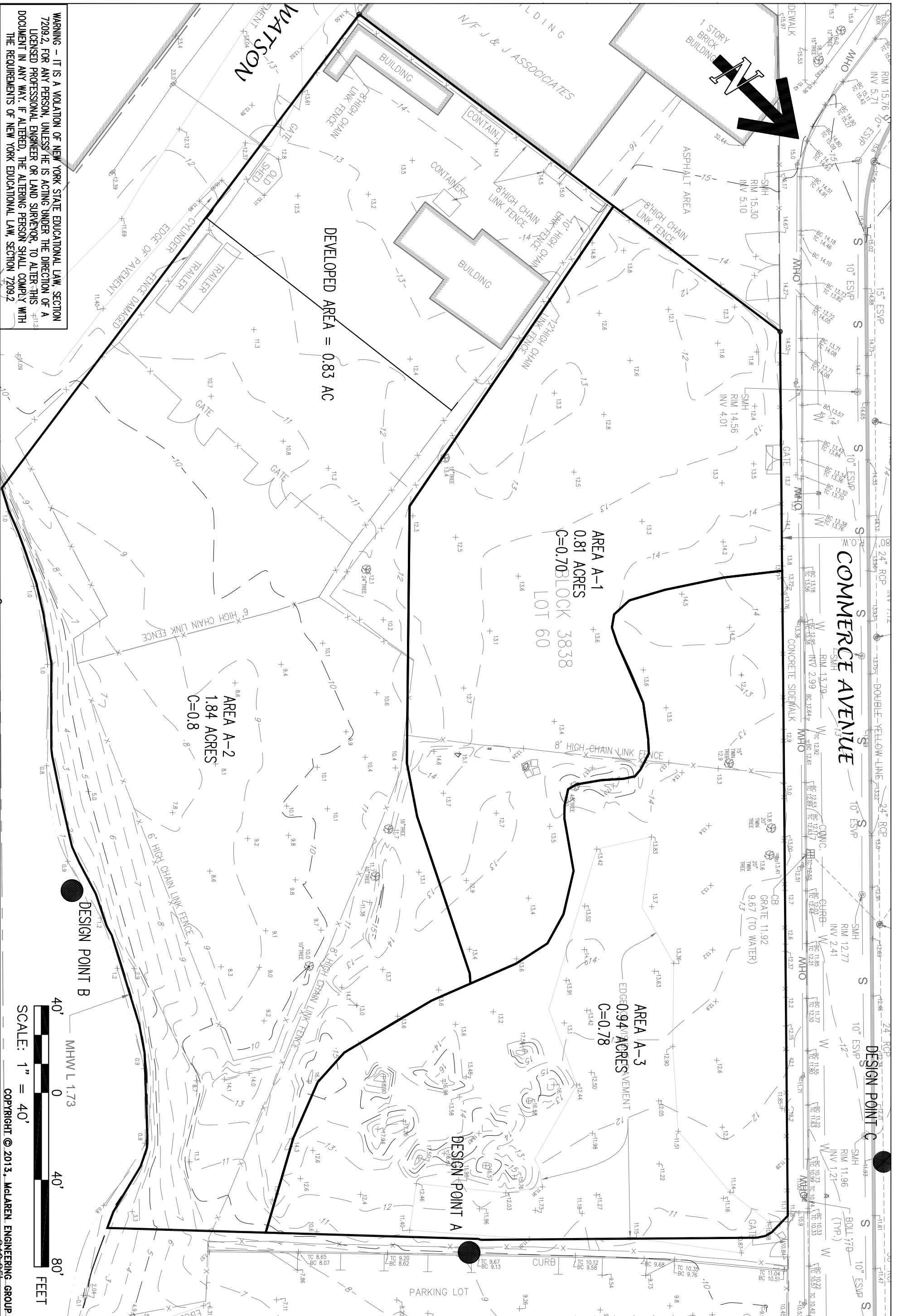


Figure No. 2
Preliminary Firm Map



WARNING - IT IS A VIOLATION OF NEW YORK STATE EDUCATIONAL LAW, SECTION 7209.2, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED, THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK EDUCATIONAL LAW, SECTION 7209.2.

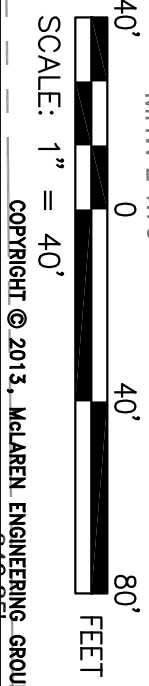
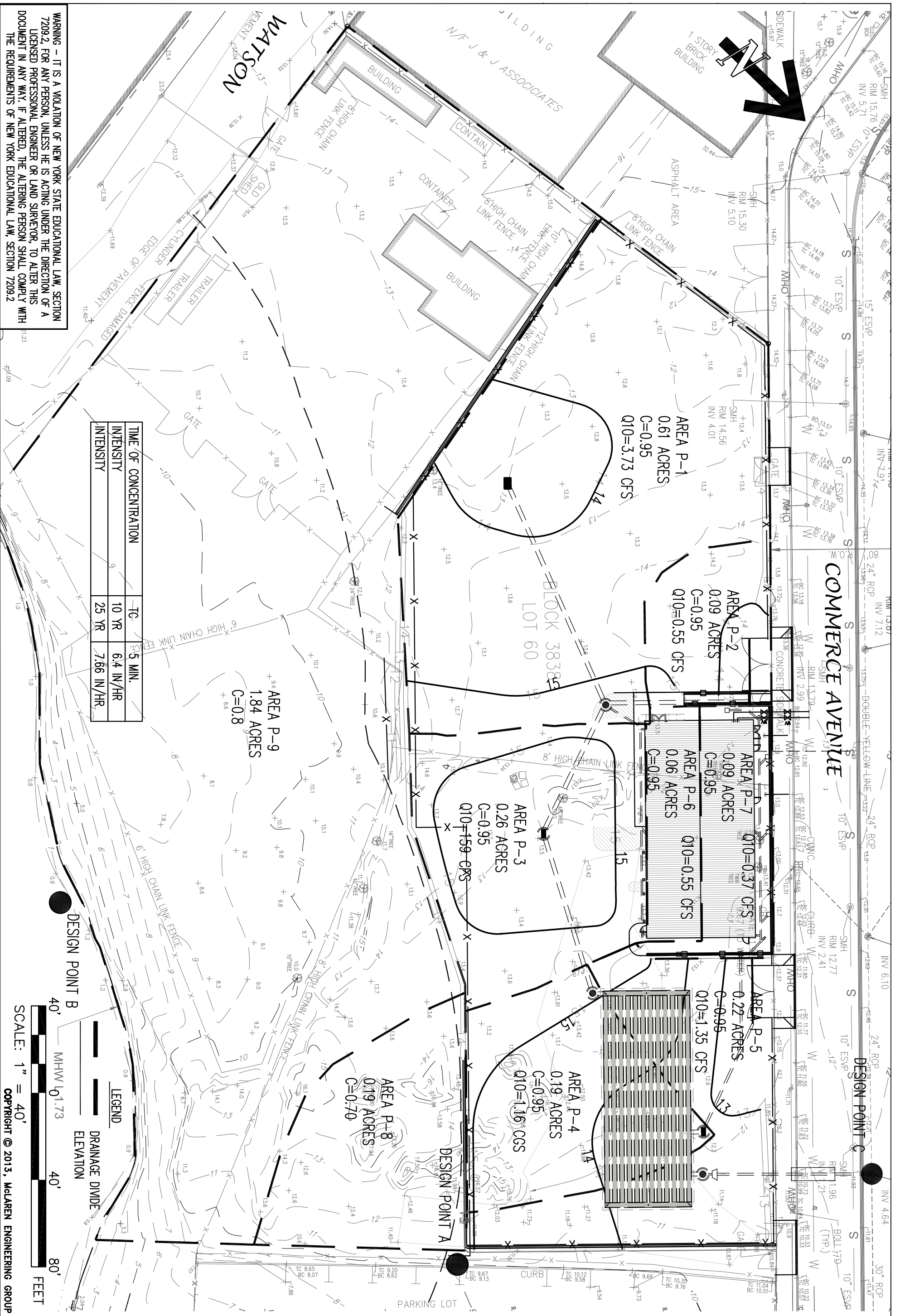


FIGURE-3 0' 1" 2" 3" 4" 5" 6" 7" 8" 9" 10" 11" 12" 13" 14" 15" 16" 17" 18" 19" 20" 21" 22" 23" 24" 25" 26" 27" 28" 29" 30" 31" 32" 33" 34" 35" 36" 37" 38" 39" 40" 41" 42" 43" 44" 45" 46" 47" 48" 49" 50" 51" 52" 53" 54" 55" 56" 57" 58" 59" 60" 61" 62" 63" 64" 65" 66" 67" 68" 69" 70" 71" 72" 73" 74" 75" 76" 77" 78" 79" 80" 81" 82" 83" 84" 85" 86" 87" 88" 89" 90" 91" 92" 93" 94" 95" 96" 97" 98" 99" 100" 101" 102" 103" 104" 105" 106" 107" 108" 109" 110" 111" 112" 113" 114" 115" 116" 117" 118" 119" 120" 121" 122" 123" 124" 125" 126" 127" 128" 129" 130" 131" 132" 133" 134" 135" 136" 137" 138" 139" 140" 141" 142" 143" 144" 145" 146" 147" 148" 149" 150" 151" 152" 153" 154" 155" 156" 157" 158" 159" 160" 161" 162" 163" 164" 165" 166" 167" 168" 169" 170" 171" 172" 173" 174" 175" 176" 177" 178" 179" 180" 181" 182" 183" 184" 185" 186" 187" 188" 189" 190" 191" 192" 193" 194" 195" 196" 197" 198" 199" 200" 201" 202" 203" 204" 205" 206" 207" 208" 209" 210" 211" 212" 213" 214" 215" 216" 217" 218" 219" 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2012" 2013" 2014" 2015" 2016" 2017" 2018" 2019" 2020" 2021" 2022" 2023" 2024" 2025" 2026" 2027" 2028" 2029" 2030" 2031" 2032" 2033" 2034" 2035" 2036" 2037" 2038" 2039" 2040" 2041" 2042" 2043" 2044" 2045" 2046" 2047" 2048" 2049" 2050" 2051" 2052" 2053" 2054" 2055" 2056" 2057" 2058" 2059" 2060" 2061" 2062" 2063" 2064" 2065" 2066" 2067" 2068" 2069" 2070" 2071" 2072" 2073" 2074" 2075" 2076" 2077" 2078" 2079" 2080" 2081" 2082" 2083" 2084" 2085" 2086" 2087" 2088" 2089" 2090" 2091" 2092" 2093" 2094" 2095" 2096" 2097" 2098" 2099" 2100" 2101" 2102" 2103" 2104" 2105" 2106" 2107" 2108" 2109" 2110" 2111" 2112" 2113" 2114" 2115" 2116" 2117" 2118" 2119" 2120" 2121" 2122" 2123" 2124" 2125" 2126" 2127" 2128" 2129" 2130



TIME OF CONCENTRATION	TC	PC	5 MIN.
INTENSITY	10 YR	6.4	IN/HR
INTENSITY	25 YR	7.66	IN/HR

LEGEND	
	DRAINAGE DIVIDE
	ELEVATION

SCALE: 1" = 40'
 40' 40' 80' FEET
 MHW 0.173

WARNING - IT IS A VIOLATION OF NEW YORK STATE EDUCATIONAL LAW, SECTION 7209.2, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED, THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK EDUCATIONAL LAW, SECTION 7209.2.

FIGURE-4 <small>DATE: 12-9-2013 DRAWN BY: JMV CHECKED BY: LAD</small>	PROJECT NO. 1200536 SCALE 1"=40' DATE 12-9-2013	PROPOSED DRAINAGE AREA MAP	MTA PARATRANSIT BUILDING CASTLE HILL, BRONX, NEW YORK	 McLaren ENGINEERING GROUP applied Ingenuity M. G. McLAREN, P.C. 100 Snake Hill Road, West Nyack, NY 10994 Tel. (845) 353-6400 Fax. (845) 353-6509 www.mgmclaren.com	<table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>REVISION</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	DATE	REVISION	BY				
	NO.	DATE	REVISION	BY									

APPENDIX A

**DESIGNATED QUALIFIED
INSPECTOR'S CERTIFICATION**

DESIGNATED QUALIFIED INSPECTOR'S CERTIFICATION

Project Name: MTA PARATRANSIT TRAINING FACILITY

Address: 1000 COMMERCE STREET
BRONX, NY 10462

In accordance with the requirements of the NYSDEC SPDES General Permit for Construction Activities, GP-0-10-001, I hereby certify that I am a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed [] Professional Engineer, [] Certified Professional in Erosion and Sediment Control (CPESC), [] licensed Landscape Architect, or [] other Department endorsed individual(s). Someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Signature

Date

[Printed Name]

[Title]

Company Name: _____

Address: _____

Tel.: _____

Fax: _____

Individual Working under Direct Supervision of the Licensed Professional:- _____

APPENDIX B

**CONTRACTOR/SUBCONTRACTOR
SPDES PERMIT CERTIFICATION**

CONTRACTOR CERTIFICATION

Project Name: MTA PARATRANSIT TRAINING FACILITY

Address: 1000 COMMERCE STREET
BRONX, NY 10462

In accordance with the requirements of the NYSDEC SPDES General Permit for Construction Activities, GP-0-10-001, any Contractor or Sub-Contractor performing an activity that involves soil disturbance shall provide a signed copy of this certification to the Owner/Operator prior to performing any Contract work.

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. "

Company Name: _____ **Contact Person:** _____
Address: _____
Tel.: _____ **Fax:** _____
Email: _____

Specific elements of the SWPPP that Contractor will be responsible:

Trained Contractor*Responsible for SWPPP Implementation:

Signature

Date

Printed Name

Title

*In accordance with the General Permit a Trained Contractor means an employee from the contracting (construction) company, identified above, that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years. It can also mean an employee from the contracting (construction) company that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity). The *trained contractor* will be responsible for the day to day implementation of the SWPPP.

APPENDIX C
EXISTING CONDITIONS ANALYSIS

WinTR-55 Current Data Description

--- Identification Data ---

User: JVolpe Date: 12/23/2013
 Project: MTA Paratransit Building Units: English
 SubTitle: 1000 Commerce Avenue Areal Units: Acres
 State: New York
 County: Bronx
 Filename: P:\Proj120\120536.03\8_Technical\Calculations\Current\Existing Flow.w55

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
Exist A-1		Outlet	0.81	70	0.166
Exist A-3		Outlet	0.94	78	0.166
Exist A-2		Outlet	1.84	83	0.166

Total area: 3.59 (ac)

--- Storm Data ---

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.5	4.5	5.0	6.0	7.0	7.5	2.9

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type III
 Dimensionless Unit Hydrograph: <standard>

JVolpe

MTA Paratransit Building
1000 Commerce Avenue
Bronx County, New York

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Exist A-1	Brush - brush, weed, grass mix	(fair)	C	.81	70
	Total Area / Weighted Curve Number			.81	70
				===	==
Exist A-3	Paved parking lots, roofs, driveways		C	.26	98
	Brush - brush, weed, grass mix	(fair)	C	.68	70
	Total Area / Weighted Curve Number			.94	78
				===	==
Exist A-2	Paved parking lots, roofs, driveways		C	.83	98
	Brush - brush, weed, grass mix	(fair)	C	1.01	70
	Total Area / Weighted Curve Number			1.84	83
				====	==

JVolpe

MTA Paratransit Building
1000 Commerce Avenue
Bronx County, New York

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period				
	ANALYSIS: (cfs)	10-Yr (cfs)	25-Yr (cfs)	100-Yr (cfs)	1-Yr (cfs)

SUBAREAS					
Exist A-1	0.74	1.58	2.19	3.16	0.46
Exist A-3	1.35	2.45	3.23	4.41	0.94
Exist A-2	3.30	5.58	7.13	9.46	2.42
REACHES					
OUTLET	5.38	9.60	12.55	17.03	3.81

APPENDIX D

PROPOSED CONDITIONS ANALYSIS

WinTR-55 Current Data Description

--- Identification Data ---

User: JVolpe Date: 12/21/2013
 Project: MTA Paratransit Units: English
 SubTitle: Areal Units: Acres
 State: New York
 County: Bronx
 Filename: P:\Proj120\120536.03\8_Technical\Calculations\Current\Proposed Flow.w55

--- Sub-Area Data ---

Name	Description	Reach	Area (ac)	RCN	Tc
Prop P-1		Outlet	0.61	98	0.166
Prop P-2		Outlet	0.09	98	0.166
Prop P-3		Outlet	0.23	98	0.166
Prop P-4		Outlet	0.19	98	0.166
Prop P-5		Outlet	0.11	98	0.166
Prop P-6		Outlet	0.06	98	0.166
Prop P-7		Outlet	0.09	98	0.166
Prop P-8		Outlet	0.19	70	0.166
Prop P-9		Outlet	1.84	82	0.166

Total area: 3.41 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.5	4.5	5.0	6.0	7.0	7.5	2.9

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type III
 Dimensionless Unit Hydrograph: <standard>

JVolpe

MTA Paratransit

Bronx County, New York

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Prop P-1	Paved parking lots, roofs, driveways	C	.61	98
	Total Area / Weighted Curve Number		.61 ===	98 ==
Prop P-2	Paved parking lots, roofs, driveways	C	.09	98
	Total Area / Weighted Curve Number		.09 ===	98 ==
Prop P-3	Paved parking lots, roofs, driveways	C	.23	98
	Total Area / Weighted Curve Number		.23 ===	98 ==
Prop P-4	Paved parking lots, roofs, driveways	C	.19	98
	Total Area / Weighted Curve Number		.19 ===	98 ==
Prop P-5	Paved parking lots, roofs, driveways	C	.11	98
	Total Area / Weighted Curve Number		.11 ===	98 ==
Prop P-6	Paved parking lots, roofs, driveways	C	.06	98
	Total Area / Weighted Curve Number		.06 ===	98 ==
Prop P-7	Paved parking lots, roofs, driveways	C	.09	98
	Total Area / Weighted Curve Number		.09 ===	98 ==
Prop P-8	Brush - brush, weed, grass mix (fair)	C	.19	70
	Total Area / Weighted Curve Number		.19 ===	70 ==
Prop P-9	Paved parking lots, roofs, driveways	C	.81	98
	Brush - brush, weed, grass mix (fair)	C	1.03	70
	Total Area / Weighted Curve Number		1.84 =====	82 ==

JVolpe

MTA Paratransit
Bronx County, New York
Watershed Peak Table

Sub-Area or Reach Identifier	ANALYSIS: (cfs)	Peak Flow by Rainfall Return Period			
		10-Yr (cfs)	25-Yr (cfs)	100-Yr (cfs)	1-Yr (cfs)

SUBAREAS					
Prop P-1	1.68	2.42	2.91	3.64	1.39
Prop P-2	0.25	0.36	0.43	0.54	0.20
Prop P-3	0.64	0.92	1.10	1.38	0.53
Prop P-4	0.53	0.76	0.92	1.15	0.44
Prop P-5	0.30	0.43	0.52	0.65	0.25
Prop P-6	0.16	0.23	0.28	0.34	0.13
Prop P-7	0.25	0.36	0.43	0.54	0.20
Prop P-8	0.18	0.37	0.52	0.75	0.11
Prop P-9	3.16	5.43	6.98	9.31	2.30
REACHES					
OUTLET	7.13	11.26	14.06	18.28	5.53



JOB: 120536.03
 JOB #: MTA Paratransit
 CLIENT: EDC
 CALC BY: SLG DATE: #
 CHK BY: DATE: #

WATER QUALITY VOLUME CALCULATIONS

WATER QUALITY FOR REDEVELOPMENT AREAS
 NYSDEC DESIGN MANUAL CHAPTER 9
 TREATMENT: NYDEC DESIGN MANUAL STANDARD PRACTICES

EXISTING IMPERVIOUS COVERAGE	C_{EX}	=	0.30	ac		
PROPOSED IMPERVIOUS COVERAGE	C_P	=	1.60	ac		
ADDITIONAL IMPERVIOUS COVERAGE	$C_P - C_{EX}$	=	I_{P-EX}			
	C_{P-EX}	=	1.30	ac		
DRAINAGE AREA	A	=	1.60	ac		
REDEVELOPMENT (EXISTING) IMPERVIOUS COVERAGE	$I_{EX} = \text{Impervious Cover}$	=	$\frac{C_{EX}}{A}$	*	100	
	$I_{EX} = \text{Impervious Cover}$	=	$\frac{0.30}{1.60}$	*	100	= 18.75 %
ADDITIONAL IMPERVIOUS COVERAGE	$I_{P-EX} = \text{Impervious Cover}$	=	$\frac{C_{P-EX}}{A}$	*	100	
	$I_{P-EX} = \text{Impervious Cover}$	=	$\frac{1.30}{1.60}$	*	100	= 81.25 %
	R_{V-EX}	=	0.05	+	(0.009 * I_{EX})	
	R_{V-EX}	=	0.05	+	(0.009 * 18.75)	
	R_{V-EX}	=	0.22			
	$R_{V P-EX}$	=	0.05	+	(0.009 * I_{P-EX})	
	$R_{V P-EX}$	=	0.05	+	(0.009 * 81.25)	
	$R_{V P-EX}$	=	0.78			
	P	=	1.3	in. (1-yr storm)		

WQ_V CALCULATIONS BASED ON ASSUMPTION THAT SITE IMPLEMENTATION OF NYSDEC DESIGN MANUAL STANDARD TREATMENT PRACTICES

Redevelopment Impervious: 0.25 * WQ_V
 (Per Section 9.3.2 Sizing Criteria, B, I., 25% WQ_V required for Standard Practice, 100% WQ_V for new impervious area)

Additional Impervious: 1.00 * WQ_V

WQ _V	=	0.25	*	$\frac{1.3 * R_{V-EX}}{12}$	*	1.60	+
		1.00	*	$\frac{1.3 * R_{V P-EX}}{12}$	*	1.60	
WQ _V	=	0.25	*	$\frac{1.3 * 0.22}{12}$	*	1.60	+
		1.00	*	$\frac{1.3 * 0.78}{12}$	*	1.60	
WQ _V	=	0.14	ac-ft				
WQ _V	=	6,312	ft ³				

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?..... **No**

Design Point: Westchester
 P= 1.30 inch

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments						
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Description
1	2.20	1.60	73%	0.70	7,314	Site
2						
3						
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	2.20	1.60	73%	0.70	7,314	Subtotal 1
Total	2.20	1.60	73%	0.70	7,314	Initial WQv

Identify Runoff Reduction Techniques By Area			
Technique	Total Contributing Area	Contributing Impervious Area	Notes
	(Acre)	(Acre)	
Conservation of Natural Areas	0.00	0.00	<i>minimum 10,000 sf</i>
Riparian Buffers	2.20	1.60	<i>maximum contributing length 75 feet to 150 feet</i>
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	<i>Up to 100 sf directly connected impervious area may be subtracted per tree</i>
Total	2.20	1.60	

Recalculate WQv after application of Area Reduction Techniques					
	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Runoff Coefficient Rv	WQv (ft ³)
"<<Initial WQv"	2.20	1.60	73%	0.70	7,314
Subtract Area	-2.20	-1.60			
WQv adjusted after Area Reductions	0.00	0.00	0%	0.05	0
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	0.00	0.00	0%	0.05	0
WQv reduced by Area Reduction techniques					7,314

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techniques/Standard SMPs		Total Contributing Area	Total Contributing Impervious Area	WQv Reduced (RRv)	WQv Treated
			(acres)	(acres)	cf	cf
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	2.20	1.60		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00			
	Bioretention & Infiltration Bioretention	F-5	0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4)	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2)	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction		→	2.20	1.60	7314	
Totals by Volume Reduction		→	0.00	0.00	0	
Totals by Standard SMP w/RRV		→	0.00	0.00	0	0
Totals by Standard SMP		→	0.00	0.00		0
Totals (Area + Volume + all SMPs)		→	2.20	1.60	7,314	0
	Impervious Cover v	okay				
	Total Area v	okay				

Riparian Buffer

Design Point:	Westchester Creek						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
1	2.20	1.60	0.73	0.70	7314.45	1.30	Site
Design Elements							
Is another area based practice applied to this area?			No				
Undisturbed Soil and Natural Vegetation? (Y/N)			Yes				
Outside the limits of disturbance?			Yes				
Protected by ESC during Construction?			Yes				
Adjacent to Stream Buffer or Forest Conservaton Area?			Yes				
Boundary Spreader?			Yes			GD at top of buffer	
Boundary Zone?			Yes			10 feet of level grass	
Specify how sheet flow will be ensured			redirect adjacent flow			level spreader shall be used for buffer slopes ranging from 3-15%	
Slope of first 10 feet of buffer			4	%		4% maximum	
Overall Slope			3	%		6% maximum	
Contributing Length of Pervious Areas (PC)			0	ft		150 ft maximum	
Contributing Length of Impervious areas (IC)			75	ft		75 ft maximum	
Maximum PC Contributing Length for combination of PC & IC			75	ft		Error	
Soil Group (HSG)			C				
Buffer Width			150	ft		50 ft minimum for slopes 0-8% 75 ft minimum for slopes 8-12%	
Are All Criteria for Riparian Buffers in Section 5.3.2 met?			Yes				
Area Reduction Adjustments							
Subtract			2.20	from total Area			
Subtract			1.60	from total Impervious Area			

APPENDIX E
STORM DRAIN CALCULATIONS

APPENDIX F

**POLLUTION DISCHARGE ELIMINATION SYSTEM (SPDES)
FOR DISCHARGES FOR CONSTRUCTION ACTIVITIES,
GENERAL PERMIT GP-0-10-001**



NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

from

CONSTRUCTION ACTIVITY

Permit No. GP-0-10-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2010

Expiration Date: January 28, 2015

William R. Adriance
Chief Permit Administrator

William R. Adriance
Authorized Signature

January 28, 2010
Date

Address: NYS DEC
Div. Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act (“CWA”), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System (“NPDES”)* permit or by a state permit program. New York’s *State Pollutant Discharge Elimination System (“SPDES”)* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law (“ECL”)*.

This general permit (“permit”) is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent (“NOI”) to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation (“the Department”) regional office (see Appendix G). They are also available on the Department’s website at:

<http://www.dec.ny.gov/>

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of “*construction activity*”, as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES**

FROM CONSTRUCTION ACTIVITIES

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Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application - This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;
2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State*.
3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

B. Maintaining Water Quality - It shall be a violation of this permit and the *ECL* for any *discharge* to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;
2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and
3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

C. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph D. of this Part.
2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater discharges from *construction activities*.

(Part I. C)

3. Notwithstanding paragraphs C.1 and C.2 above, the following non-stormwater *discharges* may be authorized by this permit: discharges from fire fighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated groundwater or spring water; uncontaminated discharges from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who discharge as noted in this paragraph, and with the exception of flows from fire fighting activities, these discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with water quality standards in Part I.B.

D. Activities Which Are Ineligible for Coverage Under This General Permit - All of the following are **not** authorized by this permit:

1. *Discharges after construction activities* have been completed and the site has undergone *final stabilization*;
2. *Discharges* that are mixed with sources of non-stormwater other than those expressly authorized under subsection C.3. of this Part and identified in the SWPPP required by this permit;
3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII, subparagraph K of this permit;
4. *Discharges from construction activities* that adversely affect a listed, or proposed to be listed, endangered or threatened species, or its critical habitat;
5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;
6. *Construction activities* for residential, commercial and institutional projects that:
 - a. are tributary to waters of the state classified as AA or AA-s; and

(Part I. D. 6)

- b. disturb one or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.
7. *Construction activities* for linear transportation projects and linear utility projects that:
 - a. are tributary to waters of the state classified as AA or AA-s; and
 - b. disturb two or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.
8. *Construction activities* that adversely affect a property that is listed or is eligible for listing on the State or National Register of Historic Places (Note: includes Archeological sites), unless there are written agreements in place with the NYS Office of Parks, Recreation and Historic Preservation (OPRHP) or other governmental agencies to mitigate the effects, or there are local land use approvals evidencing the same.

Part II. OBTAINING PERMIT COVERAGE

A. Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the address below in order to be authorized to *discharge* under this permit. The NOI form shall be one which is associated with this permit, signed in accordance with Part VII.H. of this permit.

