GOWANUS VILLAGE I, LLC
322 3rd AVENUE
BROOKLYN, KINGS COUNTY, NEW YORK

REMEDIAL ACTION WORK PLAN
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

Prepared For

Gemini Arts Initiative, Inc.

June 2014

Prepared By:

LBG ENGINEERING SERVICES, P.C.
Professional Environmental & Civil Engineers
4 Westchester Park Drive, Suite 175
White Plains, NY 10604
(914) 694-5711

CERTIFICATIONS

I, William Beckman, am currently a registered professional engineer licensed by the State of New York. Working on behalf of Gemini Arts Initiative, Inc. (GAII), I have primary direct responsibility for oversight of the implementation of the remedial program for the Gowanus Village I, LLC site (the "Site") listed in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as Index No. W2-1069-0506, Site No. C224099.

I certify that the Site description presented in this Remedial Action Work Plan (RAWP) is identical to the Site descriptions presented under the BCP for Gowanus Village I, LLC and related amendments.

I certify that this plan includes proposed use restrictions, Institutional Controls (ICs), Engineering Controls (ECs), 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 to Environmental Conservation Law (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 (SMP) must be submitted by the Volunteer for the continual and proper operation, maintenance and monitoring of all ECs employed at the Site, including the proper maintenance of all remaining monitoring wells, for approval by the NYSDEC.

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 off-site and that all activities of this type will be in accordance with all local, State and Federal laws and requirements.

I certify 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 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 a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

	June 18, 2014	William K Beckman
NYS Professional Engineer #063219-1	Date	Signature

Note: include PE stamp

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.

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

Page

TABLE OF CONTENTS
(continued)

Page

TABLE OF CONTENTS
(continued)

Page

LIST OF APPENDICES
(at end of report)

Appendix	
A	6 NYCRR Part 375 Soil Cleanup Objectives Summary Tables
B	Key Project Personnel Resumes
C	Health and Safety Plan (HASP)
D	BCP Project Site Sign
E	Community Air Monitoring Plan (CAMP)
F	Storm Water Pollution Prevention Plan (SWPPP)
G	NYSDEC SPDES General Permit GP-02-01 - NOI Application
H	Citizen Participation Plan (CPP)
I	Quality Assurance Project Plan (QAPP)
J	February 2, 2013 Site Topographical Survey Plan
K	USEPA Low Flow Groundwater Sampling Procedures
L	Sample DPE Field Sheet
M	Specifications for Proposed Vapor Barrier Materials and Liquid Boot® Brownfield Membrane
N	NYSDEC Environmental Easement Template

LIST OF TABLES
(at end of report)

Table

LIST OF FIGURES
(at end of report)

Figure

ACRONYMS AND ABBREVIATIONS

AA	Alternatives Analysis
AIGV	AI Gowanus Village, LLC
Allied	Allied Environmental Group, Inc.
ARARs	Applicable or Relevant and Appropriate Regulations
AS	Air Sparging
ASTM	American Society for Testing and Materials
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BRT	Brooklyn Rapid Transit
BRT RR	Brooklyn Rapid Transit RR
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CEC	Clean Earth of Carteret, Inc.
cfm	Cubic Feet Per Minute
Clean Water	Clean Water of New York, Inc.
cm	Centimeter
cm^2	Square Centimeters
COCs	Contaminants of Concern
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
DER-10	Division of Environmental Remediation – 10 (Technical Guidance for Site Investigation and Remediation)
DO	Dissolved Oxygen
DPE	Dual-Phase Extraction
EC	Engineering Controls
ECL	Environmental Conservation Law

ACRONYMS AND ABBREVIATIONS
(continued)

EE	Environmental Easement
ELAP	Environmental Laboratory Accreditation Program
ESA	Environmental Site Assessment
EWP	Excavation Work Plan
FER	Final Engineering Report
ft bg	Feet Below Grade
ft msl	Feet Above Mean Sea Level
GAII	Gemini Arts Initiative, Inc.
gpm	Gallons Per Minute
GPS	Global Positioning System
GVI	Gowanus Village I, LLC
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
Hg	Mercury
HMR	Hazardous Materials Regulations
hp	Horsepower
HSO	Health and Safety Officer
IC	Institutional Controls
IDW	Investigation Derived Waste
IRM	Interim Remedial Measures
kW	Kilowatt
LBG	Leggette, Brashears & Graham, Inc.
LBGES	LBG Engineering Services, P.C.
ml/minute	Milliliter Per Minute
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MTA	Metropolitan Transportation Authority

ACRONYMS AND ABBREVIATIONS
(continued)

