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CERTIFICATION

I, Omar Ramotar, P.E., am currently a registered professional engineer licensed by the State of New York. I have primary direct responsibility for implementation of the remedial program for the 1800 Southern Boulevard Site (NYSDEC BCA Index No. W2-1133-09-03).

I certify that the Site description presented in this RAWP is identical to the Site descriptions presented in the Brownfield Cleanup Application for the 1800 Southern Boulevard Site and related amendments.

I certify that this plan includes proposed use restrictions, Institutional Controls, Engineering Controls, and plans for all operation and maintenance requirements applicable to the Site and provision for development of an Environmental Easement to be created and recorded pursuant ECL 71-3605. This RAWP requires that all affected local governments, as defined in ECL 71-3603, will be notified that such Easement has been recorded. This RAWP requires that a Site Management Plan must be submitted by the Applicant 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, for approval by the Department.

I certify that this RAWP has a plan for transport and disposal of all soil, fill, fluids, and other material removed from the property under this Plan, and that all transport and disposal will be performed in accordance with all local, State and Federal laws and requirements. All exported material will be taken to facilities licensed to accept this material in full compliance with all Federal, State, and local laws.

I certify that this RAWP has a plan for import of all soils and other material from offsite and that all activities of this type will be in accordance with all local, State and Federal laws and requirements.

I certify that that this RAWP has a plan for nuisance control during the remediation and all invasive development work, including a dust, odor and vector suppression plan and that such plan is sufficient to control dust, odors and vectors and will prevent nuisances from occurring.

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.

077995	August 17, 2009	
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.

LIST OF ACRONYMS

Acronym	Definition
ASP	Analytical Services Protocol
AWQSGVs	Ambient Water Quality Standards and Guidance Values
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bls	Below Land Surface
BSA	New York City Board of Standards and Appeals
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Certificate of Completion
COCs	Contaminants of Concern
CPP	Community Participation Plan
CQAP	Construction Quality Assurance Plan
CRZ	Contamination Reduction Zone
CY	Cubic Yards
DER	Division of Environmental Remediation
DO	Dissolved Oxygen
DRO	Diesel Range Organics
DSHM	Division of Solid and Hazardous Materials
DSNY	New York City Department of Sanitation
DUSR	Data Usability Summary Report

LIST OF ACRONYMS

Acronym	Definition
EC	Engineering Control
ECL	Environmental Conservation Law
EDD	Electronic data deliverable
EZ	Exclusion Zone
FDNY	New York City Fire Department
FER	Final Engineering Report
FS	Feasibility Study
FSI	Focused Subsurface Investigation
GRA	General Response Action
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operation Worker
HDPE	High Density Polyethylene
HRO	Heavy Range Organics
IHWDS	Inactive Hazardous Waste Disposal Site
IC	Institutional Control
IRM	Interim remedial measures
L/min	Liters per minute
mg/kg	Milligrams per kilogram, equal to 1,000 µg/kg
µg/kg	Micrograms per kilogram, equal to 0.001 mg/kg
µg/L	Micrograms per liter
MS	Matrix Spike
MSDs	Matrix Spike Duplicates
MTBE	Methyl tertiary butyl-ether

LIST OF ACRONYMS

Acronym	Definition
MW	Monitoring well
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OM&M	Operation, Maintenance and Monitoring
ORP	Oxidation Reduction Potential
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethene
PID	Photoionization detector
PPE	Personal protection equipment
ppm	Parts per million, equivalent to mg/kg
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation

LIST OF ACRONYMS

Acronym	Definition
RRSCO	Restricted Residential Soil Cleanup Objectives
RSCOs	Recommended Soil Cleanup Objectives
SCGs	Standards, Criteria and Guidance
SCOs	Soil Cleanup Objective
SF	Square feet
SMP	Site Management Plan
SoMP	Soil Management Plan
SOP	Site Operations Plan
SPH	Separate-Phase Petroleum Hydrocarbon
STARS	Spill Technology and Remediation Series
SVE	Soil Vapor Extraction
SVOCs	Semivolatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
SZ	Support Zone
TAL	Target Analyte List
TAGM	Technical and Administrative Guidance Memorandum
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substance Control Act
USCS	Unified Soil Classification System

LIST OF ACRONYMS

Acronym	Definition
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UUSCOs	Unrestricted Use Soil Cleanup Objectives
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

SB 1800 LLC has submitted an application to the Brownfield Cleanup Program (BCP) with the New York State Department of Environmental Conservation (NYSDEC) in July 2008, to remediate a 0.27-acre property located at 1800 Southern Boulevard in the Borough of the Bronx, New York City, New York (Site). SB 1800 LLC is a Volunteer in the BCP for the Site, identified as 1800 Southern Boulevard (BCP site number is C203046).

The Brownfield Cleanup Agreement (BCA) for the Site was executed on May 7, 2009 (NYSDEC BCA Index No, W2-1133-09-03). The proposed Site redevelopment plan consists of construction of a multi-story affordable income housing building that will include ground level retail space.

Site Description/Physical Setting/Site History

The Site is located at 1800 Southern Boulevard, Borough of the Bronx, New York City, New York 10460 and is identified as Block 2984, Lots 1 and 7 on the New York City Tax Map. A Site Location Map (Figure 1) shows the Site location. The site is a triangular shaped parcel of land approximately 0.27-acres in size situated at the southern tip of a city block where Boston Road and Southern Boulevard cross with Southern Boulevard to the west and Boston Road to the east and south. Currently, the site includes an area occupied by a vacated gas station and a fenced lot largely covered with exposed soil or overgrown with vegetation. The vacated gas station was an Amoco gas station that has been vacant since 2003. The fenced area was a car wash that has been vacant since 1993. All of the facilities associated with the car wash have been demolished and this portion of the Site is currently a vacant open lot.

Historic storage, transfer, and usage of petroleum products have resulted in impacts to soil, soil vapor, and groundwater.

Summary of the Remedial Investigation

Roux Associates completed a RI of soil, groundwater, and soil vapor associated with the release of petroleum at the Site as identified by Delta Environmental Consultants in historic Site

investigations. The RI was performed in June 2008 and July 2009, during which the following was performed:

- Seven soil borings were advanced;
- Eleven soil samples were collected and submitted for laboratory analysis;
- Two soil vapor samples and 1 air sample were collected and submitted for laboratory analysis; and
- Ten groundwater samples were collected from six soil borings and four monitoring wells and submitted for laboratory analysis.

The results of the RI indicate that onsite soil is contaminated with petroleum-related VOCs in excess of the NYSDEC Sub-part 375.6 Unrestricted Use Soil Cleanup Objectives (UUSCO) and Restricted Residential Soil Cleanup Objectives (RRSCO). Concentrations of VOCs, SVOCs, and metals in soil require remediation.

The investigation also indicated that gasoline related compounds were detected in soil vapor at concentrations above ambient air.

Onsite and offsite groundwater is impacted with gasoline related compounds in excess of the AWQSGVs. Concentrations of VOCs in groundwater require remediation.

Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment was conducted as part of the RI. A summary of the findings are:

- Probable sources of contamination in soil and groundwater at the Site were spills or leaks from former USTs containing petroleum, direct discharge to the ground of petroleum associated with historical operations of the Site that included vehicular maintenance.
- The contaminants at the Site exist in the form of residual material adsorbed to soil particles in the saturated and unsaturated zones and compounds dissolved in groundwater. Inhalation of windblown dust is a potential exposure pathway. The leaching of contaminants from soil serves as an ongoing source of contamination to groundwater beneath portions of the Site. In addition, VOCs are migrating through volatilization of compounds into soil vapor.
- Potential onsite receptors include occupational workers, construction workers, visitors, or trespassers. Future onsite receptors are also expected to include residents, guests, and

retail customers/workers, depending on the potential future use of the property. The potential offsite receptors include offsite workers, visitors, residents, and trespassers.

- Contaminated soil is limited to specific areas of the Site. However, there is the potential for direct exposure to contaminated soil by anyone digging in the contaminated area and by windblown dust.

- Volatilization of VOCs has been demonstrated at the Site. There is no current potential for migration of VOCs into indoor air because there are no existing buildings onsite. Inhalation via vapor intrusion for off-site receptors is a potential exposure pathway.

- The potential and completed exposure pathways will be addressed by this RAWP through source removal and engineering and institutional controls.

Summary of the Remedy

A Track 2 cleanup is proposed consisting of the following remedial components:

1. Excavation of soil/fill in the upper 15 feet of the Site, plus limited excavation of soils exceeding the protection of groundwater Soil Cleanup Objectives (SCOs) to 20 feet in the area surrounding boring SB-106;

2. Groundwater remediation during construction activities consisting of excavation dewatering, pre-treatment and offsite disposal;

3. Site Monitoring of airborne VOCs and particulates in accordance with a NYSDEC and NYSDOH approved Community Air Monitoring Plan (CAMP) for all intrusive and soil handling activities;

4. Implementation of proper dust and odor suppression techniques for all intrusive and soil handling activities;

5. Import of materials to be used for backfill and cover in compliance with: (1) Sub-part 375-6 (d); and (2) all Federal, State and local rules and regulations for handling and transport of material;

6. Implementation of a Soil Erosion and Sediment Control Plan;

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

8. Collection and analysis of post-excavation end-point soil samples to evaluate the performance of the remedy with respect to attainment of Track 2 residential SCOs;

9. Appropriate offsite disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;

10. Post-remediation groundwater monitoring for a minimum of two years;

11. Post-remediation evaluation of potential soil vapor intrusion concerns;

12. If post-excavation soil sampling demonstrates that the Remedial Action Objectives have not been met, the Department may require limited treatment using In-situ Chemical Oxidation (ISCO).

13. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site;

14. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

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

16. Installation of a vapor barrier to prevent potential water seepage and vapor migration, if any, from the underlying and adjacent soils and groundwater.

1.0 INTRODUCTION

SB 1800 LLC has submitted an application to the Brownfield Cleanup Program (BCP) with the New York State Department of Environmental Conservation (NYSDEC) in July 2008, to remediate a 0.27-acre property located at 1800 Southern Boulevard in the Borough of the Bronx, New York City, New York (Site). SB 1800 LLC is a Volunteer in the BCP for the Site, identified as 1800 Southern Boulevard (BCP site number is C203046).

The Brownfield Cleanup Agreement (BCA) for the Site was executed on May 7, 2009 (NYSDEC BCA Index No, W2-1133-09-03). The proposed Site redevelopment plan consists of construction of a multi-story affordable income housing building.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed in June 2008 and historical site investigations. It provides an evaluation of a Track 1 cleanup and Track 2 Restricted Residential Remedial Action alternative, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria, and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have determined that this Site poses a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

A formal Remedial Design document will not be prepared.

1.1 Site Location and Description

The Site is located at 1800 Southern Boulevard, Borough of the Bronx, New York City, New York 10460 and is identified as Block 2984, Lots 1 and 7 on the New York City Tax Map. A Site Location Map (Figure 1) shows the Site location. The site is a triangular shaped parcel of land approximately 0.27-acres in size situated at the southern tip of a city block where Boston Road and Southern Boulevard cross with Southern Boulevard to the west and Boston Road to the east and south (see Figure 2). A boundary map is attached to the BCP application.

Currently, the site includes an area occupied by a vacated gas station and a fenced lot largely covered with exposed soil or overgrown with vegetation. The property is also known by 1776-1778 Southern Boulevard and 1800 to 1808 Southern Boulevard.

The vacated gas station was an Amoco gas station that has been vacant since 2003. The fenced area was a car wash that has been vacant since 1993. All of the facilities associated with the car wash have been demolished and this portion of the Site is currently a vacant open lot.

1.2 Contemplated Redevelopment Plan

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

The proposed Site redevelopment plan consists of construction of a multi-story affordable income housing building that will include ground level retail space over the entire footprint of the property.

1.3 Description of Surrounding Property

The following sections provide a summary of the surrounding properties, including all adjoining properties and the general surrounding area.

1.3.1 Adjoining Property

The land use surrounding the Site is a combination of commercial, recreational, and residential areas.

Sensitive receptors, including schools, daycare facilities, and hospitals, are not located on adjoining properties. Provided below is a description of the adjoining properties.

East: East of the Site is Boston Road. There is an elevated MTA subway track running above Boston Avenue with a vacant parking lot and a mixture of commercial and residential properties beyond.

West: West of the Site is Southern Boulevard with Crotona Park East road, Crotona Park, and a mixture of commercial and residential properties beyond.

North: North of the Site is a self storage center with East 175th Street and a vacant lot beyond.

South: South of the Site is the intersection of Boston Road and Southern Boulevard with the 174th Street MTA Station located above this intersection (elevated tracks) a vacant lot and a mixture of commercial and residential properties beyond.

1.3.2 General Surrounding Area

According to New York City zoning maps (last revised on May 9, 2007), the general area surrounding the Site is divided into residential and commercial zoning classifications.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated by Roux Associates, Inc. in June 2008 and July 2009. A summary report was submitted to NYSDEC in July 2008 and has not yet been approved by NYSDEC. However, this RAWP presents a summary of the June 2008 and June 2009 data for approval by NYSDEC.

2.1 Summary of Remedial Investigation Performed

Roux Associates completed a RI and Supplemental RI of soil, groundwater, and soil vapor associated with the release of petroleum at the Site as identified by Delta Environmental Consultants in historic Site investigations. The RI was performed in June 2008 and the Supplemental RI was performed in July 2009, during which the following was performed:

- Nine soil borings were advanced;
- Eleven soil samples were collected and submitted for laboratory analysis;
- Two soil vapor samples and 1 air sample were collected and submitted for laboratory analysis; and
- Ten groundwater samples were collected from six soil borings and four monitoring wells and submitted for laboratory analysis.

A summary of the sampling locations and analyses performed is provided in Table 1. A figure showing sampling locations is included as Figure 2.

2.1.1 Soil Boring and Sampling

Seven soil borings (SB-101 to SB-107) were completed during the RI in June 2008, five onsite and two offsite (SB-104 and SB-105). Two soil borings (SB-106R and SB-107R were re-advanced in June 2009) One soil sample was analyzed from seven of the soil borings and two soil samples were analyzed from two soil borings (SB-101 and SB-106R). At each soil boring location, soil samples were collected using a Geoprobe direct push sampler. Soil samples were collected in five-foot increments to the completion depth indicated in the Soil Boring Logs (Appendix A). Each five-foot increment was collected in dedicated acetate sleeves. The acetate sleeve was laid on a piece of polyethylene sheeting and opened. Soil in the acetate sleeve were separated into approximately two-foot long sections and screened with a PID. Following the PID screening, a portion of soil from each two-foot long section was placed into pre-cleaned

sample jars and placed on ice in a cooler at 4°C. All remaining soils were visually characterized according to the Unified Soils Classification System (USCS) and placed into zip-lock plastic storage bags and homogenized. The bags were allowed to stand for approximately 30 minutes and the bag headspace was monitored for organic vapors with a PID.

All soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, PCBs, and pesticides. Analytical results for these compounds are summarized on Table 2 through Table 6, respectively. Ten VOCs (acetone, benzene, n-butylbenzene, ethylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, toluene, m&p xylenes, and o-xylene), one SVOC (naphthalene), and six metals (chromium, copper, lead, mercury, nickel, and zinc) were identified in at least one soil boring at concentrations above NYSDEC Sub-part 375-6 UUSCOs (Figure 3). There were no additional compounds detected above NYSDEC UUSCOs in any soil boring.