**NOTICE OF INTENT
NYS DEC, Bureau of Water Permits
625 Broadway, 4th Floor
Albany, New York 12233-3505**

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4*, or by a duly authorized representative of that person, and then submit that form along with the NOI to the address referenced under “Notice of Intent (NOI) Submittal”.

(Part II. A.2)

This requirement does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of Owner or Operator).

3. The *owner or operator* shall have the SWPPP preparer sign the “SWPPP Preparer Certification” statement on the NOI prior to submitting the form to the Department.
4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.
2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:
 - a. project review pursuant to the State Environmental Quality Review Act (SEQRA) have been satisfied, when SEQRA is applicable,
 - b. where required, all necessary Department permits subject to the *Uniform Procedures Act (UPA)* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators of construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Regional Office in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,
 - c. the final SWPPP has been prepared, and
 - d. an NOI has been submitted to the Department in accordance with the requirements of this permit.
3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

(Part II. B. 3)

- a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:
 - i. Five (5) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 and/or 3, or
 - ii. Sixty (60) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has not been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 or 3.
- b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:
 - i. Five (5) business days from the date the Department receives a complete NOI and signed “MS4 SWPPP Acceptance” form,
4. The Department may suspend or deny an *owner’s or operator’s* coverage under this permit if the Department determines that the SWPPP does not meet the permit requirements.
5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department.

C. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination (NOT) has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4.
2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-10-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form and inspection reports at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department.

(Part II. C. 2)

The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4*, the MS4 (provided the MS4 is not the *owner or operator* of the construction activity). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:
 - a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.
 - b. In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.
 - c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.
 - d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.
 - e. The *owner or operator* shall include the requirements above in their SWPPP.
4. The Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements.

(Part II. C)

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the *MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *MS4* prior to commencing construction of the post-construction stormwater management practice.

D. Permit Coverage for Discharges Authorized Under GP-0-08-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001), an *owner or operator* of *construction activity* with coverage under GP-0-08-001, as of the effective date of GP-0-10-001, shall be authorized to *discharge* in accordance with GP-0-10-001 unless otherwise notified by the Department.

E. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1.. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*.

(Part III. A)

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the pollutants in stormwater discharges and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.
3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.
4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:
 - a. whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater *discharges* from the site;
 - b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the discharge of pollutants; and
 - c. to address issues or deficiencies identified during an inspection by the *qualified inspector*, the Department or other regulatory authority.
5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit.
6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP.

(Part III. A. 6)

The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor*. The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. "

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.
8. The SWPPP must include documentation supporting the determination of permit eligibility with regard to Part I.D.8. (Historic Places or Archeological Resource). At a minimum, the supporting documentation shall include the following:

(Part III. A. 8)

- a. Information on whether the stormwater discharge or *construction activities* would have an effect on a property (historic or archeological resource) that is listed or eligible for listing on the State or National Register of Historic Places;
- b. Results of historic resources screening determinations conducted. Information regarding the location of historic places listed, or eligible for listing, on the State or National Registers of Historic Places and areas of archeological sensitivity that may indicate the need for a survey can be obtained online by viewing the New York State Office of Parks, Recreation and Historic Places (OPRHP) online resources located on their web site at: <http://nysparks.state.ny.us/shpo/online-tools/> (using The Geographic Information System for Archeology and National Register). OPRHP can also be contacted at: NYS OPRHP, State Historic Preservation Office, Peebles Island Resources Center, P.O. Box 189, Waterford, NY 12188-0189, phone: 518-237-8643;
- c. A description of measures necessary to avoid or minimize adverse impacts on places listed, or eligible for listing, on the State or National Register of Historic Places. If the *owner or operator* fails to describe and implement such measures, the stormwater *discharge* is ineligible for coverage under this permit; and
- d. Where adverse effects may occur, any written agreements in place with OPRHP or other governmental agency to mitigate those effects, or local land use approvals evidencing the same.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Where erosion and sediment control practices are not designed in conformance with this technical standard, the *owner or operator* must demonstrate equivalence to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:
 - a. Background information about the scope of the project, including the location, type and size of project;

(Part III. B. 1)

- b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s), wetlands and drainage patterns that could be affected by the construction activity; existing and final slopes; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater discharge(s);
- c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);
- d. A construction phasing plan and sequence of operations describing the intended order of construction activities, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;
- e. A description of the minimum erosion and sediment control practices to be installed or implemented for each construction activity that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;
- f. A temporary and permanent soil stabilization plan that meets the requirements of the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of final stabilization;
- g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;
- h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

(Part III. B. 1)

- i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6., to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control;
 - j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a pollutant source in the stormwater *discharges*;
 - k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and
 - l. Identification of any elements of the design that are not in conformance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards.
2. Post-construction stormwater management practice component - All construction projects identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual (“Design Manual”). If the Design Manual is revised during the term of this permit, an *owner or operator* must begin using the revised version of the Design Manual to prepare their SWPPP six (6) months from the final revision date of the Design Manual.

Where post-construction stormwater management practices are not designed in conformance with this technical standard, the *owner or operator* must demonstrate equivalence to the technical standard.

At a minimum, the post-construction stormwater management practice component of the SWPPP shall include the following:

- a. Identification of all post-construction stormwater management practices to be constructed as part of the project;

(Part III. B. 2)

- b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;
 - c. The dimensions, material specifications and installation details for each post-construction stormwater management practice;
 - d. Identification of any elements of the design that are not in conformance with the Design Manual. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards;
 - e. A hydrologic and hydraulic analysis for all structural components of the stormwater management control system;
 - f. A detailed summary (including calculations) of the sizing criteria that was used to design all post-construction stormwater management practices. At a minimum, the summary shall address the required design criteria from the applicable chapter of the Design Manual; including the identification of and justification for any deviations from the Design Manual, and identification of any design criteria that are not required based on the design criteria or waiver criteria included in the Design Manual; and
 - g. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.
3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.g. above.

(Part III. C)

C. Required SWPPP Components by Project Type - Unless otherwise notified by the Department, *owners or operators of construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices and all post-construction stormwater management practices identified in the SWPPP are maintained in effective operating condition at all times.
2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Owner or Operator Maintenance Inspection Requirements

1. The *owner or operator* shall inspect, in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, the erosion and sediment controls identified in the SWPPP to ensure that they are being maintained in effective operating condition at all times.
2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the *owner or operator* can stop conducting the maintenance inspections. The *owner or operator* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.
3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *owner or operator* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

(Part IV. C)

C. Qualified Inspector Inspection Requirements - The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- Licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- Someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:
 - a. the construction of a single family residential subdivision with 25% or less impervious cover at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;
 - b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;
 - c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and
 - d. construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.
2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:
 - a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

(Part IV. C. 2)

- b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.
- c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the Regional Office stormwater contact person (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4*, the MS4 (provided the MS4 is not the *owner or operator* of the construction activity) in writing prior to reducing the frequency of inspections.
- d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the Regional Office stormwater contact person (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4*, the MS4 (provided the MS4 is not the *owner or operator* of the construction activity). in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization*, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice” certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1..

(Part IV. C. 3)

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization*, all points of discharge to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of discharge from the construction site.
4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:
 - a. Date and time of inspection;
 - b. Name and title of person(s) performing inspection;
 - c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;
 - d. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
 - e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;
 - f. Identification of all erosion and sediment control practices that need repair or maintenance;
 - g. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;
 - h. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;

(Part IV. C 4)

- i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;
 - j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and
 - k. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.
5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.
 6. All inspection reports shall be signed by the *qualified inspector*. Pursuant to Part II.C.2., the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1. The NOT form shall be one which is associated with this general permit, signed in accordance with Part VII.H.
2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

(Part V. A. 2)

- a. Total project completion - All construction activity identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;
 - b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;
 - c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E.
3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice” certification statements on the NOT, certify that all disturbed areas have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP.
 4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall also have the MS4 sign the “MS4 Acceptance” statement on the NOT. The *owner or operator* shall have the principal executive officer, ranking elected official, or duly authorized representative from the *regulated, traditional land use control MS4*, sign the “MS4 Acceptance” statement. The MS4 official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The MS4 can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector’s* final site inspection certification(s) required in Part V.3.
 5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

(Part V. A. 5)

- a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,
- b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),
- c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has modified their deed of record to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan,
- d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention - The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the site achieves *final stabilization*. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

B. Addresses - With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate Department Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply - The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied.

(Part VII. A)

The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

B. Continuation of the Expired General Permit - This permit expires five (5) years from the effective date. However, coverage may be obtained under the expired general permit, which will continue in force and effect, until a new general permit is issued. Unless otherwise notified by the Department in writing, an *owner or operator* seeking authorization under the new general permit must submit a new NOI in accordance with the terms of such new general permit.

C. Enforcement - Failure of the *owner or operator*, its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to \$37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense - It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate - The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to minimize or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information - The *owner or operator* shall make available to the Department for review and copying or furnish to the Department within five (5) business days of receipt of a Department request for such information, any information requested for the purpose of determining compliance with this permit. This can include, but is not limited to, the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form, executed maintenance agreement, and inspection reports. Failure to provide information requested by the Department within the request timeframe shall be a violation of this permit.

The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review the NOI, SWPPP or inspection reports. Copying of documents will be done at the requester's expense.

G. Other Information - When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any other report, or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s)

(Part VII. G)

changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or impervious area), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

- a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
 - i. a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
 - ii. the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
- b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or
- c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
 - i. the chief executive officer of the agency, or

(Part VII. H. 1. c)

- ii. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described in Part VII.H.1.;
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,
 - c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.
3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.
4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4*, or by a duly authorized representative of that person.

It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights - The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability - The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

(Part VII. K)

K. Denial of Coverage Under This Permit

1. At its sole discretion, the Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Regional Water Engineer, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.
2. Any *owner or operator* authorized by this permit may request to be excluded from the coverage under this permit by applying for an individual permit or another general permit. In such cases, the *owner or operator* shall submit an individual application or an alternative general permit application in accordance with the requirements of this general permit, 40 CFR 122.26(c)(1)(ii) and 6 NYCRR Part 621, with reasons supporting the request, to the Department at the address for the appropriate Department Office (see addresses in Appendix F). The request may be granted by issuance of an individual permit or another general permit at the discretion of the Department.
3. When an individual SPDES permit is issued to a discharger authorized to discharge under a general SPDES permit for the same discharge(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance - The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry - The *owner or operator* shall allow the Department or an authorized representative of EPA, the State, or, in the case of a construction site which discharges through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

(Part VII. M)

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

N. Permit Actions - At the Department's sole discretion, this permit may, at any time, be modified, suspended, revoked, or renewed. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions - Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.
2. Permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports – Article 17 of the ECL provides for a civil penalty of \$37,500 per day per violation of this permit. Articles 175 and 210 of the New York State Penal Law provide for a criminal penalty of a fine and/or imprisonment for falsifying forms and reports required by this permit.

R. Other Permits – Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both “sewage” and “stormwater”.

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for “Construction Activity(ies)” also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 authorizing a category of discharges.

Groundwater - means waters in the saturated zone. The saturated zone is a subsurface zone in

which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct construction activities are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that construction activities may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- i. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State;
- ii. Designed or used for collecting or conveying stormwater;
- iii. Which is not a *combined sewer*; and
- iv. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from construction activity.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the construction activity is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in Parts 700 et seq of this Title.

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics in order to prepare a SWPPP that conforms to the Department's technical standard. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

Routine Maintenance Activity - means construction activity that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* will be responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B

Required SWPPP Components by Project Type

Table 1
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP
THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other agricultural building, silo, stock yard or pen.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Bike paths and trails
- Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

Table 2
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP
THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover*, and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* and *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual (“Design Manual”).

- Entire New York City Watershed located east of the Hudson River - Figure 1
- Onondaga Lake Watershed - Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed – Figure 4

Figure 1 - New York City Watershed East of the Hudson

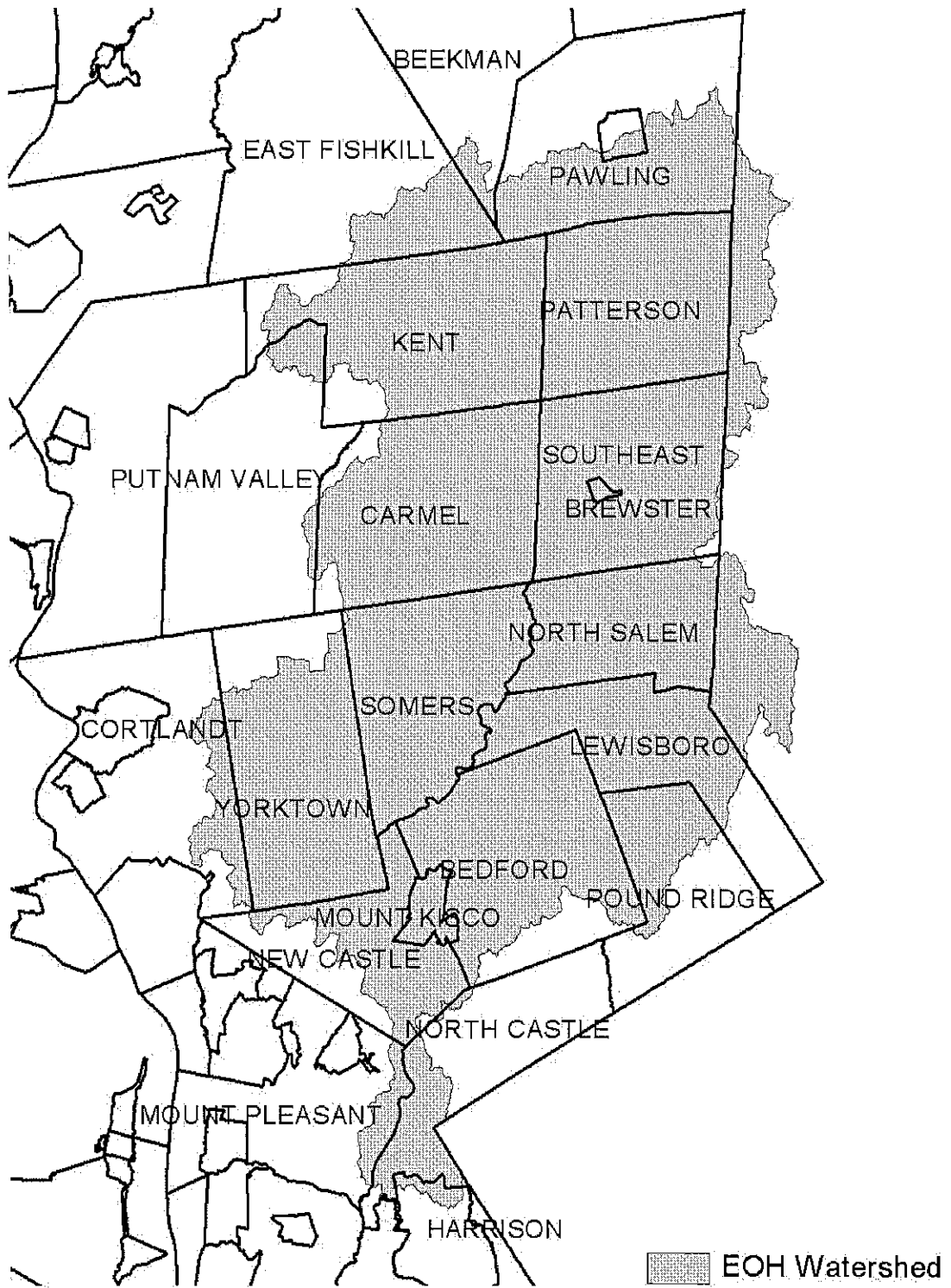


Figure 2 - Onondaga Lake Watershed

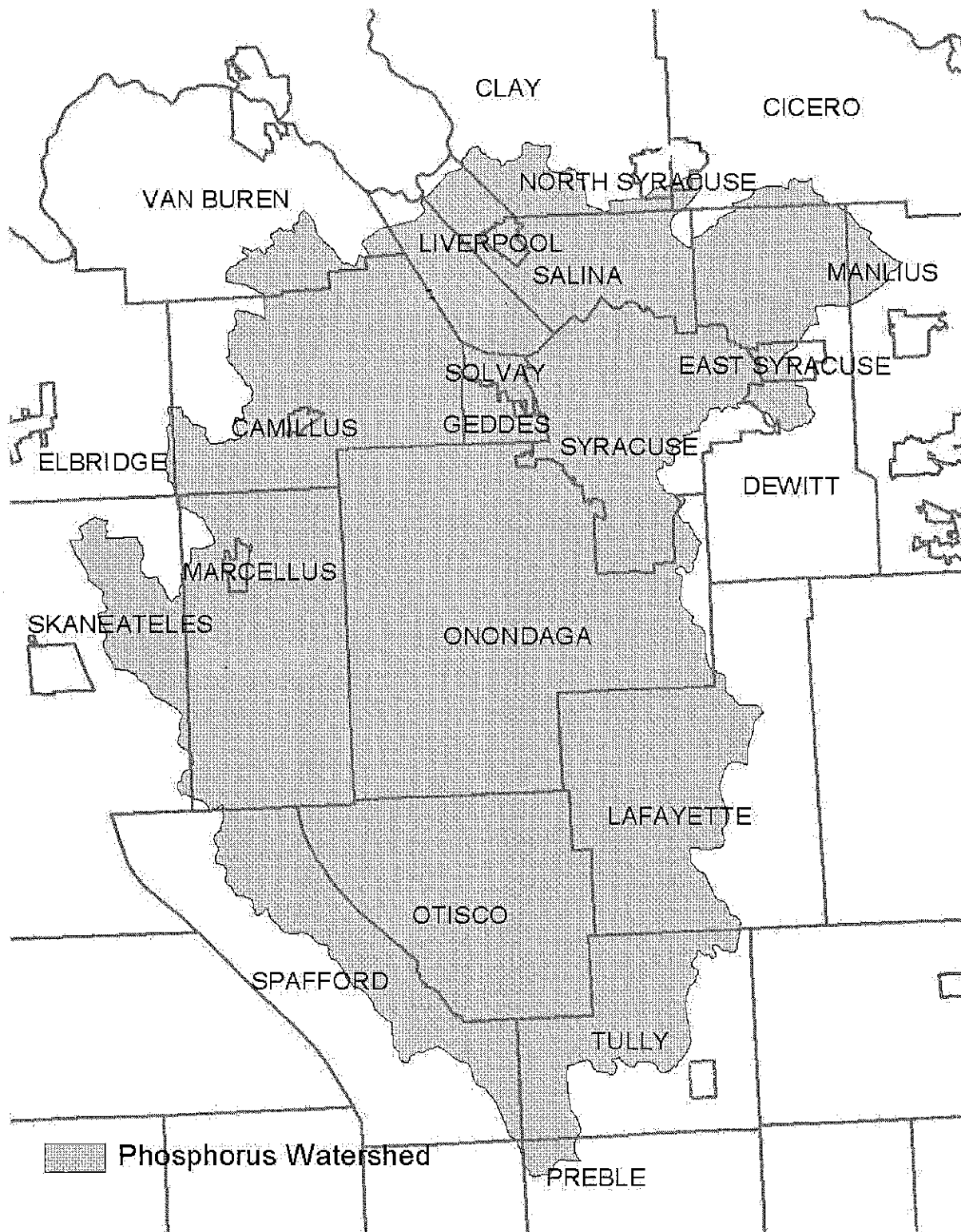


Figure 3 - Greenwood Lake Watershed

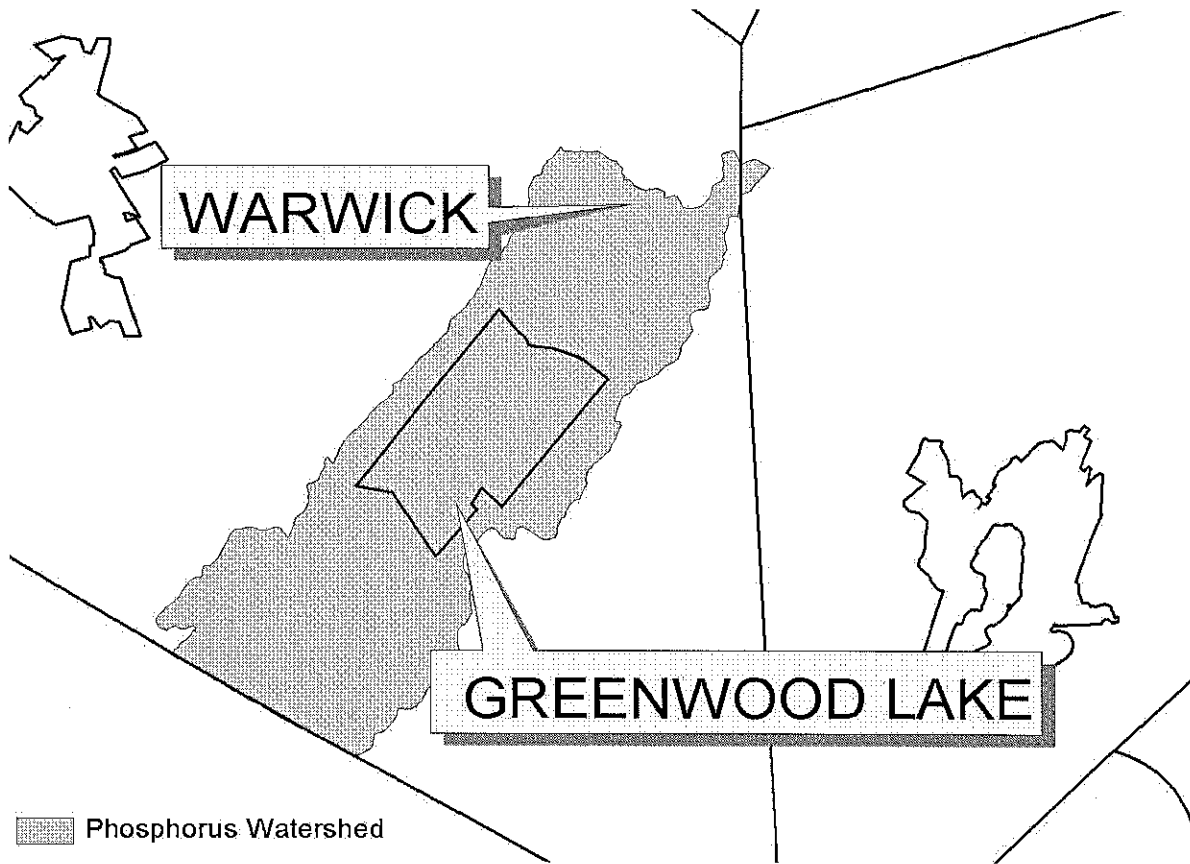
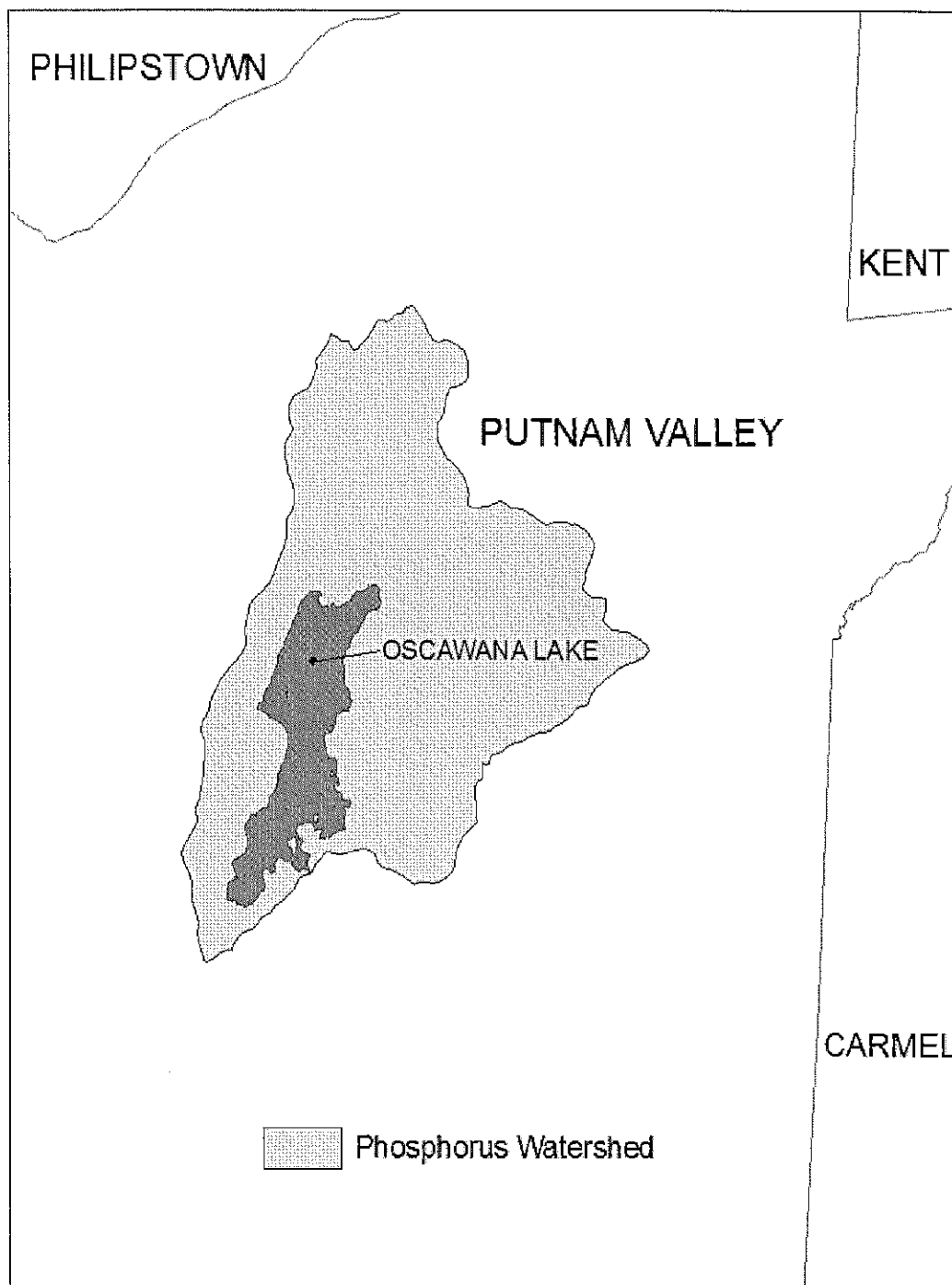


Figure 4 - Oscawana Lake Watershed



APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C
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APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivision construction activities that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual (“Design Manual”).