NAPL	Non-Aqueous Phase Liquid
NJDEP	New Jersey Department of Environmental Protection
NOC	Notice of Completion
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NYC	New York City
NYCDCP	New York City Department of City Planning
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCRR	New York Codes, 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
OER	Office of Environmental Remediation
ORP	Oxygen Reduction Potential
OSHA	Occupational Safety and Health Administration
PAL	Pal Environmental Safety Corp.
PCBs	Polychlorinated Biphenyls
PDF	Portable Document Format
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts Per Million
PRR	Periodic Review Report
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
QA	Quality Assurance

ACRONYMS AND ABBREVIATIONS
(continued)

QA/QC	Quality Assurance and Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
RA	Remedial Action
RAOs	Remedial Action Objectives
RAP	Remedial Action Plan
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
Release	Release and Covenant Not To Sue
RI	Remedial Investigation
RIR	Remedial Investigation Report
RUSCOs	Restricted Use Soil Cleanup Objectives
SCFS	Sample Collection Field Sheets
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
sf	Square Feet
Site	Former BRT Powerhouse, 322 3rd Avenue, Brooklyn, NY
SMP	Site Management Plan
SoMP	Soil/Materials Management Plan
SPDES	State Pollutant Discharge Elimination System
SRI	Supplemental Remedial Investigation
SSDS	Sub-Slab Depressurization System
STARS	Spill Technology and Remediation Series
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion

ACRONYMS AND ABBREVIATIONS
(continued)

SVOCs	Semivolatile Organic Compounds
SWPPP	Storm Water Pollution Prevention Plan
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical and Operational Guidance Series
TSCA	Toxic Substances Control Act
ug	Micrograms
UIR	Underground Injection/Recirculation
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tanks
VOCs	Volatile Organic Compounds

GOWANUS VILLAGE I, LLC
322 3rd AVENUE
BROOKLYN, KINGS COUNTY, NEW YORK

REMEDIAL ACTION WORK PLAN
NYS BCP SITE NO. C224099
INDEX NO. W2-1069-0506

EXECUTIVE SUMMARY

Gemini Arts Initiative, Inc. (heretofore referred to as "GAII" or the "Volunteer") is undertaking the remediation and potential redevelopment of the former Brooklyn Rapid Transit Corporation (BRT) Central Station powerhouse property located at 322 3rd Avenue in Brooklyn, New York (heretofore referred to as the "Site"). An alternative address for the Site is 153 2nd Street. The Site is the subject of an environmental remediation pursuant to the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). Under the BCP, the Site Name is listed as Gowanus Village I, LLC and is registered as BCA Index Number W2-1069-0506, Site No. C224099.

The Site is located in the Gowanus neighborhood of Brooklyn, adjacent to the Carroll Gardens and Park Slope neighborhoods. The Site, located adjacent to the east of the Gowanus Canal, is currently vacant pending implementation of remediation and redevelopment activities. The Site is currently zoned as a manufacturing district (M2-1) by the City of New York. Over the last few decades the neighborhood has evolved from corporate-owned heavy industry to the current predominance of small, light manufacturing businesses. There are also some residentially zoned areas in the northwest and southeast. A site location map is presented as figure 1.

The Site property is listed as being 108,722.5 sf (square feet) in total area. Approximately 84,522.5 sf of the total property area is undeveloped, while the remainder of the Site is improved with a 3-story warehouse with a footprint of approximately 24,200 sf. A Site Plan is presented as figure 2.

Based on the evaluation of historical resources, the Site has a history of industrial use. The Site was historically utilized for: sulfur-works, a power station, a paper mill, a lumber yard, a coal-fired electric powerhouse (steam generating plant and dynamo building), an

electrical sub-station and switching yards (frequency converting), a warehouse, and has subsequently been vacant for over the past decade. Property records indicate that the existing warehouse is a portion of the larger BRT Central Station powerhouse complex originally constructed in 1901-1902. The original power plant complex (including the remaining building) was constructed and used in association with the electrical generation for the BRT Rail Road (RR) operations.

As a result of the historical property uses, the subsurface environmental condition at the Site has been negatively impacted by various contaminants. The contaminants at the Site are summarized below:

1. *Soil Contamination*

   Soil contamination consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, pesticides and polychlorinated biphenyls (PCBs) are present in the soils beneath the Site.

2. *Groundwater Contamination*

   The dissolved phase VOCs and PCBs in groundwater beneath the Site is limited and correlates with the distribution of contamination recorded in soil samples collected throughout the Site during historical Remedial Investigation (RI) activities and is not migrating. Of note, the metals and SVOCs appear to be relatively stable (minimally soluble) with minimal impact to groundwater.