Seven VOCs (benzene, ethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, toluene, m&p xylenes, and o-xylene), and two metals (copper and lead) were identified in soil boring SB-101, SB-106, SB-106R, or SB-107R at concentrations above NYSDEC Sub-part 375-6 restricted residential use standards (Figure 4). Three VOCs (MTBE, n-propylbenzene, and toluene) and two metals (copper and nickel) were also detected at concentrations above NYSDEC UUSCOs and protection of groundwater standards in soil boring SB-106R and SB-107R. There were no additional compounds detected above NYSDEC UUSCOs or protection of groundwater standards in any soil boring

2.1.2 Soil Vapor Sampling

Two soil vapor samples were collected from the Site (SV-201 and SV-202). SV-201 was collected adjacent to MW-1, a monitoring well installed by Delta during a previous Site Investigation that identified concentrations of VOCs in groundwater. SV-202 was collected at the location of the former car wash. The soil vapor samples were collected from temporary soil vapor collection points. One ambient air sample was also collected.

Soil vapor and air samples collected during the RI were analyzed for VOCs using USEPA method TO 15. A summary of analytical results for soil vapor samples collected as part of the

Roux Associates RI is presented below, in Table 7, and on Figure 15. 19 VOCs were detected in SV-201, 18 VOCs were detected in SV-202 and 6 VOCs were detected in air sample AS-203. Five of the six VOCs detected in AS-203 were detected at greater concentrations in both SV-201 and SB-202. Concentrations of VOCs detected in soil vapor ranged from 2.3 micrograms per cubic meter ($\mu g/m^3$) of chloroform in SV-202 to 160 $\mu g/m^3$ of MTBE in SV-201. Gasoline related VOCs were detected in soil vapor at greater concentrations than in ambient air. NYSDEC and the NYSDOH do not have specific soil vapor standards or guidelines for comparison.

2.1.3 Water-Level Measurement

A round of water level measurements (depth to water) were collected from monitoring wells MW-1 to MW-4 on July 16, 2009. Prior to collection of water-level measurements, each monitoring well was surveyed in relation to a Site datum. A summary of water-level data and monitoring well elevations is provided in Table 8. Water-level elevations collected on July 16, 2009 and an inferred direction of groundwater flow (to the north, northwest) are shown on Figure 5.

2.1.4 Groundwater Sampling

Six groundwater samples were collected during the RI from six soil borings (SB-101 to SB-105 and SB-107) and four groundwater samples were collected during the Supplemental RI from four monitoring wells (MW-1 to MW-4). An attempt to collect groundwater from SB-106 was unsuccessful due to poor recovery of groundwater. Of these 10 samples, one was located hydraulically upgradient (SB-107W), and two were located offsite hydraulically downgradient (SB-104W and SB-105W). Hydraulic gradient was determined by Delta during previous Site investigations.

Groundwater samples SB-102W through SB-105W were analyzed for VOCs, SVOCs, metals, PCBs, and pesticides. Groundwater samples SB-101W and SB-107W were analyzed for VOCs only and VOCs and SVOCs, respectively, due to insufficient sample volume. MW-1, MW-3, and MW-4 were analyzed for VOCs; total and dissolved iron, lead, and manganese; ammonia, nitrate, sulfate, and sulfide. MW-2 was analyzed for VOCs and total iron, lead, and manganese only due to insufficient sample volume. Summaries of VOCs, SVOCs, metals, PCBs, and pesticides are presented as Table 9 through Table 13 respectively. Nine VOCs (acetone,

benzene, ethylbenzene, MTBE, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, toluene, m&p xylenes, and o-xylene), one SVOC (naphthalene), eight metals (arsenic, beryllium, chromium, copper, lead, manganese, nickel, and sodium) were identified at concentrations above NYSDEC AWQSGV in at least one groundwater sample (Figure 6). At least one compound was detected above NYSDEC AWQSGV in every sample. There were no additional compounds detected above NYSDEC UUSCOs standards in any groundwater sample.

Concentrations of Total BTEX compounds (benzene, toluene, ethylbenzene, and xylenes) ranged from 1.5 µg/L in downgradient sample SB-105W to 40,470 µg/L in upgradient sample SB-107W. Onsite groundwater samples (SB-107W is actually on the far upgradient property boundary) ranged from non detect in MW-1, MW-2, and MW-4 to 4,710 µg/L (SB-101W).

2.1.5 Documentation and Summary of RI Findings

The results of the RI indicate that onsite soil is contaminated with petroleum-related VOCs in excess of the NYSDEC Sub-part 375.6 UUSCOs and restricted residential use standards. Concentrations of VOCs, SVOCs, and metals in soil require remediation.

The investigation also indicated that gasoline related compounds were detected in soil vapor at concentrations above ambient air.

Onsite and offsite groundwater is impacted with gasoline related compounds in excess of the AWQSGVs. Concentrations of VOCs in groundwater require remediation.

2.2 Significant Threat

The NYSDEC and NYSDOH have determined that this Site poses a significant threat to human health and the environment. Notice of the determination will be provided for public review.

2.3 Site History

The following describes the operational history of the Site.

2.3.1 Site Operational History

Based on a 2007 Phase I Environmental Site Assessment of the Site conducted by ATC Associates, prior to 1940 the Site was undeveloped with the surrounding areas being industrial

and residential. Between 1940 and 1960, the Site was used as a filling station, auto repair facility, and a car wash. The surrounding areas were primarily commercial, professional, and residential. In approximately 1993, the car wash was no longer in service and, in 2003, the gas station was no longer in service.

The following is a list of the known previous operators and/or generic uses at the site, with approximate periods of operation.

Former Gasoline Station

- 2003 to Present Vacant
- 1988 to 2003 Amoco Oil Company
- 1972 to 1988 Getty Oil Company (Eastern Operations), Inc.
- 1958 to 1972 Getty Oil Company
- 1940 to 1958 Auto Repair Facility and Filling Station
- Prior to 1940 Undeveloped

Former Car Wash

- 1993 to Present Vacant
- 1956 to 1993 Car wash
- 1940 to 1956 Car wash, filling station, metal polishing facility
- upholstery shop, paint supply company
- Prior to 1940 Undeveloped

2.3.2 Site Ownership

Ownership of the Site is presented in the BCP Application. The site is currently owned by SoBRO Development Corporation.

2.3.3 Site Investigation and Remediation History

The following section provides a summary of the investigation and remediation history of areas that include the Site.

2.3.3.1 2007 Phase I

A Phase I report, conducted in October 2007 by ATC Associates, Inc. identified the Site as a former gasoline station and considered the presence of historical tanks at the Site a recognized environmental concern. That report indicates that there were four 4,000-gallon capacity gasoline tanks at the Site that were closed/removed in August 2003.

2.3.3.2 2003 Subsurface Hydrocarbon Assessment Report

Delta Environmental Consultants, Inc. (Delta) conducted a Subsurface Hydrocarbon Assessment at the Site between February 2003 and July 2003.

As part of a baseline divestment investigation, Delta advanced five soil borings in February 2003 and collecting soil and groundwater samples from each boring for analysis of VOCs. Analytical results of soil samples did not indicate any VOCs in soil that exceed NYSDEC UUSCOs. Groundwater samples identified between one and 13 VOCs that exceeded NYSDEC AWQSGVs. Total BTEX concentrations in groundwater samples ranged from 7 µg/L in SB-4 to 11,273 µg/L in SB-2.

In July 2003, four monitoring wells (MW-1 to MW-4) were installed at the Site and three groundwater samples were collected (MW-1 to MW-3). MW-4 was not sampled as it was dry. Groundwater samples identified between one and 13 VOCs that exceeded NYSDEC AWQSGVs. Total BTEX concentrations in groundwater samples ranged from 20 µg/L in MW-3 to 22,512 µg/L in MW-1.

Based on the presence of VOC concentrations in groundwater in excess of NYSDEC AWQSGVs NYSDEC Spill Number 02-12264 was opened on March 13, 2003. The spill number is still currently open.

2.3.3.3 2003 Underground Storage Tank Excavation Assessment Report

Delta Environmental Consultants, Inc. (Delta) prepared an Underground Storage Tank Excavation Assessment Report to document the results of gasoline tank and pump island excavation at the Site between July 2003 and August 2003.

Between July 24, 2003 and August 1, 2003 Salamone Brothers, Inc. excavated four 4,000-gallon capacity double walled steel gasoline USTs from a single excavation. The gasoline tanks were observed to be in good condition with no visible holes or areas of pitting. Six post-excavation sidewall and four post-excavation bottom samples were collected for VOC analysis. Sidewall samples were collected from 7 feet bls and bottom samples were collected from 12 feet bls.

Five pump island dispensers and associated piping were excavated from the Site between July 24, 2003 and August 1, 2003. Following excavation five post excavation samples were collected from the pump island dispenser areas and three samples were collected from the piping run areas for analysis of VOCs. All samples were collected from two feet below land surface.

Analytical results of post excavation soil samples indicated that 14 of 18 post excavation samples exceeded NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives (RSCOs). Compared to Part 375 standards, 12 of 18 post excavation samples exceed UUSCOs and 5 of 18 samples exceed Restricted Residential standards. Groundwater samples identified between one and 13 VOCs that exceeded NYSDEC AWQSGVs. Total BTEX concentrations in groundwater samples ranged from 7 µg/L in SB-4 to 11,273 µg/L in SB-2.

During tank excavation, approximately 226 tons of petroleum impacted soil were transported from the Site and disposed of at a facility in Carteret, New Jersey.

2.4 Geological Conditions

2.4.1 Geology

The Site contains shallow occurring bedrock (approximately 24 feet bls) that is directly overlain by weathered rock and glacial deposits consisting of a mix of sand, silt, and clay in varying thickness. Evidence of fill material was observed at depths ranging from zero to 5 feet bls. Soil boring logs generated during Roux Associates' June 2008 RI and July 2009 Supplemental RI are attached as Appendix A and a generalized hydrogeologic cross section of the site is presented in Figure 7.

2.4.2 Hydrogeology

Groundwater at the Site ranges in depth from approximately 6 to 10 feet bls. In general, Delta determined during their 2003 subsurface hydrocarbon assessment that groundwater flows in a northwesterly direction, perpendicular to the long axis of the site. A groundwater flow map, based on recent groundwater elevation data is presented as Figure 5. This figure shows an inferred groundwater flow direction of northwest, similar to the 2003 data.

2.5 Contamination Conditions

The following sections provide a summary of the Site contamination identified during the RI.

2.5.1 Conceptual Model of Site Contamination

Site soil and groundwater are contaminated with petroleum-related VOCs in excess of the NYCRR Sub-part 375 UUSCOs and AWQSGVs. Metals linked with urban fill have also been detected in soil in excess of the NYCRR Sub-part 375 UUSCOs. Petroleum contamination is likely attributable to a combination of leaks over time associated with the former USTs and associated piping that were removed from the Site as part of the 2003 UST removal, or surface spills over time associated with fuel transfer or vehicular maintenance activities.

2.5.2 Identification of Standards, Criteria and Guidance

SCGs are promulgated requirements ("standards" and "criteria") and non-promulgated guidance ("guidance") that govern activities that may affect the environment and are used by the DER at various stages in the investigation and remediation of a site. SCGs incorporate Federal and State requirements. SCGs applicable to the Site are as follows:

<u>SCGs for Soil</u>

The main SCGs for soil are contained in 6 NYCRR Part 375-6. For the purposes of the RAWP, the SCGs were developed to address contaminants resulting from of historic releases based on a restricted residential use scenario and the reasonably anticipated future use of the Site as a residential building with ground level retail. Therefore, the SCGs for soil are the restricted residential cleanup criteria, consistent with the criteria contained in the 6 NYCRR Part 375 Regulations. The selection of the appropriate SCG for soil is supported by the results of the alternatives analysis presented in Section 3.1.

In addition, the UUSCOs presented in the Part 375 Regulations are used in this RAWP to evaluate an UUSCOs remedial alternative, as required for the alternatives analysis portion of this document.

SCGs for soil for the protection of groundwater and the protection of ecological resources were considered, however, were determined not to be applicable based on site-specific conditions. In accordance with the Part 375 Regulations, the protection of groundwater soil cleanup objectives may not be applicable where:

- The groundwater standard contravention is the result of an onsite source which is addressed by the remedial program;
- An environmental easement will be put in place which provides for a groundwater use restriction on the site as set forth in paragraph 375-1.8(h)(2);
- The Department determines that contaminated groundwater at the site:
    1. Is not migrating, or likely to migrate, offsite; or
    2. Is migrating, or is likely to migrate, offsite, however, the remedy includes controls or treatment to address offsite migration; and
    3. The Department determines the groundwater quality will improve over time.

In this situation, one or more of these conditions will be met and therefore, use of SCGs for soil for protection of groundwater is not applicable.

In accordance with the Part 375 Regulations, protection of ecological resources soil cleanup objectives do not and/or will not apply to sites or portions of sites where the condition of the land (e.g., paved, covered by impervious surfaces, buildings and other structures) precludes the existence of an ecological resource that constitutes an important component of the environment. At this site, the entire onsite area will be either paved, covered by buildings, or be a landscaped area; therefore, use of SCGs for protection of ecological resources is not applicable.

In addition to the Part 375 Regulations, the following SCGs apply to soil:

- 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes (November 1998);
- 6 NYCRR Part 364 – NYS Waste Transporter Permits;
- 6 NYCRR Part 360 and Part 364 – NYS Solid Waste Management Requirements; and

- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998).

Comparison of site specific soil data with SCGs is presented in Tables 2 through 6 and Figure 3 and Figure 4.

SCGs for Groundwater

Based upon the evaluation of the current groundwater data, the following SCGs for the groundwater were identified:

- New York State Groundwater Quality Standards – 6 NYCRR Part 703; and
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1.

Comparison of site specific soil data with SCGs is presented in Tables 9 through 13 and Figure 6.

SCGs for Soil Vapor

The following SCGs for the soil vapor were identified:

- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update); and
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft).

Site specific soil vapor and air data are presented in Table 7.

In addition, the following guidance documents are applicable to the Site for all media:

- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation – December 2002 (or later version if available);
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004;
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan;
- 6 NYCRR Part 375-1 Environmental Remediation Programs; and
- TAGM 4031 Fugitive Dust Suppression.

2.6 Environmental and Public Health Assessments

2.6.1 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment is to describe how human and environmental receptors may be exposed to Site contaminants based upon the Site-specific conditions and to assess whether there are any complete or potentially complete exposure pathways.

As discussed above, the contaminants of concern (COCs) at the Site include petroleum related VOCs and to a lesser extent metals. The petroleum related VOCs were detected in soil and /or groundwater at concentrations exceeding their respective SCGs. In addition, petroleum related VOCs were identified in soil vapor at concentrations above ambient air concentrations. The NYSDEC Class GA AWQSGVs were developed to be protective of public health based upon consideration of groundwater as a potential source of drinking water. This exposure scenario is not applicable to the Site given the current land use and the reasonably anticipated land use at the Site. As specified in ECL Article 27-1415(2), the exposure assessment should consider the current conditions, as well as the reasonably anticipated future land use of the Site and the affected offsite areas, and the reasonably anticipated future groundwater use.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a receptor population; (4) a point of exposure; and (5) a route of exposure. The following paragraphs provide an overview discussion of exposure pathways that may potentially exist associated with the Site.

Contaminant Sources

The probable sources of contamination in soil and groundwater at the Site were spills or leaks from former clusters of USTs containing petroleum and direct discharge to the ground associated with historical operations of the Site that included vehicular maintenance.

Contaminant Release and Transport Mechanisms

The contaminants at the Site exist in the form of residual material adsorbed to soil particles in the saturated and unsaturated zones and compounds dissolved in groundwater. Inhalation of

windblown dust is a potential exposure pathway. The leaching of contaminants from soil serves as an ongoing source of contamination to groundwater beneath portions of the Site. In addition, VOCs are migrating through volatilization of compounds into soil vapor.

Receptor Population

The potential onsite receptors include occupational workers, construction workers, visitors, or trespassers. Future onsite receptors are expected to include also residents, guests, and retail customers/workers based on the potential future use of the property. The potential offsite receptors include offsite workers, visitors, residents, and trespassers.