COUNTY	WATERBODY	COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond	Monroe	Genesee River, Lower, Main Stem
Albany	Basic Creek Reservoir	Monroe	Genesee River, Middle, Main Stem
Bronx	Van Cortlandt Lake	Monroe	Black Creek, Lower, and minor tribs
Broome	Whitney Point Lake/Reservoir	Monroe	Buck Pond
Broome	Beaver Lake	Monroe	Long Pond
Broome	White Birch Lake	Monroe	Cranberry Pond
Chautauqua	Chautauqua Lake, North	Monroe	Mill Creek and tribs
Chautauqua	Chautauqua Lake, South	Monroe	Shipbuilders Creek and tribs
Chautauqua	Bear Lake	Monroe	Minor tribs to Irondequoit Bay
Chautauqua	Chadakoin River and tribs	Monroe	Thomas Creek/White Brook and tribs
Chautauqua	Lower Cassadaga Lake	Nassau	Glen Cove Creek, Lower, and tribs
Chautauqua	Middle Cassadaga Lake	Nassau	LI Tribs (fresh) to East Bay
Chautauqua	Findley Lake	Nassau	East Meadow Brook, Upper, and tribs
Clinton	Great Chazy River, Lower, Main Stem	Nassau	Hempstead Bay
Columbia	Kinderhook Lake	Nassau	Hempstead Lake
Columbia	Robinson Pond	Nassau	Grant Park Pond
Dutchess	Hillside Lake	Niagara	Bergholtz Creek and tribs
Dutchess	Wappinger Lakes	Oneida	Ballou, Nail Creeks
Dutchess	Fall Kill and tribs	Onondaga	Ley Creek and tribs
Dutchess	Rudd Pond	Onondaga	Onondaga Creek, Lower and tribs
Erie	Rush Creek and tribs	Onondaga	Onondaga creek, Middle and tribs
Erie	Ellicott Creek, Lower, and tribs	Onondaga	Onondaga Creek, Upper, and minor tribs
Erie	Beeman Creek and tribs	Onondaga	Harbor Brook, Lower, and tribs
Erie	Murder Creek, Lower, and tribs	Onondaga	Ninemile Creek, Lower, and tribs
Erie	South Branch Smoke Cr, Lower, and tribs	Onondaga	Minor tribs to Onondaga Lake
Erie	Little Sister Creek, Lower, and tribs	Ontario	Honeoye Lake
Essex	Lake George (primary county listed as Warren)	Ontario	Hemlock Lake Outlet and minor tribs
Genesee	Black Creek, Upper, and minor tribs	Ontario	Great Brook and minor tribs
Genesee	Tonawanda Creek, Middle, Main Stem	Oswego	Lake Neatahwanta
Genesee	Tonawanda Creek, Upper, and minor tribs	Putnam	Oscawana Lake
Genesee	Little Tonawanda Creek, Lower, and tribs	Putnam	Lake Carmel
Genesee	Oak Orchard Creek, Upper, and tribs	Queens	Jamaica Bay, Eastern, and tribs (Queens)
Genesee	Bowen Brook and tribs	Queens	Bergen Basin
Genesee	Bigelow Creek and tribs	Queens	Shellbank Basin
Greene	Schoharie Reservoir	Rensselaer	Snyders Lake
Greene	Sleepy Hollow Lake	Richmond	Grasmere, Arbutus and Wolfes Lakes
Herkimer	Steele Creek tribs	Saratoga	Dwaas Kill and tribs
Kings	Hendrix Creek	Saratoga	Tribs to Lake Lonely
Lewis	Mill Creek/South Branch and tribs	Saratoga	Lake Lonely
Livingston	Conesus Lake	Saratoga	Schuyler Creek and tribs
Livingston	Jaycox Creek and tribs	Schenectady	Collins Lake
Livingston	Mill Creek and minor tribs		

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY	COUNTY	WATERBODY
Schoharie	Engleville Pond		
Schoharie	Summit Lake		
St. Lawrence	Black Lake Outlet/Black Lake		
Steuben	Lake Salubria		
Steuben	Smith Pond		
Suffolk	Millers Pond		
Suffolk	Mattituck (Marratooka) Pond		
Suffolk	Tidal tribs to West Moriches Bay		
Suffolk	Canaan Lake		
Suffolk	Lake Ronkonkoma		
Tompkins	Cayuga Lake, Southern End		
Tompkins	Owasco Inlet, Upper, and tribs		
Ulster	Ashokan Reservoir		
Ulster	Esopus Creek, Upper, and minor tribs		
Warren	Lake George		
Warren	Tribs to L.George, Village of L. George		
Warren	Huddle/Finkle Brooks and tribs		
Warren	Indian Brook and tribs		
Warren	Hague Brook and tribs		
Washington	Tribs to L.George, East Shore of Lake George		
Washington	Cossayuna Lake		
Wayne	Port Bay		
Wayne	Marbletown Creek and tribs		
Westchester	Peach Lake		
Westchester	Mamaroneck River, Lower		
Westchester	Mamaroneck River, Upper, and minor tribs		
Westchester	Sheldrake River and tribs		
Westchester	Blind Brook, Lower		
Westchester	Blind Brook, Upper, and tribs		
Westchester	Lake Lincolndale		
Westchester	Lake Meahaugh		
Wyoming	Java Lake		
Wyoming	Silver Lake		

Note: The list above identifies those waters from the final New York State “2008 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy”, dated May 26, 2008, that are impaired by silt, sediment or nutrients.

APPENDIX F

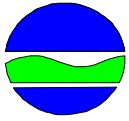
LIST OF NYS DEC REGIONAL OFFICES

<u>Region</u>	<u>COVERING THE FOLLOWING COUNTIES:</u>	<u>DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS</u>	<u>DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM</u>
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD, PO BOX 220 WARRENSBURG, NY 12885-0220 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

APPENDIX G

**NOTICE OF INTENT
(DRAFT)**

NOTICE OF INTENT



**New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505**

NYR
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-10-001
All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

- IMPORTANT -
RETURN THIS FORM TO THE ADDRESS ABOVE
OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State Zip -

Phone (Owner/Operator) - - Fax (Owner/Operator) - -

Email (Owner/Operator)

FED TAX ID - (not required for individuals)

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- Preservation of Undisturbed Areas
- Preservation of Buffers
- Reduction of Clearing and Grading
- Locating Development in Less Sensitive Areas
- Roadway Reduction
- Sidewalk Reduction
- Driveway Reduction
- Cul-de-sac Reduction
- Building Footprint Reduction
- Parking Reduction

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

. acre-feet

29. Identify the RR techniques (Area Reduction), RR techniques (Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required (#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

<u>RR Techniques (Area Reduction)</u>	<u>Total Contributing Area (acres)</u>		<u>Total Contributing Impervious Area(acres)</u>	
<input type="radio"/> Conservation of Natural Areas (RR-1) ...	<input type="text"/>	<input type="text"/>	and/or	<input type="text"/>
<input type="radio"/> Sheetflow to Riparian Buffers/Filters Strips (RR-2)	<input type="text"/>	<input type="text"/>	and/or	<input type="text"/>
<input type="radio"/> Tree Planting/Tree Pit (RR-3)	<input type="text"/>	<input type="text"/>	and/or	<input type="text"/>
<input type="radio"/> Disconnection of Rooftop Runoff (RR-4) ..	<input type="text"/>	<input type="text"/>	and/or	<input type="text"/>
<u>RR Techniques (Volume Reduction)</u>				
<input type="radio"/> Vegetated Swale (RR-5)				
<input type="radio"/> Rain Garden (RR-6)				
<input type="radio"/> Stormwater Planter (RR-7)				
<input type="radio"/> Rain Barrel/Cistern (RR-8)				
<input type="radio"/> Porous Pavement (RR-9)				
<input type="radio"/> Green Roof (RR-10)				
<u>Standard SMPs with RRv Capacity</u>				
<input type="radio"/> Infiltration Trench (I-1)				
<input type="radio"/> Infiltration Basin (I-2)				
<input type="radio"/> Dry Well (I-3)				
<input type="radio"/> Underground Infiltration System (I-4)				
<input type="radio"/> Bioretention (F-5)				
<input type="radio"/> Dry Swale (O-1)				
<u>Standard SMPs</u>				
<input type="radio"/> Micropool Extended Detention (P-1)				
<input type="radio"/> Wet Pond (P-2)				
<input type="radio"/> Wet Extended Detention (P-3)				
<input type="radio"/> Multiple Pond System (P-4)				
<input type="radio"/> Pocket Pond (P-5)				
<input type="radio"/> Surface Sand Filter (F-1)				
<input type="radio"/> Underground Sand Filter (F-2)				
<input type="radio"/> Perimeter Sand Filter (F-3)				
<input type="radio"/> Organic Filter (F-4)				
<input type="radio"/> Shallow Wetland (W-1)				
<input type="radio"/> Extended Detention Wetland (W-2)				
<input type="radio"/> Pond/Wetland System (W-3)				
<input type="radio"/> Pocket Wetland (W-4)				
<input type="radio"/> Wet Swale (O-2)				

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

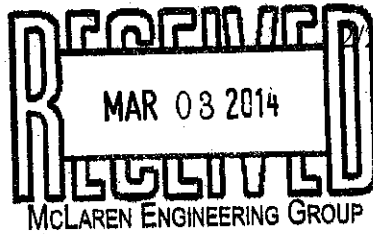
WQv Provided

						
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New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 • **Fax:** (518) 402-9029
Website: www.dec.ny.gov



Joe Martens
Commissioner



120536.03

21g
cad

NEW YORK CITY

110 WILLIAM STREET
NEW YORK NY 10038-

**Re: ACKNOWLEDGMENT of NOTICE of INTENT for
Coverage Under SPDES General Permit for Storm
Water Discharges from CONSTRUCTION
ACTIVITY General Permit No. GP-0-10-001**

Dear Prospective Permittee:

This is to acknowledge that the New York State Department of Environmental Conservation (Department) has received a complete Notice of Intent (NOI) for coverage under General Permit No. GP-0-10-001 for the construction activities located at:

**MTA PARATRANSIT FACILITY
1000 COMMERCE AVENUE
BRONX NY 10462-**

County: BRONX

Pursuant to Environmental Conservation Law (ECL) Article 17, Titles 7 and 8, ECL Article 70, discharges in accordance with GP-0-10-001 from the above construction site will be authorized 5 business days from 2/26/2014 which is the date we received your final NOI, unless notified differently by the Department.

The permit identification number for this site is: NYR 10X669 . Be sure to include this permit identification number on any forms or correspondence you send us. When coverage under the permit is no longer needed, you must submit a Notice of Termination to the Department.

This authorization is conditioned upon the following:

1. The information submitted in the NOI received by the Department on 2/26/2014 is accurate and complete.
2. You have developed a Storm Water Pollution Prevention Plan (SWPPP) that complies with GP-0-10-001 which must be implemented as the first element of construction at the above-noted construction site.
3. Activities related to the above construction site comply with all other requirements of GP-0-10-001.

4. Payment of the annual \$100 regulatory fee, which is billed separately by the Department in the late fall. The regulatory fee covers a period of one calendar year. In addition, since September 1, 2004, construction stormwater permittees have been assessed an initial authorization fee which is now \$100 per acre of land disturbed and \$600 per acre of future impervious area. The initial authorization fee covers the duration of the authorized disturbance.

5. When applicable, project review pursuant to the State Environmental Quality Review Act (SEQRA) has been satisfied.


6. You have obtained all necessary Department permits subject to the Uniform Procedures Act (UPA). You should check with your Regional Permit Administrator for further information.

***Note: Construction activities cannot commence until project review pursuant to SEQRA has been satisfied, when SEQRA is applicable; and, where required, all necessary Department permits subject to the UPA have been obtained.**

Please be advised that the Department may request a copy of your SWPPP for review.

Should you have any questions regarding any aspect of the requirements specified in GP-0-10-001, please contact Dave Gasper at (518) 402-8114 or the undersigned at (518) 402-8109.

Sincerely,



Toni Cioffi
Environmental Program Specialist 1

cc: RWE - 2
SWPPP Preparer

MCLAREN ENGINEERING GROUP
GROGG, STEVEN
100 SNAKE HILL ROAD
WEST NYACK NY 10994-

APPENDIX E
COMMUNITY AIR MONITORING PLAN

**INTERIM REMEDIAL MEASURE WORK PLAN
APPENDIX E – COMMUNITY AIR MONITORING PLAN
PROPOSED MTA PARATRANSIT FACILITY
COMMERCE AVENUE, BRONX, NEW YORK
NYSDEC ORDER ON CONSENT INDEX NO: R2-20150206-62; SITE NO. 203074**

FEBRUARY 2017

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APPENDIX A – MANUFACTURERS’ OWNER’S MANUALS

1.0 INTRODUCTION

In accordance with the Interim Remedial Measure Work Plan, this Community Air Monitoring Plan (CAMP) is developed for utilization during soil excavation activities at the Commerce Avenue Site, Bronx, New York. The Site is an approximately 94,958 square-foot portion of Block 3838, Lot 60 and is proposed for development as the MTA Paratransit Bus Facility.

TRC Engineers, Inc. (TRC) developed this CAMP to describe the procedures for real-time air monitoring for volatile organic compounds (VOCs) and particulate levels which will be completed during intrusive activities. Continuous monitoring and observations will be required during soil excavation activities. This CAMP was developed based on the requirements of New York State Department of Health (NYSDOH) Generic CAMP, Appendix 1A and Fugitive Dust and Particulate Monitoring, Appendix 1B, of NYSDEC DER-10.

2.0 PURPOSE

The Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of the work area at the Site. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of excavation work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities do not spread contamination off-site through the air.

3.0 AIR MONITORING PROTOCOL

A qualified environmental monitor with “stop work authority” will be responsible for the air monitoring and daily calibration and maintenance of the equipment in accordance with the manufacturer’s specifications. All instrumentation and equipment will be maintained at all times in proper operating condition. The qualified environmental monitor will be responsible for documenting in the dedicated project log book each calibration event, any equipment and instrument malfunctions, unusual conditions, air monitoring station locations, and any exceedances of action levels and countermeasures implemented. Copies of the manufacturers’ owner’s manuals for monitoring instrumentation to be used is included as *Appendix A*.

3.1 VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the work area on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present (i.e., photoionization detector MiniRae 2000). The equipment will be calibrated daily and will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring. Note that odor complaints from any owner of an adjacent or nearby property will be managed by the Contractor in a manner equivalent to an exceedance of an action level in the CAMP.

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

3.2 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind locations of the perimeter of the Site at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level (i.e., TSI DusTrak Model 8520). The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

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

INTERIM REMEDIAL MEASURE WORK PLAN – APPENDIX E
COMMUNITY AIR MONITORING PLAN
PROPOSED MTA PARATRANSIT FACILITY - COMMERCE AVENUE, BRONX, NEW YORK
NYSDEC ORDER ON CONSENT INDEX NO: R2-20150206-62; SITE NO. 203074

adjacent or nearby property will be managed by the Contractor in a manner equivalent to an exceedance of an action level in the CAMP.

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

4.0 REPORTING

Any exceedance of a CAMP threshold or action level will be reported to the NYCEDC immediately and additionally via email within 4 hours of the time it is recorded. The report will include the instrument readings; location of the monitoring station where the exceedance was recorded; readings at upwind locations; date, time, and duration of elevated readings (i.e., number of 15 minute time-weighted exceedances); activities being performed at the time of the exceedances; and descriptions of countermeasures implemented to control the exceedance and prevent future occurrences.

At the completion of each work day, the data recorded from each air monitoring station will be downloaded onto a dedicated field computer and evaluated by the qualified environmental monitor. All readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

APPENDIX A
MANUFACTURERS' OWNER'S MANUALS

MiniRAE 2000

Portable VOC Monitor PGM-7600



OPERATION AND MAINTENANCE MANUAL

(Document No.: 011-4001-000)
Revision E, May 2005



ATTENTION!

For European Applications

- A. CE 0575 Ⓢ II 1G/2G
DEMKO 03 ATEX 0204759X
Eex ia IIC T4**
- B. Recharge batteries only in non-hazardous locations.**
- C. Do not connect external cable to serial interface jack in hazardous locations.**
- D. Use RAE Systems Adapter P/N 500-0072 for connection to communication port and charging jack only in a non-hazardous area.**

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Data Analysis Software

TRAKPRO™
Data Analysis Software

User's Guide

1980581, Revision D
July 2009



TRUST. SCIENCE. INNOVATION.

Part Number

1980581 / Revision D / July 2009

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Address

TSI Incorporated / 500 Cardigan Road / Shoreview, MN 55126 / USA

Phone No.

1-800-874-2811 (USA) or (651) 490-2811

Fax No.

(651) 490-3824

E-mail Address

answers@tsi.com

Limitation of Warranty and Liability (effective July 2000)

Seller warrants the goods sold hereunder, under normal use and service as described in the operator's manual, shall be free from defects in workmanship and material for twenty-four (24) months, or the length of time specified in the operator's manual, from the date of shipment to the customer. This warranty period is inclusive of any statutory warranty. This limited warranty is subject to the following exclusions:

- a. Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment.
- b. Parts repaired or replaced as a result of repair services are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment.
- c. Seller does not provide any warranty on finished goods manufactured by others or on any fuses, batteries or other consumable materials. Only the original manufacturer's warranty applies.
- d. Unless specifically authorized in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, goods which are incorporated into other products or equipment, or which are modified by any person other than Seller.

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Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at (800) 874-2811 (USA) or (001 651) 490-2811 (International).

Software License

(effective March 1999)

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APPENDIX F
RESUMES OF KEY PERSONNEL

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

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

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

RELEVANT EXPERIENCE

DPR Soundview Park Playgrounds and Open Space, Bronx, NY

AKRF is part of a team working on the reconstruction of this 212-acre NYCDPR public park located along the Bronx River in the Bronx, New York. The park was identified as an underutilized park and is being improved in accordance with the goals of PlaNYC. Ms. Lapin is overseeing AKRF's hazardous materials investigations including environmental and remediation-related work. AKRF prepared the Environmental Assessment Statement (EAS) and the project has moved into the design and construction phase. The remediation/construction of multiple phases of the development is currently underway.

BACKGROUND

Education

M.S., Civil Engineering, Syracuse University, 1985

B.S., Civil Engineering, Clarkson University, 1983

Licenses & Certifications

New York State P.E.

State of Connecticut P.E.

Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters

Member, American Society of Civil Engineers (ASCE), National and CT Chapters

Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)

Member, Environmental Professionals' Organization of Connecticut (EPOC)

Board Member, New York City Brownfield Partnership

Member, NAIOP, a Commercial Real Estate Development Association

Years of Experience

Year started in company: 1994

Year started in industry: 1986

Brooklyn Bridge Park, Brooklyn, NY

AKRF prepared an Environmental Impact Statement (EIS) and is continuing to provide technical and planning support services for Brooklyn Bridge Park, which revitalizing the 1.3-mile stretch of the East River waterfront between Jay Street on the north and Atlantic Avenue on the south. The new park, allows public access to the water's edge, allowing people to enjoy the spectacular views of the Manhattan skyline and New York Harbor. It also provides an array of passive and active recreational opportunities, including lawns, pavilions, and a marina. As with many waterfront sites around New York City, the lands along the Brooklyn waterfront have a long history of industrial activities. Some of these industries used dangerous chemicals and generated toxic by-products that could have entered the soil and groundwater. In addition, landfilling activities along the shoreline also used ash and other waste materials from industrial processes. Based on site inspections, historical maps, government records, and other sources, AKRF has been investigating the potential for the presence for hazardous materials in the park. This information was compiled into a Phase I Environmental Site Assessment report. AKRF has also provided and continues to support to the design team related to designing the project to minimize costs related to remediating hazardous materials where possible. Ms. Lapin is serving as senior manager for the hazardous materials investigations.

Hudson River Park, New York, NY

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

New York City School Construction Authority (SCA), Environmental Consulting Hazardous Materials Services

The SCA was established by the New York State government to construct school facilities to reduce overcrowding and to provide new schools in growing neighborhoods. Focusing on the environmental consulting services, dating back to the 1980s and the days of the New York City Board of Education, the firm continues to provide broad support to SCA's effort, including environmental assessments in meeting the requirements of the State Environmental Quality Review Act (SEQRA), and site selection and property acquisition support for potential new sites. AKRF is currently serving under three individual on-call contracts for site acquisition and environmental consulting services, hazardous materials consulting services, and architectural and engineering services.

AKRF has undertaken various assignments under two consecutive hazardous materials on-call contract, including environmental assessment, remedial design, and plumbing disinfection consulting tasks. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments (ESAs) and multi-media subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, design of sub-slab depressurization systems (SSDS) and contract specifications, and construction oversight. The work has also included conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, and investigation and remediation of spills for existing schools. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours. Ms. Lapin is the QA/QC officer for all of the SCA hazardous materials assignments and the Professional Engineer (P.E.) of record for the various remediation systems, including sub-slab depressurization systems (SSDS).

Storage Deluxe, Various Locations, NY

Ms. Lapin manages the firm's ongoing work with Storage Deluxe, which includes Phase I Environmental Site Assessments and Phase II Subsurface Investigations, underground storage tank removals and associated remediation, asbestos surveys and abatement oversight, and contaminated soil removal and remediation for sites in Connecticut, the Bronx, Brooklyn, Manhattan, Westchester County, and Long Island.

Memorial Sloan Kettering Cancer Center-CUNY 74th Street EIS, New York, NY

AKRF was engaged by Memorial Sloan-Kettering Cancer Center (MSK) and CUNY-Hunter College (CUNY) to prepare an EIS for a proposed joint facility located on a New York City-owned parcel located between East 73rd Street and East 74th Street adjacent to the FDR Drive in Manhattan. The proposed facility was formerly occupied by the Department of Sanitation, and had included over 41 underground storage tanks, will include an ambulatory medical care center for MSK and educational and medical research facilities for CUNY.

Ms. Lapin is leading the hazardous materials work which includes the preparation of the Phase I and II environmental site assessments, remedial action work plans (RAWPs), and construction health and safety plans (CHASPs) for submission to the New York City Office of Environmental Remediation (OER) for the Voluntary Cleanup Program (VCP) and to the New York State Department of Environmental Conservation (NYSDEC) for remediation of a petroleum spill. The RAWPs and CHASPs included provisions for excavation of contaminated soil and rock, removal of tanks and environmental monitoring during the construction activities. AKRF also performed a pre-demolition asbestos survey of the remaining concrete foundation structures and prepared specifications for asbestos abatement, soil management and underground storage tank removal and disposal.

MARC S. GODICK, LEP

SENIOR VICE PRESIDENT

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

RELEVANT EXPERIENCE

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

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

Remedial Design, Gowanus Canal First Street Turning Basin, New York City Department of Design and Construction (DDC)

Mr. Godick is managing the remedial design for restoration of the filled-in former First Street Turning Basin in Brooklyn, New York. The remediation is being conducted as part of an Order of Consent between the City of New York and EPA for the Gowanus Canal Superfund Site. The remedial design will include removal of fill and sediment within the fill-in basing in an approximately 475-foot by 50-foot area. The restored basin will provide enhanced waterfront access to the community and a boat launch for canoes and kayaks. Design considerations include geotechnical concerns related to adjacent buildings and new and existing bulkheads; soil and water management; landscape design; and access/construction logistics. The design is anticipated to be completed in late 2017.

On-Call Environmental Consulting (Various Locations), New York City School Construction Authority

Mr. Godick is managing an on-call contract with the SCA for environmental assessment, remedial design, and plumbing disinfection. For new school sites, initial due diligence involves conducting Phase I environmental site assessments

BACKGROUND

Education

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

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

Licenses & Certifications

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

40 Hour HAZWOPER and Annual Refresher Training, 1990 - Present

Supervisors of Hazardous Waste Operations (8 Hour), 1990

Professional Memberships

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

Member, Westchester County Stormwater Advisory Board, 2011 – Present

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

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

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

Community Leadership Alliance, Pace University School of Law, 2001

Years of Experience

Year started in company: 2002

Year started in industry: 1990

(ESAs) and multi-media sampling of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school and remediation requirements and associated costs. Once design for a school is underway, AKRF would prepare remediation plans and construction specifications and oversee the construction activities. For existing school sites, the work can involve conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, investigation and remediation of spills, and development of remediation cost estimates. AKRF also oversees plumbing disinfection work, which is required prior to new plumbing being placed into service. The assignments involve reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of a report documenting the work was conducted in accordance with the specifications and applicable requirements. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

Remediation & Litigation Support, 3200 Jerome Avenue, Bronx, NY (Former PS 151)

Mr. Godick managed the investigation and remediation of a former public school in the Bronx under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP). The site was contaminated with trichloroethylene (TCE) from historic operations at the property prior to use as a school. The remedial investigation included soil, groundwater, and vapor intrusion assessment both on-site and off-site. The remedial design included excavation of the source area, in-situ chemical oxidation of groundwater, and installation of a sub-slab depressurization system (SSDS) to address to potential vapor intrusion. Implementation of the remedy was complete in late 2014. The completed remediation allows for future multi-family residential, educational, childcare, and/or medical uses. Mr. Godick has also been providing litigation support and will serve as a fact witness and potentially an expert witness in connection with a cost recovery claim against the former operator of the site.

Remediation & Litigation Support, Queens West Project, Avalon Bay Communities, Queens, NY

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF prepared an Environmental Impact Statement (EIS) that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. As part of this project, Mr. Godick managed one of the largest remediation projects completed under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP) that was contaminated by coal tar and petroleum. The remedy included the installation of a hydraulic barrier (sheet pile cut off wall), excavation of contaminated soil under a temporary structure to control odors during remediation, a vapor mitigation system below the buildings, and implementation of institution controls. The investigation, remediation design, and remedy implementation, and final sign-off (issuance of Certificate of Completion) were completed in two years. Total remediation costs were in excess of \$13 million. Following completion of the remediation, Mr. Godick developed a cost allocation model and provided litigation support for a cost recovery action against a former operator of the site, including participation in a deposition as a fact witness prior to settlement between the parties.

Remediation, Former Industrial Laundry/Dry Cleaning Plant, 2350 Fifth Avenue. New York, NY

Mr. Godick managed the assessment, cleanup and post-remedial operations, maintenance and monitoring of the only NYSDEC listed inactive hazardous waste (State Superfund) site in Manhattan, a former laundry/dry cleaning plant in Harlem. Remedial investigation included evaluation of soil, groundwater, soil vapor, indoor air, and building materials. Interim remediation included the removal of contaminated building materials and operation of a sub-slab vapor extraction system retrofitted into the existing building. Mr. Godick coordinated with the regulatory agencies, site owner and occupants; and managed the investigation, remedial design, and remedial implementation activities. Phase 1 of the Remedial Action Work Plan consisted of further removal of contaminated building materials. Phase 2 of the remediation included a sub-slab depressurization system (SSDS) retrofitted into the existing building, soil vapor extraction (SVE) system, and chemical oxidation injection. Remedial action work was completed in 2014 and documented in a Final Engineering Report. NYSDEC issued Certificate of Completion in January 2015 and the site has been reclassified to a “Class 4” site (site properly closed – requires continued management). Mr. Godick continues to manage the project, including operations, maintenance and monitoring of the SSDS and SVE system under the NYSDEC-approved Site Management Plan.

606 West 57th Street, New York, NY, TF Cornerstone

AKRF has been retained by TF Cornerstone to provide environmental services for the proposed redevelopment of a portion of the block bounded by Eleventh and Twelfth Avenues and West 56th and 57th Streets. The proposed actions included a zoning map amendment, zoning text amendments, a special permit, and an authorization to facilitate development of approximately 1.2 million square feet of residential and retail space. AKRF prepared an Environmental Impact Statement (EIS) for the New York City Department of City Planning (DCP) to analyze the effects of the proposed actions and development of the proposed building. The EIS addressed the full range of environmental impacts associated with the proposed development.

Mr. Godick was responsible for the elements of the EIS pertaining to hazardous materials, including coordination of a Phase I ESA and summarizing pertinent site information for the hazardous materials and construction chapters. Mr. Godick provided pre-acquisition support to TF Cornerstone, which included development of a remedial cost estimate report to outline remediation cost during site development. Mr. Godick also managed work related to the subsurface investigation, localized remediation (chemical injection and limited excavation beneath the building basement) and regulatory closure of a petroleum spill on a portion of the project site to satisfy NYSDEC requirements. After EIS certification, Mr. Godick coordinated approvals with NYCOER, the regulatory agency overseeing remedial measures related to the redevelopment of the site. The Site has an (E) Designation and is participating in the New York City Voluntary Cleanup Program. Mr. Godick managed the preparation of a Phase II Investigation Work Plan, Remedial Investigation Report, Remedial Action Work Plan, and contractor specifications for soil management and tank and hydraulic lift removal. Mr. Godick is continuing to manage the project during remediation and construction.

NYCDEP Permit Resource Division On-Call Contract, New York, NY

Under subcontract to a national engineering firm, and as part of three successive on-call contracts, AKRF provided support in a wide range of technical areas related to environmental and engineering permits for NYCDEP capital projects. These services fall into two major categories: preparing detailed guidance documents that will be used by project designers and construction managers on future projects, in order to expedite permit approvals and prevent delays; and providing expert review and guidance regarding permits for current projects, in order to ensure completeness of permit applications and effective coordination with regulatory agencies. The technical areas covered by AKRF include: wetlands, groundwater, surface water, and other natural resources; hazardous materials; traffic and transportation; air quality; noise and vibration; historic and archaeological resources; stormwater management; open space and parkland; and a broad range of permits and approvals from the New York City Fire Department (FDNY), the New York City Police Department (NYPD), the New York City Department of Buildings (NYCDOB), and other municipal agencies. AKRF also helped NYCDEP improve the overall process for tracking environmental and engineering permits and approvals, from the planning and design phases of a project to construction and long-term operation. Mr. Godick served as the hazardous materials task leader under this contract.