3. *Non-Aqueous Phase Liquid (NAPL)*

   Non-aqueous phase liquid (NAPL) (unidentified constituents) is present in the subsurface. Based on the RI, the NAPL is primarily localized in the subsurface beneath the north-central portion of the onsite building.

4. *Soil Vapor Contamination*

   The types and relative concentrations of VOCs detected in soil vapor samples collected from beneath the Site property interior and perimeter indicate that there is minimal impact via elevated soil vapor VOC concentrations.

The contamination beneath the Site is the result of historical activities on the Site, as well as possible contributions from offsite sources. Based on the current status of the Site (a vacant property), there are no direct exposure pathways resulting from ongoing activities.

All potential exposure pathways to residual contamination onsite will be the result of the proposed onsite remedial or potential construction activities. The potential onsite exposure pathways for workers and/or occupants are via ingestion, inhalation or dermal contact. Additionally, a possible exposure route is through soil vapor intrusion (SVI). These exposure pathways will be addressed via the onsite Health and Safety Plan (HASP) as well as by utilizing proper waste handling procedures.

Potential exposures to Site contaminants during the proposed construction and remediation activities at the Site will be avoided by implementation of a HASP (including the use of personal protective equipment [PPE]) and a Soil Management Plan (SMP). The proposed activities include renovation of the existing building and excavation and removal of some impacted soil. The potential exposure of soil contaminants of concern (COCs) to construction workers via dermal absorption, ingestion, and inhalation will also be avoided by the HASP, PPE and SMP. If groundwater is encountered during excavation activities, exposure of groundwater COCs to construction workers via dermal absorption, ingestion, and inhalation will also be avoided by the same measures. The proposed construction activities will also implement the HASP and SMP to avoid exposure to the construction workers of the volatilization of vapors into the air and through generation and offsite migration of dust containing Site COCs. Working in accordance with a HASP (including the use of personal protective equipment [PPE]) and a Soil Management Plan (SMP) will minimize the potential impacts.

The proposed construction activities will avoid any exposure to the public through volatilization of vapors into the air and through generation and offsite migration of dust containing Site COCs by implementing a Community Air Monitoring Plan (CAMP) and applying vapor and dust suppression measures when and where required. These activities will address this potential migration pathway and ensure protectiveness of the surrounding community.

Summary of the Remedy

A detailed analysis of potential remedial alternatives was completed in order to address the residual soil and groundwater contamination at the Site. This selected remedial alternative and RAWP was developed based on the results of the historical investigations completed at the Site.

The remedial goals of the proposed RAWP are to:

- implement all NYSDEC required Citizen Participation activities according to an approved Citizen Participation Plan (CPP).
- establish Track 4 Restricted Use Soil Cleanup Objectives (RUSCOs) for restricted residential use for the entire Site.
- remediate the subsurface soil at the Site by removing the PCB contaminated "hot spot" source materials and soils from select areas contaminated with elevated metals contamination;
- eliminate the potential direct exposure pathway to the residual subsurface soil contamination by the installation of a demarcation layer filter fabric and a cover system consisting of a combination of one or more of the following: (i) 2-foot certified clean backfill layer; (ii) concrete paving; or (iii) asphalt paving;
- remove the NAPL source from the subsurface beneath the building;
- install a network of groundwater monitoring wells to monitor the progress of the Site following the implementation of the RAWP; and,
- ensure all necessary institutional controls (ICs) and/or engineering controls (ECs are developed to ensure protectiveness of human health at the Site.

As selected based on the Alternatives Analysis (AA) report, the preferred remedial action alternative is the Track 4 cleanup through implementation of Alternative 6. The preferred remedial action alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the Remedial Action Objectives (RAOs) established for the project and addresses applicable Standards, Criteria and Guidance (SCGs) as outlined in the AA report. The preferred remedial action alternative is effective in both the short-term and long-term and reduces mobility,

toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standard methods that are well established in the industry. In order to achieve these goals, the following Remedial Action (RA) activities are proposed to be implemented at the Site. Several ECs and ICs will be maintained until the goal of each element of the RA is achieved at the Site.

1. *Removal of Residual Contaminated Source Material Soils*

In order to address and eliminate the residual PCBs, metals and VOCs source materials onsite, select areas of contaminated soil will be excavated and disposed of offsite. The removal will be conducted in a way to ensure the structural integrity of the building foundation can be maintained. Where necessary to facilitate the contaminated soil excavation activities (primarily in the location of the PCB contaminated soils classified as hazardous under Toxic Substances Control Act [TSCA]), structural supporting and dewatering activities will be instituted. These excavation methods will permit the removal of the contaminated soils located at depth and below the groundwater table. An ancillary remedial benefit of the dewatering activities will be dissolved phase contaminant mass removal. All soil/fill material will be transported for off-Site disposal at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal. Sampling and analysis of excavated media will be performed as required by disposal facilities. Appropriate segregation of excavated media will be performed onsite.