Potential Points and Routes of Exposure

Contaminated soil is limited to specific areas of the Site. However, there is the potential for direct exposure to contaminated soil by anyone digging in the contaminated area. Inhalation of windblown dust is also a potential exposure pathway for onsite and offsite receptors.

The Site and surrounding community are supplied by public sources of drinking water which meets all State and Federal standards for drinking water quality. As such, there is no potential for exposure to site contaminants from the public sources of drinking water. Although it has not been conclusively verified, it is highly unlikely that there are any private wells located near the Site.

There is no potential for migration of VOCs into indoor air because there are currently no existing buildings onsite. If buildings are constructed on the Site in the future (without source removal prior to construction), site workers, or future residents, guests, or students could be exposed to contaminants via the indoor air inhalation route of exposure. Inhalation of soil vapor by offsite receptors is also a potential exposure pathway.

2.7 Remedial Action Objectives

The remedial goals for soil at the Site are to meet the restricted residential SCOs for onsite areas. The remedial goals for the groundwater are to obtain mass reductions of VOCs in onsite groundwater to the extent practicable. Consistent with the Part 375 Regulations, the proposed

remedies for the Site will be fully protective of public health and the environment, taking into account the current, intended, and potential future land use.

According to Part 375 Regulations, for Track 1 cleanup remedies and all tracks in general:

- A generic table is utilized to identify soil cleanup objectives for UUSCOs remedies which allow the property to be developed for any use;
- The threat to public health and the environment resulting from contamination in environmental media (i.e., groundwater and soil vapor) other than soil shall be evaluated in the development of remedial alternatives;
- Restrictions on the use of the site are not permitted;
- Contaminated soil that generally exceeds the UUSCOs limits should be removed or treated; and
- Reliance upon institutional control/engineering controls to address exposure and achieve the RAOs for the site is not allowed, except one that allows for a groundwater use restriction if a Volunteer has taken steps to reduce groundwater contamination to asymptotic levels.

According to Part 375 Regulations, for Track 2 cleanup remedies and all tracks in general:

- A generic table is utilized to identify soil cleanup objectives for restricted use remedies. The lowest of the three applicable contaminant-specific soil cleanup objectives for all soils above bedrock shall apply, except as noted below.
- Requirements to achieve contaminant-specific soil cleanup objectives for all soil above bedrock greater than 15 feet below ground surface shall not apply assuming: soils below 15 feet do not represent a source of contamination, the environmental easement for the Site requires that any contaminated soils remaining at depth will be managed along with other Site soils, pursuant to a site management plan, offsite groundwater does not exceed standards, and onsite groundwater use is restricted.
- Contamination in environmental media other than soil (i.e., groundwater and soil vapor) shall meet applicable SCGs and applicable regulatory guidance, unless long-term institutional or engineering controls are implemented.
- Restrictions can be placed on the use of the site as residential, commercial, or industrial and on the use of site groundwater.
- Reliance upon long-term institutional control/engineering controls to address soil exposure and achieve the RAOs for the site is not allowed.
- A groundwater use restriction may be placed upon the site.

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

2.7.1 Groundwater

RAOs for Public Health Protection

- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater;
- RAOs for Environmental Protection;
- Restore ground water aquifer, to the extent practicable, to pre-disposal/pre-release conditions; and
- Remove the source of groundwater contamination.

2.7.2 Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

The following is a detailed description of the alternatives analysis and remedy selection process to address impacted media onsite. The onsite areas are defined as areas within the limits of the 1800 Southern Boulevard Site, which is shown on Figure 2.

In accordance with Part 375 Regulations, this section of the RAWP was prepared in accordance with Part 375-1.8(f), Part 375-3.8(f) and Section 4.39c0 of DER-10. As required, a minimum of two remedial alternatives (one being an UUSCOs scenario) are evaluated, as follows:

- One alternative that will achieve UUSCOs relative to onsite soil without the use of institutional or engineering controls; and
- One alternative assuming a restricted residential cleanup scenario for onsite areas coupled with the use of institutional and engineering controls.

The following remedial action alternatives for the media of concern were developed based upon the remedial goals and RAOs identified in Section 2.7:

- Remedial Alternative 1: Track 1 Unrestricted cleanup: Excavation and offsite disposal of soil exceeding the UUSCOs criteria presented in the Part 375 Regulations at any depth above or below the water table for all onsite areas impacted from historic releases; pumping groundwater as necessary to dewater the excavation and discharge of that water under permit to sewer system; backfill of excavated areas as necessary for the construction of the proposed building foundation.
- Remedial Alternative 2: Track 2 Restricted Residential cleanup: Excavation and offsite disposal of soil exceeding the restricted residential use criteria for onsite areas above bedrock, but no greater than 15 feet below existing grade; excavation of soil exceeding protection of groundwater standards at any depth above bedrock; pumping groundwater as necessary to dewater the excavation and discharge of that water under permit to sewer system; backfill of excavated areas as necessary for the construction of the proposed building foundation; and institutional and engineering controls.
- Remedial Alternative 3: Track 2 Restricted Residential cleanup: Excavation and offsite disposal of soil exceeding the restricted residential use criteria for onsite areas above bedrock, but no greater than 15 feet below existing grade; addition of *in situ* chemical oxidation material; pumping groundwater as necessary to

dewater the excavation and discharge of that water under permit to sewer system; backfill of excavated areas as necessary for the construction of the proposed building foundation; and institutional and engineering controls. This alternative includes a contingency for a Track 4 remediation that may be selected following five years of groundwater monitoring.

3.1 Evaluation Criteria

Each alternative was evaluated based on the following eight evaluation criteria presented in Section 4.1 of the Draft DER-10 Technical Guidance and/or Part 375 Regulations:

- Overall protection of public health and the environment;
- Compliance with SCGs;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume with treatment;
- Short-term effectiveness;
- Implementability;
- Cost; and
- Compatibility with land use.

Each of the criteria is described below. In addition, DER-10 and Part 375 Regulations require that the remedy be evaluated on the basis of Community Acceptance. In accordance with NYSDEC guidance, the proposed remedy was evaluated for community acceptance following completion of the required 45-day public comment period.

3.1.1 Overall Protection of Human Health and the Environment

Description of Criteria

From DER-10: "This criterion is an evaluation of the remedy's ability to protect public health and the environment, assessing how risks posed through each existing or potential pathway of exposure are eliminated, reduced, or controlled through removal, treatment, engineering controls, or institutional controls. The remedy's ability to achieve each of the RAOs is evaluated."

3.1.2 Compliance with Remedial Goals, SCGs and RAOs

Description of Criteria

From DER-10: "Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. All SCGs for the site will be listed along with a discussion of whether or not the remedy will achieve compliance. For those SCGs that will not be met, provide a discussion and evaluation of the impacts of each and whether waivers are necessary."

3.1.3 Long-term Effectiveness and Permanence

Description of Criteria

From DER-10: "This criteria evaluates the long-term effectiveness of the remedy after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated:

- The magnitude of the remaining risks (i.e., will there be any significant threats, exposure pathways, or risks to the community and environment from the remaining wastes or treated residuals);
- The adequacy of the engineering and institutional controls intended to limit the risk;
- The reliability of these controls; and
- The ability of the remedy to continue to meet RAOs in the future."

3.1.4 Reduction in Toxicity, Mobility or Volume through Treatment

Description of Criteria

From DER-10: "The remedy's ability to reduce the toxicity, mobility, or volume of site contamination is evaluated. Preference should be given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the Site."

3.1.5 Short-term Effectiveness

Description of Criteria

From DER-10: "The potential short-term adverse impacts and risks of the remedy upon the community, the workers, and the environment during the construction and/or implementation are evaluated. A discussion of how the identified adverse impacts and health risks to the community or workers at the site will be controlled and the effectiveness of the controls should be presented.

Provide a discussion of engineering controls that will be used to mitigate short-term impacts (i.e., dust control measures). The length of time needed to achieve the remedial objectives is also estimated."

3.1.6 Implementability

Description of Criteria

From DER-10: "The technical and administrative feasibility of implementing the remedy is evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc."

3.1.7 Cost

Description of Criteria

From DER-10: "Capital, operation, maintenance, and monitoring costs are estimated for the remedy and presented on a present worth basis."

3.1.8 Compatibility with Land Use

Description of Criteria

From Part 375 Regulations: "Preliminary information regarding the land use factor was submitted as part of the application. The Department accepted this initial determination of use by approval of the application. This preliminary determination is confirmed and updated as necessary during the remedy selection process. Current, intended, or reasonably anticipated future land uses of the site and its surroundings must be considered in the selection of the remedy."

3.1.9 Community Acceptance

Description of Criteria

From DER-10: "The public's comments, concerns and overall perception of the remedy are evaluated in a format that responds to all questions that are raised (i.e. responsiveness summary)." Fact Sheets were distributed and documents placed in document repositories for

public comment. A 45-day public comment period was provided. No public comments were received.

3.2 Remedial Alternative 1

The following sections provide a description of Remedial Alternative 1. Remedial Alternative 1 follows a Track 1 cleanup as per Part 375-1.8(e)1. An evaluation based on the specific evaluation criteria is also presented below.

3.2.1 Description

Figure 8 shows the areas to be addressed under Remedial Alternative 1. Remedial Alternative 1 includes the following remedial elements:

- Mobilization and Site Preparation;
- Permitting;
- Storm Water Management and Erosion Control;
- Vapor, Odor, and Dust Control;
- Excavation and offsite disposal of soil exceeding the UUSCOs criteria presented in the Part 375 Regulations at any depth above bedrock;
- Temporary Staging and Stockpiling;
- Waste Characterization Sampling;
- Dewatering and Groundwater Treatment;
- Traffic Control;
- Offsite Disposal and Equipment Decontamination;
- End-point Sampling;
- Backfill of the excavated areas, as necessary to build the proposed building foundation with imported soil meeting the UUSCOs criteria presented in the Part 375 Regulations;
- Interim Site Restoration;
- Health and Safety and Community Air Monitoring;
- Post-remediation groundwater monitoring for a minimum of two years; and
- Post-remediation evaluation of potential soil vapor intrusion concerns.

Each of these elements is discussed in greater detail below.

3.2.1.1 Mobilization and Site Preparation

Prior to commencing the remediation construction activities, the Remediation and General Contractor will perform the following mobilization and Site preparation activities:

- Identification and markout of all aboveground and underground utilities;
- De-energizing, turning off and disconnecting existing subsurface utility services known to be present in the work area (e.g., water, gas, electric and sewer);
- Mobilization of remediation equipment and materials;
- Employ traffic control measures;
- Work zone demarcation;
- Installation of erosion control devices in accordance with the Soil Erosion and Sediment Control Plan;
- Conduct pre-construction survey prepared by a land surveyor licensed by the State of New York;
- Removal of existing pavement, where applicable;
- Installation of perimeter air monitoring system;
- Installation of temporary facilities;
- Installation of dewatering and water treatment system; and
- Installation of the decontamination facilities.

The detailed description of the mobilization and site preparation activities and responsibilities will be presented in the Contractors' Site Operations Plan.

3.2.1.2 Permitting

The Remediation and General Contractor will be responsible for obtaining federal, state and New York City permits required for remediation prior to mobilization. At a minimum, the permits will include a New York City Building Department permit, Foundation permit and a New York City Department of Environmental Protection (NYCDEP) sewer discharge permit. The permit conditions will be complied with and copies of the permits will be maintained at the Site.

3.2.1.3 Storm Water Management and Erosion Control

A stormwater pollution and prevention plan (SWPPP), discussed in Sections 4.1.5 and 5.4.10, will be prepared and implemented. All necessary measures to manage stormwater and temporarily control erosion will be employed. Soil erosion and sediment control measures will be installed prior to the implementation of the remediation and will be maintained throughout the duration of all remedial construction activities, as appropriate. Haybales and/or silt fences will be placed by the Contractor to control sediment around the disturbed area/excavations or other work areas. Erosion and sediment control measures (i.e., haybales, silt fences, etc.) will be used to protect any storm water drain in proximity to the construction activities.

In addition, the entrance and adjacent street areas will be swept and/or cleaned, as necessary, throughout the work day, and at the end of the workday, to keep the streets free of soil or other debris generated from the work site during the duration of all excavation activities.

3.2.1.4 Vapor, Odor and Dust Control

Vapor, odor and dust control measures will also be instituted, as necessary, to prevent any vapors, odors, or dust from migrating offsite and impacting the surrounding community. During the course of construction, odor suppressant and water will be used on an as-needed basis during excavation activities to control the dust, vapors, and/or odors generated. In addition, each entrance/egress point for trucks will be furnished with a stabilized construction entrance for the purpose of keeping trucks and equipment clean of soil and other materials during site remediation and redevelopment. The dust, vapor and odor control measures are specified in the Community Air Monitoring Plan (CAMP).

Dust (particulate matter) will be controlled at the Site in accordance with the site specific CAMP, the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031 – Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites (TAGM 4031), and all federal, state and local requirements. The Contractor will be required to maintain all excavations, stockpiles, and all other work areas to minimize dust that would cause a hazard or nuisance to others.

Dust will be monitored in accordance with the requirements of the Contractor's HASP, the CAMP, and the NYSDEC TAGM 4031. Based on the results of the monitoring, the Contractor will implement necessary measures to control dust to acceptable levels, including but not limited to, one or more of the following measures:

- minimizing the area of open excavation;
- misting equipment and excavation fences;
- spraying water (using atomizer) on buckets during excavation and dumping;
- hauling materials in tarped or lined containers;
- reducing speed of vehicles moving through the construction area;
- covering excavated material stockpiles and/or portions of the stockpile, as necessary, throughout the day and after excavation activities cease each day; and
- stopping work.

3.2.1.5 Excavation

A comparison of the available data to the UUSCOs criteria presented in the Part 375 Regulations was conducted for this alternative and a summary of the soil sampling locations and exceedances the UUSCOs criteria is provided on Figure 3. Based on the results of the RI, the impacted zone is located within the upper 10 to 24 feet of soil. Remedial Alternative 1 would require the excavation of all onsite soils from land surface to approximately 13 feet and additional hotspot excavation to between 15 feet and bedrock at approximately 24 feet, and end-point soil sampling to demonstrate removal of all soils in excess of the Track 1 Unrestricted SCOs. For the purpose of estimating the Remedial Alternative 1 excavation volume, a conservative excavation depth of 20 feet bls is assumed since the vertical limits of contamination were not confirmed during the RI. There are considerable physical limitations within the Site that will most likely hinder the excavation activities, including but not limited to:

- depth to bedrock;
- adjacent roadways and neighboring building, that will require a significant shoring system to prevent damage to those adjacent properties; and
- shallow depth to groundwater, which will require a significant dewatering and groundwater treatment system to access and remove the contaminated soil located below the water table.

The estimated volume of soil to be removed to achieve UUSCOs onsite would be approximately 8,100 cubic yards. The final horizontal and vertical limits of the excavation will be surveyed. This alternative is estimated to require two months to complete.

3.2.1.6 Temporary Staging and Stockpiling

All impacted materials are to be stored in stockpiles lined and covered with a single layer of minimum 6-mil plastic sheeting. Stockpiles will be routinely inspected and broken sheeting covers will be promptly replaced. Soil stockpiles will be continuously encircled with silt fence or haybales.

3.2.1.7 Waste Characterization Sampling

Soil samples will be collected and analyzed for waste characterization, based upon the sample frequency and analytical requirements of the approved disposal facility. It is likely that the selected disposal facility will require that samples will be analyzed for the following:

- Target compound list (TCL) VOCs and SVOCs according to USEPA Methods SW-846 8260 and 8270, respectively;
- TPH for gasoline and diesel range organics (by Method SW-846 8015B);
- TAL metals by Method SW-846 6010;
- PCBs by Method 8082; and
- The full list of toxicity characteristics leaching procedure (TCLP) analyses (metals, VOCs, SVOCs, pesticides, and herbicides).