164 Kent Avenue, Brooklyn, NY (AKA Northside Piers and 1 North 4th Place), RD Management, L&M Development, Toll Brothers, and Douglaston Development

The project was a multi-phase development consisting of a large waterfront block in the Williamsburg Rezoning Area. The project site has been developed with a mixed-use residential-commercial high rise towers with an esplanade and a pier along the East River. AKRF provided acquisition and development support, including performing Phase I and II environmental site assessments and development of remedial cost estimates for development, and preparation of Remedial Action Plans (RAPs) and Construction Health and Safety Plan (CHASPs) for approval by DEP and OER. AKRF provided assistance with construction oversight during soil handling activities and managing the Community Air Monitoring Plan (CAMP) activities. To date, closure reports have been prepared and occupancy now achieved for all four buildings under the project.

DUSTIN KAPSON, LEED® GREEN ASSOCIATE

SENIOR TECHNICAL DIRECTOR / ENVIRONMENTAL SCIENTIST

Mr. Kapson is a Senior Technical Director with over seven years of environmental assessment and remediation experience. He has performed numerous Phase I ESAs and supervised Phase II activities and has served as Contaminated Materials/Hazardous Materials Task Leader for a wide variety of transportation projects in New York and New Jersey. Mr. Kapson has been responsible for cost proposals, sampling and analysis, health and safety, contract management and quality control plans for several site assessment and environmental remediation projects. Mr. Kapson is a LEED® Green Associate, certified in OSHA HAZWOPER, as an NYSDEC Erosion and Sediment Control inspector, and is a member of the Water Environment Federation.

RELEVANT EXPERIENCE

3200 Jerome Avenue, Bronx, New York

AKRF conducted a Phase I ESA and an Indoor Air Quality Survey of this property in the Bronx during due diligence investigations for the NYCSCA which identified levels of trichloroethene (TCE) in indoor air that exceeded the New York State Department of Health (NYSDOH) standards. NYCSCA subsequently terminated its lease of the site and discontinued its use as a school. Following the termination of NYCSCA's lease of the site, AKRF was retained by the owner to conduct an investigation and cleanup. Mr. Kapson helped to prepare the application to enter the site into the NYSDEC Brownfield Cleanup Program (BCP). Following the sites acceptance into the program, Mr. Kapson has been responsible for preparing a Citizen Participation Plan to identify health risks to the public, developing workplans, and conducting/overseeing Site Characterization and Remedial Investigations in an effort to develop a remedial strategy. Other responsibilities have included coordination with the New York City Transit Authority and communicating findings with NYSDEC and NYSDOH representatives.

Environmental Consulting Services for E-designated Sites

Mr. Kapson has provided environmental services required to satisfy hazardous materials-related E-designations on various locations in New York City, including 547 Tenth Avenue in Manhattan, NY for Extell Development Company, 41-43 Bond Street in Manhattan, NY for DDG Partners, 86 Delancey Street in Manhattan, NY for Helm Equities LLC, and 78-82 Irving Place in Brooklyn, NY for New York Concrete Corporation. These services included Phase I and Phase II site investigations, preparation of Sampling Protocols, Remedial Action Plans and Health and Safety Plans based on identified hazardous materials issues, correspondence with the New York City Mayor's Office of Environmental Remediation (OER), remediation oversight as required by identified conditions, and preparation of Remedial Investigation and Final Engineering Reports.

BACKGROUND

Education

B.A, Environmental Studies, Bucknell University, Lewisburg, PA, 2007

Pursuing Masters Degree in Environmental Engineering, Manhattan College, Expected 2016

Licenses & Certifications

OSHA HAZWOPER, December 2007 – annual refresher every year (scheduled for December 2012)

LEED® Green Associate

NYSDEC Erosion and Sediment Control Inspector

Years of Experience

Year started in company: 2011

Year started in industry: 2007

NYS DOT/NYSTA Tappan Zee Hudson River Crossing, Rockland and Westchester Counties, NY

AKRF completed an EIS for this project on a fast-track schedule. Mr. Kapson conducted an extensive Phase II Site Investigation in support of the Hazardous Materials and Construction Impacts chapters of the EIS. Findings of the study were utilized to develop numerous documents prepared to guide the construction team, including a Remedial Action Plan and a Construction Health and Safety Plan for the five-year bridge replacement project. Mr. Kapson has continued to conduct peer reviews of these reports and construction plans, which were prepared by others on the design and construction team, to confirm regulatory compliance.

National Grid Brooklyn Queens Interconnect, Brooklyn and Queens, NY

AKRF prepared the environmental review materials and has continued to consult and help lead the project team through the construction of a new gas pipeline in the Rockaway area for National Grid. The project will reinforce the natural gas transmission and distribution systems and will provide for projected increases in energy demand in both Brooklyn and Queens. Two parallel (12- and 26-inch) natural gas mains are to be installed between Beach 169th Street on the Rockaway Peninsula to Avenue U in Brooklyn. The 12-inch gas main will provide an alternative delivery source of natural gas to the Rockaway Peninsula, where the demand for natural gas is expected to exceed the delivery capacity of the system within a few years. The 26-inch main is to connect to an interstate natural gas transmission line. This will be the first new transmission source of natural gas into New York City in over 40 years. The environmental analyses included land use, open space, cultural resources, hazardous materials, coastal zone consistency, construction, and natural resources. Mr. Kapson led the hazardous materials portion of the analyses. Based on the findings of a Phase I Environmental Site Assessment conducted by AKRF, AKRF coordinated and oversaw an extensive Phase II Site Investigation which assessed soil and groundwater conditions across the entire project area. Based on the findings of the investigation, AKRF developed a Remedial Action Plan and Construction Health and Safety Plan, which was approved by NYCDEP for implementation during the installation of the pipelines. AKRF also assisted with the construction dewatering by assessing specific requirements and obtaining permission for the treated discharge to be pumped into adjacent waterways. AKRF's engineers designed a system settling tanks and a dual polymer system of Storm Lear Liqui-Floc™ and HaloKlear LBP-210 to reduce discoloration before discharge, which was approved by NYSDEC and allowed the project substantial financial savings. AKRF has continued to perform SWPPP inspections to support the landscape restoration and coordination between numerous city and state agencies.

Pepsi Bottling Facility, Bronx, NY

While at another firm, Mr. Kapson oversaw and conducted site investigation and remedial activities and inspections in support of a Pepsi Bottling and Distribution Center in Bronx, New York including the characterization and coordination of the transportation and disposal of over 25,000 tons of contaminated soil. Daily field reports and construction oversight were completed in accordance with detailed Remedial Action Workplans and Health and Safety Plans approved by the NYCDEP.

Amtrak & NJ Transit's Portal Bridge Capacity Enhancement Project—Preliminary & Final Engineering, Hackensack River, NJ

New Jersey Transit's Portal Bridge Capacity Enhancement Project involves replacing a century-year-old, two-track rail swing bridge that crosses the Hackensack River along the Northeast Corridor. As the lead environmental subconsultant to the tri-venture of Gannett Fleming, Jacobs Engineering, and HNTB Corporation for preliminary and final engineering, AKRF is responsible for securing all necessary environmental permits and regulatory approvals, including those from the United States Army Corps of Engineers (USACE), United States Coast Guard (USCG), New Jersey Department of Environmental Protection (NJDEP), and the New Jersey Meadowlands Commission (NJMC). The permits and approvals require substantial wetland and natural resource analyses, conceptual mitigation, Green Acres and parkland issues, contaminated materials investigations, and hydrology assessments. Mr. Kapson has been responsible for the review of the engineering team's remedial action workplans and correspondences which are being prepared to initiate the large scale project. Mr. Kapson reviews these documents prior to submission to NJDEP to verify regulatory framework in an effort to streamline project review.

KENNETH WILES

SENIOR PROFESSIONAL // ENVIRONMENTAL SCIENTIST

Mr. Wiles is an Environmental Scientist with five years of environmental assessment and remediation experience. He has performed numerous site and remedial investigations, supervised and developed subsurface soil, groundwater, soil vapor intrusion studies, and underground storage tank (UST) removals for a wide variety of clients and property types. Mr. Wiles has been responsible for cost proposals, sampling and analysis, health and safety, project/client/contract management for several environmental remediation projects. Mr. Wiles is certified in OSHA HAZWOPER and is knowledgeable in the GIS and AutoCAD fields. He is experienced in numerous field activities, including environmental sampling, monitoring well installation oversight, and contractor oversight.

RELEVANT EXPERIENCE

Battery Park Esplanade, Battery Park City Authority, New York, NY

Assisted in the preparation of the General Permit to allow for repairs and upgrades to the piers and other water structures. The General Permit consists of New York State and United States Army Corp of Engineers Joint Application, Permission to Inspect Form, Short Environmental Assessment Form, and the Federal Consistency Assessment Form.

Remedial Actions, Molly Pitcher Service Area, NJ Turnpike Authority (NJTA), Cranbury, NJ

Conducted remedial investigations for contaminated soils related to multiple UST discharges. Also implemented remedial actions to address onsite contamination. An air sparge/soil vapor extraction system was present onsite, which was transitioned to a biosparge system as contaminants decreased. Targeted Multi-Phase Extraction events are being conducted. Responsible for field investigations and assisting in the remedial processes. Responsibilities include membrane interface probe study oversight, soil sampling, groundwater sampling, monitoring well and temporary well installations. Prepared Remedial Action Progress Reports and the Remedial Investigation Report for submittal to the NJDEP.

Hilton Bus Garage, NJ Transit, Maplewood, NJ

The site had multiple UST discharges was undergoing a remedial investigation. The UST system was upgraded and required the removal of seven USTs. Provided environmental oversight, performed the compliance sampling, and reporting for the removal USTs.

Washington Bus Garage, NJ Transit, Washington Township, NJ

Remedial investigations and remedial actions were performed for a large diesel fuel release, a release from the waste oil sump, and a release from the dispensers. The diesel release impacted downgradient streams and lakes. Was a key member of sampling team to evaluate the streams and lakes for initial impact. Delineated soil and groundwater contamination for

BACKGROUND

Education

M.S, Earth and Environmental Sciences, Lehigh University, Bethlehem, PA, 2010

B.S, Environmental Science, Juniata College, Huntingdon, PA, 2008

Licenses & Certifications

OSHA HAZWOPER, September 2010

Years of Experience

Year started in company: 2015

Year started in industry: 2010

the three plumes through a Laser Induced Fluorescence, soil and monitoring well investigation. Responsible for managing field work operations, including well installation, potable well sampling, soil sampling, product monitoring, and excavation oversight. Responsibilities also included task management and report writing for NJDEP regulatory compliance.

Woodrow Wilson Service Area, NJ Turnpike Authority (NJTA), Hamilton, NJ

A remedial investigation was conducted for contaminated soils related to a UST discharge. Prepared Remedial Action Progress Reports, Classification Exception Area application (Institutional Control), and Remedial Investigation Report for submittal to the NJDEP.

Remedial Investigation, Wood-Ridge Borough Department of Public Works, Bergen County, NJ

A remedial investigation was performed and a Remedial Action Workplan for a UST release with impact to soil and groundwater. A bulk of the contaminated soil will be removed and the remainder will be remediated by the injection of reagents. Prior to implementing remedial actions, land use permits will have to be acquired. Responsible for well installation and soil, groundwater and surface water sampling. Responsibilities also include task management and report preparation for NJDEP regulatory compliance.

Proposed Wesmont Commuter Rail Station, NJ Transit, Wood-Ridge, NJ

PCB contamination on a railroad corridor was remediated through the NJDEP linear construction program and an Environmental Protection Agency (EPA) Self-Implementing Cleanup Plan for redevelopment as Wesmont Rail Station. Environmental services included construction oversight of environmental issues, dust monitoring, and preparation of the Self-Implementing Cleanup Plan. Coordinated and executed soil and groundwater sampling events and performed dust monitoring. Worked as part of a team to investigate onsite PCB contamination for the health and safety of workers for the construction of the station. Assisted in the project management, preliminary assessment, site investigation, and linear construction reporting process.

Vince Lombardi Service Area NJ Turnpike Authority (NJTA), Ridgefield, NJ

Conducted remedial investigations for contaminated soils related to a UST discharge. Responsible for field investigations and assisting in the remedial processes. Responsibilities included soil and groundwater sampling. Prepared Remedial Action Progress Reports and the Classification Exception Area application.

Bay Head Rail Yard, NJ Transit, Ocean County, NJ

Environmental services included construction oversight of environmental issues, remedial investigation, operation oversight, and sampling of a groundwater remedial system. The project included shallow soil and groundwater diesel fuel contamination and historic fill soil contamination. Responsible for groundwater sampling, soil boring and temporary well installation, and free product monitoring.

Market Street Bus Garage, NJ Transit, Paterson, NJ

Environmental services included conducting a remedial investigation, implementation of interim remedial measures for product removal from groundwater, and groundwater sampling. The project included soil and groundwater diesel fuel and heating oil contamination and historic fill soil contamination. Responsible for groundwater sampling, product monitoring, soil sampling, and ground penetration radar surveys.

ERIC PARK

ENVIRONMENTAL ENGINEER

Working in the Hazardous Materials department, Mr. Park has acted as environmental consultant to clients developing and remediating their properties. Services provided include, but are not limited to, remediation system design, bid specification production, creating workplans, negotiating with contractors, construction/remediation oversight management and reporting. Mr. Park has worked extensively on projects involving trichloroethylene (PCE) contamination and with remedial technologies including oxygen injection and air sparge (AS)/soil vapor extraction (SVE).

RELEVANT EXPERIENCE

New York City Economic Development Corporation (EDC) Toxics Retainer Contract

Zerega Avenue - Phase I, Phase II and Wetland Survey, Bronx, NY

AKRF was contracted by EDC to conduct perform environmental services at an approximately 255,000-square foot project area located at 530 to 590 Zerega Avenue, Bronx, New York. Mr. Park's work included a Phase I Environmental Site Assessment (ESA), and Phase II Environmental Site Investigation which included preparation of a site-specific health and safety plan, a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples.

Queens West Remediation, Long Island City, NY

Mr. Park has been involved in the on-going post-remediation activities at various sites in the Queens West development community. Queens West has a long history of contaminated sites, mostly caused by coal tar-related industrial facilities that were located in the vicinity in the past. Working with other consultants, Mr. Park has taken part in groundwater, soil and soil gas sampling and has been involved in the post investigation documentation.

New York City School Construction Authority On-Call Environmental Consulting, Various Locations, NY

Mr. Park has assisted with Phase I, Phase II, engineering design, specification preparation, submittal review, and SSDS and vapor barrier installation inspection for AKRF's on-call hazardous materials consulting contract with the NYCSCA, which includes for potential new school sites, initial due diligence, Phase I environmental site assessments (ESAs) and multi-media subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, design of sub-slab depressurization systems (SSDS) and contract specifications, and construction oversight.

BACKGROUND

Education

B.S. Engineering, Cooper Union Albert Nerken School of Engineering, 2006

Licenses & Certifications

40-hour OSHA Certified

Order of the Engineer

Years of Experience

Year started in company: 2006

Year started in industry: 2006

Former Laundry/Dry Cleaning Plant, Harlem, NY

Mr. Park is involved in the management of the assessment and cleanup of the only New York State Department of Environmental Conservation's (NYSDEC) listed hazardous waste site in Manhattan, a former laundry/dry cleaning plant in Harlem. Remedial investigation has included evaluation of soil, groundwater, soil vapor, indoor air, and building materials. Interim remediation completed to date has included the removal of contaminated building materials and operation of an innovative sub-slab vapor extraction system retrofitted into the existing building. The final Remedial Investigation/Feasibility Study (RI/FS) was approved in 2011. Mr. Park co-designed the proposed engineering controls for the site, which include SVE, SSDS, vapor barrier installation, and in-situ injection treatment. Mr. Park has also assisted in coordination with regulatory agencies, site owner and occupants, management of investigation activities, and preparation of bid specifications and remedial contracts.

Gedney Way Landfill, White Plains, NY

Mr. Park has been involved in the ongoing landfill closure procedures at the Gedney Way composting facility. The investigation consisted of the installation of monitoring wells, soil gas points, soil borings and test pits to delineate the extents of both subsurface fill material associated with the landfill as well as the extent of VOC contamination associated with a known incident in the 1980's. Groundwater samples were collected using low-flow sampling methods.

Brooklyn Bridge Park, Brooklyn, NY

Mr. Park has been involved in the application for the Department of Sanitation of New York (DSNY) Fill Materials Operation (FMO) permit. He has been working with project consultants and architects to complete the requirements necessary to obtain the FMO permit. The DSNY permit allows for the import of clean fill in excess of 1,000 cubic yards to be used on-site for the construction of noise mitigating hills at the proposed park.

Columbia University Manhattanville Academic Mixed-Use Development, New York, NY

Mr. Park was involved in the preparation of the Remedial Action Plan / Construction Health and Safety Plan for the Columbia University Manhattanville Academic Mixed-Use Development project. Due to the scope and scale of the intended development, many issues concerning hazardous materials (auto-industry related facilities, historic MGP sites) were addressed in conjunction with issues from the associated Environmental Impact Statement.

MARCO BALLETTA

ENVIRONMENTAL SCIENTIST

Marco Balletta is an Environmental Scientist in AKRF's Hazardous Materials Department. Mr. Balletta has a 5-year degree in Environmental Science from - Seconda Universita' degli Studi di Napoli (SUN) – Caserta, Campania, Italy. He has practical experience in both a laboratory setting and in the field. His range of expertise includes the collection and analysis of environmental samples including soil, sediment, groundwater, surface water, indoor air and ambient air. Mr. Balletta has professional experience including: Environmental Field Technician, Health and Safety Officer, Industrial Hygienist, Lab Analyst, Laboratory Research Assistant, Solid Waste Geologist Intern at NYSDEC.

RELEVANT EXPERIENCE

25 Broad Street, Manhattan, NY

AKRF was contracted by LCOR during the demolition of a residential building on a property which will eventually be redeveloped. AKRF was responsible for creating and implementing a community air monitoring program during demolition activities. Mr. Balletta was the on-site monitor responsible for calibrating equipment and monitoring levels of volatile organic compounds and particulate matter for the surrounding area and construction personnel. Reports of the daily activity including data collected throughout the day were prepared for submittal to the client. Mr. Balletta summarized the data and contributed to the Final Engineering Report.

406 East 91th Street, Manhattan, NY

AKRF provided environmental services in connection with the 406 East 91st Street property in Manhattan. AKRF implemented the required OER-approved Remedial Action Plan (RAP), including construction monitoring and imported soil sampling. Mr. Balletta served as the on-site environmental monitoring for this project, during which he monitored construction activities in accordance with the OER-approved RAP. His duties included community air monitoring for volatile organic compounds and airborne dust, and preparing daily reports for submittal to the OER project manager.

Riverside South, Manhattan, NY

Development of this high-rise residential building is being conducted in accordance with a Health and Safety Plan approved by the NYCDEP, which was included in AKRF's Final Environmental Impact Statement (FEIS) completed for the entire Riverside South area from 59th to 72nd Streets, between West End Avenue and the Hudson River. Mr. Balletta has served as the on-site environmental monitor, overseeing soil management activities, conducting air quality monitoring, and preparing daily reports for submittal to the regulatory agency.

BACKGROUND

Education

5-Year Laurea - Degree in Environmental Science (equivalent to combined B.S. & M.S.) – Seconda Universita' degli Studi di Napoli, Caserta, Italy, 2009

Thesis: Arsenic in Iron Floc and Groundwater Downgradient of Unlined Landfills in Southeastern New York State, 2009 (SUN/LDEO/NYSDEC)

Licenses & Certifications

40 Hour OSHA HAZWOPER Certified

OSHA HAZWOPER Supervisor

Erosion and Sediment Control Site Inspector

New York City Certified Asbestos Inspector

Years of Experience

Year started in company: 2012

Year started in industry: 2007

Hurricane Sandy Emergency Response, Various Schools, Bronx and Brooklyn, NY

AKRF provided emergency response support to the NYCSCA to address petroleum and hazardous materials releases resulting from flooding of certain NYC schools caused by Hurricane Sandy. Mr. Balletta oversaw the spill remediation activities and documented these activities on behalf of the SCA. The spill remediation activities consisted of pumping oily water from the school basements and recoverable oil from on-site oil tanks and cleaning residual oil from walls and floors using biodegradable cleaners.

Hurricane Sandy Emergency Response, P.S. 52R and P.S. 2R, Staten Island, New York

AKRF supervised the implementation of the Disinfection and Water Quality Testing Plan (DWQTP) for new domestic plumbing at two schools in Staten Island, New York. Mr. Balletta provided oversight to ensure that the water disinfection and flushing were performed in accordance with the contract specifications, the approved DWQTP, New York City Plumbing Code, and other applicable Federal, State and local regulations.

Empire Meeker; 902-924 Meeker Ave., Greenpoint, Brooklyn NY

AKRF was retained by Peerless Equities, LLC to conduct semi-annual air quality testing at the 902-924 Meeker Avenue facility in Greenpoint, Brooklyn NY. The facility is situated above an approximately 55-acre subsurface petroleum plume known as Greenpoint Oil Spill and/or the ExxonMobil Off-Site Plume. The subsurface petroleum contamination is well documented and is currently undergoing remediation. Mr. Balletta performed an on-site chemical inventory; concrete floor inspection for cracks and damage; inspection of the Sub-Slab Depressurization System (SSDS) for proper operation and negative pressure readings; and indoor and ambient air sampling using Summa canisters equipped with regulators set to obtain a continuous sample over a 24-hour period.

181 Avenue A, New York, NY

Mr. Balletta performed an Asbestos-Containing Materials (ACM) Survey at Avenue A Site (a former Catholic School complex), located at 181 Avenue A in Manhattan, New York. The survey included the inspection of the building to identify suspect ACMs; collection of representative samples of suspect ACMs; documentation of sampling locations in accordance with laboratory requirements on a Chain-of-Custody form; and submission of samples for analysis of suspect ACMs at a New York State Department of Health (NYSDOH)-approved laboratory.

327 East 64th Street, New York, NY

Mr. Balletta assisted New York City certified asbestos investigators and inspector with an ACM Survey of the approximately 24,300-square foot, two-story garage with a partial basement located at 327 East 64th Street in New York, NY. The survey consisted of: inspection of the building to identify suspect ACMs; collection of representative samples of suspect ACMs; documentation of sampling locations on a Chain-of-Custody form; and submission of samples for Analysis of suspect ACMs at a New York State Department of Health (NYSDOH)-approved laboratory. Mr. Balletta assisted asbestos investigators with the identification of suspect ACMs, the collection of representative samples of suspect ACMs, the documentation of sampling locations on a Chain-of-Custody form.

MARGO DAVIS

ENVIRONMENTAL SCIENTIST

Margo Davis is an Environmental Scientist in AKRF's Hazardous Materials group. She is a recent graduate from Colorado College with a degree in Environmental Science. She is responsible for conducting Phase I Environmental Site Assessments (ESAs), and supporting the hazardous materials group in preparing Phase II Subsurface Investigations and hazardous materials assessments for EASs and EISs; remediation planning and oversight; and developing Remedial Action Plans and Health and Safety Plans.

RELEVANT EXPERIENCE

New York City School Construction Authority (SCA), Environmental Consulting Hazardous Materials Services

AKRF has undertaken various assignments under two consecutive hazardous materials on-call contracts, including environmental assessment, remedial design, and plumbing disinfection consulting tasks. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments (ESAs) and multi-media subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, design of sub-slab depressurization systems (SSDS) and contract specifications, and construction oversight. The work has also included conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, and investigation and remediation of spills for existing schools. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours. Ms. Davis conducts Phase I ESAs as part of this contract.

2 North 6th Place, Brooklyn, New York

Investigation and remediation of the Site is being conducted under the New York City Office of Environmental Remediation. AKRF completed a Phase I Environmental Site Assessment, Supplemental Phase II Subsurface Investigation, and prepared a Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP). For this project, Ms. Davis served as the on-site environmental monitor who sampled soil, oversaw soil excavation and exports, conducted air quality monitoring and airborne dust screening, and prepared daily summary reports for submittal to the OER project manager.

810 Fulton Street, Brooklyn, New York

In addition to performing the Phase II Investigation, Ms. Davis prepared the Remedial Investigation Report and provided support for the preparation and future implementation of the RAP and CHASP.

BACKGROUND

Education

Bachelor of Arts, Environmental Science, Anthropology Minor, Colorado College, 2013

Licenses & Certifications

Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120

OSHA 10 Hour Occupational Construction Safety and Health

Years of Experience

Year started in company: 2014

Year started in industry: 2014

City Tech College, Brooklyn, New York

Development of this new academic building is being conducted under the New York City Office of Environmental Remediation. Ms. Davis served as an on-site environmental monitor, overseeing soil management activities, conducting air monitoring, and preparing daily reports.

Litigation Support (Confidential Client) Brooklyn, NY

Ms. Davis reviewed data provided by the USEPA and information pertaining to historical operations to help assess relative likelihood that a given Potentially Responsible Party (PRP) contributed to the Gowanus Canal sediment contamination.

Various Phase I ESAs

Ms. Davis prepared a Phase I ESAs in accordance with ASTM E1527-13 and EPA's All Appropriate Inquiry (AAI) rule, which included conducting site visits, reviewing federal and state regulatory databases, and collecting historical fire insurance maps and building records from the City of New York for review in determining possible hazardous environmental conditions. Representative projects include:

- Albert Einstein College of Medicine, Bronx, New York
- ADC-Genesis Y15 Resyndication, New York, New York
- South Street Seaport, New York, New York
- Metropolitan Hospital, New York, New York
- Peter Cooper Village and Stuyvesant Town, New York, New York
- 57 Willoughby Street, Brooklyn, New York
- Hudson Boulevard, New York, New York

Phase II Subsurface Investigations

Ms. Davis conducted Phase II Subsurface Investigations for sites being developed including:

- 810 Fulton Street, Brooklyn, New York
- Jamaica Crossing, Queens, New York
- The Barnett, Queens, New York
- 28 and 42 Trinity Place, New York, New York
- St. Augustine Apartments, Bronx, New York



Ryan Dinsmore

Project Manager

@ rdinsmore@hrcg.com

📞 212-699-4945

As Project Manager, Ryan Dinsmore supports management and coordination of the engineering process of the project. His duties include managing the subcontractor shop drawing submittal process and coordinating approvals with the project design team. He serves as a liaison for the client in managing potential change orders from the subcontractors. Ryan also provides the Hunter Roberts field staff with coordination and submittal information as it becomes available and ensures that there is a seamless transition from the engineering stage of the project to the actual construction of the work. Ryan has spent seven years in the New York construction marketplace.

ABOUT

Strengths

- Civil
- Public

Education

Villanova University
B.S., Civil & Environmental Engineering

Associations

- American Society of Civil Engineers (ASCE), Member

EXPERIENCE

26th Ward Green Infrastructure Improvements, Brooklyn, NY

Green infrastructure improvements to the Hutchinson River/Westchester Creek CSO tributary area. Includes approximately 1,060 right-of-way bioswales across nearly 1,000 acres. Plants, trees, permeable concrete, low curbs, and rainwater retention systems.

South Street Seaport Pier 17 Redevelopment, New York, NY

Transformation of Pier 17 through demolition of existing pier and building. New pier construction with increased open space. Four-story pier building with garden roof, destination stores, restaurants, and neighborhood shops.

Icahn Charter School 3, Bronx, NY

Consulting services for the gut rehabilitation of an existing 90,000-SF school with a 14,000-SF addition for use by three new charter schools. Completed in several phases, Phase 1 included 28 classrooms with back-of-house facilities and Phase 2 included another 41 classrooms with back-of-house facilities.

St. George Ferry Terminal Renovation, Staten Island, NY

The 190,000-SF renovation of the Staten Island Ferry facility, including upgrades to primary utility services, new commercial retail spaces, and a structural addition to the top of the facility. Carefully phased and coordinated to minimize disruption to passengers. Included photovoltaic panels to generate electricity and green roof technology to capture rainwater for reuse.



Steve Martell

Superintendent

@ smartell@hrcg.com

📞 212-321-6800

As Superintendent, Steve Martell reports to the Project Executive with specific responsibility for managing and overseeing the construction operations on the project. In addition, he is responsible for updating the project schedule, the site logistics plans, he acts as liaison to the labor representatives, coordinates weekly meetings with the project team, and assists in the preparation of monthly status reports for the owner. Steve has over 34 years experience in the construction industry. He has significant project management experience in all aspects of construction development and coordination. His unique ability to provide innovative solutions to complex time sensitive projects through broad oversight attention to detail, extensive knowledge of design and engineering has led to successful projects.