2. *NAPL Recovery and Contaminated Groundwater Extraction and Treatment*

The groundwater treatment system utilized for the excavation dewatering activities will be utilized during the implementation of the RAWP. This system will be used to perform NAPL recovery and groundwater extraction and treatment beneath the building slab. The results of the system operation will be used to assess the feasibility of this system as a part of the final remedial design for the Site (if needed). In the event there is a continued presence of NAPL after the cessation of the dewatering activities a replacement means of continued product recovery will be implemented.

3. *Cover Systems*

Collection and analysis of endpoint confirmation soil samples will be performed to verify the effectiveness of the remedy with respect to attainment of RUSCOs. Various cover systems will be used onsite to prevent exposure to residual contaminated soils that will remain in-place and maintained under the SMP. In open areas throughout the Site, the cover will consist of a minimum of a geotextile (or similar) fabric demarcation layer overlain by 2 feet of certified clean soil cover. The top six inches of soil will be of sufficient quality to support vegetation. Import of materials to be used for backfill and cover at the Site will comply with applicable laws and regulations. Dependent on redevelopment plans, the cover system in select locations may consist of asphalt or concrete pavement (walkways, paved areas and/or parking lots). All cover systems (when combined with Site ICs) will be effective measures in preventing exposure to residual contaminated soils.

4. *Vapor Barrier*

A vapor barrier will be installed on the interior surfaces (walls and floors) of the portions of the onsite building that are below grade. A spray-on vapor barrier will be applied to the applicable sub-grade floors and walls. To prevent damage to the vapor barrier and eliminate future use restrictions or excessive maintenance, following the installation and Quality Assurance/Quality Control (QA/QC) activities the vapor barrier coated floor slab will be covered with a protective skim coat concrete slab. The vapor barrier will prevent direct contact with interior surfaces and subsurface contamination. Additionally, the vapor barrier will prevent potential SVI from the subsurface.

5. *Groundwater Monitoring*

A quarterly groundwater monitoring program will be instituted at the Site. This monitoring will allow continual evaluation of the groundwater quality at the Site as well as assessing the progress of the completed RAs at the Site. Periodic monitoring will continue until the remedial goals for the Site are achieved or until the NYSDEC indicates they are no longer required.

6. *Recording of a Deed Restriction*

Following completion of the RA activities, a Deed Restriction will be recorded for the Site with the Kings County Clerk's office. This document will act as an IC to prevent future exposure to any residual contamination remaining at the Site by establishing protocols limiting the potential for human exposure. This document will also ensure continued operation of any required EC.

7. *Implementation of a Site Management Plan*

A SMP will be developed for long-term management of residual contamination left in-place. The Site management activities will be implemented following completion of the RA activities and implementation of the Remedial Design (if required). Site management is the last phase of remediation and begins with the approval of the Final Engineering Report (FER) and issuance of the Release and Covenant Not To Sue (Release). Site management continues in perpetuity or until released in writing by NYSDEC. 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 RA in accordance with the NYSDEC BCP.

GOWANUS VILLAGE I, LLC
322 3rd AVENUE
BROOKLYN, KINGS COUNTY, NEW YORK

REMEDIAL ACTION WORK PLAN
NYS BCP SITE NO. C224099
INDEX NO. W2-1069-0506

1.0 INTRODUCTION

Gemini Arts Initiative, Inc. (heretofore referred to as "GAII" or the "Volunteer") is undertaking the remediation and potential redevelopment of the former Brooklyn Rapid Transit Corporation (BRT) Central Station powerhouse property located at 322 3rd Avenue in Brooklyn, New York (heretofore referred to as the "Site"). A Site Location Map is presented as figure 1. The Site property is listed as being 108,722.5 sf (square feet) in total area (2.49 acres). The Site is improved with a 3-story warehouse building that is approximately 24,200 sf in area. The remaining property area of approximately 84,522.5 sf (1.89 acres) is undeveloped. The Site is located in the Gowanus neighborhood in Brooklyn, New York. The Site is located on the western half of the city block bounded by the historical 1st Street Basin (Lateral Canal) to the north, 2nd Street to the south, the Gowanus Canal to the west, and 3rd Avenue to the east. A Site Plan is presented as figure 2.