3.2.1.8 Dewatering and Groundwater Treatment

Dewatering will be required during excavation and foundation construction activities to facilitate work below the groundwater table. Extracted groundwater will either be containerized for offsite disposal or be treated as necessary to meet NYCDEP requirements, and discharged to the NYCDEP sewer system. The groundwater will be extracted through the use of drainage sumps and/or perimeter well points to maintain dry conditions within the excavation. Drainage sumps will be installed within the excavation, as necessary, to dewater the excavation area. The water from the drainage sumps will be pumped to either an onsite wastewater storage tank or an onsite treatment system. The Remediation Contractor will identify, in the Contractor's SOP, the means and methods for dewatering and treatment.

If required, the treatment system may entail a settling tank, oil/water separator, bag filters and carbon filter vessels, respectively. The effluent from the treatment system will be discharged to the NYCDEP sewer system under a sewer discharge permit that will be obtained from the NYCDEP following the submission of information regarding the proposed treatment system. The effluent from the treatment system will be sampled as required by NYCDEP. If wastewater is to be disposed of offsite, it will be stored onsite in an approved water storage tank pending characterization and transport for proper offsite disposal.

If the excavated soil contains free liquids, it may require rendering to satisfy the moisture content requirements of the selected disposal facility. The paint filter test using USEPA Method 9095 and/or visual observation may be used to determine if the excavated soil contains free liquids. The excavated soil will be rendered with stabilized soil from the excavation and/or a NYSDEC approved alternative. The Remediation Contractor will identify the means and methods of soil stabilization to meet disposal requirements in the Contractor's SOP.

The quantity of groundwater to be extracted and treated will be determined based upon the following factors:

- Duration of excavation/foundation work below the water table;
- Depth of excavation beneath the water table; and
- Hydrogeologic factors including hydraulic permeability, hydraulic gradient and rate of recharge into the excavation.

The extracted and treated groundwater will serve a beneficial role in reducing the toxicity, mobility, and volume of contaminated groundwater beneath the Site. A minimum two-year post-remediation groundwater monitoring plan would be implemented to confirm that there has been a bulk reduction in groundwater contamination to asymptotic levels based on the dewatering effort performed during the remedial action.

3.2.1.9 Traffic Control

The Remediation Contractor/General Contractor will be responsible for providing all necessary personnel and materials (i.e., traffic lanes, safety cones) to control traffic entering and exiting the

Site and for coordinating traffic control measures, as necessary. Detailed traffic control procedures will be developed when preparing the Contractor's HASP and Contractor's SOP.

3.2.1.10 Offsite Disposal and Equipment Decontamination

All impacted soil excavated from the Site and other remediation-derived waste will be transported and disposed of in accordance with all applicable federal, state, and local regulations. The remediation-derived waste that will be generated during the construction activities include:

- Soil impacted from historic releases;
- Personal Protective Equipment (PPE);
- Dewatering groundwater; and
- Decontamination water, if any is generated.

Haul vehicles for bulk soil will be secured with appropriate tight-fitting covers prior to exiting the construction area to prevent a release of waste. Loose-fitting canvas covers will be prohibited. PPE waste generated during the implementation of the remedy will be consolidated and stored in appropriate bulk containers and temporarily staged at the designated waste storage area. Any full or partially filled containers will be appropriately labeled.

Trucks will be appropriately decontaminated before they leave the Site.

All wastewater that is generated from equipment decontamination will be managed utilizing one of the following options:

- wastewater will be treated, if applicable and discharged to the New York City public sewer system in accordance with NYCDEP requirements, which include, at a minimum, correctly filing the necessary permits; or
- wastewater will be disposed of offsite at an approved disposal facility, pending quantity of wastewater generated.

3.2.1.11 End-point Sampling

End-point bottom sampling (at a frequency of one sample per 900 square feet of bottom area in accordance with the guidance provided in NYSDEC DER-10 Sections 3.5 and 5.4 for excavations 20 to 300 feet in perimeter) would be conducted for all contaminants. Areas that

appear more heavily impacted, if any, will be given sampling preference. If the end-point bottom sample results indicate that concentrations of target constituents are detected below the UUSCOs, the excavation activities will be considered complete. However, if concentrations of target constituents are detected at a level above the UUSCOs criteria, the excavation activities, including additional end-point bottom sampling, will continue deeper until these conditions are met or to the maximum depth reasonably attainable.

If sheeting is not encountered, end-point sidewall samples (at a frequency of one sample per 30 linear feet or at least one sample per sidewall) would be conducted for the UUSCOs criteria. Areas that appear more heavily impacted, if any, will be given sampling preference. If the end-point sidewall sample results indicate that concentrations of contaminants are detected below the UUSCOs criteria, the excavation activities will be considered complete. However, if concentrations of target constituents are detected at a level above the UUSCOs criteria, the excavation activities, including additional end-point sidewall sampling, will continue until these conditions are met or to the extent feasible due to excavation limitations associated with underground utilities, adjacent building foundations and sidewalk or property boundaries.

The locations of the end-point samples will be surveyed.

End-point samples will be submitted to a New York State Environmental Laboratory Approval Program (ELAP) certified laboratory. Category B laboratory data deliverables, as defined in the analytical services protocol (ASP), will be requested. In addition, a Data Usability Summary Report (DUSR) will be prepared by a party independent from the laboratory performing the analysis in accordance with Appendix 2B of DER-10.

3.2.1.12 Backfilling

When excavation and removal of the impacted soil is complete, the excavation will be backfilled as necessary to prepare the Site for the building foundation installation. All backfill material (offsite common fill material and topsoil) will meet the requirements of the UUSCOs criteria presented in the Part 375 6.8 (d). The backfill material will be free of extraneous debris or solid waste. The source of the fill must be documented by the supplier, including the location where the fill was obtained and a brief history of the site that is the source of the fill. The fill material

must be approved in advance by the NYSDEC. A minimum of one grab sample for each 500 cubic yards must be collected and analyzed per source and analyzed for VOCs, SVOCs, metals, PCBs, herbicides and pesticides. Analytical results will be submitted to the NYSDEC prior to use of the backfill.

3.2.1.13 Interim Site Restoration

After subsurface excavation and foundation activities are completed, the work area will be restored, as appropriate, to conduct the next phase of work. Once interim site restoration activities have been completed, all temporary work zone barriers, and remedial construction equipment will be removed. The Contractor will then decontaminate all equipment in the established decontamination area prior to removal from the Site.

3.2.1.14 Health and Safety and Community Air Monitoring

All remedial construction activities will be performed in a manner consistent with 29CFR 1910 and 1926. Each consultant and contractor on site will operate under a site-specific HASP for the project. The HASP will be readily available during the work. During all phases of Site work, the Contractor will monitor safety and health conditions and fully enforce the site-specific HASP. The Contractor will be responsible for monitoring general Site conditions and for safety hazards. Specifically, monitoring will be performed to verify that all requirements of the Occupational Safety and Health Administration, as outlined on 29 CFR Part 1910 and 1926, are adhered to. A copy of the consultant's HASP is included as Appendix B

Ambient air will be monitored at the site perimeter throughout the course of the work for particulate matter and VOCs in accordance with the CAMP. During the course of the work, the Contractor will take abatement measures, as directed or as otherwise necessary, to minimize the levels of particulates at the limits of the work.

3.2.1.15 Post-Remediation Groundwater Monitoring

Following the completion of the remedial action, a groundwater monitoring plan will be implemented at the Site for a minimum of two years to allow the effectiveness of the remedy to be monitored with regards to any residual groundwater contamination. Specific details

describing the number and location of monitoring wells and proposed analyses will be presented as part of a Site Management Plan prepared during remedial construction.

It is anticipated that the post-remediation groundwater monitoring results will demonstrate that there has been a bulk reduction in groundwater contamination at the Site to asymptotic levels. If the results of this monitoring program indicate that residual groundwater contamination at the site has not reached asymptotic levels, an *in situ* groundwater remediation program will potentially be developed and implemented at the Site. This program will be implemented until the remedial objectives for the Site has been achieved, or until it is determined that additional remedial action is technically impractical or not feasible.

3.2.1.16 Post-Remediation Evaluation of Potential Vapor Intrusion Concerns

Following the completion of the remedial action, subsurface soil vapor intrusion will be evaluated in accordance with applicable NYSDOH guidance. However, soil vapor intrusion is not expected to be a concern as a vapor barrier / water-proof barrier for the building foundation will be installed as part of the construction project since the basement will extend below the water table.

3.2.2 Evaluation

The following sections provide an evaluation of Remedial Alternative 1 based on the seven specific evaluation criteria.

3.2.2.1 Overall Protection of Human Health and the Environment

Alternative 1 will be protective of human health and the environment by eliminating the concentrations in soil of constituents due to the historic releases through source removal. The potential for human and environmental exposure to these constituents onsite will be eliminated by excavation of the impacted soil with concentrations in excess of the UUSCOs criteria, disposing of impacted material offsite and backfilling the area with material meeting the UUSCOs criteria. Potential post-remediation exposures from residual groundwater and soil vapor contamination, if present, cannot be evaluated until the remedial action has been completed. However, it is anticipated that groundwater use will be restricted at the redeveloped

Site. Also, vapor intrusion should not be an issue at the redeveloped Site as a vapor barrier / water proof barrier is currently planned that will be in place.

During site-preparation work (e.g., excavation of subsurface soil) for remedial purposes (e.g., construction of building foundation, etc.) and other construction purposes, subsurface workers may be exposed to impacted soil and groundwater. Potential worker exposure to soil and groundwater during excavation activities will be mitigated through the required Occupational Safety and Health Administration (OSHA) training and appropriate health and safety plans (HASPs). Any potential environmental exposure will be mitigated by engineering controls implemented during construction.

3.2.2.2 Compliance with Remedial Goals, SCGs and RAOs

SCGs for the proposed remedy are presented in Section 2.5.2 and RAOs are presented in Section 2.7. Alternative 1 will achieve compliance with the remedial goals, SCGs and RAOs for onsite soil through source removal to Track 1 unrestricted cleanup levels. Although bulk removal of groundwater contamination is consistent with the RAOs established for the Site, there is a potential that SCGs for groundwater will not be achieved. Compliance with SCGs for soil vapor cannot be determined until the remedial action has been completed.

3.2.2.3 Long-term Effectiveness and Permanence

Alternative 1 is expected to remove all soil and the bulk of groundwater that was impacted by the historic releases. Therefore, incremental risk from soil impacts is eliminated and significantly reduced from groundwater impacts.

Alternative 1 will continue to meet RAOs in the future, thus providing a permanent long-term solution for the Site.

3.2.2.4 Reduction in Toxicity, Mobility or Volume through Treatment

By removing all soil with concentrations that exceeded the UUSCOs criteria, Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from onsite soil and reduce the toxicity, mobility, and volume of contaminants within onsite soil vapor, if present. In

addition, the removal and treatment of groundwater via dewatering will reduce the toxicity, mobility, and volume of impacted groundwater onsite.

3.2.2.5 Short-term Effectiveness

The health and environmental risks associated with implementation of Alternative 1 are minimal for the following reasons:

The excavation and handling of soil (i.e., urban fill) may pose a potential risk to onsite workers through direct contact with the soil, airborne particulates (dust), odors and organic vapors, and physical risks associated with the depth of excavation. However, potential short-term exposure to onsite workers will be addressed with a HASP and mitigated through use of appropriate personal protective equipment (PPE), conducting air monitoring, and implementing dust and vapor suppression activities.

Possible environmental risks to the community during the excavation and handling of soil include the potential for odors, dust and organic vapors resulting from the disturbance of soil and the uncontrolled migration of impacted soil by onsite workers and vehicles. In addition, other potential impacts to the community could include construction-related noise, vibrations and traffic. Community air monitoring activities will be conducted during all excavation and soil handling activities to identify the need for perimeter controls. In addition, decontamination procedures will minimize the potential for offsite migration of impacted soil beyond the Site boundary. An approved truck traffic plan will minimize disturbance to the local roads and community.

3.2.2.6 Implementability

The materials, equipment, and personnel associated with the implementation of Alternative 1 are commercially available and have been proven effective and reliable for remediation of the media of concern.

3.2.2.7 Cost

The construction and equipment costs associated with Alternative 1 are estimated at approximately $2,000,000. The following assumptions were made to develop this cost estimate:

- It is anticipated that a short-term groundwater monitoring program will be implemented following the completion of Site redevelopment activities;
- Excavations will be to a depth of 20 feet bls and approximately 10 feet into the water table;
- CAMP monitoring is necessary for the duration of the remedial activities;
- Dewatering with water treatment will be necessary; and
- Excavations will be larger than necessary to construct the building foundation, to meet the UUSCOs criteria for all end-point samples.

3.2.2.8 Compatibility with Land Use

The anticipated future use of the Site is residential housing with commercial retail space on the ground floor. Following implementation of the remedy, the Site will be restored to UUSCOs conditions, which will exceed the cleanup standards for future residential land use. A groundwater use restriction will be implemented to prevent future exposure to impacted groundwater.

3.2.2.9 Community Acceptance

Since no public comments were received during the 45-day public comment period, it has been determined that the community is accepting of the alternative.

3.3 Remedial Alternative 2

The following sections provide a description of Remedial Alternative 2. Remedial Alternative 2 presents a Track 2 cleanup per 375 3.8(e)2. An evaluation based on the specific evaluation criteria is also presented below.

3.3.1 Description

Figure 9 shows the areas to be addressed under Remedial Alternative 2. Remedial Alternative 2 includes the following remedial elements:

- Mobilization and Site Preparation;

- Permitting;
- Storm Water Management and Erosion Control;
- Vapor, Odor, and Dust Control;
- Excavation of soil/fill in the upper 15 feet of the Site, plus limited excavation of soils exceeding the protection of groundwater Soil Cleanup Objectives (SCOs) to 20 feet in the area surrounding boring SB-106;
- Temporary Staging and Stockpiling;
- Waste Characterization Sampling;
- Dewatering and Groundwater Treatment;
- Traffic Control;
- Offsite Disposal and Equipment Decontamination;
- End-point Sampling;
- Backfill of the excavated areas, as necessary to build the proposed building foundation with imported soil in compliance with Part 375-6.8(9d);
- Site Restoration;
- Health and Safety and Community Air Monitoring;
- Post-remediation groundwater monitoring for a minimum of two years;
- Post-remediation evaluation of potential soil vapor intrusion concerns; and
- Installation of a vapor barrier to prevent potential water seepage and vapor migration, if any, from the underlying and adjacent soils.

Each of these elements is discussed in greater detail below.

3.3.1.1 Mobilization and Site Preparation

Mobilization and site preparation will be the same as described in Section 3.2.1.1.

3.3.1.2 Permitting

Permitting will be the same as described in Section 3.2.1.2.

3.3.1.3 Storm Water Management and Erosion Control

Storm water management and erosion control will be the same as described in Section 3.2.1.3.

3.3.1.4 Vapor, Odor and Dust Control

Vapor, odor and dust control will be the same as described in Section 3.2.1.4.

3.3.1.5 Excavation

A comparison of the available data to the restricted residential use criteria presented in the Part 375 Regulations was conducted for this alternative and the locations and exceedances of the restricted residential use criteria for VOCs, SVOCs, Metals, Pesticides and PCBs in soil are provided on Figure 4.

Based on the results of the RI, and the foundation excavation plan, soil will be excavated from land surface to a depth 15 feet across the Site. Based on the results of the Supplemental RI, contaminants in soil below 15 feet were identified in soil boring SB-106 at concentrations that exceed the Protection of Groundwater Soil Cleanup Objectives. Soil surrounding soil boring SB-106 (approximately 15 foot by 15 foot area) will be excavated to a minimum of 20 feet below land surface and disposed offsite. The sample collection depth for these soil borings varied from ground surface to 20 feet below grade. Since a Track 2 cleanup will require a site-wide excavation to an elevation of fifteen (15) feet below grade, this means that all of the soil that was detected in excess of the restricted residential use criteria during the RI will be excavated and disposed offsite during development.