ABOUT

Strengths

- Public
- Residential
- Commercial

Education

Essex County College
RCS & ISC Certification

William Patterson College

Certifications

- OSHA 30
- Heavy Equipment Operator
- CDL Licence

EXPERIENCE

NYCEDC FM/CM Consultant Contract, High Limit, Various Locations, NY

A cost-plus, fixed-term \$100 million contract. Pre-construction and construction assignments include building renovations, new building construction, and civil and marine cost-plus and design/build projects. Assignments include Sandy Relief Projects, Caribbean Cultural Center and African Diaspora Institute, and MMI Jim Henson Exhibition.

PS 29, Queens, NY

Multi-phased primary school renovation. Demolition of existing 1930s addition, relocation of dry-wells and utilities, new 26,500-SF addition, and renovations of the existing 62,000-SF school.

1330 Avenue of the Americas Garage, Plaza, and Storefront Upgrades, New York, NY

Comprehensive repair program for the parking garage to replace severely deteriorated conditions, repair less severe conditions of minor to moderate deterioration, and install a high-performance waterproofing and traffic bearing membrane coating system. Complete waterproofing and paver system at grade for the plaza, along with planters, steps, railings, and an overall integration with a new storefront system.

Conrad Hotel, New York, NY

Repositioning of entire hotel and retail areas, including 463 all-suite rooms, conference center, and public interior right-of-way atrium. New banquet rooms, a new hotel restaurant, bar and sundry shop, and rooftop lounge. Custom stained oak beds, switchback granite grand staircase with walnut struts, white oak millwork, sliding glass walls, and custom leather furniture.

Hudson Greene, Jersey City, NJ

A 1.5 million-SF waterfront residential development. Two 50-story residential towers built from a common podium containing a 10-story garage, a 10,000-SF ground floor lobby, and high-end retail space. Units include floor-to-ceiling height curtain wall, hardwood flooring, marble bathrooms, and European-style kitchens. Fitness centers, saunas, private theater rooms, virtual golf, cafes, libraries, and business centers. Podium includes a rooftop park with Olympic-size swimming pool and hot tub, outdoor bar and grille, a children's playground, and dog run.

New Water Street Corporation (NYCDOT) Interior Fit-Out and Storefront, New York, NY

Demolition, extensive HVAC work, sprinkler relocations; the partial build-out of specified areas on four levels; and the complete build-out of six floors to provide new office space and a sizable data center. Work covered 10 floors and 400,000 SF. Installation of a storefront with revolving doors and a build-out of an ancillary means of egress.

Steve Martell

Superintendent

Empire State Building Renovations and MEP Upgrades, New York, NY

The 40,000-SF renovation and restoration project to the historic lobby and overhaul of the mechanical and electrical infrastructure on the 80th floor of the Empire State Building. Replacement of the plastic panel dropped ceiling, turnstile reconfiguration, and new reception desk and fire warden stations.

Avant Chelsea, New York, NY

386 Park Avenue South Elevator Upgrade, New York, NY

Spinella/Martell Construction, New York, NY

APPENDIX G
VAPOR BARRIER AND SSDS DESIGN
DOCUMENTS

DIVISION 31 - EARTHWORK

312110 - SUB-SLAB DEPRESSURIZATION SYSTEM (CONTINUED FROM H201.00):

PART 3 - EXECUTION

3.01 EXAMINATION/INSPECTION

AT A MINIMUM, INSPECTION BY AND APPROVAL FROM THE CONTRACTOR'S PROFESSIONAL ENGINEER AT ALL MILESTONES IDENTIFIED ON THE FOLLOWING INSPECTION SCHEDULE SHALL BE REQUIRED PRIOR TO COMMENCING EACH SUBSEQUENT PHASE OF WORK...

A. INSPECTION SCHEDULE

Table with 2 columns: #, SDDS INSPECTION SCHEDULE - MILESTONE DESCRIPTION. Contains 11 rows of inspection milestones.

1. MATERIALS COVERED WITHOUT CONTRACTOR'S PROFESSIONAL ENGINEER INSPECTION AND APPROVAL SHALL BE UNCOVERED FOR PROPER INSPECTION AT NO COST TO THE ENGINEER...

B. INTERIOR RISER PRESSURE TESTING

- 1. THE INTERIOR RISERS SHALL BE SUBJECT TO A PRESSURE TEST TO ENSURE ALL COMPONENTS OF THE SDDS THAT PASS THROUGH THE BUILDING INTERIOR ARE AIRTIGHT AT 5.0 PSIG AIR PRESSURE.

C. BMS TESTING

- 1. PRIOR TO ENGINEER ACCEPTANCE OF THE SDDS THE CONTRACTOR MUST DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER THAT THE SDDS PRESSURE SWITCHES ARE OPERATING PROPERLY AND ARE PROPERLY CONNECTED TO THE BMS...

3.02 SURFACE PREPARATION

- A. PREPARATION OF ALL SURFACES PRIOR TO THE INSTALLATION OF THE SDDS SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS AND SHOWN ON THE DRAWINGS.

3.03 INSTALLATION

ALL COMPONENTS OF THE SDDS SHALL BE INSTALLED AS SPECIFIED IN THE CONTRACT DOCUMENTS, AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.

A. INSTALLATION OF THE GEOTEXTILE ABOVE PREPARED SOIL SUBGRADE.

- 1. FOLLOWING THE COMPLETION OF THE BUILDING FOUNDATION WALLS AND FOOTINGS, THE SUBBASE SHALL BE EXCAVATED TO THE DEPTH REQUIRED TO INSTALL THE GAS PERMEABLE AGGREGATE LAYER...

B. INSTALLATION OF THE GAS PERMEABLE AGGREGATE AND SUB-SLAB DEPRESSURIZATION SYSTEM PITS.

- 1. THE GAS PERMEABLE AGGREGATE LAYER SHALL BE PLACED AND COMPACTED DIRECTLY BELOW THE LOWEST LEVEL CONCRETE SLABS AS SHOWN ON THE CONTRACT DRAWINGS.

C. INSTALLATION OF THE GAS VAPOR BARRIER

- 1. INSTALL GAS VAPOR BARRIER AS SPECIFIED IN SECTION 071357.

D. INSTALLATION OF THE PIPING, RISERS, AND RELATED WORK

- 1. THE RISERS SHALL BE AS IDENTIFIED IN THE CONTRACT DOCUMENTS AND DRAWINGS. THE RISERS SHALL BE INSTALLED, TESTED, LABELED, AND ENCLOSED IN THE INTERIOR WALL CAVITIES.

B. IDENTIFY AND LABEL ALL SDDS PIPING INSIDE THE BUILDING AND ABOVE THE ROOF.

BACKGROUND SHALL BE SAFETY BLUE WITH WHITE LETTERING AND SHALL BE PROVIDED ON ALL INTERIOR RISER PIPES BEGINNING AT THE FLOOR SLAB ELEVATION AND CONTINUING EVERY FIVE (5) FEET, AT A MINIMUM, TO THE INLET OF EACH SUCTION FAN ABOVE THE ROOF.

A. WARNING - IT IS A VIOLATION OF NEW YORK STATE EDUCATIONAL LAW, SECTION 7209.2...

5. PIPING (GENERAL)

- a. THE RUN AND ARRANGEMENTS OF ALL PIPES SHALL BE APPROXIMATELY AS SHOWN ON THE DRAWINGS OR SPECIFIED AND AS DIRECTED DURING INSTALLATION, AND SHALL BE AS STRAIGHT AND DIRECT AS POSSIBLE...

3.04 PROTECTION

A. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT NO DAMAGE OCCURS TO COMPONENTS OF THE SDDS PRIOR TO, DURING OR FOLLOWING INSTALLATION OF SYSTEM, OR DURING ANY SUBSEQUENT CONSTRUCTION OF THE FACILITY...

312111 - SUB-SLAB DEPRESSURIZATION SYSTEM ACCESSORIES:

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. FURNISH AND INSTALL SUCTION FANS, WITH ALL SPECIFIED ACCESSORIES AND OPTIONS, CONNECTING TO VERTICAL RISERS, ORDER TO CREATE A VACUUM IN THE SUB-SLAB GAS PERMEABLE AGGREGATE LAYER...

1.02 RELATED SECTIONS

- A. DIVISION 22 - PLUMBING
B. DIVISION 23 - HEATING, VENTILATING AND AIR CONDITIONING
C. DIVISION 26 - ELECTRICAL

1.03 STANDARDS AND REGULATIONS

A. COMPLY WITH APPLICABLE PORTIONS OF THE NYC BUILDING CODE, WHERE REQUIREMENTS FOR PRODUCTS, MATERIALS, EQUIPMENT, METHODS, AND OTHER PORTIONS OF THE WORK SPECIFIED HEREIN EXCEED MINIMUM REQUIREMENTS OF NYC BUILDING CODE...

B. STANDARDS ISSUED BY THE ORGANIZATIONS LISTED BELOW MAY BE REFERENCED IN THIS SECTION.

- 1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
3. AMERICAN STANDARDS ASSOCIATION (ASA)
4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1.04 RESTRICTIONS AND QUALITY CONTROL

A. PRE-INSTALLATION MEETING: THE CONTRACTOR SHALL ARRANGE FOR AND CONVEVE A PRE-INSTALLATION MEETING PRIOR TO THE START OF WORK OF THIS SECTION TO REVIEW INSTALLATION PROCEDURES, PROTECTION, AND COORDINATION WITH OTHER WORK...

B. INSPECTION: CONTRACTOR SHALL PROVIDE A NEW YORK STATE LICENSED PROFESSIONAL ENGINEER WITH EXPERIENCE AND QUALIFICATIONS TO APPROVE THE WORK, INDEPENDENT OF THE INSTALLER...

C. QUALITY CONTROL INSPECTIONS MAY BE PERFORMED THROUGHOUT THE INSTALLATION BY THE ENGINEER OR ITS AUTHORIZED REPRESENTATIVE...

1.05 SUBMITTALS

A. APPROVAL BY THE ENGINEER OF SUBMITTALS OF THIS SECTION SHALL BE REQUIRED PRIOR TO START OF THE RELATED WORK OF THIS SECTION, AS APPLICABLE.

B. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER WITHIN TEN (10) BUSINESS DAYS OF NOTICE TO PROCEED A SCHEDULE SHOWING THE FOLLOWING FOR EACH SUBMITTAL OF THIS SECTION: DATE OF DELIVERY OF SUBMITTAL TO THE ENGINEER...

C. PRODUCT DATA: SUBMIT MANUFACTURER PRODUCT DATA, INCLUDING INSTALLATION INSTRUCTIONS AND MOUNTING DETAILS FOR THE SUCTION FANS, PRESSURE SWITCHES, PRESSURE GAUGES, FLEXIBLE CONNECTORS, AND RAIN CAPS.

D. SUBMIT COMPLETE SHOP DRAWINGS OF ALL WORK RELATED TO INSTALLATION OF THE SUCTION FANS AND EXHAUST STACKS SHOWING DIMENSIONS AND LOCATIONS OF ALL ITEMS INCLUDING CLEARANCE REQUIREMENTS...

E. SUBMIT COMPLETE SHOP DRAWINGS OF ALL WORK RELATED TO INSTALLATION OF THE PRESSURE SWITCHES SHOWING DIMENSIONS AND LOCATIONS OF ALL ITEMS...

F. SUBMIT RESUME OF PROFESSIONAL ENGINEER FOR APPROVAL. PROFESSIONAL ENGINEER'S CERTIFICATION, SUBMIT CERTIFICATION PREPARED, SIGNED, AND SEALED BY A NEW YORK STATE LICENSED PROFESSIONAL ENGINEER...

G. SUBMIT MANUFACTURER'S MANUALS/OPERATIONS AND MAINTENANCE MANUALS FOR SUCTION FANS, PRESSURE SWITCHES, AND PRESSURE GAUGES.

H. SUBMIT NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER AUTHORIZED SERVICE TECHNICIAN FOR SUCTION FANS.

I. SUBMIT MANUFACTURER'S WARRANTIES FOR ALL EQUIPMENT AND ACCESSORIES.

1.06 DELIVERY, STORAGE, AND HANDLING

A. DELIVER PRODUCTS TO SITE IN MANUFACTURER'S ORIGINAL PACKAGING, WITH LABELS CLEARLY IDENTIFYING PRODUCT AND MANUFACTURER.

B. STORE MATERIALS IN A CLEAN, DRY AREA IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

C. PROTECT MATERIALS DURING HANDLING AND INSTALLATION TO PREVENT DAMAGE.

D. EXAMINE ALL EQUIPMENT BEFORE INSTALLATION. DO NOT INSTALL ANY UNIT THAT IS FOUND TO BE DEFECTIVE. PROTECT ALL MATERIALS DURING HANDLING AND INSTALLATION TO PREVENT DAMAGE.

PART 2 - PRODUCTS

2.01 ACCESSORIES

A. SUCTION FANS

- 1. SUCTION FANS SHALL BE INLINE FANS CAPABLE OF: FLOW RATE OF 80 CFM AT A MINIMUM STATIC PRESSURE OF 1.75 INCHES WATER COLUMN.

B. PRESSURE SWITCHES

- 1. A PRESSURE SWITCH SHALL BE PROVIDED FOR EACH SUCTION FAN RISER TO DETECT LOW VACUUM IN EACH SUCTION FAN RISER...

312310 - GAS PERMEABLE AGGREGATE:

PART 1 - GENERAL

1.01 MATERIAL

- A. GAS PERMEABLE AGGREGATE, TO BE USED UNDER BUILDING FLOOR SLABS AND AS SHOWN ON THE DRAWINGS SHALL BE COMPOSED OF GRAVEL, CRUSHED GRAVEL, AND CRUSHED STONE...

C. PORTABLE PRESSURE GAUGE

- 1. ONE (1) DIGITAL MANOMETER TO MEASURE THE PRESSURE (VACUUM) AT EACH SUB-SLAB MONITORING POINT SHALL BE FURNISHED TO THE ENGINEER OR DESIGNATED REPRESENTATIVE.

2. THE DIGITAL MANOMETER SHALL BE ACCURATE WITHIN 1.5% AND INDICATE DIRECTLY IN INCHES WATER COLUMN POSITIVE OR NEGATIVE PRESSURE IN THE FOLLOWING RANGE AT THE SPECIFIED INCREMENT:

3. EACH GAUGE SHALL BE FURNISHED WITH CARRYING CASE AND 9 FEET OF 3/16-INCH INNER DIAMETER (ID) POLYETHYLENE TUBING...

D. GENERAL

- 1. PROVIDE ADDITIONAL INSTALLATION ACCESSORIES AS NECESSARY FOR A COMPLETE SDDS READY FOR USE. ENSURE ACCESSORIES ARE FROM SAME MANUFACTURERS AS PRODUCTS.

E. APPROVED MANUFACTURERS/EQUIPMENT

1. SUCTION FANS SHALL BE: INLINE CENTRIFUGAL BLOWER MODEL RP265, FURNISHED AND INSTALLED WITH THE OPTIONAL EQUIPMENT, ACCESSORIES, AND ADDITIONAL AND ANCILLARY EQUIPMENT SPECIFIED ABOVE AS MANUFACTURED BY:

RADONAWAY, 3 SABER WAY, WARD HILL, MA 01835
978-521-3703
WWW.RADONAWAY.COM
OR APPROVED EQUAL.

2. PRESSURE SWITCHES SHALL BE: SERIES 1950, MODEL 1950-02-25 AS MANUFACTURED BY:

DWYER INSTRUMENTS INC., 102 INDIANA HIGHWAY, MICHIGAN CITY, IN 46361
219-879-9000
WWW.DWYER-INST.COM
OR APPROVED EQUAL.

3. VACUUM GAUGE SHALL BE: MODEL 1490 PART 251490A02L10/01WV AS MANUFACTURED BY:

ASHCROFT INC., 250 EAST MAIN STREET, STRATFORD, CT 06614
203-378-8281
WWW.ASHCROFT.COM
OR APPROVED EQUAL.

4. PORTABLE PRESSURE GAUGE SHALL BE: SERIES 476A-0 SINGLE PRESSURE DIGITAL MANOMETER AS MANUFACTURED BY:

DWYER INSTRUMENTS INC., 102 INDIANA HIGHWAY, MICHIGAN CITY, IN 46361
219-879-9000
WWW.DWYER-INST.COM
OR APPROVED EQUAL.

F. ON DISCHARGE OF EXHAUST STACK, INSTALL A STAINLESS STEEL RAIN CAP AS SHOWN ON THE DRAWINGS.

PART 3 - EXECUTION

3.01 EXAMINATION/INSPECTION

A. THE CONTRACTOR'S PROFESSIONAL ENGINEER SHALL INSPECT ALL COMPONENTS OF THE SUCTION FANS AND ACCESSORIES AND CERTIFY ALL COMPONENTS OF THE SUCTION FAN SYSTEMS HAVE BEEN PROPERLY CONSTRUCTED AND INSTALLED AND ARE PROPERLY SECURED...

3.02 INSTALLATION

ALL COMPONENTS OF THE SUCTION FAN SYSTEMS AND ACCESSORIES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE MECHANICAL CODE REQUIREMENTS.

A. INSTALLATION OF SUCTION FANS AND ACCESSORIES

- 1. SUCTION FANS, INSTALLED WITH ALL ACCESSORIES, SHALL BE CONNECTED TO THE SUCTION FAN RISERS ON THE ROOF OF THE BUILDING. CONTRACTOR SHALL START UP SDDS AND DEMONSTRATE SATISFACTORY OPERATION...

2. THE SUCTION FANS SHALL BE ELECTRICALLY GROUNDED.

3. CONTRACTOR SHALL PERMANENTLY SUPPORT ALL SYSTEM COMPONENTS IN ACCORDANCE WITH NYC BUILDING CODE REQUIREMENTS.

4. PERFORM ALL REQUIRED MECHANICAL WORK NOT EXPLICITLY SPECIFIED IN THIS SECTION IN ACCORDANCE WITH SPECIFICATION SECTION 312110 AND DIVISIONS 22 AND 23...

5. INSTALL CONNECTIONS FOR PORTABLE PRESSURE GAUGE ON MONITORING POINTS AS SHOWN ON DRAWINGS. DELIVER PORTABLE GAUGE WITH TUBING AND QUICK CONNECT FITTING TO AN ENGINEER-DESIGNATED REPRESENTATIVE.

6. INSTALL IN-LINE PRESSURE GAUGES WITH THREADED AIR-TIGHT CONNECTIONS. THE PRESSURE GAUGES SHALL BE INSTALLED IN ROOFTOP PIPING AND SUCH THAT GAUGES CAN BE EASILY REMOVED AND REPLACED.

7. INSTALL ONE (1) PRESSURE SWITCH WITH SPECIFIED LABELING FOR EACH SUCTION FAN RISER. CONNECT EACH PRESSURE SWITCH TO THE BMS SO THAT THE FOLLOWING CONDITION IS INDICATED AT THE SET POINT: LOW VACUUM.

8. INSTALL PRESSURE SWITCHES IN LOCATIONS FREE FROM EXCESSIVE VIBRATION.

9. EACH SWITCH SHALL BE CALIBRATED BY THE CONTRACTOR AND THE SET POINT OF EACH SWITCH SHALL BE FIELD ADJUSTED AFTER THE SDDS IS FULLY OPERATIONAL.

3.03 BMS REMOTE ALARM NOTIFICATION SEQUENCE

A. EACH SUB-SLAB DEPRESSURIZATION SYSTEM SUCTION FAN SHALL BE PROVIDED WITH A PRESSURE SWITCH INSTALLED IN THE PIPING PRIOR TO THE INLET OF EACH SDDS SUCTION FAN...

3.04 PROTECTION AND CLOSE OUT

A. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT NO DAMAGE OCCURS TO COMPONENTS OF THE SDDS OR BUILDING PRIOR TO, DURING, OR FOLLOWING INSTALLATION OF SUCTION FAN SYSTEMS...

B. PROVIDE SERVICE TRAINING BY A QUALIFIED REPRESENTATIVE OF THE SUCTION FAN MANUFACTURER. FOUR (4) HOURS OF ON-SITE TRAINING SHALL BE PROVIDED AT A TIME DESIGNATED BY THE ENGINEER UP TO ONE (1) YEAR AFTER THE DATE OF COMPLETION OF INSTALLATION OF THE SUCTION FANS.

C. PRIOR TO ENGINEER ACCEPTANCE OF THE SDDS THE CONTRACTOR MUST DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER THAT THE SDDS PRESSURE SWITCHES ARE OPERATING PROPERLY AND ARE PROPERLY CONNECTED TO THE BMS...

D. PRIOR TO ENGINEER ACCEPTANCE OF THE SDDS THE CONTRACTOR MUST DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER THAT THE SDDS PRESSURE SWITCHES ARE OPERATING PROPERLY AND ARE PROPERLY CONNECTED TO THE BMS...

312310 - GAS PERMEABLE AGGREGATE:

PART 1 - GENERAL

1.01 MATERIAL

A. GAS PERMEABLE AGGREGATE, TO BE USED UNDER BUILDING FLOOR SLABS AND AS SHOWN ON THE DRAWINGS SHALL BE COMPOSED OF GRAVEL, CRUSHED GRAVEL, AND CRUSHED STONE...

B. PLACE AND COMPACT GAS PERMEABLE AGGREGATE IN LAYERS OF UNIFORM THICKNESS, BUT NOT EXCEEDING 6 INCHES. PROVIDE PROOF ROLLING USING MULTIPLE PASSES OF THE COMPACTOR TO PREVENT SHOVING OF THE MATERIAL.

C. SUBMITTALS

- 1. PROVIDE CERTIFICATE GUARANTEEING AGGREGATE MATERIALS USED FOR CONSTRUCTION CONFORMS TO THE GRADATION SUPPLIED AND THE REQUIREMENTS OF THIS SECTION.

ARCHITECT / MEP ENGINEERING

GC ENG & ASSOCIATES, P.C. CONSULTING ENGINEERS
141 WEST 28TH STREET, 8TH FL. TEL: 212.695.5313
NEW YORK, NY 10001 FAX: 212.695.5170

CLIENT

HUNTER ROBERTS CONSTRUCTION GROUP
2 World Financial Center, 6th Floor
New York NY 10281

CLIENT

NEW YORK CITY ECONOMIC AND DEVELOPMENT CORP.
110 William St.
New York, NY 10038

CIVIL / STRUCTURAL ENGINEER

MCLAREN ENGINEERING GROUP
100 Snake Hill Road
West Nyack, NY 10994

ENVIRONMENTAL

TRC ENGINEERS, INC.
1430 Broadway, 10th Floor
New York, NY 10018

NO. SUBMISSIONS / REVISIONS DATE

Table with 3 columns: NO., SUBMISSIONS / REVISIONS, DATE. Contains 10 rows.

PROJECT NORTH



PROJECT

RELOCATED MTA PARATRANSIT FACILITY
COMMERCE AVENUE BRONX, NY 10462

SUB-SLAB DEPRESSURIZATION SYSTEM SPECIFICATIONS SHEET II

SEAL & SIGNATURE

DATE: 2/21/17
PROJECT No: 263418
SCALE: AS SHOWN
DRAWING BY: DS
CHECKED BY: JD
DWG No: H202.00
NYC DOB Number: OF 79

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

071357 - GAS VAPOR BARRIER:

1.01 DESCRIPTION OF WORK

- A. INSTALL A GAS VAPOR BARRIER... B. THE GAS VAPOR BARRIER SHALL BE INSTALLED... C. THE INTENT OF THIS SECTION IS TO SPECIFY... D. DO NOT COMBINE PRODUCTS...

1.02 RELATED SECTIONS

- A. SECTION 033000 - CAST-IN-PLACE CONCRETE
B. DIVISION 07 - THERMAL AND MOISTURE PROTECTION
C. DIVISION 22 - PLUMBING
D. SECTION 311000 - SITE PREPARATION
E. SECTION 312200 - GRADING, EXCAVATION, AND BACKFILLING

1.03 STANDARDS AND REGULATIONS

- A. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS
1. ASTM D882 - STANDARD TEST METHOD FOR TENSILE PROPERTIES...
2. ASTM D1004 - STANDARD TEST METHOD FOR TEAR RESISTANCE...
3. ASTM D1505 - STANDARD TEST METHOD FOR DENSITY OF PLASTICS...
4. ASTM D1709 - STANDARD TEST METHOD FOR IMPACT RESISTANCE...
5. ASTM D2103 - STANDARD SPECIFICATION FOR POLYETHYLENE FILM...
6. ASTM D4533 - STANDARD TEST METHOD FOR TRAPEZOID TEARING...
7. ASTM D4833 - STANDARD TEST METHOD FOR INDEX PUNCTURE...
8. ASTM E96 - STANDARD TEST METHOD FOR WATER VAPOR TRANSMISSION...
9. ASTM E1643 - STANDARD PRACTICE FOR SELECTION, DESIGN, INSTALLATION...

1.04 QUALITY CONTROL

- A. PRE-INSTALLATION MEETING: THE CONTRACTOR SHALL ARRANGE... B. INSPECTION: CONTRACTOR SHALL PROVIDE A NEW YORK STATE LICENSED PROFESSIONAL ENGINEER...

1.05 SUBMITTALS

- A. APPROVAL BY ENGINEER OF SUBMITTALS OF THIS SECTION SHALL BE REQUIRED... B. PRODUCT DATA AND SHOP DRAWINGS: SUBMIT MANUFACTURER'S PRODUCT DATA... C. SAMPLES: SUBMIT MANUFACTURER'S SAMPLES OF GAS VAPOR BARRIER... D. RESUME OF PROFESSIONAL ENGINEER... E. REPORT ON PROFESSIONAL ENGINEER'S INSPECTION AND APPROVAL... F. MANUFACTURER'S AND INSTALLER'S WARRANTIES AS REQUIRED...

1.06 DELIVERY, STORAGE, AND HANDLING

- A. DELIVER MATERIALS TO SITE IN ORIGINAL UNBROKEN PACKAGES... B. STORE MATERIALS AT THE SITE IN STRICT COMPLIANCE... C. PROTECT MATERIALS DURING HANDLING AND INSTALLATION... D. SURFACE PREPARATION SHALL BE PER MANUFACTURER'S SPECIFICATION.

1.07 PROJECT/SITE CONDITIONS

- A. THE CONTRACTOR SHALL COORDINATE WITH ALL TRADES INVOLVED... B. ALL PLUMBING, ELECTRICAL, MECHANICAL, AND STRUCTURAL ITEMS... C. GAS VAPOR BARRIER SHALL BE INSTALLED BEFORE PLACEMENT OF REINFORCING STEEL.

1.08 WARRANTIES

- A. SUBMIT A WARRANTY, SIGNED BY THE MANUFACTURER OF THE GAS VAPOR BARRIER SYSTEM... B. SUBMIT A WARRANTY, SIGNED BY THE INSTALLER OF THE GAS VAPOR BARRIER SYSTEM...

WARNING - IT IS A VIOLATION OF NEW YORK STATE EDUCATIONAL LAW, SECTION 7209.2 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED, THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK EDUCATIONAL LAW, SECTION 7209.2

PART 2 - PRODUCTS

2.01 MATERIALS

- A. REINFORCED GAS VAPOR BARRIER: PERMALON® L30 BLACK OR APPROVED EQUAL.
1. MATERIAL: LIGHTWEIGHT, HIGHLY FLEXIBLE POLYETHYLENE MEMBRANE.
2. WEIGHT, ASTM D 2103: 148 LB/1,000 FT2 (72.2 KG/100 M2)
3. THICKNESS, ASTM D 2103: 30 MIL (0.76 MM)
4. DENSITY, ASTM D 1505: 0.939 G/CC
5. 3" LOAD @ BREAK, ASTM D 882: 350 LBF (1557 N)
6. 3" ELONGATION @ BREAK, ASTM D882: 225% (225%)
7. TONGUE TEAR, ASTM D 1004: 50 LBF (222 N)
8. TRAPEZOIDAL TEAR, ASTM D 4533: 66 LBF (294 N)
9. PERMEANCE (PERM), ASTM E 96: 0.013 GRAINS/HR-FT2-IN HG (0.72 NG/(PA-S-M2))
10. DART IMPACT STRENGTH, ASTM D 1709: >5.0 LBS (>2,200 G)
11. PUNCTURE STRENGTH, ASTM D 4833: 65 LBF (289 N)
12. MANUFACTURED BY REEF INDUSTRIES, INC., 9209 ALMEDA GENOA RD., HOUSTON, TEXAS 77075 (800) 231-6074.