The Site is the subject of an environmental remediation pursuant to the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). Under the Brownfield Cleanup Agreement (BCA) executed on July 25, 2005, the Site was originally included in the BCP with the Site Name "Gowanus Village I, LLC". As per the original BCA, the Site was registered in the BCP as BCA Index Number W2-1069-0506, Site No. C224099. A three party limited liability company, Gowanus Village I, LLC (GVI), was the original volunteer for the Site. On August 5, 2009, the GVI consented to a change of party BCA amendment such that AI Gowanus Village, LLC (AIGV) became the new volunteer. AIGV subsequently consented to a change of party BCA amendment (submitted on July 29, 2012) such that BRT Powerhouse, LLC became the new volunteer on August 14, 2012. BRT Powerhouse, LLC submitted a BCA amendment application to the NYSDEC for Change in Party (approved on May 24, 2013) requesting that GAII be added as the Site Volunteer. GAII

is listed as the current BCP Volunteer as per the NYSDEC approval letter for Change in Party (issued on June 6, 2013).

LBG Engineering Services, P.C. (LBGES) on behalf of GAII, completed an Alternatives Analysis (AA) report for the Site to evaluate available remedial alternatives and to develop a recommended remedial approach to address residual subsurface contamination present beneath the Site. The AA summarizes the nature and extent of contamination as determined from data gathered during the Phase I Environmental Site Assessments (ESAs), Remedial Investigation (RI), and Supplemental Remedial Investigations (SRI) performed on the Site and surrounding properties between 1996 and 2007. The AA provides an evaluation of applicable Remedial Action (RA) alternatives, their associated costs, and the recommended and preferred remedy. The response actions as described in 6 NYCRR 375-1.10 were used to form the foundation for the development and screening of applicable remedial alternatives. Following the screening of alternatives, a comparative analysis was performed to assess the relative advantages and disadvantages of each of the alternatives, and was used to facilitate identification of a preferred remedial approach. The AA report was submitted to the NYSDEC (under separate cover) on August 30, 2013.

LBGES on behalf of GAII, has prepared the following Remedial Action Work Plan (RAWP) to address the residual contamination at the Site. This RAWP outlines the detailed specifications associated with the implementation of the preferred remedy for the Site (as determined via the AA report). The remedy described in this document is consistent with the procedures defined in Division of Environmental Remediation – 10 Technical Guidance for Site Investigation and Remediation (DER-10) and complies with all applicable Standards, Criteria and Guidance (SCG). 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 does pose a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources to exist onsite. Therefore, the selected remedy does not have to account for impacts to fish and wildlife resources.

Following implementation and completion of the RAWP, a Final Engineering Report (FER) will be submitted to the NYSDEC and NYSDOH. The FER will include a Site Man-

agement Plan (SMP), developed to outline the long-term management of residual contamination to be left onsite following the implementation of the RAWP.

2.0 SUMMARY OF SELECTED REMEDIAL ACTIONS

Following the alternatives analysis and confirmation of feasibility of the selected remedial alternatives, the following RAWP has been developed for the Site. This RAWP outlines the detailed descriptions of each scope task included in the Proposed Remedial Action Plan as presented in the AA report.

2.1 Remedial Alternative Summary

In addition to the contaminant removal activities performed as part of the RAWP, several engineering controls (ECs) and institutional controls (ICs) will be utilized as part of the Site remediation. These ECs/ICs will be required to be maintained onsite as designed until the goal of each element of the RA is achieved at the Site. A summary of the scope of the RAWP for the Site is presented below with detailed descriptions in subsequent subsections:

1. Remedial Action Site Preparation Activities:
    a. establishing Site security;
    b. installation of perimeter silt fencing;
    c. installation of staging areas, decontamination station and truck wash station;
    d. proceed to excavation activities as specified based on the contaminant distribution.
2. Excavation and disposal of the Toxic Substances Control Act (TSCA) regulated hazardous polychlorinated biphenyl (PCB) contaminated soils with significantly elevated metals concentrations from "hot spot" source areas:
    a. excavation of shallow soil from the "hot spot" locations;
    b. remedial design investigation activities (groundwater extraction well installations and slug tests and/or pumping test) to determine the hydraulic properties of the geologic formation in the area of the proposed deep excavations;
    c. installation of excavation sheet piles and additional dewatering wells;

d. implementation of the dewatering activities required for achieving stabilized groundwater drawdown;

e. excavation of deep contaminated soils within the shored and dewatered "hot spot" excavations;

f. excavation endpoint sampling, surveying and demarcation layer installation;

g. installation of a lateral recovery well screen adjacent to the building for potential future use as an extraction/application point;

h. installation of certified clean material backfill and regrading (according to lift/compaction specifications); and,

i. disposal profiling followed by offsite disposal of excavated "hot spot" soil.