The estimated volume of soil to be removed to achieve restricted residential use onsite would be approximately 6,100 cubic yards based on a conservative excavation depth of 15 feet below grade and to 20 feet surrounding SB-106.

The final horizontal and vertical limits of the excavation will be surveyed. This alternative is estimated to require one to two months to complete.

3.3.1.6 Temporary Staging and Stockpiling

Temporary staging and stockpiling will be the same as described in Section 3.2.1.6.

3.3.1.7 Waste Characterization Sampling

Waste characterization sampling will be the same as described in Section 3.2.1.7.

3.3.1.8 Dewatering and Groundwater Treatment

Dewatering will be the same as described in Section 3.2.1.8, with the exception that the construction dewatering and groundwater treatment and disposal for Remedial Alternative 2 will be implemented to facilitate the excavation of soils exceeding the restricted residential criteria and protection of groundwater criteria, and to excavate and prepare the proposed development foundation.

3.3.1.9 Traffic Control

Traffic control will be the same as described in Section 3.2.1.9.

3.3.1.10 Offsite Disposal and Equipment Decontamination

Offsite disposal and equipment decontamination will be the same as described in Section 3.2.1.10.

3.3.1.11 End-point Sampling

End-point bottom sampling (at a frequency of one sample per 900 square feet of bottom area in accordance with the guidance provided in NYSDEC DER-10 Sections 3.5 and 5.4 for excavations 20 to 300 feet in perimeter) would be conducted for constituents that exceeded the restricted residential criteria in previous sampling events to confirm that the restricted residential criteria were met. Areas that appear more heavily impacted, if any, will be given sampling preference. If the end-point bottom sample results indicate that concentrations of target constituents are detected below the proposed restricted residential use criteria and protection of groundwater criteria, the excavation activities will be considered complete. However, if concentrations of target constituents are detected at a level above the protection of groundwater criteria, the excavation activities, including additional end-point bottom sampling, will continue deeper until these conditions are met or to the maximum depth reasonably attainable. The maximum depth reasonably attained will be the extent feasible based on underground utilities, adjacent building foundations, and sidewalk or property boundary limitations.

If sheeting is not encountered, end-point sidewall samples (at a frequency of one sample per 30 linear feet or at least one sample per sidewall) would be conducted for constituents that exceeded the restricted residential use criteria in previous sampling events to confirm that the restricted residential criteria were met. Areas that appear more heavily impacted, if any, will be given sampling preference. If the end-point sidewall sample results indicate that concentrations of target constituents are detected below the restricted residential use criteria or the protection of groundwater criteria, the excavation activities will be considered complete. However, if concentrations of target constituents are detected at a level above the restricted residential use criteria or the protection of groundwater criteria, the excavation activities, including additional end-point sidewall sampling, will continue until these conditions are met or to the extent feasible with underground utilities, adjacent building foundations and sidewalk or property boundary limitations.

The locations of the end-point samples will be surveyed.

End-point samples will be submitted to a New York State ELAP certified laboratory. Category B laboratory data deliverables, as defined in the analytical services protocol (ASP), will be requested. In addition, a Data Usability Summary Report (DUSR) will be prepared by a party independent from the laboratory performing the analysis in accordance with Appendix 2B of DER-10.

3.3.1.12 Backfilling

Backfilling will be the same as presented in Section 3.2.1.12.

3.3.1.13 Interim Site Restoration

Interim site restoration will be the same as described in Section 3.2.1.13.

3.3.1.14 Health and Safety and Community Air Monitoring

Health and safety and community air monitoring will be the same as described in Section 3.2.1.14.

3.3.1.15 Post-Remediation Groundwater Monitoring

Post-remediation groundwater monitoring will be the same as described in Section 3.2.1.15.

3.3.1.16 Post-Remediation Evaluation of Potential Vapor Intrusion Concerns

The post-remediation evaluation of potential vapor intrusion concerns will be the same as described in Section 3.2.1.16.

3.3.2 Evaluation

The following sections provide a detailed evaluation of Remedial Alternative 2 based on the specific evaluation criteria.

3.3.2.1 Overall Protection of Human Health and the Environment

Alternative 2 will be protective of human health and the environment by removing soil above and below the water table that was impacted above the restricted residential criteria and the bulk of groundwater impacted by the historic onsite releases. The potential for human and environmental exposure to these constituents onsite will be mitigated by excavation of the impacted soil with concentrations in excess of the restricted residential use criteria to an elevation of fifteen feet below grade, excavation of soil with concentrations in excess of the protection of groundwater SCOs, disposing of impacted material offsite, backfilling the area with material meeting the criteria outlined in 6NYCRR Part 375-6.7(d) or construction of the proposed development's building slab and adjacent surface covers. Potential post-remediation exposures from residual groundwater and soil vapor contamination, if present, cannot be evaluated until the remedial action has been completed. However, it is anticipated that groundwater use will be restricted at the redeveloped Site. Also, vapor intrusion should not be an issue at the redeveloped Site has a vapor barrier / water proof barrier that will be in place.

During site-preparation work (e.g., excavation of subsurface soil) for remedial purposes (e.g., construction of building foundation, etc.) and other construction purposes, onsite workers may be exposed to impacted soil and groundwater. Potential worker exposure to soil and groundwater during excavation activities will be mitigated through the required Occupational Safety and Health Administration (OSHA) training and appropriate health and safety plans (HASPs). In addition, offsite residents and workers may be exposed to vapors and/or dust.

Monitoring for vapors and dust will be conducted as per the CAMP. Any potential environmental exposure will be mitigated by engineering controls implemented during construction.

3.3.2.2 Compliance with Remedial Goals, SCGs and RAOs

SCGs for the proposed remedy are presented in Section 2.5.2 and RAOs are presented in Section 2.7. Alternative 2 will achieve compliance with the remedial goals, SCGs and RAOs for onsite soil through source removal to Track 2 restricted residential cleanup levels. Although bulk removal of groundwater contamination is consistent with the RAOs established for the Site, there is a potential that SCGs for groundwater will not be achieved. Compliance with SCGs for soil vapor cannot be determined until the remedial action has been completed.

3.3.2.3 Long-Term Effectiveness and Permanence

Alternative 2 removes most soil onsite that was impacted above the restricted residential criteria and all soil impacted above the protection of groundwater criteria by the historic releases. Alternative 2 returns the Site to conditions that are compatible with the zoning and reasonably anticipated future use of the Site as residential housing with ground level commercial retail space.

Based upon the Site's location in an urban area and the potential presence of residual impacted groundwater and soil vapor onsite following excavation of onsite soils to restricted use standards, institutional controls will be necessary for Alternative 2 to ensure long term effectiveness and permanence. These institutional controls, in the form of a Site Management Plan and easement to limit use to restricted resident and restrict use of groundwater beneath the site.

Alternative 2 will continue to meet RAOs in the future, thus providing a permanent long-term solution for the Site.

3.3.2.4 Reduction in Toxicity, Mobility or Volume through Treatment

By removing soil impacted above the restricted residential use criteria, Alternative 2 will reduce the toxicity, mobility, and volume of contaminants at the Site. In addition, the removal and

treatment of groundwater via dewatering will reduce the toxicity, mobility, and volume of impacted groundwater on Site.

3.3.2.5 Short-term Effectiveness

The health and environmental risks associated with implementation of Alternative 2 are minimal for the following reasons:

The excavation and handling of soil (i.e., urban fill) may pose a potential risk to onsite workers through direct contact with the soil, airborne particulates (dust), odors and organic vapors, and physical risks associated with the depth of excavation. However, potential short-term exposure to onsite workers will be addressed with a HASP and mitigated through use of appropriate personal protective equipment (PPE), conducting air monitoring, and implementing dust and vapor suppression activities.

Possible environmental risks to the community during the excavation and handling of soil include the potential for odors, dust and organic vapors resulting from the disturbance of soil and the uncontrolled migration of impacted soil by onsite workers and vehicles. In addition, other potential impacts to the community could include construction-related noise, vibrations, and traffic. Community air monitoring activities will be conducted during all excavation and soil handling activities to identify the need for perimeter controls. In addition, decontamination procedures will minimize the potential for offsite migration of impacted soil beyond the Site boundary. An approved truck traffic plan will minimize disturbance to the local roads and community.

3.3.2.6 Implementability

The labor, equipment, materials and supplies for the implementation of Alternative 2 are commercially available and have been proven effective and reliable for remediation of the media of concern at the Site under similar circumstances. Alternative 2 is implementable through source removal combined with engineering and institutional controls under a restricted residential cleanup. It is not anticipated that future remedial action following the proposed remedial construction will be required.

3.3.2.7 Cost

The construction and equipment costs associated with Alternative 2 are estimated at approximately $1,500,000. The following assumptions were made to develop this cost estimate:

- It is anticipated that a minimum two year groundwater monitoring program will be implemented following the completion of Site redevelopment activities.
- Excavations will be dependent upon the depth and locations of previously identified soil with concentrations in excess of the SCOs.
- CAMP monitoring will be necessary for the duration of the remedial activities.
- Dewatering will be necessary.
- Excavations will be smaller than required to meet the Alternative 1 unrestricted residential use criteria for all end-point samples.

3.3.2.8 Compatibility with Land Use

The present and reasonably anticipated future use of the Site is residential housing with commercial ground level retail. Following implementation of the remedy, the Site will be restored to residential use conditions, thereby meeting the cleanup standards for future residential land use. A groundwater use restriction will be implemented to prevent future exposure to impacted groundwater.

3.3.2.9 Community Acceptance

Since no public comments were received during the 45-day public comment period, it has been determined that the community is accepting of the alternative.

3.4 Remedial Alternative 3

The following sections provide a description of Remedial Alternative 3. Remedial Alternative 3 presents a Track 2 cleanup with a Track 4 contingency per 375 3.8(e)4. An evaluation based on the specific evaluation criteria is also presented below.

3.4.1 Description

Figure 9 shows the areas to be addressed under Remedial Alternative 3 (and Remedial Alternative 2). Remedial Alternative 3 includes the following remedial elements:

- Mobilization and Site Preparation;

- Permitting;
- Storm Water Management and Erosion Control;
- Vapor, Odor, and Dust Control;
- Excavation and offsite disposal of the upper fifteen feet of soil exceeding the restricted residential use criteria;
- Excavation and offsite disposal of soil above bedrock exceeding the protection of groundwater criteria in an area surrounding SB-106;
- Placement of *In Situ* Chemical Oxidation material in areas beyond excavation to address soil exceeding Protection of Groundwater criteria;
- Installation of a composite cover system consisting of building foundations and concrete or asphalt walkways;
- Temporary Staging and Stockpiling;
- Waste Characterization Sampling;
- Dewatering and Groundwater Treatment;
- Traffic Control;
- Offsite Disposal and Equipment Decontamination;
- End-point Sampling;
- Backfill of the excavated areas, as necessary to build the proposed building foundation with imported soil meeting the restricted residential use criteria presented in the Part 375 Regulations;
- Site Restoration;
- Health and Safety and Community Air Monitoring;
- Post-remediation groundwater monitoring for a minimum of two years;
- Post-remediation evaluation of potential soil vapor intrusion concerns; and
- Installation of a vapor barrier to prevent potential water seepage and vapor migration, if any, from the underlying and adjacent soils.

Each of these elements is discussed in greater detail below.

3.4.1.1 Mobilization and Site Preparation

Mobilization and site preparation will be the same as described in Section 3.2.1.1.

3.4.1.2 Permitting

Permitting will be the same as described in Section 3.2.1.2.

3.4.1.3 Storm Water Management and Erosion Control

Storm water management and erosion control will be the same as described in Section 3.2.1.3.

3.4.1.4 Vapor, Odor and Dust Control

Vapor, odor and dust control will be the same as described in Section 3.2.1.4.

3.4.1.5 Excavation

Based on the results of the RI, and the foundation excavation plan, soil will be excavated from land surface to a depth 15 feet across the Site. Based on the results of the Supplemental RI, contaminants in soil below 15 feet were identified in soil boring SB-106 at concentrations that exceed the Protection of Groundwater standard. Soil surrounding soil boring SB-106 (approximately 15 foot by 15 foot area) will be excavated to a minimum of 20 feet below land surface and disposed offsite. The sample collection depth for these soil borings varied from ground surface to 20 feet below grade. Since a Track 2 cleanup will require a site-wide excavation to an elevation of fifteen (15) feet below grade, this means that all of the soil that was detected in excess of the restricted residential use criteria during the RI will be excavated and disposed offsite during development.

The estimated volume of soil to be removed to achieve restricted residential use onsite would be approximately 6,100 cubic yards based on a conservative excavation depth of 15 feet below grade and to 20 feet surrounding SB-106.

The final horizontal and vertical limits of the excavation will be surveyed. This alternative is estimated to require two months to complete.

3.4.1.6 Temporary Staging and Stockpiling

Temporary staging and stockpiling will be the same as described in Section 3.2.1.6.

3.4.1.7 Waste Characterization Sampling

Waste characterization sampling will be the same as described in Section 3.2.1.7.

3.4.1.8 Dewatering and Groundwater Treatment

Dewatering will be the same as described in Section 3.2.1.8, with the exception that the construction dewatering and groundwater treatment and disposal for Remedial Alternative 3 will be implemented to facilitate the excavation of soils exceeding the restricted residential criteria and protection of groundwater criteria, and to excavate and prepare the proposed development foundation.

3.4.1.9 Traffic Control

Traffic control will be the same as described in Section 3.2.1.9.

3.4.1.10 Offsite Disposal and Equipment Decontamination

Offsite disposal and equipment decontamination will be the same as described in Section 3.2.1.10.

3.4.1.11 End-Point Sampling

End-point bottom sampling (at a frequency of one sample per 900 square feet of bottom area in accordance with the guidance provided in NYSDEC DER-10 Sections 3.5 and 5.4 for excavations 20 to 300 feet in perimeter) would be conducted for constituents that exceeded the restricted residential criteria in previous sampling events to confirm that the restricted residential criteria were met. Areas that appear more heavily impacted, if any, will be given sampling preference. If the end-point bottom sample results indicate that concentrations of target constituents are detected below the proposed restricted residential use criteria (above 15 foot depth) and protection of groundwater criteria (at any depth), the excavation activities will be considered complete. However, if concentrations of target constituents are detected at a level above the protection of groundwater criteria, *in situ* chemical oxidation material will be used as described below. The maximum depth reasonably attained, including end-point bottom sampling, may be restricted based on underground utilities, adjacent building foundations, and sidewalk or property boundary limitations.

If sheeting is not encountered, end-point sidewall samples (at a frequency of one sample per 30 linear feet or at least one sample per sidewall) would be conducted for constituents that exceeded the restricted residential use criteria (above 15 foot depth) or protection of groundwater criteria (at any depth) in previous sampling events to confirm that the criteria were met. Areas that appear more heavily impacted, if any, will be given sampling preference. If the end-point sidewall sample results indicate that concentrations of target constituents are detected below the restricted residential use criteria or the protection of groundwater criteria, the excavation activities will be considered complete. However, if concentrations of target constituents are detected at a level above the restricted residential use criteria (above 15 foot depth) or the protection of groundwater criteria (at any depth), *in situ* chemical oxidation material will be used as described below. The maximum depth reasonably attained, including end-point bottom sampling, may be restricted based on underground utilities, adjacent building foundations, and sidewalk or property boundary limitations.

The locations of the end-point samples will be surveyed.

End-point samples will be submitted to a New York State ELAP certified laboratory. Category B laboratory data deliverables, as defined in the analytical services protocol (ASP), will be requested. In addition, a Data Usability Summary Report (DUSR) will be prepared by a party independent from the laboratory performing the analysis in accordance with Appendix 2B of DER-10.