2.02 ACCESSORIES

- A. GENERAL: ENSURE ACCESSORIES ARE FROM SAME MANUFACTURER AS VAPOR BARRIER.
B. MASTIC TAPE: GRIFFOLYN® FAB TAPE RI PART NUMBER: 60-0002 OR APPROVED EQUAL.
1. DESCRIPTION: BLACK, DOUBLE-SIDED, ASPHALTIC, PRESSURE-SENSITIVE, MASTIC TAPE.
2. WEIGHT: 3.75 POUNDS PER 100 FEET (1.7 KG PER 30 M).
3. THICKNESS: 35 MILS (0.9 MM).
4. 3" SEAM SHEAR: 35 POUNDS (156N).
C. SELF-ADHESIVE TAPE: GRIFFOLYN® WHITE SEALANT TAPE RI PART NUMBER: 60-0153 OR APPROVED EQUAL.
1. DESCRIPTION: REINFORCED WHITE BACKING WITH GRAY ADHESIVE.
2. WEIGHT: 3.0 LBS FOR 4" X 50 FOOT ROLL.
3. THICKNESS: 26 MILS (0.65 MM).
4. 3" SEAM SHEAR: 30 LBS (134 N)
D. PIPE BOOTS: GRIFFOLYN® PIPE BOOTS, FACTORY-FABRICATED OR APPROVED EQUAL.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. THE CONTRACTOR'S PROFESSIONAL ENGINEER SHALL PERFORM ALL INSPECTIONS, ADDITIONAL INSPECTIONS, EXAMINATIONS, AND QUALITY CONTROL MEASURES... B. INSPECTION: CONTRACTOR SHALL PROVIDE A NEW YORK STATE LICENSED PROFESSIONAL ENGINEER WITH EXPERIENCE AND QUALIFICATIONS TO APPROVE THE WORK...

3.02 SURFACE PREPARATION

- A. THE SUBGRADE SHALL BE MOISTURE CONDITIONED AND COMPACTED AS SPECIFIED AND IN ACCORDANCE WITH SECTION 312000... B. INSPECTION: CONTRACTOR SHALL PROVIDE A NEW YORK STATE LICENSED PROFESSIONAL ENGINEER WITH EXPERIENCE AND QUALIFICATIONS TO APPROVE THE WORK...

3.03 INSTALLATION

- A. INSTALL GAS VAPOR BARRIER IN ACCORDANCE WITH ASTM E 1643 AND MANUFACTURER'S INSTRUCTIONS.
B. INSTALL GAS VAPOR BARRIER CONTINUOUSLY AT LOCATIONS UNDER SLAB AS INDICATED ON THE DRAWINGS.
C. INSTALL GAS VAPOR BARRIER IN LARGEST PRACTICAL WIDTHS.
D. ENSURE SUBGRADE BENEATH GAS VAPOR BARRIER IS SMOOTH, LEVEL, AND COMPACTED WITH NO SHARP PROJECTIONS.
E. JOIN SECTIONS OF GAS VAPOR BARRIER AND SEAL PENETRATIONS IN GAS VAPOR BARRIER WITH MASTIC TAPE.
F. ENSURE THERE IS NO MOISTURE ENTRAPMENT BY GAS VAPOR BARRIER DUE TO RAINFALL OR GROUND WATER INTRUSION.
G. IMMEDIATELY REPAIR HOLES IN GAS VAPOR BARRIER IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS WITH SELF-ADHESIVE TAPE.
H. SEAL AROUND PIPES AND OTHER PENETRATIONS IN GAS VAPOR BARRIER WITH PIPE BOOTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
I. DO NOT PENETRATE GAS VAPOR BARRIER.
J. POST INSTALLATION INSPECTION

3.04 PROTECTION

- A. THE GAS VAPOR BARRIER SHALL BE PROTECTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS TO PREVENT DISTURBANCE, DAMAGE, OR DETERIORATION... B. CONTRACTOR'S PROFESSIONAL ENGINEER SHALL VISUALLY INSPECT THE CONDITION OF THE GAS VAPOR BARRIER IMMEDIATELY PRIOR TO PLACING THE CONCRETE SLAB... C. PROTECT GAS VAPOR BARRIER FROM DAMAGE UNTIL COVERED BY FINISH WALL, FLOOR, ETC.
D. IMMEDIATELY REPAIR DAMAGED GAS VAPOR BARRIER AND COMPONENTS OF GAS VAPOR BARRIER SYSTEM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

DIVISION 31 - EARTHWORK

312110 - SUB-SLAB DEPRESSURIZATION SYSTEM:

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. FURNISH AND INSTALL A SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) AS SPECIFIED, AS SHOWN ON THE DRAWINGS... B. FURNISH AND INSTALL A GEOTEXTILE PLACED DIRECTLY ON THE COMPACTED SUBBASE... C. THE CONTRACTOR SHALL FURNISH AND INSTALL AS PART OF THE SSDS, FOUR (4) SUB-SLAB MONITORING POINTS.
D. FURNISH, INSTALL, AND TEST ALL SYSTEM COMPONENTS AS INDICATED, SPECIFIED AND REQUIRED IN THE CONTRACT DOCUMENTS... E. ALL MATERIALS AND EQUIPMENT FURNISHED UNDER THIS SECTION SHALL BE NEW, IN FIRST-CLASS CONDITION... F. PERFORM AND CERTIFY RESULTS OF INSPECTIONS AND TESTS AS SPECIFIED.

1.02 RELATED SECTIONS

- A. DIVISION 22 - PLUMBING
B. DIVISION 23 - HEATING, VENTILATING AND AIR CONDITIONING
C. DIVISION 26 - ELECTRICAL
D. SECTION 311000 - SITE PREPARATION
E. SECTION 312200 - GRADING, EXCAVATION, AND BACKFILLING

1.03 STANDARDS AND REGULATIONS

- A. COMPLY WITH APPLICABLE PORTIONS OF THE NEW YORK CITY BUILDING CODE... B. STANDARDS ISSUED BY THE ORGANIZATIONS LISTED BELOW MAY BE REFERENCED IN THIS SECTION.
1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
3. AMERICAN STANDARDS ASSOCIATION (ASA)
4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
5. NEW YORK CITY BUILDING CODE MC 512 - SUBSLAB SOIL EXHAUST SYSTEMS

1.04 RESTRICTIONS AND QUALITY CONTROL

- A. PRE-INSTALLATION MEETING: THE CONTRACTOR SHALL ARRANGE FOR AND CONVENE A PRE-INSTALLATION MEETING... B. INSPECTION: CONTRACTOR SHALL PROVIDE A NEW YORK STATE LICENSED PROFESSIONAL ENGINEER WITH EXPERIENCE AND QUALIFICATIONS TO APPROVE THE WORK... C. QUALITY CONTROL INSPECTIONS MAY BE PERFORMED THROUGHOUT THE INSTALLATION BY THE ENGINEER OR ITS AUTHORIZED REPRESENTATIVE... D. CONTRACTOR TO VERIFY THAT ALL SSDS STACK EXHAUST LOCATIONS ARE A DISTANCE OF 10 FEET OR MORE FROM ANY AIR INTAKES AND OPERABLE WINDOWS... E. APPROVAL BY THE ENGINEER OF SUBMITTALS OF THIS SECTION SHALL BE REQUIRED PRIOR TO START OF THE RELATED WORK OF THIS SECTION, AS APPLICABLE.

- F. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER WITHIN TEN (10) BUSINESS DAYS OF NOTICE TO PROCEED A SCHEDULE SHOWING THE FOLLOWING FOR EACH SUBMITTAL OF THIS SECTION: DATE OF DELIVERY OF SUBMITTAL TO THE ENGINEER, ANTICIPATED TIME FOR ENGINEER REVIEW, AND REQUIRED DATE OF ENGINEER APPROVAL... G. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A SCHEDULE SHOWING DATES FOR EACH INSPECTION SPECIFIED IN ARTICLE 3.01(A) OF THIS SECTION.
D. PRODUCT DATA: SUBMIT MANUFACTURERS' PRODUCT DATA, INCLUDING INSTALLATION INSTRUCTIONS FOR:
1. CLEANOUT TEST TEE
2. NON-WOVEN GEOTEXTILE
3. PIPES AND FITTINGS

1.05 SUBMITTALS

- A. APPROVAL BY THE ENGINEER OF SUBMITTALS OF THIS SECTION SHALL BE REQUIRED PRIOR TO START OF THE RELATED WORK OF THIS SECTION, AS APPLICABLE.
B. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER WITHIN TEN (10) BUSINESS DAYS OF NOTICE TO PROCEED A SCHEDULE SHOWING THE FOLLOWING FOR EACH SUBMITTAL OF THIS SECTION: DATE OF DELIVERY OF SUBMITTAL TO THE ENGINEER, ANTICIPATED TIME FOR ENGINEER REVIEW, AND REQUIRED DATE OF ENGINEER APPROVAL... C. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A SCHEDULE SHOWING DATES FOR EACH INSPECTION SPECIFIED IN ARTICLE 3.01(A) OF THIS SECTION.
D. PRODUCT DATA: SUBMIT MANUFACTURERS' PRODUCT DATA, INCLUDING INSTALLATION INSTRUCTIONS FOR:
1. CLEANOUT TEST TEE
2. NON-WOVEN GEOTEXTILE
3. PIPES AND FITTINGS

- E. SAMPLES - SUBMIT REPRESENTATIVE SAMPLES OF THE FOLLOWING FOR APPROVAL:
1. NON-WOVEN GEOTEXTILE
F. SUBMIT SHOP DRAWINGS FOR MONITORING POINTS AND ALL PIPING INSTALLATIONS.
G. PIPE SCHEDULE: ITEMIZE PIPE AND FITTING MATERIALS FOR EACH SPECIFIED APPLICATION.
H. MATERIAL TEST REPORTS: INDICATE AND INTERPRET TEST RESULTS FOR COMPLIANCE OF MATERIALS WITH REQUIREMENTS INDICATED, AS APPLICABLE.
I. RESUME OF PROFESSIONAL ENGINEER, LICENSED TO PRACTICE IN NEW YORK STATE, TO PERFORM MILESTONE INSPECTIONS, AND CERTIFY PROPER INSTALLATION OF SSDS...

- J. REPORT ON PROFESSIONAL ENGINEER'S INSPECTION AND APPROVAL OF THE WORK OF THIS SECTION... K. WARRANTIES FROM MANUFACTURERS FOR ALL PRODUCTS AND CONTRACTOR INSTALLATION WARRANTY.
L. CERTIFICATION PREPARED BY THE REMEDIAL ENGINEER THAT STATES THAT SSDS SUCTION FAN EXHAUST STACKS HAVE BEEN INSTALLED A MINIMUM OF TEN (10) FEET AWAY FROM ANY BUILDING AIR INTAKE AND OPERABLE WINDOWS.
1.06 DELIVERY, STORAGE, AND HANDLING
A. DELIVER MATERIALS TO SITE IN MANUFACTURERS' ORIGINAL, UNOPENED CONTAINER AND PACKAGING... B. STORE MATERIALS IN A CLEAN, DRY AREA... C. PROTECT MATERIALS DURING HANDLING AND INSTALLATION TO PREVENT DAMAGE.
D. DELIVERY, STORAGE, AND HANDLING OF PIPE MATERIALS:
1. DELIVER PIPE MATERIALS PROPERLY PROTECTED, AND UNDAMAGED.
2. PROPERLY PROTECT ALL PIPING TO PREVENT DAMAGE TO THE PIPE AND THE INTRODUCTION OF FOREIGN MATERIAL INTO THE PIPE...
3. EXAMINE ALL PIPE AND FITTINGS BEFORE LAYING PIPE...
PART 2 - PRODUCTS
2.01 MATERIALS AND ACCESSORIES
A. NON-WOVEN GEOTEXTILE
1. GEOTEXTILE MATERIAL TO BE PLACED ON PREPARED SUBGRADE BELOW THE GAS PERMEABLE AGGREGATE LAYER SHALL BE A NON-WOVEN POLYPROPYLENE TYPE...

- 2. GEOTEXTILE MATERIAL TO BE PLACED ON PREPARED SUBGRADE BELOW THE GAS PERMEABLE AGGREGATE LAYER SHALL BE A NON-WOVEN POLYPROPYLENE TYPE, SUCH AS MIRAFI N-SERIES PRODUCT TYPE 140ML OR APPROVED EQUAL AND HAVING THE FOLLOWING PROPERTIES:
PROPERTY/TEST METHOD UNITS VALUE
MECHANICAL PROPERTIES
GRAB TENSILE STRENGTH
ASTM D4632 N (LBS) 401 (90)
GRAB TENSILE ELONGATION
ASTM D4632 % 50
TRAPEZOIDAL TEAR STRENGTH
ASTM D4533 N (LBS) 178 (40)
CBR PUNCTURE STRENGTH
ASTM D6241 N (LBS) 1,113 (250)
UV RESISTANCE AT 500 HRS.
ASTM D4355 % STRENGTH RETAINED 70
HYDRAULIC PROPERTIES
APPARENT OPENING SIZE (AOS)
ASTM D4751 MM (US SIEVE) 0.30 (50)
PERMITTIVITY
ASTM D4491 SEC-1 2.0
FLOW RATE
ASTM D4491 L/MIN/M² (GAL/MIN/FT²) 5,907 (145)
NOTE: ALL MECHANICAL PROPERTIES AND HYDRAULIC PROPERTIES SHOWN ARE MINIMUM AVERAGE ROLL VALUES (MARV.)
B. GAS PERMEABLE AGGREGATE LAYER
1. GAS PERMEABLE AGGREGATE LAYER SHALL BE AS SPECIFIED IN SECTION 312310.
C. SUB-SLAB PITS, PIPE, AND APPURTENANCES
1. INSTALL SUB-SLAB DEPRESSURIZATION PITS AS SHOWN ON THE CONTRACT DRAWINGS...
2. PITS SHALL BE CONSTRUCTED WITH 4-INCH THICK AND 5-FOOT BY 5-FOOT IN AREA PRECAST CONCRETE BASE PLATES...
3. SCHEDULE 40 PVC PIPE SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS AND SHALL TERMINATE IN AND SLOPE UNIFORMLY TO THE SUB-SLAB DEPRESSURIZATION PITS...
D. MONITORING POINTS
1. MONITORING POINTS SHALL BE INSTALLED THROUGH THE LOWEST LEVEL FLOOR SLABS AND SHALL BE CONSTRUCTED WITH 1-INCH DIAMETER SOLID-WALL SCHEDULE 80 PVC PIPE...
2. SUB-SLAB MONITORING POINTS SHALL TERMINATE TWO (2) INCHES BELOW THE TOP OF THE GAS PERMEABLE AGGREGATE LAYER.
3. ACCESS COVER SHALL BE FLUSH MOUNTED 6-INCH DIAMETER CAST IRON CLEANOUT MANUFACTURED BY JAY R. SMITH MANUFACTURING CO. #4231L OR APPROVED EQUAL.
4. ONE-INCH DIAMETER PVC PIPE SHALL BE COMPLETED WITH 1-INCH DIAMETER THREADED PVC CAP WITH QUICK CONNECT FITTING AS SHOWN ON THE DRAWINGS.
5. QUICK-CONNECT FITTING WITH 1/2-INCH THREADS, SHUT OFF VALVE, AND VITON SEAL AS MANUFACTURED BY LANDFILL CONTROL TECHNOLOGIES (LANDTEC) OR APPROVED EQUAL SHALL BE INSTALLED IN PVC CAPS.
6. LABEL EACH MONITORING POINT WITH ENGRAVED METAL TAG ON CHAIN AROUND PVC PIPE WITH: "SSDS MONITORING POINT". LETTER HEIGHT SHALL BE 1/4-INCH MINIMUM.
E. GAS VAPOR BARRIER
1. GAS VAPOR BARRIER SHALL BE AS SPECIFIED IN SECTION 071357.
F. PIPE AND RELATED ACCESSORIES
1. PIPE, FITTINGS, UNIONS, CLEANOUTS, SLEEVES, SUPPORTS, AND RELATED ACCESSORIES SHALL BE FURNISHED IN ACCORDANCE WITH THE REQUIREMENTS FOR PLUMBING IN DIVISION 22, UNLESS OTHERWISE SPECIFIED.
G. SUCTION FANS
1. REFER TO SECTION 312111 SUB-SLAB DEPRESSURIZATION SYSTEM ACCESSORIES FOR SUCTION FAN REQUIREMENTS...
H. GENERAL
1. PROVIDE ADDITIONAL INSTALLATION ACCESSORIES AS NECESSARY FOR A COMPLETE SSDS, READY FOR USE. ENSURE ACCESSORIES ARE FROM SAME MANUFACTURERS AS SPECIFIED PRODUCTS. FURNISH ALL MANUFACTURER RECOMMENDED ACCESSORIES.

- K. WARRANTIES FROM MANUFACTURERS FOR ALL PRODUCTS AND CONTRACTOR INSTALLATION WARRANTY.
L. CERTIFICATION PREPARED BY THE REMEDIAL ENGINEER THAT STATES THAT SSDS SUCTION FAN EXHAUST STACKS HAVE BEEN INSTALLED A MINIMUM OF TEN (10) FEET AWAY FROM ANY BUILDING AIR INTAKE AND OPERABLE WINDOWS.
1.06 DELIVERY, STORAGE, AND HANDLING
A. DELIVER MATERIALS TO SITE IN MANUFACTURERS' ORIGINAL, UNOPENED CONTAINER AND PACKAGING... B. STORE MATERIALS IN A CLEAN, DRY AREA... C. PROTECT MATERIALS DURING HANDLING AND INSTALLATION TO PREVENT DAMAGE.
D. DELIVERY, STORAGE, AND HANDLING OF PIPE MATERIALS:
1. DELIVER PIPE MATERIALS PROPERLY PROTECTED, AND UNDAMAGED.
2. PROPERLY PROTECT ALL PIPING TO PREVENT DAMAGE TO THE PIPE AND THE INTRODUCTION OF FOREIGN MATERIAL INTO THE PIPE...
3. EXAMINE ALL PIPE AND FITTINGS BEFORE LAYING PIPE...
PART 2 - PRODUCTS
2.01 MATERIALS AND ACCESSORIES
A. NON-WOVEN GEOTEXTILE
1. GEOTEXTILE MATERIAL TO BE PLACED ON PREPARED SUBGRADE BELOW THE GAS PERMEABLE AGGREGATE LAYER SHALL BE A NON-WOVEN POLYPROPYLENE TYPE...

PART 2 - PRODUCTS

2.01 MATERIALS AND ACCESSORIES

- A. NON-WOVEN GEOTEXTILE
1. GEOTEXTILE MATERIAL TO BE PLACED ON PREPARED SUBGRADE BELOW THE GAS PERMEABLE AGGREGATE LAYER SHALL BE A NON-WOVEN POLYPROPYLENE TYPE, SUCH AS MIRAFI N-SERIES PRODUCT TYPE 140ML OR APPROVED EQUAL AND HAVING THE FOLLOWING PROPERTIES:

Table with 3 columns: PROPERTY/TEST METHOD, UNITS, VALUE. Rows include MECHANICAL PROPERTIES (GRAB TENSILE STRENGTH, ELONGATION, TEAR STRENGTH, PUNCTURE STRENGTH, UV RESISTANCE), HYDRAULIC PROPERTIES (APPARENT OPENING SIZE, PERMITTIVITY), and FLOW RATE.

- B. GAS PERMEABLE AGGREGATE LAYER
1. GAS PERMEABLE AGGREGATE LAYER SHALL BE AS SPECIFIED IN SECTION 312310.
C. SUB-SLAB PITS, PIPE, AND APPURTENANCES
1. INSTALL SUB-SLAB DEPRESSURIZATION PITS AS SHOWN ON THE CONTRACT DRAWINGS...
2. PITS SHALL BE CONSTRUCTED WITH 4-INCH THICK AND 5-FOOT BY 5-FOOT IN AREA PRECAST CONCRETE BASE PLATES...
3. SCHEDULE 40 PVC PIPE SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS AND SHALL TERMINATE IN AND SLOPE UNIFORMLY TO THE SUB-SLAB DEPRESSURIZATION PITS...
D. MONITORING POINTS
1. MONITORING POINTS SHALL BE INSTALLED THROUGH THE LOWEST LEVEL FLOOR SLABS AND SHALL BE CONSTRUCTED WITH 1-INCH DIAMETER SOLID-WALL SCHEDULE 80 PVC PIPE...
2. SUB-SLAB MONITORING POINTS SHALL TERMINATE TWO (2) INCHES BELOW THE TOP OF THE GAS PERMEABLE AGGREGATE LAYER.
3. ACCESS COVER SHALL BE FLUSH MOUNTED 6-INCH DIAMETER CAST IRON CLEANOUT MANUFACTURED BY JAY R. SMITH MANUFACTURING CO. #4231L OR APPROVED EQUAL.
4. ONE-INCH DIAMETER PVC PIPE SHALL BE COMPLETED WITH 1-INCH DIAMETER THREADED PVC CAP WITH QUICK CONNECT FITTING AS SHOWN ON THE DRAWINGS.
5. QUICK-CONNECT FITTING WITH 1/2-INCH THREADS, SHUT OFF VALVE, AND VITON SEAL AS MANUFACTURED BY LANDFILL CONTROL TECHNOLOGIES (LANDTEC) OR APPROVED EQUAL SHALL BE INSTALLED IN PVC CAPS.
6. LABEL EACH MONITORING POINT WITH ENGRAVED METAL TAG ON CHAIN AROUND PVC PIPE WITH: "SSDS MONITORING POINT". LETTER HEIGHT SHALL BE 1/4-INCH MINIMUM.

- E. GAS VAPOR BARRIER
1. GAS VAPOR BARRIER SHALL BE AS SPECIFIED IN SECTION 071357.
F. PIPE AND RELATED ACCESSORIES
1. PIPE, FITTINGS, UNIONS, CLEANOUTS, SLEEVES, SUPPORTS, AND RELATED ACCESSORIES SHALL BE FURNISHED IN ACCORDANCE WITH THE REQUIREMENTS FOR PLUMBING IN DIVISION 22, UNLESS OTHERWISE SPECIFIED.
G. SUCTION FANS
1. REFER TO SECTION 312111 SUB-SLAB DEPRESSURIZATION SYSTEM ACCESSORIES FOR SUCTION FAN REQUIREMENTS...
H. GENERAL
1. PROVIDE ADDITIONAL INSTALLATION ACCESSORIES AS NECESSARY FOR A COMPLETE SSDS, READY FOR USE. ENSURE ACCESSORIES ARE FROM SAME MANUFACTURERS AS SPECIFIED PRODUCTS. FURNISH ALL MANUFACTURER RECOMMENDED ACCESSORIES.

- J. REPORT ON PROFESSIONAL ENGINEER'S INSPECTION AND APPROVAL OF THE WORK OF THIS SECTION... K. WARRANTIES FROM MANUFACTURERS FOR ALL PRODUCTS AND CONTRACTOR INSTALLATION WARRANTY.
L. CERTIFICATION PREPARED BY THE REMEDIAL ENGINEER THAT STATES THAT SSDS SUCTION FAN EXHAUST STACKS HAVE BEEN INSTALLED A MINIMUM OF TEN (10) FEET AWAY FROM ANY BUILDING AIR INTAKE AND OPERABLE WINDOWS.
1.06 DELIVERY, STORAGE, AND HANDLING
A. DELIVER MATERIALS TO SITE IN MANUFACTURERS' ORIGINAL, UNOPENED CONTAINER AND PACKAGING... B. STORE MATERIALS IN A CLEAN, DRY AREA... C. PROTECT MATERIALS DURING HANDLING AND INSTALLATION TO PREVENT DAMAGE.
D. DELIVERY, STORAGE, AND HANDLING OF PIPE MATERIALS:
1. DELIVER PIPE MATERIALS PROPERLY PROTECTED, AND UNDAMAGED.
2. PROPERLY PROTECT ALL PIPING TO PREVENT DAMAGE TO THE PIPE AND THE INTRODUCTION OF FOREIGN MATERIAL INTO THE PIPE...
3. EXAMINE ALL PIPE AND FITTINGS BEFORE LAYING PIPE...
PART 2 - PRODUCTS
2.01 MATERIALS AND ACCESSORIES
A. NON-WOVEN GEOTEXTILE
1. GEOTEXTILE MATERIAL TO BE PLACED ON PREPARED SUBGRADE BELOW THE GAS PERMEABLE AGGREGATE LAYER SHALL BE A NON-WOVEN POLYPROPYLENE TYPE...

- 2. GEOTEXTILE MATERIAL TO BE PLACED ON PREPARED SUBGRADE BELOW THE GAS PERMEABLE AGGREGATE LAYER SHALL BE A NON-WOVEN POLYPROPYLENE TYPE, SUCH AS MIRAFI N-SERIES PRODUCT TYPE 140ML OR APPROVED EQUAL AND HAVING THE FOLLOWING PROPERTIES:
PROPERTY/TEST METHOD UNITS VALUE
MECHANICAL PROPERTIES
GRAB TENSILE STRENGTH
ASTM D4632 N (LBS) 401 (90)
GRAB TENSILE ELONGATION
ASTM D4632 % 50
TRAPEZOIDAL TEAR STRENGTH
ASTM D4533 N (LBS) 178 (40)
CBR PUNCTURE STRENGTH
ASTM D6241 N (LBS) 1,113 (250)
UV RESISTANCE AT 500 HRS.
ASTM D4355 % STRENGTH RETAINED 70
HYDRAULIC PROPERTIES
APPARENT OPENING SIZE (AOS)
ASTM D4751 MM (US SIEVE) 0.30 (50)
PERMITTIVITY
ASTM D4491 SEC-1 2.0
FLOW RATE
ASTM D4491 L/MIN/M² (GAL/MIN/FT²) 5,907 (145)
NOTE: ALL MECHANICAL PROPERTIES AND HYDRAULIC PROPERTIES SHOWN ARE MINIMUM AVERAGE ROLL VALUES (MARV.)
B. GAS PERMEABLE AGGREGATE LAYER
1. GAS PERMEABLE AGGREGATE LAYER SHALL BE AS SPECIFIED IN SECTION 312310.
C. SUB-SLAB PITS, PIPE, AND APPURTENANCES
1. INSTALL SUB-SLAB DEPRESSURIZATION PITS AS SHOWN ON THE CONTRACT DRAWINGS...
2. PITS SHALL BE CONSTRUCTED WITH 4-INCH THICK AND 5-FOOT BY 5-FOOT IN AREA PRECAST CONCRETE BASE PLATES...
3. SCHEDULE 40 PVC PIPE SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS AND SHALL TERMINATE IN AND SLOPE UNIFORMLY TO THE SUB-SLAB DEPRESSURIZATION PITS...
D. MONITORING POINTS
1. MONITORING POINTS SHALL BE INSTALLED THROUGH THE LOWEST LEVEL FLOOR SLABS AND SHALL BE CONSTRUCTED WITH 1-INCH DIAMETER SOLID-WALL SCHEDULE 80 PVC PIPE...
2. SUB-SLAB MONITORING POINTS SHALL TERMINATE TWO (2) INCHES BELOW THE TOP OF THE GAS PERMEABLE AGGREGATE LAYER.
3. ACCESS COVER SHALL BE FLUSH MOUNTED 6-INCH DIAMETER CAST IRON CLEANOUT MANUFACTURED BY JAY R. SMITH MANUFACTURING CO. #4231L OR APPROVED EQUAL.
4. ONE-INCH DIAMETER PVC PIPE SHALL BE COMPLETED WITH 1-INCH DIAMETER THREADED PVC CAP WITH QUICK CONNECT FITTING AS SHOWN ON THE DRAWINGS.
5. QUICK-CONNECT FITTING WITH 1/2-INCH THREADS, SHUT OFF VALVE, AND VITON SEAL AS MANUFACTURED BY LANDFILL CONTROL TECHNOLOGIES (LANDTEC) OR APPROVED EQUAL SHALL BE INSTALLED IN PVC CAPS.
6. LABEL EACH MONITORING POINT WITH ENGRAVED METAL TAG ON CHAIN AROUND PVC PIPE WITH: "SSDS MONITORING POINT". LETTER HEIGHT SHALL BE 1/4-INCH MINIMUM.
E. GAS VAPOR BARRIER
1. GAS VAPOR BARRIER SHALL BE AS SPECIFIED IN SECTION 071357.
F. PIPE AND RELATED ACCESSORIES
1. PIPE, FITTINGS, UNIONS, CLEANOUTS, SLEEVES, SUPPORTS, AND RELATED ACCESSORIES SHALL BE FURNISHED IN ACCORDANCE WITH THE REQUIREMENTS FOR PLUMBING IN DIVISION 22, UNLESS OTHERWISE SPECIFIED.
G. SUCTION FANS
1. REFER TO SECTION 312111 SUB-SLAB DEPRESSURIZATION SYSTEM ACCESSORIES FOR SUCTION FAN REQUIREMENTS...
H. GENERAL
1. PROVIDE ADDITIONAL INSTALLATION ACCESSORIES AS NECESSARY FOR A COMPLETE SSDS, READY FOR USE. ENSURE ACCESSORIES ARE FROM SAME MANUFACTURERS AS SPECIFIED PRODUCTS. FURNISH ALL MANUFACTURER RECOMMENDED ACCESSORIES.