3. Capping the Historic Fill Topsoil:

a. Establish a cover system over surface soil/fill that contains concentrations above the Restricted Use Soil Cleanup Objectives (RUSCOs) for Restricted Residential (or to a depth 2 feet below the proposed redevelopment grade). This may involve excavation and disposal of the historic fill in order to maintain or reduce existing grades prior to capping;

b. disposal profiling followed by offsite disposal of excavated historic fill surface soil; and,

c. excavation endpoint sampling, surveying, demarcation layer installation, certified clean material backfilling and regrading (throughout the entire Site).

4. Delineate and remove non-aqueous phase liquid (NAPL) from the subsurface beneath the building concrete slab to eliminate any continuing source material:

a. install extraction wells within the basement of the onsite building for targeted contaminant extraction;

b. characterize the properties of the geologic formation beneath the building to assess potential additional remedial alternatives for the sub-slab contamination;

c. perform extraction activities to remove accessible NAPL; and,

d. assess the feasibility and/or need for additional RAs for the residual sub-slab contamination.

5. Building Interior Construction Activities:
   a. building interior PCB wipe sampling (decontamination activities as needed);
   b. surface preparation activities and installation of a soil vapor barrier within the basement of the onsite building (the floor slab and sub-grade portions of walls); and,
   c. installation of a protective concrete thin-set slab overlying the vapor barrier.
6. Development of the Groundwater Monitoring Program:
   a. installation of a replacement groundwater monitoring well (network); and,
   b. performance of groundwater monitoring until contaminant concentrations decrease to asymptotic/acceptable levels.
7. Site Demobilization Activities:
   a. final equipment decontamination activities;
   b. deconstruction of: the onsite decontamination station, truck wash station and miscellaneous protective measures; and,
   c. disposal profiling followed by offsite disposal of investigation derived waste (IDW).
8. Project Reporting.
9. Site Management Activities:
   a. Placement of a deed restriction on the property that includes:
      i. development of a SMP;
      ii. requirement for the maintenance of the Site's cover system and vapor barrier within the subgrade portions of the onsite building; and,
      iii. prohibition on the use of groundwater as a source of potable or process water without necessary water-quality treatment as determined by the NYSDEC.
   b. Perform annual certification of ECs and ICs.

2.2 Soil Cleanup Objectives

The selected cleanup track for the Site is Track 4: RUSCOs for Restricted Residential. Localized "hot spot" areas of significant contamination will be excavated and transported to

approved offsite disposal facilities. Due to the volume and distribution of the historic fill material at the Site, this cleanup track was selected because it allows for the implementation and maintenance of ECs and ICs as part of the final remedy. This is appropriate for the Site based on the limited mobility of the contaminants of concern (COCs) associated with the historic fill as well as the lack of exposure pathways (following the RAs). The RAWP has been prepared using the 6 NYCRR Part 375 RUSCOs for Restricted Residential use.

Track 4 cleanup track permits remedial program to include the use of long-term institutional or ECs to address all residually contaminated media left in place following the implementation of the Site remedy. Specific approaches have been established for addressing exposed surface soils in a Track 4 remedy. This approach to exposed surface soils, not otherwise covered by the components of the development of the Site (e.g., buildings, pavement), requires that contaminant concentrations not exceed the applicable RUSCOs for Restricted Residential. Additionally, where it is necessary to utilize offsite soil to achieve this requirement, the soil brought to the Site for use as a soil cover or backfill must be comprised of soil or other unregulated material as set forth in 6 NYCRR Part 360. The imported soil must not exceed the applicable Soil Cleanup Objectives (SCOs) for the use of the Site, as set forth in 6 NYCRR Part 375-6.8(b). For the selected restricted-residential use, the lower of the protection of groundwater or the protection of public health SCOs is the regulatory guidance value. Summary tables presenting the RUSCOs for Restricted Residential use are included in Appendix A.

Soil and materials management both on-Site and off-Site will be conducted in accordance with the SoMP as described in Section 3.2.3, below.

2.3 Remedial Performance Evaluation

2.3.1 Endpoint Sampling Frequency

The onsite excavation activities will adequately remove the "hot spot" soil contamination areas as well as the surface soil (historic fill). The extent of the excavation activities will result in the redevelopment grade required to permit the installation of the selected cover system (consisting of one of the following systems: a filter fabric demarcation layer and 2 feet of certified clean fill; concrete paving (e.g., roads, walkways and sidewalks); or asphalt paving).