3.4.1.12 *In Situ* Chemical Oxidation Material

Based on analytical results of post-excavation sampling, *In Situ* Chemical Oxidation Material, PermeOx Plus or similar will be added to the excavation in lieu of additional soil excavation. Application of PermeOx Plus will be in a 50 percent slurry solution (approximately 100 pounds of PermeOx Plus to 12 gallons of water). The slurry can be pumped evenly across the excavation bottom if dry, placed by backhoe bucket, or mixed with standing groundwater. If mixed with standing groundwater, the dense slurry will tend to sink quickly to the bottom of the water layer. Backfill material if necessary will be added to the excavation following application of the PermeOx.

The amount of PermeOx Plus applied to the excavation will be based on manufactures recommendations and will depend on the concentrations of contaminants assumed to be present as a result of soil and groundwater samples collected pre- and post-excavation.

3.4.1.13 Composite Cover System

A composite cover system consisting of impervious surfaces (e.g., buildings, and asphalt and concrete paving) and a minimum two feet of clean soil meeting the lower of the protection of groundwater or the protection of public health soil cleanup objectives for restricted-residential use as described in 6 NYCRR 375-6.7(d) (in all other areas, e.g., landscaped areas) will be installed. The composite cover system would be a permanent engineering control and the quality and integrity of this system would be inspected at defined, regular intervals in perpetuity.

3.4.1.13 Backfilling

Backfilling will be the same as presented in Section 3.2.1.12.

3.4.1.14 Interim Site Restoration

Interim site restoration will be the same as described in Section 3.2.1.13.

3.4.1.15 Health and Safety and Community Air Monitoring

Health and safety and community air monitoring will be the same as described in Section 3.2.1.14.

3.4.1.16 Post-Remediation Groundwater Monitoring

Post-remediation groundwater monitoring will be the same as described in Section 3.2.1.15. If after five years the post-remediation groundwater monitoring results demonstrate that there has not been a bulk reduction in groundwater contamination at the Site to asymptotic levels the remedial alternative will be considered a Track 4 until groundwater monitoring results do demonstrate a bulk reduction in groundwater contamination at the Site to asymptotic levels.

3.4.1.17 Post-Remediation Evaluation of Potential Vapor Intrusion Concerns

The post-remediation evaluation of potential vapor intrusion concerns will be the same as described in Section 3.2.1.16.

3.4.2 Evaluation

The following sections provide a detailed evaluation of Remedial Alternative 3 based on the specific evaluation criteria.

3.4.2.1 Overall Protection of Human Health and the Environment

Alternative 3 will be protective of human health and the environment by removing soil that was impacted above the restricted residential criteria. The potential for human and environmental exposure to these constituents onsite will be mitigated by excavation of the impacted soil with concentrations in excess of the restricted residential use criteria to an elevation of two feet below grade, disposing of impacted material offsite, backfilling the area with material meeting the UUSCOs criteria or construction of the proposed development's building slab and adjacent surface covers. Potential post-remediation exposures from residual groundwater and soil vapor contamination, if present, cannot be evaluated until the remedial action has been completed. However, it is anticipated that groundwater use will be restricted at the redeveloped Site. Also, vapor intrusion should not be an issue at the redeveloped Site as a vapor barrier / water proof barrier will be in place in addition to an active ventilation system in the basement as part of the building's mechanical system.

During site-preparation work (e.g., excavation of subsurface soil) for remedial purposes (e.g., construction of building foundation, etc.) and other construction purposes, subsurface workers may be exposed to impacted soil and groundwater. Potential worker exposure to soil and groundwater during excavation activities will be mitigated through the required Occupational Safety and Health Administration (OSHA) training and appropriate health and safety plans (HASPs). Any potential environmental exposure will be mitigated by engineering controls implemented during construction.

3.4.2.2 Compliance with Remedial Goals, SCGs and RAOs

SCGs for the proposed remedy are presented in Section 2.5.2 and RAOs are presented in Section 2.7. Alternative 3 will achieve compliance with the remedial goals, SCGs and RAOs for onsite soil through source removal to Track 4 restricted residential cleanup levels. Compliance with SCGs for groundwater and soil vapor cannot be determined until the remedial action has been completed.

3.4.2.3 Long-Term Effectiveness and Permanence

Alternative 3 removes some soil onsite that was impacted above the restricted residential criteria by the historic releases. Alternative 3 returns the Site to conditions that are compatible with the zoning and reasonably anticipated future use of the Site as residential housing with ground level commercial retail space.

Based upon the Site's location in an urban area and the potential presence of residual impacted groundwater and soil vapor onsite as well as on adjacent properties following excavation of onsite soils to restricted use standards, long term engineering and institutional controls will be necessary for Alternative 3 to ensure long term effectiveness and permanence. These engineering and institutional controls, in the form of a vapor barrier / water proof barrier below the bottom slab and outside foundation walls, the engineered cover composite system consisting of the proposed building's bottom slab, adjacent surface covers, and a groundwater use restriction will be necessary to prevent exposure from sources of soil, soil vapor, and groundwater.

Alternative 3 will continue to meet RAOs in the future, thus providing a permanent long-term solution for the Site.

3.4.2.4 Reduction in Toxicity, Mobility or Volume through Treatment

By removing soil impacted above the restricted residential use criteria, Alternative 3 will reduce the toxicity, mobility, and volume of contaminants at the Site.

3.4.2.5 Short-term Effectiveness

The health and environmental risks associated with implementation of Alternative 3 are minimal for the following reasons.

The excavation and handling of soil (i.e., urban fill) may pose a potential risk to onsite workers through direct contact with the soil, airborne particulates (dust), odors and organic vapors, and physical risks associated with the depth of excavation. However, potential short-term exposure to onsite workers will be addressed with a HASP and mitigated through use of appropriate

personal protective equipment (PPE), conducting air monitoring, and implementing dust and vapor suppression activities.

Possible environmental risks to the community during the excavation and handling of soil include the potential for odors, dust and organic vapors resulting from the disturbance of soil and the uncontrolled migration of impacted soil by onsite workers and vehicles. In addition, other potential impacts to the community could include construction-related noise, vibrations, and traffic. Community air monitoring activities will be conducted during all excavation and soil handling activities to identify the need for perimeter controls. In addition, decontamination procedures will minimize the potential for offsite migration of impacted soil beyond the Site boundary. An approved truck traffic plan will minimize disturbance to the local roads and community.

3.4.2.6 Implementability

The labor, equipment, materials and supplies for the implementation of Alternative 3 are commercially available and have been proven effective and reliable for remediation of the media of concern at the Site under similar circumstances. Alternative 3 is implementable through source removal combined with engineering and institutional controls under a restricted residential cleanup. It is not anticipated that future remedial action following the proposed remedial construction will be required.

3.4.2.7 Cost

The construction and equipment costs associated with Alternative 3 are estimated at approximately $1,600,000. The following assumptions were made to develop this cost estimate:

- It is anticipated that a minimum two year groundwater monitoring program will be implemented following the completion of Site redevelopment activities.
- Excavations will be dependent upon the depth and locations of previously identified soil with concentrations in excess of the SCOs.
- CAMP monitoring will be necessary for the duration of the remedial activities.
- Dewatering will be necessary.
- Excavations will be smaller than required to meet the Alternative 1 unrestricted residential use criteria for all end-point samples.

3.4.2.8 Compatibility with Land Use

The present and reasonably anticipated future use of the Site is residential housing with commercial ground level retail. Following implementation of the remedy, the Site will be restored to residential use conditions, thereby meeting the cleanup standards for future residential land use. A groundwater use restriction will be implemented to prevent future exposure to impacted groundwater, and in turn, soil vapor.

3.4.2.9 Community Acceptance

Since no public comments were received during the 45-day public comment period, it has been determined that the community is accepting of the alternative.

3.5 Selected Soil Remedial Alternative

Remedial Alternative 2 was selected for implementation in onsite areas since it adequately meets each of the evaluation criteria, but is more easily implemented than Alternative 1 and as easily implemented as Alternative 3.

In summary, Alternative 2:

- Is protective of public health and the environment;
- Complies with the appropriate restricted residential criteria for soil;
- Provides long-term effectiveness and permanence through source removal and engineering and institutional controls;
- Reduces the toxicity, mobility, or volume of impacted material through source removal;
- Provides short-term effectiveness, including minimal impacts to workers or the surrounding neighborhood through the implementation of engineering controls during construction;
- Is readily implemented;
- Can be implemented at a lower cost than Alternative 1; and
- Is compatible with land use.

Alternative 2 is consistent with the approach for a restricted residential use scenario described in Part 375 Regulations.

3.6 Preferred Remedy Land Use Factor Evaluation

As described in Section 3.3, the preferred Remedial Alternative 2 proposes source removal for the excavation and offsite disposal of soil exceeding the restricted residential use and protection of groundwater criteria.

A land use factor evaluation of the preferred Remedial Alternative 2 is provided below based on the following criteria as required by Article 27, Title 14 of the Environmental Conservation Law 27-1415.

3.6.1 Zoning

As described in the Project BCP Application "the proposed building will be constructed in a C8-3 commercial zone where it is permitted as-of-right.

3.6.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The proposed development has been discussed with the local Community Board and has received a very positive and favorable response. The Community Board has held a public hearing in accordance with the New York City Department of Planning's Uniform Land Use Review Procedure.

3.6.3 Surrounding Property Uses

From Section 1.3.1, land use surrounding the Site is a combination of commercial and residential areas. The presence of a residential building in the area is consistent with the surrounding property uses.

3.6.4 Citizen Participation

Citizen participation will be pursued throughout the remedial process in accordance with Part 375 Regulations.

3.6.5 Environmental Justice Concerns

There are no environmental justice concerns for this Site.

3.6.6 Land Use Designations

There are no federal or state land use designations pertaining to this Site.

3.6.7 Population Growth Patterns

Population growth patterns support the proposed use for the Site.

3.6.8 Accessibility to Existing Iinfrastructure

The Site is accessible to existing infrastructure. The close proximity of the Cross Bronx Expressway and the MTA's 174th Street Station to the Site will be beneficial during soil removal and enable Contractor access.

3.6.9 Proximity to Cultural Resources

The Site contains cultural resources within one-half mile, including:

Herman Ridder Junior High School (Public School 98)
1619 Boston Road
Bronx, New York 10460

New York City Landmark Preservation Commission – Designation List 230; LP-1628

The following New York City landmark is located approximately one-half mile to the west of the site:

Crotona Pool Complex and Bath House
Crotona Park, between East 172nd Street and East 173rd Street

Cultural resources will not be endangered by the Remedial Alternative.

3.6.10 Proximity to Natural Resources

The Site contains natural resources within one-half mile (see Attachment J of the BCP Application). Natural resources will not be endangered by the Remedial Alternative.

3.6.11 Offsite Groundwater Impacts

Onsite and offsite groundwater is impacted with VOCs in excess of the AWQSGVs for Class GA Groundwater. By removing the source of contaminated onsite soil in excess of the restricted residential use criteria and protection of groundwater criteria, and the pumping and treating of groundwater, Remedial Alternative 2 will reduce the toxicity, mobility, and volume of contaminants in offsite groundwater.

3.6.12 Proximity to Floodplains

The Site is located outside of the 500-year floodplain. The closest 100-year and 500-year flood zones are present along the Bronx River, approximately 1,800 feet to the east of the Site.

3.6.13 Geography and Geology of the Site

The removal of subsurface soil material will be required to implement the preferred Remedial Alternative 2. The proposed development's design will take into account the geography and geology of the Site.

3.6.14 Current Institutional Controls

There are currently no institutional controls on the property.

3.7 Summary of Selected Remedial Actions

The Remedial Action will consist of the following remedial elements:

1. Excavation of soil/fill in the upper 15 feet of the Site, plus limited excavation of soils exceeding the protection of groundwater Soil Cleanup Objectives (SCOs) to 20 feet in the area surrounding boring SB-106 as shown in Figure 4.

2. Groundwater remediation during construction activities consisting of excavation dewatering, treatment and offsite disposal.

3. Site Monitoring of airborne VOCs and particulates in accordance with a NYSDEC and NYSDOH approved Community Air Monitoring Plan (CAMP) during all intrusive and soil handling activities.

4. Implementation of proper dust and odor suppression techniques during all intrusive and soil handling activities.

5. Import of materials to be used for backfill and cover in compliance with: (1) the Sub-part 375-6.7(d), (2) all Federal, State and local rules and regulations for handling and transport of material.

6. Implementation of a Soil Erosion and Sediment Control Plan.

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

8. Collection and analysis of end-point soil samples to evaluate the performance of the remedy with respect to attainment of restricted residential and protection of groundwater SCOs.

9. Appropriate offsite disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.

10. Post-remediation groundwater monitoring for a minimum of two years.

11. Post-remediation evaluation of potential soil vapor intrusion concerns.

12. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site (the Environmental Easement is discussed in Section 8.1).

13. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting.

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

15. Installation of a vapor barrier to prevent potential water seepage and vapor migration, if any, from the underlying and adjacent soils.

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

4.0 REMEDIAL ACTION PROGRAM

The following sections provide a summary of the remedial action, including governing documents, general remedial construction information, Site preparation, and reporting requirements.

4.1 Governing Documents

Governing documents for this RAWP are introduced herein and are discussed generally. Some governing documents noted below will be developed with the aid of the Project's Construction Manager and foundation/earthwork subcontractors, who will be chosen based on future bidding and therefore, not included herein. These documents will be developed and submitted to NYSDEC for review prior to implementing the remedy. This Plan review and approval process from the project subcontractors is essential to ensure that the key elements of the plans are properly implemented and receive total buy in. Key highlights of all plans are included here.

The following project plans are discussed in the sections below:

- Site Specific Health and Safety Plan
- Quality Assurance Project Plan
- Construction Quality Assurance Plan
- Soil/Materials Management Plan
- Stormwater Pollution Prevention Plan
- Community Air Monitoring Plan
- Contractors Site Operations Plan
- Community Participation Plan

4.1.1 Site Specific Health & Safety Plan (HASP)

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal Occupational Safety and Health Administration (OSHA). As defined in the health and safety plan (HASP), all Site workers conducting intrusive activities in the exclusion zone will be required to have

40-hour Hazardous Waste Operation Worker (HAZWOPER) training in accordance with the referenced regulations

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws. A copy of the consultant's HASP is included in Appendix B. The Site-Specific HASP will be used to protect all personnel working on the Site, as well as any Site visitors. The HASP shall be readily available at all times. The Excavation/Remedial Contractor performing the work will also be responsible for preparing his own Site-specific HASP. During all phases of work, the Excavation/Remedial Contractor shall monitor health and safety conditions and fully enforce all provisions of the Site-specific HASP. The Excavation/Remedial Contractor shall also be responsible for monitoring general Site conditions and for safety hazards. Specifically, monitoring will be performed to verify that all requirements of 29 CFR 1910 and 1926 are adhered to.

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

As provided in the HASP, Site controls will be established to limit potential exposure to impacted materials. A support zone (SZ), contamination reduction zone (CRZ), and an exclusion zone (EZ) will be established to define specific areas of personal protective equipment (PPE) requirements. Site worker decontamination procedures will be adhered to when leaving the EZ. Personnel decontamination procedures will be conducted within the CRZ. Control zones and PPE requirements will be defined in the HASP.

Health and safety monitoring, including both worker and community monitoring, will be performed during all work activities. All monitoring activities will be performed in accordance with the NYSDEC TAGM 4031-Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites (NYSDEC, 1989), the New York State Department of Health (NYSDOH) protocol for Community Air Monitoring (NYSDEC, 2002), and HASP for the Site.

The Site Safety Coordinator will be identified upon selection of an Excavation/Remedial Contractor. A resume will be provided to NYSDEC prior to the start of remedial construction.