ARCHITECT / MEP ENGINEERING

GC ENG & ASSOCIATES, P.C. CONSULTING ENGINEERS
141 WEST 28TH STREET, 8TH FL TEL: 212.695.5313 NEW YORK, NY 10001 FAX: 212.695.5170

CLIENT
HUNTER ROBERTS CONSTRUCTION GROUP
2 World Financial Center, 6th Floor New York NY 10281

CLIENT
NEW YORK CITY ECONOMIC AND DEVELOPMENT CORP.
110 William St. New York, NY 10038

CLIENT / STRUCTURAL ENGINEER
MCLAREN ENGINEERING GROUP
100 Snake Hill Road West Nyack, NY 10994

ENVIRONMENTAL
TRC ENGINEERS, INC.
1430 Broadway, 10th Floor New York, NY 10018

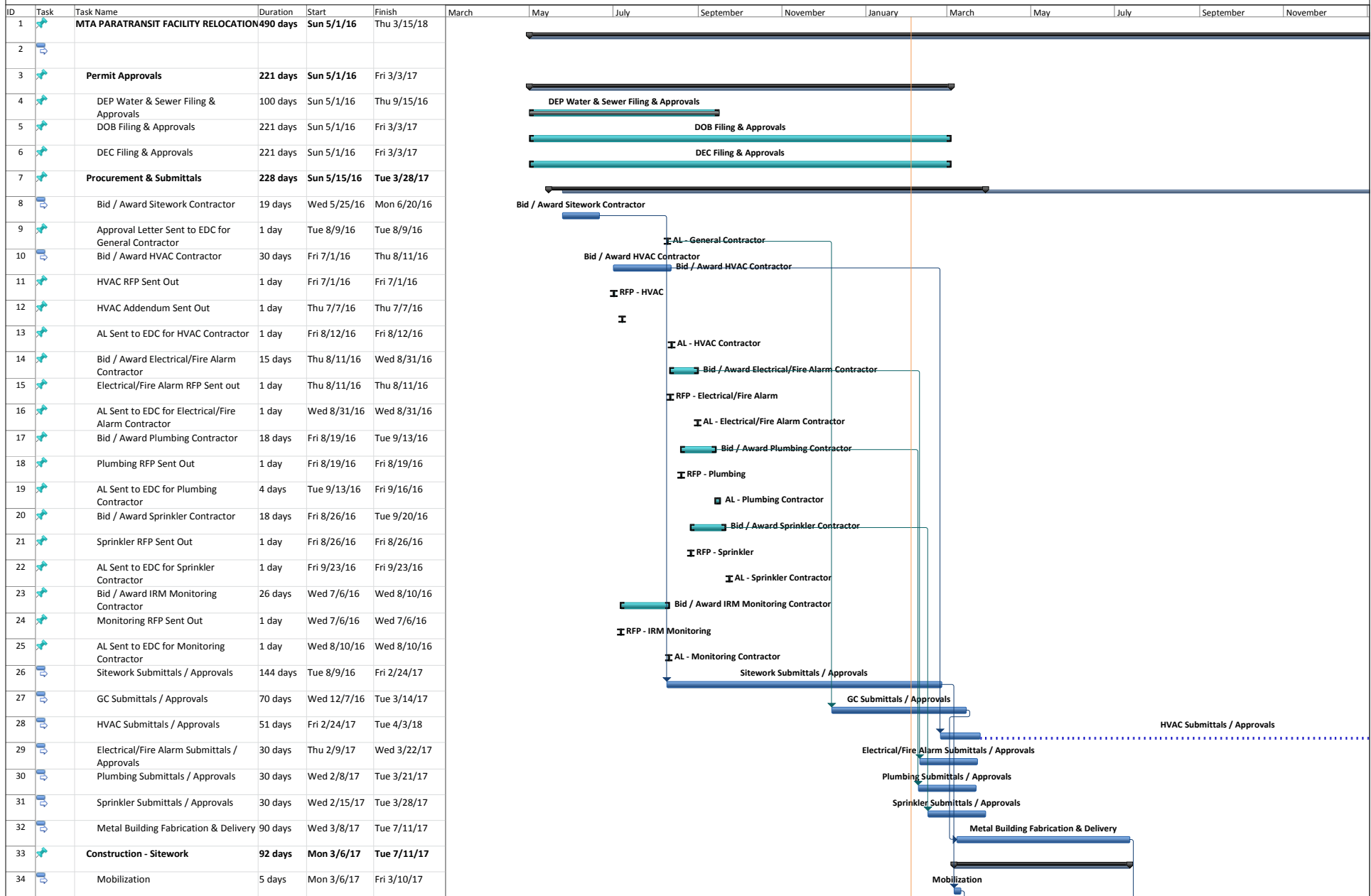
Table with 3 columns: NO., SUBMISSIONS / REVISIONS, DATE. Includes a PROJECT NORTH diagram and a REFERENCE BAR for scale designations.

PROJECT
RELOCATED MTA PARATRANSIT FACILITY
COMMERCE AVENUE BRONX, NY 10462
SUB-SLAB DEPRESSURIZATION SYSTEM SPECIFICATIONS SHEET I

SEAL & SIGNATURE
DATE: 2/21/17
PROJECT No: 263418
SCALE: AS SHOWN
DRAWING BY: DS
CHECKED BY: JD
DWG No: H201.00
NYC DOB Number: OF 79

APPENDIX H
CONSTRUCTION SCHEDULE

MTA PARATRANSIT TRAINING FACILITY



Project: MTA Schedule Update (2-Date: Fri 2/3/17)	Task	Summary	External Milestone	Inactive Summary	Manual Summary Rollup	Finish-only
	Split	Project Summary	Inactive Task	Manual Task	Manual Summary	Deadline
	Milestone	External Tasks	Inactive Milestone	Duration-only	Start-only	Progress

MTA PARATRANSIT TRAINING FACILITY

ID	Task	Task Name	Duration	Start	Finish	March	May	July	September	November	January	March	May	July	September	November
35		Selective Demolition	10 days	Mon 3/13/17	Fri 3/24/17							Selective Demolition				
36		Rough Grading	10 days	Mon 3/27/17	Fri 4/7/17							Rough Grading				
37		Storm Water Drainage System	15 days	Mon 4/10/17	Fri 4/28/17							Storm Water Drainage System				
38		Underground Sanitary	10 days	Mon 5/1/17	Fri 5/12/17							Underground Sanitary				
39		Underground Domestic Water / Gas	10 days	Mon 5/15/17	Fri 5/26/17							Underground Domestic Water / Gas				
40		Site Lighting	10 days	Mon 5/29/17	Fri 6/9/17							Site Lighting				
41		Final Grading	10 days	Mon 6/12/17	Fri 6/23/17							Final Grading				
42		Subgrade & Paving	12 days	Mon 6/26/17	Tue 7/11/17							Subgrade & Paving				
43		Construction - Building	190 days	Mon 4/10/17	Fri 12/29/17											
44		Piles	18 days	Mon 4/10/17	Wed 5/3/17							Piles				
45		Foundation / SOG	20 days	Thu 5/4/17	Wed 5/31/17							Foundation / SOG				
46		Metal Butler Building Installation	30 days	Wed 7/12/17	Tue 8/22/17							Metal Butler Building Installation				
47		MEPS & Fire Alarm Rough In	40 days	Wed 8/23/17	Tue 10/17/17							MEPS & Fire Alarm Rough In				
48		Doors / Windows	15 days	Wed 8/23/17	Tue 9/12/17							Doors / Windows				
49		Masonry / Framing / Drywall	20 days	Wed 9/13/17	Tue 10/10/17							Masonry / Framing / Drywall				
50		Painting / Finishes	20 days	Wed 10/11/17	Tue 11/7/17							Painting / Finishes				
51		Ceramic Tiles in Restrooms	15 days	Wed 10/11/17	Tue 10/31/17							Ceramic Tiles in Restrooms				
52		Accoustical Ceilings / Light Fixtures	15 days	Wed 11/1/17	Tue 11/21/17							Accoustical Ceilings / Light Fixtures				
53		Flooring	10 days	Fri 11/24/17	Thu 12/7/17							Flooring				
54		Millwork	12 days	Wed 11/22/17	Thu 12/7/17							Millwork				
55		MEPS & Fire Alarm Finishes	18 days	Wed 11/22/17	Fri 12/15/17							MEPS & Fire Alarm Finishes				
56		HVAC Start Up & Commissioning	10 days	Mon 12/18/17	Fri 12/29/17							HVAC Start Up & Commissioning				
57		Closeout	150 days	Thu 6/15/17	Wed 1/10/18											
58		IRM Acceptance Submission to DEC/DOH	1 day	Thu 6/29/17	Thu 6/29/17							IRM Acceptance by DEC/DOH				
59		IRM Acceptance by DEC/DOH	20 days	Fri 6/30/17	Thu 7/27/17											
60		FDNY Inspection	15 days	Thu 12/21/17	Wed 1/10/18											FDNY Ins
61		DOB Inspection	15 days	Thu 1/11/18	Wed 1/31/18											
62		TCO	15 days	Thu 2/1/18	Wed 2/21/18											
63		MTA Inspection / Acceptance	10 days	Thu 2/22/18	Wed 3/7/18											
64		Punchlist	15 days	Thu 2/22/18	Wed 3/14/18											
65		Closeout Docs.	15 days	Thu 2/22/18	Wed 3/14/18											
66																

Project: MTA Schedule Update (2-
Date: Fri 2/3/17)

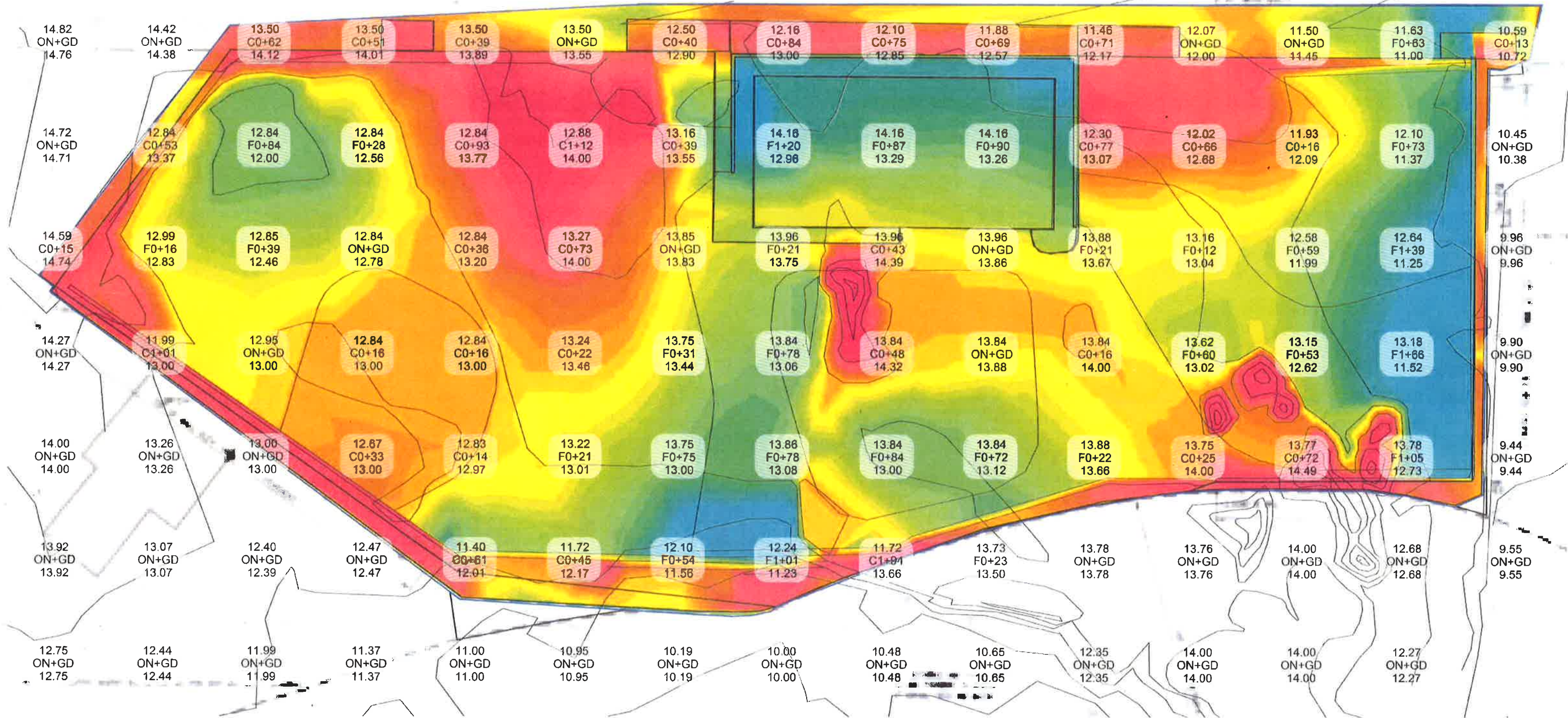
	Summary		External Milestone		Inactive Summary		Manual Task		Manual Summary Rollup		Finish-only
	Project Summary		Inactive Task		Manual Task		Manual Summary		Manual Summary		Deadline
	External Tasks		Inactive Milestone		Duration-only		Start-only		Start-only		Progress

APPENDIX I

SUPPORTING DOCUMENTATION

- **LAYOUT AND MATERIAL PLAN SHOWING COVER TYPES**
- **CUT/FILL DRAWING**
- **PRIOR SOIL DATA SHOWING EXCEEDANCES OF INDUSTRIAL USE SCOS**
- **INDUSTRIAL USE SOIL CLEANUP OBJECTIVES FOUND IN NYCRR PART 375**

COMMERCE AVENUE



NOTE: ELEVATION DATA IS INTERPOLATED.

CUT AND FILL DRAWING PREPARED BY
 SENTRALE CONTRACTING CORPORATION
 206 FERRIS AVE.
 WHITE PLAINS, NY 10603

Table 4 (Page 1 of 2)
SVOCs in Soil
Proposed MTA Paratransit Training Facility
1000 Commerce Avenue, Bronx, New York 10462

Sample ID:	SP1	SP2	B1 (0-4)	B1 (5-9)	B2 (0-4)	B2 (5-9)	B3 (0-4)	B3 (6-10)	B4 (0-4)	B4 (6-10)	B5 (0-4)	B5 (20-25)	T1	T2	Blind Duplicate (from T2)	T3	T4	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO
Sample Depth (feet bgs):	0-1	0-1	0-4	5-9	0-4	5-9	0-4	6-10	0-4	6-10	0-4	20-25	0-8	0-8	0-8	0-8	0-8			
COMPOUND	RESULTS (ppm)																	(ppm)		
Acenaphthene	< 0.14	0.34 J	< 0.76	< 0.74	< 1.4	< 0.74	< 0.72	< 0.14	0.2 J	0.56	< 1.5	< 0.22	< 1.6	< 0.58	< 0.95	< 0.37	< 2	20	100	500
1,2,4-Trichlorobenzene	< 0.005	< 0.0063	< 0.0056	< 0.0052	< 0.0055	< 0.0075	< 0.0055	< 0.0057	< 0.0062	< 0.0045	< 0.0064	< 0.01	< 1.5	< 0.0049	< 0.0055	< 0.0062	< 0.37	NA	NA	NA
Hexachlorobenzene	< 0.11	< 0.58	< 0.57	< 0.56	< 1.1	< 0.56	< 0.54	< 0.1	< 0.22	< 0.21	< 1.1	< 0.16	< 1.2	< 0.43	< 0.72	< 0.28	< 1.5	0.33	1.2	6
Bis(2-chloroethyl)ether	< 0.16	< 0.87	< 0.86	< 0.84	< 1.6	< 0.84	< 0.81	< 0.15	< 0.33	< 0.31	< 1.7	< 0.24	< 1.8	< 0.65	< 1.1	< 0.42	< 2.3	NA	NA	NA
2-Chloronaphthalene	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
1,2-Dichlorobenzene	< 0.005	< 0.0063	< 0.0056	< 0.0052	< 0.0055	< 0.0075	< 0.0055	< 0.0057	< 0.0062	< 0.0045	< 0.0064	< 0.01	< 1.5	< 0.0049	< 0.0055	< 0.0062	< 0.37	1.1	100	500
1,3-Dichlorobenzene	< 0.005	< 0.0063	< 0.0056	< 0.0052	< 0.0055	< 0.0075	< 0.0055	< 0.0057	< 0.0062	< 0.0045	< 0.0064	< 0.01	< 1.5	< 0.0049	< 0.0055	< 0.0062	< 0.37	2.4	49	280
1,4-Dichlorobenzene	< 0.005	< 0.0063	< 0.0056	< 0.0052	< 0.0055	< 0.0075	< 0.0055	< 0.0057	< 0.0062	< 0.0045	< 0.0064	< 0.01	< 1.5	< 0.0049	< 0.0055	< 0.0062	< 0.37	1.8	13	130
3,3'-Dichlorobenzidine	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
2,4-Dinitrotoluene	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
2,6-Dinitrotoluene	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Fluoranthene	0.45	4.4	0.63	1.2	0.95 J	2.3	0.55	0.49	5.3	6.0	0.62 J	< 0.16	1.6	0.98	3.1	0.47	4.9	100	100	500
4-Chlorophenyl phenyl ether	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
4-Bromophenyl phenyl ether	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Bis(2-chloroisopropyl)ether	< 0.21	< 1.2	< 1.1	< 1.1	< 2.2	< 1.1	< 1.1	< 0.2	< 0.45	< 0.41	< 2.3	< 0.33	< 2.4	< 0.86	< 1.4	< 0.55	< 3	NA	NA	NA
Bis(2-chloroethoxy)methane	< 0.19	< 1	< 1	< 1	< 1.9	< 1	< 0.98	< 0.18	< 0.4	< 0.37	< 2.1	< 0.29	< 2.1	< 0.78	< 1.3	< 0.5	< 2.7	NA	NA	NA
Hexachlorobutadiene	< 0.005	< 0.0063	< 0.0056	< 0.0052	< 0.0055	< 0.0075	< 0.0055	< 0.0057	< 0.0062	< 0.0045	< 0.0064	< 0.01	< 1.5	< 0.0049	< 0.0055	< 0.0062	< 0.37	NA	NA	NA
Hexachlorocyclopentadiene	< 0.51	< 2.8	< 2.7	< 2.7	< 5.2	< 2.7	< 2.6	< 0.49	< 1.1	< 0.99	< 5.5	< 0.78	< 5.7	< 2.1	< 3.4	< 1.3	< 7.2	NA	NA	NA
Hexachloroethane	< 0.14	< 0.78	< 0.76	< 0.74	< 1.4	< 0.74	< 0.72	< 0.14	< 0.3	< 0.28	< 1.5	< 0.22	< 1.6	< 0.58	< 0.95	< 0.37	< 2	NA	NA	NA
Isophorone	< 0.16	< 0.87	< 0.86	< 0.84	< 1.6	< 0.84	< 0.81	< 0.15	< 0.33	< 0.31	< 1.7	< 0.24	< 1.8	< 0.65	< 1.1	< 0.42	< 2.3	NA	NA	NA
Naphthalene	< 0.18	0.32 J	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	1.6 J	< 0.72	< 1.2	< 0.46	< 2.5	12	100	500
Nitrobenzene	< 0.16	< 0.87	< 0.86	< 0.84	< 1.6	< 0.84	< 0.81	< 0.15	< 0.33	< 0.31	< 1.7	< 0.24	< 1.8	< 0.65	< 1.1	< 0.42	< 2.3	NA	NA	NA
NitrosoDiPhenylAmine(NDPA)/DPA	< 0.14	< 0.78	< 0.76	< 0.74	< 1.4	< 0.74	< 0.72	< 0.14	< 0.3	< 0.28	< 1.5	< 0.22	< 1.6	< 0.58	< 0.95	< 0.37	< 2	NA	NA	NA
n-Nitrosodi-n-propylamine	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	< 0.18	0.79 J	< 0.95	0.67 J	7.6	0.54 J	0.84 J	< 0.17	0.4	< 0.34	1.5 J	< 0.27	3.4	0.45 J	0.97 J	< 0.46	1.6 J	NA	NA	NA
Butyl benzyl phthalate	< 0.18	0.35 J	< 0.95	< 0.93	5.1	< 0.93	< 0.9	< 0.17	0.2 J	< 0.34	0.61 J	< 0.27	2.3	0.36 J	< 1.2	< 0.46	< 2.5	NA	NA	NA
Di-n-butylphthalate	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	0.42 J	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Di-n-octylphthalate	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	0.34 J	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Diethyl phthalate	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Dimethyl phthalate	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	4.2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Benzo(a)anthracene	0.23	1.9	0.25 J	0.54 J	0.48 J	1.1	0.28 J	0.16	2.3	2.4	0.4 J	< 0.16	0.88 J	0.53	1.5	0.27 J	3.3	1	1	5.6
Benzo(a)pyrene	0.24	1.8	0.4 J	0.67 J	0.82 J	1.2	0.41 J	0.19	1.8	1.8	0.77 J	< 0.22	1.2 J	0.54 J	1.3	0.29 J	2.5	1	1	1
Benzo(b)fluoranthene	0.31	2.2	0.26 J	0.66	0.65 J	1.3	0.3 J	0.2	2.5	2.3	0.49 J	< 0.16	1.5	0.71	1.6	0.42	2.7	1	1	5.6
Benzo(k)fluoranthene	0.15	0.71	< 0.57	0.23 J	< 1.1	0.55 J	< 0.54	0.081 J	0.98	0.79	< 1.1	< 0.16	0.54 J	0.3 J	0.62 J	0.13 J	0.8 J	0.8	3.9	56
Chrysene	0.25	1.8	0.26 J	0.56	0.53 J	1.1	0.29 J	0.2	2.2	2.5	< 1.1	< 0.16	1.1 J	0.5	1.2	0.28	3.8	1	3.9	56
Acenaphthylene	0.081 J	< 0.78	< 0.76	< 0.74	< 1.4	0.31 J	< 0.72	0.047 J	0.084 J	0.41	< 1.5	< 0.22	< 1.6	0.2 J	0.47 J	< 0.37	0.7 J	100	100	500
Anthracene	0.066 J	0.83	< 0.57	0.17 J	< 1.1	0.28 J	0.16 J	0.057 J	0.95	1.5	< 1.1	< 0.16	0.48 J	0.18 J	0.69 J	< 0.28	1.5	100	100	500
Benzo(ghi)perylene	0.16	1	< 0.76	0.32 J	0.4 J	0.66 J	0.19 J	0.093 J	1.1	0.98	< 1.5	< 0.22	1.2 J	0.34 J	0.72 J	0.22 J	1.2 J	100	100	500
Fluorene	< 0.18	0.43 J	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	0.24 J	0.71	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	30	100	500
Phenanthrene	0.25	3.4	0.54 J	0.67	0.45 J	0.93	0.35 J	0.41	3.6	5	< 1.1	< 0.16	2	0.56	2.5	0.22 J	5.8	100	100	500
Dibenzo(a,h)anthracene	0.039 J	0.43 J	< 0.57	0.26 J	0.42 J	0.33 J	< 0.54	0.055 J	0.34	0.30	< 1.1	< 0.16	< 1.2	< 0.43	< 0.72	< 0.28	< 1.5	0.33	0.33	0.56
Indeno(1,2,3-cd)Pyrene	0.14	1.3	0.34 J	0.51 J	0.69 J	0.85	0.36 J	0.14	1.3	1.1	0.7 J	< 0.22	1.1 J	0.29 J	0.63 J	0.18 J	0.88 J	0.5	0.5	5.6
Pyrene	0.38	3.6	0.59	1.1	0.93 J	2	0.48 J	0.4	4.6	5.6	0.54 J	< 0.16	1.8	0.93	2.7	0.49	6.7	100	100	500
Biphenyl	< 0.4	< 2.2	< 2.2	< 2.1	< 4.1	< 2.1	< 2.1	< 0.39	< 0.85	< 0.78	< 4.4	< 0.62	< 4.5	< 1.6	< 2.7	< 1	< 5.7	NA	NA	NA
4-Chloroaniline	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
2-Nitroaniline	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
3-Nitroaniline	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
4-Nitroaniline	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Dibenzofuran	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	0.14 J	0.28 J	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	7	59	350
2-Methylnaphthalene	< 0.21	< 1.2	< 1.1	< 1.1	< 2.2	< 1.1	< 1.1	< 0.2	< 0.45	< 0.41	< 2.3	< 0.33	5.8	< 0.86	< 1.4	< 0.55	< 3	NA	NA	NA
1,2,4,5-Tetrachlorobenzene	< 0.18	< 0.97	< 0.95	< 0.93	< 1.8	< 0.93	< 0.9	< 0.17	< 0.37	< 0.34	< 1.9	< 0.27	< 2	< 0.72	< 1.2	< 0.46	< 2.5	NA	NA	NA
Acetophenone	< 0.18	< 0.97	< 0.95	< 0.																