The locations and extents of the "hot spot" excavations have been developed to encompass the extent of the residual soil contamination as delineated by the Remedial Investigation soil sampling activities. In-situ excavation endpoint confirmation soil sampling for the "hot spot" excavations will be collected using a Geoprobe direct-push drill rig prior to performing the excavation activities. The excavation pre-sampling endpoint confirmation soil samples will be collected to characterize the Residual Management Zone. The pre-sampling activities will expedite the subsequent excavation activities and will reduce the time frame which the excavations will be required to remain open. Additionally, obtaining the analytical results for the endpoint confirmation soil samples prior to the excavation activities will allow for expansion of the proposed "hot spot" extents (if necessary) prior to commencing excavation activities. For the "hot spot" excavations, endpoint confirmation sample frequency will be collected in accordance with the NYSDEC technical requirements for closure of a tank. The sampling protocol will consist of collection of a minimum of five (5) samples, consisting of four (4) sidewall samples (one [1] for each 20 linear feet of excavation dimensions) and one (1) bottom sample (one [1] for each 400 square feet of excavation area). Additional sidewall samples will be collected at a rate of one (1) for each additional 20 linear feet of excavation sidewall. Additional bottom samples will be collected at a rate of one for every 400 square feet of excavation area. If following the excavation activities there is any evidence of groundwater contamination (including without limitation, a sheen or odor or if groundwater is within 20 feet of the surface), a groundwater sample will be collected.

Similar to the "hot spot" excavation pre-sampling activities, surface soil endpoint confirmation sampling will be collected prior to performing the regrading excavation activities.

The pre-sampling activities will consist of grab sampling (using a trowel, hand auger or similar method) of the soil from the proposed final excavation depth. The final excavation depth may be exposed using an excavator to provide access for grab sampling. In locations where the proposed final excavation depth is greater than two feet below existing grade elevation, the in-situ excavation endpoint confirmation soil sampling will be performed using a Geoprobe direct-push drill rig. The location of the excavation endpoint confirmation soil samples will represent the location of the Residual Management Zone. Obtaining the analytical results for the end-point confirmation soil samples prior to the excavation will allow for expansion of the proposed extents (if necessary based on the endpoint analytical results) prior to commencement of the full-scale regrading excavation activities. This will permit the regrading excavation activities (once started) to be performed continuously to the predefined final excavation elevations. This will eliminate the need to perform redundant excavation activities in previously completed excavation areas throughout the Site. Additionally, the pre-sampling activities will expedite the regrading excavation activities and prevent any extended delay in the installation of the demarcation layer and backfill. The sampling frequency for the surface soil endpoint confirmation samples (which will represent the Residual Management Zone) will be approximately one (1) soil sample for every 5,000 to 10,000 square feet of area. This sampling will be performed prior to the installation of the demarcation layer and subsequent backfilling with the certified cover system that will constitute the redevelopment/restoration of the exterior of the Site.

The FER will provide a tabular and map summary of all endpoint sample results and exceedances of RUSCOs.

2.3.2 Soil Sampling Methodology

Anticipated subsurface soil sampling activities associated with the RAWP will be performed via one of the following methods: direct excavation and soil sampling; Geoprobe® drilling; hollow-stem auger drilling (and split–spoon soil sampling); and hand auger soil sampling.

Surface and subsurface soil/fill samples will be collected for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCBs, pesticides, and Target

Analyte List (TAL) metal analysis. Endpoint confirmation soil sample analytical results will be compared to Applicable or Relevant and Appropriate Regulations (ARARs) and to 6 NYCRR Part 375 RUSCOs to adequately evaluate environmental quality. Waste characterization soil sample analytical results will be compared to waste classification standards as well as permissible contaminant concentration limits of respective waste disposal facilities.

Surface and subsurface soil/fill sample intervals may be adjusted in the field based on the actual depths to the strata changes and to allow for sampling of any native soil separately from the overlying or fill material or soils. The actual locations of any of the boreholes and/or sample intervals may be changed in the field based on actual field conditions encountered.

The portion of the collected sample not required for chemical analysis will be placed back into the hole. Clean soil will be used to fill the hole, if necessary, and the vegetative mat will be replaced.

All sample locations will be field tied to three permanent features and surveyed with a Global Positioning System (GPS) unit or other appropriate surveying equipment to obtain horizontal and vertical control for each sampling location.

Field sampling personnel will screen and document field soil vapor headspace in a sealable plastic bag using a photoionization detector (PID) calibrated to a 100 ppm (parts per million) isobutylene standard. The collection of soil samples will be biased toward known disposal areas or areas with grossly contaminated soil/fill. Sample depths may be field altered based on visual and olfactory observations and field screening instrument readings.

2.3.2.1 Surface Soil Sampling Procedures

Prior to sample collection, all sampling locations will be determined and marked. At locations where subsurface soil samples will be collected at depths greater than 2 feet below ground surface, buried utilities will be identified and marked prior to sample collection. Soil samples will be collected as follows:

1. A new pair of disposable gloves will be used at each facility to avoid potential cross-contamination of the sample.
2. Sampling equipment will be decontaminated as described herein prior to use. Dedicated or disposable sampling equipment will be used where possible. Plas-

tic sampling equipment will not be used for collection of samples that will be analyzed for organic compounds.