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

4.1.2 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) provides a detailed description of Site specific sampling and analytical methods and sample handling procedures for end-point soil sampling. The elements are provided in Section 5.2. A copy of the Site-specific QAPP is presented as Appendix C.

4.1.3 Construction Quality Assurance Plan (CQAP)

The Construction Quality Assurance Plan (CQAP) for all construction activities provides a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedy construction is in conformance with the remediation objectives and specifications. The CQAP will be prepared by the selected Excavation/Remedial Contractor and will include the following.

- Responsibilities and authorities of the organizations and key personnel involved in the design and construction of the remedy
- Qualifications of the quality assurance personnel that demonstrate that they possess the proper training and experience necessary to fulfill project-specific responsibilities
- The observations and tests that will be used to monitor construction and the frequency of performance of such activities
- The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures as addressed in the plans and specifications
- Requirements for project coordination meetings between Volunteer and its representatives, the Remedial Engineer, Construction Manager, Excavation/Remedial Contractor, foundation subcontractors, and other involved parties
- Description of the reporting requirements for quality assurance activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation

4.1.4 Soil/Materials Management Plan (SoMP)

The Soil/Materials Management Plan (SoMP) includes detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport, and disposal. The SoMP also includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations. The SoMP is provided in Section 5.4.

4.1.5 Erosion Sediment Control Plan

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control.

Haybales and/or silt fence will be placed by the remedial contractor at locations upgradient of excavation areas, within the perimeter plywood fencing, to control storm water runoff and surface water from entering or exiting the excavation. These control measures will be installed prior to initiating the soil excavation. Stormwater and collected surface water will be managed as discussed in Sections 5.4.7 and 5.4.10.

4.1.6 Community Air Monitoring Plan (CAMP)

All soil handling components of the remedial action will require air monitoring. The air monitoring program will be implemented during all intrusive remedial actions to measure the concentration of particulates in ambient air in the work zone.

The Community Air Monitoring Program (CAMP) (Appendix D) was developed in accordance with the NYSDOH Generic Community Air Monitoring Plan contained in Appendix 1A of the draft DER-10 (NYSDEC, 2002). The CAMP includes real-time continuous air monitoring at the Site's downwind perimeter for VOCs and particulates. Implementation and management procedures are specified within the CAMP. During all phases of work, the Excavation/Remedial Contractor will be responsible for mitigating any vapor and particulate issues, via suppression techniques defined in the CAMP.

4.1.7 Contractors Site Operations Plan (SOP)

A Contractors Site Operations Plan (SOP) will be developed with the selected Excavation/Remedial Contractor.

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

4.1.8 Community Participation Plan (CPP)

A Community Participation Plan (CPP) was filed with NYSDEC concurrent to submission of the BCP Application,

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

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

The Community Participation Plan (CPP) for this project is attached in Appendix E. Highlights of the CPP are presented below.

- Upon determination by the NYSDEC that the BCP application was complete, the Volunteer provided formal notification to all entities on the Site Contact List, including local media outlets, prior to the 30-day public comment period.
- The Volunteer, in cooperation with the NYSDEC, provided a fact sheet to the contact list describing the RAWP and provided a 45-day public comment period.

- Prior to any remedial construction, the Volunteer and the Participant will provide notice to the contact list announcing the start of remedial construction.
- Before the NYSDEC approves a proposed final engineering report, the Volunteer will provide notice to the contact list, including a fact sheet describing the report or any proposed institutional or engineering controls.
- Within 10 days of the issuance of a certificate of completion at the Site, the Volunteer will provide notice and a fact sheet describing any institutional or engineering controls.

As required by the BCP, a comprehensive contact list has been established that includes local and state officials, adjacent property owners, occupants and residents, local news media, the public water supplier, and additionally requested contacts. Local document repositories have been established at the Region 2 office of the NYSDEC and at the Morrisania Branch Library of the New York Public Library. All documents pertaining to community participation activities and related notifications will be placed at the document repositories for public review.

The New York Public Library
Morrisania Branch Library
% Colbert Nembhard, Branch Manager
610 East 169th Street
Bronx, New York 10456

4.2 General Remedial construction information

The following sections discuss general remedial construction information related to the 1800 SB LLC project including project organization, remedial engineer responsibilities, work schedule, and worker requirements and responsibilities.

4.2.1 Project Organization

The Excavation/Remediation contractor has not been selected to date. Once established, a listing of key personnel involved in the Remedial Action will be provided to the NYSDEC. A copy of professional profiles for the Remedial Engineer and Field Manager/Site Health and Safety Officer is presented in Appendix F.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Omar Ramotar, P.E. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will

have primary direct responsibility for implementation of the remedial program for the project. The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

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

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

The Remedial Engineer will provide the certifications listed in Section 9.1 in the Final Engineering Report.

4.2.3 Remedial Action Construction Schedule

A schedule will be prepared and submitted following development and finalization of work sequencing with the Excavation/Remedial Contractor. It is currently assumed that the remedial action would be initiated within three months of NYSDEC approval of the RAWP.

4.2.4 Work Hours

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

4.2.5 Site Security

Security for the work, equipment, materials, supplies, facilities, personnel, and incidentals will be provided throughout the performance of the work at the Site. The Site will be surrounded by perimeter fencing in accordance with the New York City construction and building code requirements. The fences and gates will be closed and locked when there is no activity on the Site and any breaks or gaps will be repaired immediately. Any equipment that will operate after normal working hours will include the appropriate automatic shutoffs and/or alarms to prevent unsafe operation. Temporary fencing will supplement the perimeter fencing to delineate and secure the area of ongoing remediation activities within the Site such as soil stockpiles, and health and safety exclusion zones.

All personnel and visitors will be required to sign-in upon entering the Site and sign-out upon leaving. A sign-in/sign-out sheet will be maintained at the Site. To restrict access during remediation activities, warning signs and barrier tape will be installed at certain locations, such as open excavations.

The Site security, control and access measures will be described in more detail in the SOP.

4.2.6 Traffic Control

The truck route for ingress and egress is presented in Figure 10. . The route will be selected based on the existing access roads and an effort to limit transportation of work vehicles through neighboring residential and commercial areas and may be modified based on input from the community prior to the start of construction.

4.2.7 Worker Training and Monitoring

As discussed in Section 4.1.1, all Site workers conducting intrusive activities in the exclusion zone will be required to have 40-hour HAZWOPER training in accordance with the referenced regulations.

4.2.8 Agency Approvals

The Volunteer has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site shall be in conformance with the proposed zoning for the property as determined by New York City Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional, and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work will be provided to NYSDEC. This list includes a citation of the law, statute, or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the Final Remediation Report.

4.2.9 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the New York State Brownfield Cleanup Program. The sign will meet the detailed specifications provided by the NYSDEC Project Manager.

4.2.10 Pre-Construction Meeting with NYSDEC

A pre-construction meeting will be conducted prior to the start of the remediation activities. This meeting will be attended by Volunteer representatives, the Contractor, the Remedial Engineer, and the NYSDEC. The meeting agenda will include: personnel roles, work hours, schedule, communications, training requirements, site preparation work status, and a discussion of upcoming activities with a focus on related environmental concerns of the NYSDEC.

4.2.11 Emergency Contact Information

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

4.2.12 Remedial Action Costs

The total estimated cost of the Remedial Action components of the project is $1,500,000. An itemized and detailed summary of estimated costs for all remedial activity is attached as Appendix G This will be revised based on actual costs and submitted as an Appendix to the Final Remediation Report.

4.3 Site Preparation

Site preparation activities will include: identification of unmapped utilities, utility relocation (if required); Site survey for pre-existing conditions, establishment of temporary construction facilities, security and perimeter fencing inspection and installation (as necessary). The preparatory tasks are described in more detail below.

4.3.1 Mobilization

As described in Section 3.2.1.1, prior to commencing the remediation construction activities, the Remediation and General Contractor will perform the following mobilization and Site preparation activities:

- Identification and markout of all aboveground and underground utilities;
- De-energizing, turning off and disconnecting existing subsurface utility services known to be present in the work area (e.g., water, gas, electric and sewer);
- Mobilization of remediation equipment and materials;
- Traffic control measures;
- Work zone demarcation;
- Installation of erosion control devices in accordance with the Soil Erosion and Sediment Control Plan;
- Conduct pre-construction survey prepared by a land surveyor licensed by the State of New York;
- Asphalt/ concrete pavement removal;
- Installation of perimeter air monitoring system;
- Installation of temporary facilities;
- Installation of dewatering and water treatment system; and

- Installation of the decontamination facilities.

The detailed description of the mobilization and site preparation activities and responsibilities will be presented in the Contractors' Site Operations Plan.

4.3.2 Erosion and Sedimentation Controls

Soil erosion and sediment control measures for management of storm water will be installed in accordance with the New York Guidelines for Urban Erosion and Sediment Control consistent with the protocols discussed in Section 4.1.5 and stormwater and collected surface water discussed in Sections 5.4.7 and 5.4.10. Haybales and/or silt fence will be placed by the remedial contractor at locations surrounding excavation areas, within the perimeter fencing, to control stormwater runoff and surface water from entering or exiting the excavation. These control measures will be installed prior to initiating the soil excavation.

4.3.3 Stabilized Construction Entrance(s)

Stabilized construction entrances will be installed at all points of vehicle ingress and egress to the Site. The truck wash (see Section 4.3.7) and the stone-based egress path will be continuous so that trucks do not get recontaminated prior to departure from the Site.

4.3.4 Utility Marker and Easements Layout

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

The presence of utilities and easements on the Site will be investigated by the Volunteer and its Contractors. The utility survey shall assess and determine if any risks or impediments to the

planned work under this Remedial Action Work Plan are posed by utilities or easements on the Site.

4.3.5 Sheeting and Shoring

Appropriate management of structural stability of onsite or offsite structures during onsite activities include excavation is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Volunteer 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 Volunteer 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.

4.3.6 Equipment and Material Staging

All equipment and work materials will be staged in a location noted in the Contractors SOP.

4.3.7 Decontamination Area

A temporary decontamination pad will be constructed to decontaminate trucks and other vehicles/equipment leaving the Site. The decontamination pad will be constructed using 60-mil high density polyethylene (HDPE) liner with perimeter berms, sloped to a low-lying sump to contain any liquids. The decontamination pad will be sized to accommodate the largest construction vehicle used and located prior to the stabilized construction egress. All decontamination material will be collected and properly disposed of offsite.

4.3.8 Site Fencing

A temporary fence will be installed around the perimeter of the Site. The perimeter fencing will be eight feet in height, with double access gates to allow ingress and egress of construction vehicles.

4.3.9 Demobilization

Following the completion of all remedial activities, the Site will be prepared for the subsequent construction activities required for the development project. All temporary structures not

required for the subsequent construction work will be removed. Materials used in constructing the waste staging area (e.g., plastic sheeting, haybales) will be removed and disposed properly. Soil underlying the plastic sheeting in the waste staging area will be inspected for any visual staining or evidence of waste materials. Any impacts to the soil in this area will be removed and disposed as well. All equipment will be decontaminated prior to leaving the Site.

4.4 Reporting

All daily and monthly Reports will be included in the Final Engineering Report. The following sections provide a summary of reports that will be prepared and maintained throughout the remedial action.

4.4.1 Daily Reports

Daily activity reports will be prepared and maintained on site for compilation and record management.

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

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

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions shall be included in the daily reports.

Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and 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 described in reports submitted to NYSDEC is attached in Figure 11.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the 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
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area, and Site structures before, during, and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (two copies) and to NYSDOH's Project Manager (one copy). CD's will have a label and a general file

inventory structure that separates photos into directories and sub-directories according to logical Remedial Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. Photos will be submitted as an Appendix to the Final Engineering Report.

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

4.4.4 Complaint Management Plan

Any complaints received from the public regarding nuisances or other site conditions will be communicated within 24-hours to NYSDEC and NYSDOH, investigated and remedied, if required.

4.4.5 Deviations from the Remedial Action Work Plan

Any required deviations from this RAWP will be discussed by Volunteer's representatives with the NYSDEC. At that time, the reasons for necessary deviations from the approved RAWP will be explained and the effect of the required deviations on the overall remedy will be evaluated. If the deviation is deemed to be a significant change to the RAWP by the NYSDEC, a description and reasons for the proposed change will be emailed to the NYSDEC Project Manager for review and written approval. All deviations from the RAWP will be fully documented in the FER.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Soil Excavation

The Site will be excavated to remove all soil with concentrations in excess of the restricted residential and protection of groundwater SCOs noted in Section 5.1 to. This work will be conducted after the New York City Department of Buildings has issued a building permit and foundation permit for the Site.

Foundation piles will be installed by the Foundation Contractor retained for the building construction. The actual sequencing of the foundation pile installation and excavation activities will be based on the final residential building design documents and/or the SOP. The excavation and pile installation will be conducted in a manner that protects the integrity of the adjacent structures. Soil excavation will generally be conducted using traditional excavation equipment. If any underground utilities or other subsurface piping are encountered, the excavation will be performed by hand.

All excavation work will be performed in accordance with the Contractor's SOP (including the CQAP) and the Site-specific HASP and CAMP. The depth of soil to be excavated and disposed offsite to meet the restricted residential SCOs will be 13 to 15 feet bls and approximately 20 feet to meet the protection of groundwater SCOs. The excavation required for construction of the proposed development will be dependent upon the foundation and sheeting and shoring design, which is yet to be completed.

Soil excavation activities will also be performed for the installation of pile caps, elevator pits, and any other subsurface structures and utilities. Because the excavation of the soil will involve removing soil from below the groundwater table, hydraulic control measures (i.e., excavation dewatering system) will be required to manage groundwater. Wastewater resulting from Site dewatering will be disposed in the public sewers in accordance with NYCDEP permitting procedures, which may require pretreatment, or will be disposed of offsite at an approved disposal facility, pending quantity of wastewater generated.

All trucks removing material from the Site will be loaded onsite and properly decontaminated before leaving the Site.

During the excavation activities, any existing subsurface structures will be demolished and removed when encountered to the extent required to construct the building foundation. The debris will be managed as discussed in the Section 5.4.5. Subsurface obstructions/conditions that may be encountered include former piles, and large pieces of demolition debris. This material, if encountered, will be managed as described below and disposed of in accordance with all federal, state and local regulations. If encountered within the excavation area, these materials will be cut or broken into lengths or pieces suitable for offsite disposal in accordance with approved disposal facility requirements. If this type of debris is not visually impacted, it will be disposed of as construction and demolition debris (C&D) at an approved licensed C&D disposal facility. If the debris is visually impacted, it will be either decontaminated (if possible) and managed as non-impacted C&D, or sampled for waste characterization purposes and disposed of at an appropriate approved facility. Any portion of former piles or structures that extend below the depth of the proposed excavation will be cut off and capped with concrete or clean backfill material.

Excavated material slated for offsite disposal will be temporarily staged on site and disposed in accordance with the Soil and Materials Management Plan discussed in Section 5.4.

Following excavation, end-point soil samples will be collected in accordance with the remedial performance evaluation described in Section 5.2.

Groundwater

Dewatering will be required during excavation and foundation construction activities to facilitate work below the groundwater table. Extracted groundwater will either be containerized for offsite disposal or be treated as necessary to meet NYCDEP requirements, and discharged to the NYCDEP sewer system. The groundwater will be extracted through the use of drainage sumps and/or perimeter well points to maintain dry conditions within the excavation. Drainage sumps will be installed within the excavation, as necessary, to dewater the excavation area. The water from the drainage sumps will be pumped to either an onsite wastewater storage tank or an onsite treatment system. The Remediation Contractor will identify, in the Contractor's SOP, the means and methods for dewatering and treatment.