**Table 5
Metals in Soil
Proposed MTA Paratransit Training Facility
1000 Commerce Avenue, Bronx, New York 10462**

Sample ID:	SP1	SP2	B1 (0-4')	B1 (5-9')	B2 (0-4')	B2 (5-9')	B3 (0-4')	B3 (6-10')	B4 (0-4')	B4 (6-10')	B5 (0-4')	B5 (20-25')	T1	T2	Blind Duplicate (from T2)	T3	T4	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO
Sample Depth (feet bgs):	0-1	0-1	0-4	5-9	0-4	5-9	0-4	6-10	0-4	6-10	0-4	20-25	0-8	0-8	0-8	0-8	0-8			
COMPOUND	RESULTS (ppm)																	(ppm)		
Aluminum, Total	8,000	10,000	4,900	7,000	7,300	9,000	7,500	9,800	7,300	7,000	13,000	12,000	7,600	12,000	9,900	21,000	14,000	NA	NA	NA
Antimony, Total	< 4.1	14	4.5	0.97 J	4 J	16	1.4 J	< 4.2	3.8 J	< 4.1	13	1 J	7.7	2.2 J	4 J	2.2 J	2 J	NA	NA	NA
Arsenic, Total	1.8	7.2	5.1	2.6	6.9	5.2	3.4	1.9	6.3	0.65 J	7	9	7.4	2.4	4.2	73	3.9	13	16	16
Barium, Total	86	370	140	480	170	410	180	120	170	130	400	34	340	250	250	720	360	350	400	400
Beryllium, Total	0.26 J	14	0.12 J	0.15 J	0.36 J	1.3	0.33 J	0.25 J	0.48	0.26 J	49	1.2	0.49	0.49	0.42 J	2	3.6	7.2	72	590
Cadmium, Total	0.43 J	6.4	2.8	0.75 J	2.0	2.0	0.74 J	0.37 J	2.8	0.42 J	5.4	0.65 J	5.3	1.6	2.5	1.2	2.9	2.5	4	9
Calcium, Total	5,100	10,000	43,000	47,000	36,000	24,000	14,000	12,000	24,000	6,100	21,000	7,800	38,000	9,300	12,000	15,000	21,000	NA	NA	NA
Chromium, Total	22	100	31	16	28	52	24	18	26	15	130	29	51	41	30	34	46	30*	180*	1,500*
Cobalt, Total	6.4	65	5.2	5	13	40	7.8	9.4	8.9	11	100	12	8.6	11	10	11	67	NA	NA	NA
Copper, Total	28	1,600	170	42	360	930	56	15	220	42	2,600	81	1,400	91	150	46	760	50	270	270
Iron, Total	15,000	74,000	48,000	12,000	23,000	35,000	19,000	17,000	35,000	14,000	91,000	33,000	30,000	25,000	24,000	40,000	40,000	NA	NA	NA
Lead, Total	51	1,500	520	400	590	9,100	140	82	490	56	2,400	45	2,400	320	510	78	490	63	400	1,000
Magnesium, Total	4,000	4,200	8,500	6,200	5,600	5,400	5,300	5,000	5,200	3,600	5,800	6,700	6,500	5,800	6,500	4,300	7,100	NA	NA	NA
Manganese, Total	230	600	410	160	240	350	240	250	440	110	880	580	350	320	370	160	470	1,600	2,000	10,000
Mercury, Total	0.09	0.31	0.35	0.57	0.2	0.18	0.21	0.05 J	0.27	0.05 J	0.34	< 0.12	0.95	0.22	0.41	0.23	0.16	0.18	0.81	2.80
Nickel, Total	17	190	24	13	43	89	23	17	56	19	300	25	47	27	39	25	160	30	310	310
Potassium, Total	2,000	1,600	930	1,700	1,300	3,000	2,000	5,000	1,900	5,100	1,600	3,400	1,300	3,900	2,600	2,000	4,700	NA	NA	NA
Selenium, Total	< 1.6	< 1.8	< 1.8	< 1.8	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 1.6	< 1.8	< 2.5	< 1.8	< 1.7	< 1.9	0.81 J	< 1.9	3.9	180	1,500
Silver, Total	< 0.82	0.69 J	1.4	< 0.89	0.22 J	0.38 J	< 0.86	< 0.84	< 0.9	< 0.82	0.55 J	< 1.2	0.3 J	0.33 J	< 0.94	< 1.1	0.26 J	2	180	1,500
Sodium, Total	130 J	780	170 J	200	270	600	150 J	120 J	230	120 J	1,500	5,600	370	180	140 J	1,000	600	NA	NA	NA
Thallium, Total	< 1.6	< 1.8	< 1.8	< 1.8	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 1.6	< 1.8	< 2.5	< 1.8	< 1.7	< 1.9	0.67 J	< 1.9	NA	NA	NA
Vanadium, Total	24	28	26	43	82	33	26	25	21	18	32	33	43	34	40	76	38	NA	NA	NA
Zinc, Total	69	7,200	390	290	1,000	4,800	180	64	2,000	140	18,000	370	2,000	490	690	78	3,500	109	10,000	10,000

Notes:

- * SCOs are for Trivalent Chromium. The reported results are for Total Chromium.
- < Analyte value is less than the laboratory detection limit for the listed compound
- Concentration above the indicated NYSDEC Part 375 SCO for Unrestricted Use
- Concentration above the indicated NYSDEC Part 375 SCO for Restricted Residential Use
- Concentration above the indicated NYSDEC Part 375 SCO for Commercial Use
- BGS Below ground surface
- J Analyte concentration is an estimate due to detection below the laboratory reporting limit.
- NA No regulatory guidance value established
- PPM Parts per million
- SCO NYSDEC Remedial Program Soil Cleanup Objective; Subpart 375-6(a,b), December, 2006

NOTE: EXCEEDANCES OF INDUSTRIAL USE SOIL CLEANUP OBJECTIVES FOR SOIL BORINGS ARE HIGHLIGHTED IN RED

**TABLE 1 (Page 1 of 3)
Soil Results Above Cleanup Objectives
Proposed MTA Paratransit Facility, Commerce Avenue, Bronx, NY**

Sample ID:	SB1 (0-0.5')	Blind Dup (S) 1 from SB1 (0-0.5')	SB1 (7-9')	SB1 (13-15')	SB2 (0-0.5')	SB2 (5-9')	SB2 (11-13')	SB3 (0-0.5')	SB3 (5-10')	SB3 (13-15')	SB4 (0-0.5')	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO	Part 375 Protection of Groundwater SCO
	Sample Depth (feet bgs):	0-0.5	0-0.5	7-9	13-15	0-0.5	5-9	11-13	0-0.5	5-10	13-15				
COMPOUND	RESULTS (ppm)											(ppm)			
Volatiles Organic Compounds (VOCs)															
Acetone					0.13			0.054				0.05	100	500	0.05
Sample ID:	SB1 (0-2')	Blind Dup (S) 1 from SB1 (0-2')	SB1 (7-9')	SB1 (13-15')	SB2 (0-2')	SB2 (5-9')	SB2 (11-13')	SB3 (0-2')	SB3 (5-10')	SB3 (13-15')	SB4 (0-2')	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO	Part 375 Protection of Groundwater SCO
Sample Depth (feet bgs):	0-2	0-2	7-9	13-15	0-2	5-9	11-13	0-2	5-10	13-15	0-2				
COMPOUND	RESULTS (ppm)											(ppm)			
Semi Volatile Organic Compounds (SVOCs)															
Benzo(a)anthracene						2.6				3.0		1.0	1.0	5.6	1.0
Benzo(a)pyrene						3.3				2.6		1.0	1.0	1.0	22
Benzo(b)fluoranthene						4.2				3.9	1.7	1.0	1.0	5.6	1.7
Benzo(k)fluoranthene						1.6				1.3		0.8	3.9	56	1.7
Chrysene						3.0				3.5	1.2	1.0	3.9	56	1.0
Dibenzo(a,h)anthracene						0.61				0.44		0.33	0.33	0.56	1,000
Di-n-butylphthalate	0.21							0.17 J	0.083 J			0.014 *	NA	NA	NA
Indeno(1,2,3-cd)Pyrene						2.6				1.7	0.88	0.5	0.5	5.6	8.2
Metals															
Aluminum, Total			11,000			16,000			11,000			10,000 *	NA	NA	NA
Antimony, Total						17		28			19	12 *	NA	NA	NA
Arsenic, Total						23						13	16	16	16
Barium, Total			630			680			380		1,500	350	400	400	820
Cadmium, Total	4.1	3.6	2.8		2.7	2.8		5.7			6.7	2.5	4.3	9.3	7.5
Calcium, Total	46,000	42,000	30,000	21,000	20,000	29,000	36,000	35,000	20,000	41,000	39,000	10,000 *	NA	NA	NA
Chromium, Total	59	42	38	70	30	83	20	49	39	37	70	30 **	180 **	1,500 **	19 **
Copper, Total	260	270	200	78	93	290		320	120	100	640	50	270	270	1,720
Iron, Total	36,000	24,000	43,000	33,000	32,000	53,000	16,000	43,000	22,000	65,000	47,000	2,000 *	NA	NA	NA
Lead, Total	950	810	570	720	290	2,700	1,400	6200	320	490	4,500	63	400	1,000	450
Mercury, Total	1.0	0.92	0.25	0.47	0.27	0.28	0.42	0.54	0.71	0.44		0.18	0.81	2.8	0.73
Nickel, Total	45	39		40		45		170	80	56	76	30	310	310	130
Silver, Total						2.6						2.0	180	1,500	8.3
Vanadium, Total	55				41	150			570	140	120	39 *	NA	NA	NA
Zinc, Total	770	660	560	3,200	860	2,200	550	1,300	400	750	3,300	109	10,000	10,000	2,480
Polychlorinated Biphenyls (PCBs)															
Aroclor 1248								0.21				0.1	1.0	1.0	3.2
Aroclor 1254	0.268 P	0.147 P				0.23		0.134 P	0.204			0.1	1.0	1.0	3.2
Aroclor 1260	0.199	0.139						0.129 P				0.1	1.0	1.0	3.2
Total PCBs	0.47	0.35				0.31		0.33	0.46	0.16	0.13	0.1	1.0	1.0	3.2
Pesticides															
Dieldrin	0.0146										0.00653	0.005	0.2	1.4	0.1
4,4'-DDE					0.0268	0.0434			0.0128	0.00596	0.00512	0.0033	8.9	62	17
4,4'-DDD	0.0115	0.00973		0.0115		0.00948			0.00513	0.00498	0.00364	0.0033	13	92	14
4,4'-DDT	0.0125 JPI	0.00887 PI	0.013		0.0596	0.0743		0.0107 PI	0.0432	0.0112	0.0228	0.0033	7.9	47	136
Notes:															
*	Where Part 375 SCO is unavailable, the lowest available NYSDEC Commissioner Policy 51 (CP-51) SCO														
<	Analyte value is less than the laboratory detection limit for the listed compound														
	Concentration above the indicated NYSDEC Part 375 SCO for Unrestricted Use														
	Concentration above the indicated NYSDEC Part 375 SCO for Restricted Residential Use														
	Concentration above the indicated NYSDEC Part 375 SCO for Commercial Use														
Bold Italic	Concentration above the indicated NYSDEC Part 375 SCO for Protection of Groundwater														
BGS	Below ground surface														
I	Pesticide analysis produces two values. If they vary significantly, EPA protocols dictate reporting the lower amount. The higher amount is assumed to be matrix interference.														
J	Analyte concentration is an estimate due to detection below the laboratory reporting limit.														
NA	No regulatory guidance value established														
ND	Not detected above the indicated laboratory reporting limit														
P	The relative percent difference between the matrix spike and matrix spike duplicate exceed the method-specified criteria.														
PPM	Parts per million														
SCO	NYSDEC Remedial Program Soil Cleanup Objective; Subpart 375-6(a,b), December, 2006														

NOTE: EXCEEDANCES OF INDUSTRIAL USE SOIL CLEANUP OBJECTIVES FOR SOIL BORINGS ARE HIGHLIGHTED IN RED

TABLE 1 (Page 2 of 3)
Soil Results Above Cleanup Objectives
Proposed MTA Paratransit Facility, Commerce Avenue, Bronx, NY

Sample ID:	SB4	SB4	SB5	SB5	SB5	SB6	Blind Dup	SB6	SB6	SB7	SB7	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO	Part 375 Protection of Groundwater SCO	
	(5-8')	(13-15')	(0-0.5')	(7-9')	(13-15')	(0-0.5')	(S) 2 from SB6 (0-0.5')	(8.5-10')	(13-15')	(1-1.5')	(10-13')					
Sample Depth (feet bgs):	5-8	13-15	0-0.5	7-9	13-15	0-0.5	0-0.5	8.5-10	13-15	1-1.5	10-13					
COMPOUND	RESULTS (ppm)											RESULTS (ppm)				
Volatile Organic Compounds (VOCs)																
Xylene (Total)										0.29		0.26	100	500	1.6	
Acetone		0.1			0.15				0.082	0.24		0.05	100	500	0.05	
Sample ID:	SB4	SB4	SB5	SB5	SB5	SB6	Blind Dup	SB6	SB6	SB7	SB7	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO	Part 375 Protection of Groundwater SCO	
	(5-8')	(13-15')	(0-2')	(7-9')	(13-15')	(0-2')	(S) 2 from SB6 (0-2')	(8.5-10')	(13-15')	(0-2')	(10-13')					
Sample Depth (feet bgs):	5-8	13-15	0-2	7-9	13-15	0-2	0-2	8.5-10	13-15	0-2	10-13					
COMPOUND	RESULTS (ppm)											RESULTS (ppm)				
Semi Volatile Organic Compounds (SVOCs)																
2-Methylnaphthalene	6.2 J								0.54	3.5		0.41 *	NA	NA	NA	
3-Methylphenol/4-Methylphenol									0.59			0.33	100	500	0.33	
Acenaphthene	33											20	100	500	98	
Benzo(a)anthracene	68											1.0	1.0	5.6	1.0	
Benzo(a)pyrene	58											1.0	1.0	1.0	22	
Benzo(b)fluoranthene	75								1.1			1.0	1.0	5.6	1.7	
Benzo(k)fluoranthene	34											0.8	3.9	56	1.7	
Chrysene	67								1.2			1.0	3.9	56	1.0	
Dibenzo(a,h)anthracene	8.8											0.33	0.33	0.56	1,000	
Dibenzofuran	15											7.0	59	350	210	
Di-n-butylphthalate			0.43								0.22	0.16 J	0.014 *	NA	NA	
Fluoranthene	170											100	100	500	1,000	
Indeno(1,2,3-cd)Pyrene	39								0.55			0.5	0.5	5.6	8.2	
Naphthalene	23											12	100	500	12	
Phenanthrene	150											100	100	500	1,000	
Pyrene	130											100	100	500	1,000	
Total Polycyclic Aromatic Hydrocarbons	801.80											500 **	NA	NA	NA	
Metals																
Aluminum, Total	12,000	11,000			15,000					18,000		13,000	10,000 *	NA	NA	NA
Antimony, Total	19											12 *	NA	NA	NA	
Arsenic, Total					15				20			13	16	16	16	
Barium, Total										450	520	350	400	400	820	
Cadmium, Total	8.2		7.2		14							2.5	4.3	9.3	7.5	
Calcium, Total	64,000		48,000			43,000	55,000	20,000		29,000	15,000	10,000 *	NA	NA	NA	
Chromium, Total	100	53	71		73	30	27		76	30	31	30 **	180 **	1,500 **	19 **	
Copper, Total	960	120	670		580	200	240		180	110	88	50	270	270	1,720	
Iron, Total	57,000	31,000	50,000	22,000	55,000	21,000	24,000	12,000	37,000	30,000	29,000	2,000 *	NA	NA	NA	
Lead, Total	5,000	280	970	64	520	660	720	100	250	770	200	63	400	1,000	450	
Mercury, Total	0.61	0.7	0.73		1.7	0.85	0.42	0.28	2.4	0.28	0.19	0.18	0.81	2.8	0.73	
Nickel, Total	140		1,400	33	51	33	37			35	34	30	310	310	130	
Silver, Total	7.4				8.2				3.5			2.0	180	1,500	8.3	
Vanadium, Total	130	54	97			42			68	190	49	39 *	NA	NA	NA	
Zinc, Total	6,200	900	3,800	130	1,300	600	570		270	580	300	109	10,000	10,000	2,480	
Polychlorinated Biphenyls (PCBs)																
Aroclor 1242										0.337		0.1	1.0	1.0	3.2	
Aroclor 1254										0.107		0.1	1.0	1.0	3.2	
Aroclor 1260										0.172		0.1	1.0	1.0	3.2	
Aroclor 1268									0.142 J			0.1	1.0	1.0	3.2	
Total PCBs	0.12	0.13	0.21		0.22	0.18			0.21	0.62		0.1	1.0	1.0	3.2	
Pesticides																
Dieldrin			0.0115									0.005	0.2	1.4	0.1	
4,4'-DDE	0.0214			0.00737 P							0.00514	0.0033	8.9	62	17	
4,4'-DDD	0.00393	0.00937	0.0191		0.00518						0.00428	0.0033	13	92	14	
4,4'-DDT	0.0313			0.0234	0.00728			0.00355			0.0127	0.0033	7.9	47	136	
Notes:																
*	Where Part 375 SCO is unavailable, the lowest available NYSDEC Commissioner Policy 51 (CP-51) SCO															
<	Analyte value is less than the laboratory detection limit for the listed compound															
	Concentration above the indicated NYSDEC Part 375 SCO for Unrestricted Use															
	Concentration above the indicated NYSDEC Part 375 SCO for Restricted Residential Use															
	Concentration above the indicated NYSDEC Part 375 SCO for Commercial Use															
Bold Italic	Concentration above the indicated NYSDEC Part 375 SCO for Protection of Groundwater															
BGS	Below ground surface															
I	Pesticide analysis produces two values. If they vary significantly, EPA protocols dictate reporting the lower amount. The higher amount is assumed to be matrix interference.															
J	Analyte concentration is an estimate due to detection below the laboratory reporting limit.															
NA	No regulatory guidance value established															
ND	Not detected above the indicated laboratory reporting limit															
P	The relative percent difference between the matrix spike and matrix spike duplicate exceed the method-specified criteria.															
PPM	Parts per million															
SCO	NYSDEC Remedial Program Soil Cleanup Objective; Subpart 375-6(a,b), December, 2006															

NOTE: EXCEEDANCES OF INDUSTRIAL USE SOIL CLEANUP OBJECTIVES FOR SOIL BORINGS ARE HIGHLIGHTED IN RED

TABLE 1 (Page 3 of 3)
Soil Results Above Cleanup Objectives
Proposed MTA Paratransit Facility, Commerce Avenue, Bronx, NY

Sample ID:	SB7	SB8	SB8	SB8	SB9	SB9	SB9	SB10	SB10	SB10	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO	Part 375 Protection of Groundwater SCO	
	(13-15)	(0-0.5)	(6-9)	(13-15)	(0-0.5)	(9-12)	(13-15)	(0-0.5)	(6-8.5)	(13-15)					
Sample Depth (feet bgs):	13-15	0-0.5	6-9	13-15	0-0.5	9-12	13-15	0-0.5	6-8.5	13-15					
COMPOUND	RESULTS (ppm)										(ppm)				
Volatile Organic Compounds (VOCs)															
Benzene										0.12 J	0.06	4.8	44	0.06	
Ethylbenzene										1.1	1.0	41	390	1.0	
Xylene (Total)										1.2	0.26	100	500	1.6	
Acetone		0.33			0.12		0.14				0.05	100	500	0.05	
Sample ID:	SB7	SB8	SB8	SB8	SB9	SB9	SB9	SB10	SB10	SB10	Part 375 Unrestricted Use SCO	Part 375 Restricted Residential Use SCO	Part 375 Commercial Use SCO	Part 375 Protection of Groundwater SCO	
Sample Depth (feet bgs):	13-15	0-2	6-9	13-15	0-2	9-12	13-15	0-2	6-8.5	13-15					
COMPOUND	RESULTS (ppm)										(ppm)				
Semi Volatile Organic Compounds (SVOCs)															
2-Methylnaphthalene										28	0.41 *	NA	NA	NA	
3-Methylphenol/4-Methylphenol							0.56				0.33	100	500	0.33	
Benzo(a)anthracene							1.7	2	2.6	1.1	8.7	1.0	1.0	5.6	1.0
Benzo(a)pyrene							1.5	1.8	2.6	1.1	8.2	1.0	1.0	1.0	2.2
Benzo(b)fluoranthene							1.8	2.5	3.3	1.3	6	1.0	1.0	5.6	1.7
Benzo(k)fluoranthene								1.0	1.2		2.4	0.8	3.9	56	1.7
Chrysene							1.7	2.6	2.6	1.2	9.6	1.0	3.9	56	1.0
Dibenzo(a,h)anthracene								0.34	0.43		0.99	0.33	0.33	0.56	1,000
Di-n-butylphthalate		0.067 J			0.38				0.33			0.014 *	NA	NA	NA
Indeno(1,2,3-cd)Pyrene					0.52	1.1	1.3	1.9	0.79	3.2	0.5	0.5	5.6	8.2	
Naphthalene										62	12	100	500	12	
Metals															
Aluminum, Total		12,000	13,000	18,000				18,000		16,000	18,000	10,000 *	NA	NA	NA
Arsenic, Total								18				13	16	16	
Barium, Total		1,600	400				460			450		350	400	400	820
Beryllium, Total		12	16							13		7.2	72	590	47
Cadmium, Total		7.3			5.1		3.4	3.2				2.5	4.3	9.3	7.5
Calcium, Total	66,000	20,000	22,000		80,000	37,000		59,000	28,000			10,000 *	NA	NA	NA
Chromium, Total		140	56	38	42	26	79	42	140	72		30 **	180 **	1,500 **	19 **
Cobalt, Total		65	51						85	25		20 *	NA	NA	NA
Copper, Total		1,800	1,200		1,200	62	270	430	1,700	420		50	270	270	1,720
Iron, Total	13,000	82,000	48,000	34,000	34,000	15,000	32,000	31,000	94,000	41,000		2,000 *	NA	NA	NA
Lead, Total	1,300	1,500	2,700		800	650	210	1,100	2,100	340		63	400	1,000	450
Mercury, Total		0.46	0.26		0.67	0.48	2.0	0.59	0.45	1.2		0.18	0.81	2.8	0.73
Nickel, Total		200	170		73	33	54	63	180	61		30	310	310	130
Silver, Total							4.4					2.0	180	1,500	8.3
Vanadium, Total		180		52	50	160	46	42	44	54		39 *	NA	NA	NA
Zinc, Total	450	9,500	10,000		2,800	420	530	1,700	13,000	2,200		109	10,000	10,000	2,480
Polychlorinated Biphenyls (PCBs)															
Aroclor 1242								0.113				0.1	1.0	1.0	3.2
Aroclor 1248					0.41							0.1	1.0	1.0	3.2
Aroclor 1254		3.0	0.174		0.388			0.195	0.103			0.1	1.0	1.0	3.2
Aroclor 1260		0.798			0.444			0.202				0.1	1.0	1.0	3.2
Total PCBs		3.80	0.23		1.24		0.19	0.51	0.28	0.20		0.1	1.0	1.0	3.2
Pesticides															
4,4'-DDE	0.00728		0.0324			0.00996 P	0.0047					0.0033	8.9	62	17
4,4'-DDD	0.0519	0.0121	0.0254	0.0575			0.0173	0.00794 J	0.0118 J	0.017		0.0033	13	92	14
4,4'-DDT	0.00825		0.0641	0.0118	0.0356 P	0.0398		0.00777 JP	0.0289	0.027 J		0.0033	7.9	47	136
Notes:															
*	Where Part 375 SCO is unavailable, the lowest available NYSDEC Commissioner Policy 51 (CP-51) SCO														
<	Analyte value is less than the laboratory detection limit for the listed compound														
	Concentration above the indicated NYSDEC Part 375 SCO for Unrestricted Use														
	Concentration above the indicated NYSDEC Part 375 SCO for Restricted Residential Use														
	Concentration above the indicated NYSDEC Part 375 SCO for Commercial Use														
Bold Italic	Concentration above the indicated NYSDEC Part 375 SCO for Protection of Groundwater														
BGS	Below ground surface														
I	Pesticide analysis produces two values. If they vary significantly, EPA protocols dictate reporting the lower amount. The higher amount is assumed to be matrix interferer														
J	Analyte concentration is an estimate due to detection below the laboratory reporting limit.														
NA	No regulatory guidance value established														
ND	Not detected above the indicated laboratory reporting limit														
P	The relative percent difference between the matrix spike and matrix spike duplicate exceed the method-specified criteria.														
PPM	Parts per million														
SCO	NYSDEC Remedial Program Soil Cleanup Objective; Subpart 375-6(a,b), December, 2006														

NOTE: EXCEEDANCES OF INDUSTRIAL USE SOIL CLEANUP OBJECTIVES FOR SOIL BORINGS ARE HIGHLIGHTED IN RED

CLEANUP CRITERIA FOR THE SITE - INDUSTRIAL USE SOIL CLEANUP OBJECTIVES

(b) Restricted use soil cleanup objectives.

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Metals							
Arsenic	7440-38-2	16 ^f	16 ^f	16 ^f	16 ^f	13 ^f	16 ^f
Barium	7440-39-3	350 ^f	400	400	10,000 ^d	433	820
Beryllium	7440-41-7	14	72	590	2,700	10	47
Cadmium	7440-43-9	2.5 ^f	4.3	9.3	60	4	7.5
Chromium, hexavalent ^h	18540-29-9	22	110	400	800	1 ^e	19
Chromium, trivalent ^h	16065-83-1	36	180	1,500	6,800	41	NS
Copper	7440-50-8	270	270	270	10,000 ^d	50	1,720
Total Cyanide ^h		27	27	27	10,000 ^d	NS	40
Lead	7439-92-1	400	400	1,000	3,900	63 ^f	450
Manganese	7439-96-5	2,000 ^f	2,000 ^f	10,000 ^d	10,000 ^d	1600 ^f	2,000 ^f
Total Mercury		0.81 ^j	0.81 ^j	2.8 ^j	5.7 ^j	0.18 ^f	0.73
Nickel	7440-02-0	140	310	310	10,000 ^d	30	130
Selenium	7782-49-2	36	180	1,500	6,800	3.9 ^f	4 ^f
Silver	7440-22-4	36	180	1,500	6,800	2	8.3
Zinc	7440-66-6	2200	10,000 ^d	10,000 ^d	10,000 ^d	109 ^f	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	93-72-1	58	100 ^a	500 ^b	1,000 ^c	NS	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 ^e	17
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 ^e	136
4,4' - DDD	72-54-8	2.6	13	92	180	0.0033 ^e	14
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04 ^g	0.02
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	5103-71-9	0.91	4.2	24	47	1.3	2.9

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
delta-BHC	319-86-8	100 ^a	100 ^a	500 ^b	1,000 ^c	0.04 ^g	0.25
Dibenzofuran	132-64-9	14	59	350	1,000 ^c	NS	210
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	959-98-8	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	102
Endosulfan II	33213-65-9	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	102
Endosulfan sulfate	1031-07-8	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	1,000 ^c
Endrin	72-20-8	2.2	11	89	410	0.014	0.06
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	1336-36-3	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	83-32-9	100 ^a	100 ^a	500 ^b	1,000 ^c	20	98
Acenaphthylene	208-96-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	107
Anthracene	120-12-7	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Benz(a)anthracene	56-55-3	1 ^f	1 ^f	5.6	11	NS	1 ^f
Benzo(a)pyrene	50-32-8	1 ^f	1 ^f	1 ^f	1.1	2.6	22
Benzo(b)fluoranthene	205-99-2	1 ^f	1 ^f	5.6	11	NS	1.7
Benzo(g,h,i)perylene	191-24-2	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Benzo(k)fluoranthene	207-08-9	1	3.9	56	110	NS	1.7
Chrysene	218-01-9	1 ^f	3.9	56	110	NS	1 ^f
Dibenz(a,h)anthracene	53-70-3	0.33 ^e	0.33 ^e	0.56	1.1	NS	1,000 ^c
Fluoranthene	206-44-0	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Fluorene	86-73-7	100 ^a	100 ^a	500 ^b	1,000 ^c	30	386
Indeno(1,2,3-cd)pyrene	193-39-5	0.5 ^f	0.5 ^f	5.6	11	NS	8.2
m-Cresol	108-39-4	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
Naphthalene	91-20-3	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	12

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
o-Cresol	95-48-7	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
p-Cresol	106-44-5	34	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8 ^e	0.8 ^e
Phenanthrene	85-01-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Phenol	108-95-2	100 ^a	100 ^a	500 ^b	1,000 ^c	30	0.33 ^e
Pyrene	129-00-0	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Volatiles							
1,1,1-Trichloroethane	71-55-6	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27
1,1-Dichloroethene	75-35-4	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33
1,2-Dichlorobenzene	95-50-1	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02 ^f
cis-1,2-Dichloroethene	156-59-2	59	100 ^a	500 ^b	1,000 ^c	NS	0.25
trans-1,2-Dichloroethene	156-60-5	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1 ^e	0.1 ^e
Acetone	67-64-1	100 ^a	100 ^b	500 ^b	1,000 ^c	2.2	0.05
Benzene	71-43-2	2.9	4.8	44	89	70	0.06
Butylbenzene	104-51-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76
Chlorobenzene	108-90-7	100 ^a	100 ^a	500 ^b	1,000 ^c	40	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1
Hexachlorobenzene	118-74-1	0.33 ^e	1.2	6	12	NS	3.2
Methyl ethyl ketone	78-93-3	100 ^a	100 ^a	500 ^b	1,000 ^c	100 ^a	0.12

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Methyl tert-butyl ether	1634-04-4	62	100 ^a	500 ^b	1,000 ^c	NS	0.93
Methylene chloride	75-09-2	51	100 ^a	500 ^b	1,000 ^c	12	0.05
n-Propylbenzene	103-65-1	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	3.9
sec-Butylbenzene	135-98-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	11
tert-Butylbenzene	98-06-6	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3
Toluene	108-88-3	100 ^a	100 ^a	500 ^b	1,000 ^c	36	0.7
Trichloroethene	79-01-6	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	1330-20-7	100 ^a	100 ^a	500 ^b	1,000 ^c	0.26	1.6

All soil cleanup objectives (SCOs) are in parts per million (ppm).

NS=Not specified. See [Technical Support Document \(TSD\)](#).

Footnotes

^a The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.

^b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

^c The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.

^d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.

^e For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

^f For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

^g This SCO is derived from data on mixed isomers of BHC.

^h The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

ⁱ This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.

^j This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts). See TSD Table 5.6-1.