If required, the treatment system may entail a settling tank, oil/water separator, bag filters and carbon filter vessels, respectively. The effluent from the treatment system will be discharged to the NYCDEP sewer system under a sewer discharge permit that will be obtained from the NYCDEP following the submission of information regarding the proposed treatment system. The effluent from the treatment system will be sampled as required by NYCDEP. If wastewater is to be disposed of offsite, it will be stored onsite in an approved water storage tank pending characterization and transport for proper offsite disposal.

The quantity of groundwater to be extracted and treated will be determined based upon the following factors:

- Duration of excavation/foundation work below the water table;
- Depth of excavation beneath the water table; and
- Hydrogeologic factors including hydraulic permeability, hydraulic gradient and rate of recharge into the excavation.

The extracted and treated groundwater will serve a beneficial role in reducing the toxicity, mobility and volume of contaminated groundwater beneath the Site.

Provided below is a more detailed description of the remedial action, including the soil cleanup objectives, remedial performance evaluation, estimated material removal quantities, and Soil and Materials Management Plan.

5.1 Soil Cleanup Objectives

The restricted residential and protection of groundwater SCOs for this Site are listed in Table 2 through 4 for VOCs, SVOCs and Metals, respectively.

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

Table 2 though Table 6 also summarize all soil samples that exceed the SCOs proposed for this Remedial Action. A spider map that shows all soil samples that exceed the SCOs proposed for this Remedial Action are shown as Figure 4.

If encountered during excavation, UST closures will, at a minimum, conform to criteria defined in DER-10. Additional, USTs are not expected to be encountered due to the prior UST removal efforts documented in Section 2.3.3.3.

5.2 Remedial Performance Evaluation (End-Point Sampling)

End-point sampling and reporting will be conducted in accordance with the DER-10 and Section 3.3.1.11 and is discussed in the sections below.

5.2.1 End-Point Sampling Frequency

End-point bottom sampling (at a frequency of one sample per 900 square feet of excavation bottom area in accordance with the guidance provided in NYSDEC DER-10 Section 5.4 for excavations 20 to 300 feet in perimeter) would be conducted for VOCs and metals. Areas that appear more heavily impacted, if any, will be given sampling preference.

If sheeting is not encountered, end-point sidewall samples (at a frequency of one sample per 30 linear feet or at least one sample per sidewall) would be conducted for constituents that exceeded the SCOs in previous sampling events to confirm that the SCOs were met. Areas that appear more heavily impacted, if any, will be given sampling preference.

5.2.2 Methodology

Each sample will be inspected for visual evidence of contamination (i.e., staining, presence of petroleum or odors) and field screened for VOCs using a portable photoionization detector (PID). Soil samples to be submitted for analysis will be placed in a laboratory sample jar, and transported to the laboratory in an iced container. Samples will be submitted for analysis for VOCs and Metals. Laboratory analysis will be performed by a NYSDEC-approved laboratory using USEPA SW846 Method 8260 for TCL VOCs and USEPA SW846 Method 6010 for TAL Metals.

5.2.3 Reporting of Results

The laboratory will report analytical results in Analytical Services Protocol (ASP) Category B deliverable packages. An electronic data deliverable (EDD) will also be provided by the laboratory.

All end-point sample data generated for the Remedial Action will be logged in a database and organized to facilitate data review and evaluation. The electronic dataset will include the data flags provided in accordance with USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organic Analysis and Inorganic Analyses, as well as additional comments of the data review for ASP/CLP analyses. The data flags include such items as: 1) concentration below required detection limit; 2) estimated concentration due to poor recovery below required detection limit; 3) estimated concentration due to poor spike recovery; and 4) concentration of chemical also found in laboratory blank.

5.2.4 QA/QC

Quality control (QC) samples serve as checks on both the sampling and measurements systems and assist in determining the overall data quality with regard to representation, accuracy, and precision. Field duplicates and matrix spike samples are analyzed to assess the quality of the data resulting from the field sampling. Field duplicate samples are individual portions of the same field sample. These samples can be used to estimate the overall precision of the data collection activity. Sampling error can be estimated by the comparison of field sample result and duplicated sample result. During end-point sampling, one field duplicate sample will be collected for each 20 grab samples collected. Matrix spike and matrix spike duplicates are used to evaluate analytical accuracy and precision, respectively. MS/MSDs will be analyzed by the laboratory at a frequency of one per preparation batch.

5.2.5 DUSR

A Data Usability Summary Report (DUSR) will be prepared to evaluate the end-point samples by a party independent from the laboratory performing the analysis in accordance with Appendix 2B of DER-10.

5.2.6 Reporting of End-Point Data in FER

Chemical labs used for all end-point sample results and contingency sampling will be NYSDOH ELAP certified.

End point sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements. Side-wall samples will be collected a minimum of

every 30 linear feet. Bottom samples will be collected at a rate of one for every 900 square feet. The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs.

5.3 Estimated Material Removal Quantities

The estimated quantity of material removed from the Site will be governed by the minimum quantity of soil to:

- Remove all onsite soil with VOC, SVOC and Metals concentrations in excess of the Sub-part 375-6 restricted residential and protection of groundwater SCOs; and
- Prepare the Site foundation for construction of the proposed redevelopment project.

The depth of soil to be excavated and disposed offsite to meet the SCOs varies from 13 to 20 feet bls. The excavation required for construction of the proposed development will be dependent upon the foundation and sheeting and shoring design, which is yet to be completed. Maps showing the extent of materials to be removed, imported or re-used on Site for construction of the proposed development will be provided to NYSDEC in the Contractor's SOP and/or SoMP.

The estimated quantity of soil/fill to be removed from the Site to meet the restricted residential and protection of groundwater SCOs is approximately 6,675 cubic yards. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 100 cubic yards. The estimated quantity of soil/fill expected to be re-used/relocated on Site is 100 cubic yards. All soil for re-use onsite will meet the restricted residential SCOs.

The estimated quantity of construction wastewater (e.g., extracted and treated groundwater, decontamination water, runoff etc.) to be removed from the Site is 200,000 gallons. This volume will be highly dependent upon the construction duration, excavation depth, hydrogeologic conditions, and weather during the construction period. The final amount will be reported in the FER.

5.4 Soil/Materials Management Plan

The following sections provide the Soil Management Plan to be implemented during the Remedial Action.

5.4.1 Soil Screening Methods

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

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

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

5.4.2 Stockpile Methods

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

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be inspected daily to ensure the covers are maintained and fugitive dust emissions do not occur. Damaged tarp covers will be promptly replaced.

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

A dedicated water truck equipped with a water cannon will be available onsite for dust control.

5.4.3 Materials Excavation and Load Out

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

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

The presence of utilities and easements on the Site will be investigated by the Volunteer and its Contractors. The utility survey shall assess and determine if any risks or impediments to the planned work under this Remedial Action Work Plan are posed by utilities or easements on the Site.

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

A truck wash will be operated onsite. The Remediation Engineer will be responsible for ensuring that all outbound trucks are inspected and will be washed at the truck wash, as required to remove loose soils before leaving the Site until the remedial construction is complete.

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

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

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all

invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

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

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

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

Mechanical processing of historical fill and contaminated soil onsite is prohibited.

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

5.4.4 Materials Transport Offsite

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

Truck transport routes will be determined with the Construction Manager and Remediation Contractor and provided to NYSDEC prior to construction. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site will be provided to NYSDEC for review prior to construction. The most appropriate route shall take into account: (a) limiting

transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

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

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

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.

5.4.5 Materials Disposal Offsite

The disposal locations will be established at a later date and will be reported to the NYSDEC Project Manager.

The total quantity of material expected to be disposed offsite was discussed in Section 5.3.

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

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

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

1. A letter from the Remedial Engineer or BCP 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 FER.

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

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

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) 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 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to onsite or offsite Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil,

historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

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

Hazardous wastes derived from onsite will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

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

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

5.4.6 Material Re-use Onsite

Chemical criteria for onsite re-use of material have been approved by NYSDEC. This criteria is the Sub-part 375-6 restricted residential use SCOs. The Remedial Engineer will ensure that procedures defined for material re-use in this RAWP are followed and that unacceptable material will not remain onsite.

Acceptable demolition material proposed for re-use onsite, if any, will be sampled for asbestos.

Concrete crushing or processing onsite is prohibited.

NYSDEC review and approval of specially designed self-contained misting devices for dust control may be requested by the Remedial Engineer. If dust-free operations are not achieved with such devices, this approval will be revoked by NYSDEC.

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

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

5.4.7 Fluids Management

Construction wastewater will be generated from personnel/equipment decontamination and run-off/run-on in bermed soil stockpile and excavation areas. Construction wastewater will be collected and stored onsite in leak-tight drums, vacuum trucks or temporary storage tanks. The wastewater will be sampled and submitted for analysis for disposal/discharge characterization. Based on the laboratory analytical results, the construction wastewater will be disposed offsite at a permitted disposal/recycling facility or discharged to the public sewer system, if approved in writing by the New York City Department of Environmental Protection (NYCDEP). The remedial contractor will acquire any required permits.

All liquids that are not directly containerized and disposed offsite in vacuum trucks will be stored in temporary onsite tanks to await disposal. Containers used for storing construction wastewater will conform to both federal and state requirements. All storage tanks or containers will be decontaminated following disposal/discharge of wastewater.

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

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

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

5.4.8 Demarcation of Residuals Management Zone

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. The proposed development's concrete structural floor slab subbase will serve as the top of the 'Residuals Management Zone,' the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the Site Management Plan. The survey will measure the grade of residual contaminated soils before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the Site Management Plan. A map showing the survey results will be included in the Final Remediation Report and the Site Management Plan.

5.4.9 Backfill from Offsite Sources

Clean fill will be imported onto the Site as necessary for utility bedding material and foundation sub-base. This material will meet the specifications of the geotechnical engineer, Remedial Engineer, and Redevelopment Construction Documents. The source approval process will require a review of the following information:

1. Sources of backfill material
    - Past usage of backfill material source site origin
    - Source area background check
2. Chemical sampling data
    - Source analytical data to confirm that material meets the lower of the protection of groundwater or the protection of public health SCOs for restricted residential use as per 6NYCRR Part 375-6.7(d)
    - Frequency to be determined by Remedial Engineer and will comply with guidance provided in DER-10

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

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

The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all import of soils from offsite, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan."

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

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

Solid waste will not be imported onto the Site.

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

5.4.10 Stormwater Pollution Prevention

Barriers and haybales checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and haybales check functional.

All undercutting or erosion of a silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or haybales will be installed around stockpile areas, around sewer inlets, where applicable, and the downgradient perimeter of construction area.

5.4.11 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during onsite remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc., as described in Section 5.5 of DER-10. Chemical analytical work will be for full scan parameters (TAL metals; TCL VOCs and SVOCs, TCL pesticides and PCBs). These analyses will not be limited to Spill Technology and Remediation Series (STARS) parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

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

5.4.12 Community Air Monitoring Plan

Each of the components of the Remedial Action will require air monitoring. These activities include excavation and handling of petroleum-impacted material and historic urban fill impacted with metals. The air monitoring program will be implemented during all intrusive remedial actions to provide a measure of protection for the downwind community from potential airborne contaminant releases as a direct result of investigative or remedial work activities.

A CAMP was prepared in accordance with the NYSDOH Generic Community Air Monitoring Plan (Appendix D). The CAMP will includes real-time continuous air monitoring at the Site's downwind perimeter for VOCs and particulates. Implementation and management procedures are specified within the CAMP. During all phases of work, the remedial contractor will be

responsible for mitigating any vapor and particulate issues, via suppression techniques defined in the CAMP.

A map showing the location of fixed and mobile sampling stations will be provided in the CAMP.

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

5.4.13 Odor, Dust and Nuisance Control Plan

Dust will be controlled by spraying a water mist over the work area if perimeter action levels established in the CAMP are exceeded. The water mist will be generated by connecting a misting device to a hose, which will be connected to any potable water source. The degree to which these measures will be used will depend on particulate levels in ambient air at the Site perimeter as determined through implementation of the CAMP.

As necessary, a foam unit to suppress vapors and odors that are generated during the soil excavations will be employed. The foam unit, such as a Rusmar PFU-400, includes a self-contained 400-gallon tank for mixing foam concentrate. Foam will be applied, if warranted, to stockpiled soil and excavation sidewalls in an effort to maintain work zone and perimeter air monitoring criteria established in the HASP and CAMP. Tarps will also be employed to suppress vapor and odors from stockpiled soil in the staging area.

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

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors offsite. Specific odor control methods to be used on a routine basis will include assigning a dedicated air monitoring technician to monitor odors, active removal of separate phase hydrocarbons (SPH)

within excavations if encountered, backfilling excavations in a timely manner, and maintaining covers over stockpiled impacted soils. If nuisance odors are identified, work in that particular work area will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteer's Remediation Engineer, who is responsible for certifying the Final Engineering Report.

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

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

5.4.13.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive onsite work, will include, at a minimum, the item(s) listed below:

- Dust suppression will be achieved through spraying water directly onto soil, including excavations and stockpiles.

5.4.13.3 Other Nuisances

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

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

6.0 RESIDUAL CONTAMINATION TO REMAIN ONSITE

Since residual contaminated soil and groundwater will potentially exist beneath the Site after the remedy is 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 and included in the FER.

ECs and environmental monitoring will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have one Engineering Controls under the proposed remedial action, a vapor barrier.

Environmental monitoring will be performed through:

- Groundwater monitoring
- Post-remedial evaluation of soil vapor intrusion

The FER will report residual contamination on the Site in tabular and map form. This will include presentation of exceedances of both Track 1 and Track 2 sites.

7.0 ENGINEERING CONTROLS

This section provides a detailed description of the methods for implementation of the engineering controls.

7.1 Groundwater Monitoring

A vapor barrier / water-proof barrier will provide the additional benefit of mitigating any potential migration of vapors associated with residual groundwater. During installation of a vapor barrier and prior to installing the concrete for the structural slab, the vapor barrier will be inspected to insure that the vapor barrier was properly installed and that any damage caused during the installation was repaired. The vapor barrier would consist of a minimum of 10 mil poly sheeting or approved equal product depending on the concrete forming application. The Site Management Plan will outline the procedures to be followed including a visual inspection of the basement for infiltration of water.

7.2 Groundwater Monitoring

All existing groundwater monitoring wells will be destroyed during soil excavation. Following building construction, new groundwater monitoring wells will be installed with NYSDEC approval and sampled quarterly for eight quarters for VOCs and metals. A figure showing approximate groundwater monitoring well locations is presented as Figure 12. A figure showing typical groundwater monitoring well construction is presented as Figure 13. Groundwater monitoring activities will continue, as determined by NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC. Monitoring activities shall be outlined in the Monitoring Plan of the SMP.

8.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Institutional Controls (ICs) for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an 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 onsite after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions than 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 Final Remediation Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Bronx County Clerk before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use

of the Site to restricted residential use(s) 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.
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP.
- Groundwater and other environmental or public health monitoring must be performed as defined in the SMP.
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP.
- Onsite environmental monitoring devices, including but not limited to groundwater monitor wells, must be protected and replaced as necessary to ensure proper functioning in the manner specified 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 restricted residential use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed.

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

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

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

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

The Site Management Plan in the Final Remediation Report will include a monitoring plan for groundwater at the Site perimeter to evaluate Site-wide performance of the remedy.

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 FINAL ENGINEERING REPORT

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

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

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

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

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

location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

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

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

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

9.1 Certifications

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer [Omar Ramotar, P.E.] who is a Professional Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Omar Ramotar, P.E., am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 1800 Southern Blvd Site (NYSDEC BCA W2-1133-09-03).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for the Site and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

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

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

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

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

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

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

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.

10.0 SCHEDULE

The Work is anticipated to begin approximately three months following NYSDEC approval of the RAWP and would be substantially completed within 12 months. The remedial elements of the Work would take place in the earlier phased of the Work. A general schedule is presented as Figure 14. A revised schedule will be prepared and submitted following development and finalization of work sequencing with the Excavation/Remedial Contractor.