3. Surface soil samples will be collected (at locations where only surface soils will be sampled) as follows:

   a. At each surface soil sample location, a clean trowel or shovel will be used to cut any vegetative cover over a one-foot square area. The vegetative cover will be removed by hand and will be gently shaken over the sample point to remove as much soil as possible from the root mat without causing significant dislodging of the roots. The soil that was shaken off will be evenly spread over the one-foot area by hand.

   b. A pre-cleaned or dedicated/disposable sampling tool (e.g., spoon, trowel, or scoop) will be used to remove soil uniformly from 0 to 3-inch depth interval. Any debris (e.g., large stones, leaves, grass, etc.) will be avoided as much as possible from inclusion in the soil sample. The soil sample will not include any soil removed from within one-inch from the perimeter of the one-foot square area where the cut was made.

   c. The soil will be placed in a clean, dedicated container (e.g., aluminum foil pan or plastic cup) for homogenization. Plastic sampling equipment will not be used for collection of samples that will be analyzed for organic compounds. Pre-cleaned dedicated sampling tools will be used to collect and homogenize the soil sample prior to transferring it into the sample jar(s) provided by the laboratory. When collected, the field duplicates, matrix spike/matrix spike duplicate (MS/MSD) sample, and investigative sample will be taken from the same soil aliquot homogenized in the container.

   d. Descriptions of the soil type encountered at each sample location will be recorded on Sample Collection Field Sheets (SCFS). At each sample location, the following information will be logged: soil stratigraphy; depth to refusal or bedrock, where encountered; and the depths to the soil in-

terface, native soil/clay interface and fill/native soil interface, if possible and where present.

2.3.2.2 Subsurface Soil Sampling Procedures

1. Geoprobe® Soil Sampling

The preferred method for subsurface soil collection will be the Geoprobe® direct-push method as described below:

i. At each sample location, a new acetate/plastic liner will be inserted into the direct-push soil sampler.

ii. The sampler will be fitted with a cutting tip/drive shoe and pushed/driven into the ground mechanically with powered equipment mounted on a track unit (approximately 4 feet by 6 feet and 10 feet high) or truck (pick-up truck or van) beyond the depth of the deepest designated sample depth. The sampler may be manually driven if the direct-push unit cannot access the sample location (i.e., presence of large trees, roots, and steep slopes) or may cause significant damage to the area or ground surface. If the deepest sampling depth exceeds the length of the soil sampler, then a second lined sampler will be advanced down the same hole subsequent to retrieval of the first sampler.

iii. The sampler will then be removed and the liner containing the soil core will be removed. The liner will be cut and the soil core will be measured, logged and recorded on a geologic log. At each borehole location, the following information will be logged: soil stratigraphy; depth to refusal where encountered; and the depths to the native soil/clay interface and fill/native soil interface, if possible and where present.

iv. If necessary to obtain sufficient sample volume, additional soil cores may be collected next to the first soil core location.

v. The soil sample from the selected sample interval(s) will be removed and placed in a clean, dedicated container (e.g., aluminum foil pan or plastic cup) for homogenization. Plastic sampling equipment will not be used for collection of samples that will be analyzed for organic compounds. Pre-cleaned dedicated

sampling tools will be used to collect and homogenize the soil sample prior to transferring it into the sample jar(s) provided by the laboratory. When collected, the field duplicate sample, split sample, MS/MSD sample, and investigative sample will be taken from the same soil aliquot homogenized in the container.

2. Hand Auger Sampling

Subsurface soil collection using the hand auger method will be used if it is determined that samples cannot be collected by the direct-push method. The hand auger method is as follows:

i. This method may be used to collect subsurface soil samples if sample collection by the direct-push method is not possible (i.e., soils are too hard to manually drive the direct-push sampler) and the direct-push powered equipment cannot access the sample location.

ii. At each sample location, the pre-cleaned hand auger will be advanced through the designated sample interval.

iii. A pre-cleaned or dedicated/disposable sampling tool (e.g., spoon, trowel, plastic scoop) will be used to retrieve the soil sample from the designated interval.

iv. If necessary to obtain sufficient sample volume, additional soil may be collected next to the first soil sampling point.

v. The soil sample from one sample interval will be removed and placed in a dedicated, disposable container (e.g., aluminum foil pan or plastic cup) for homogenization. Plastic sampling equipment will not be used for collection of samples that will be analyzed for organic compounds. Pre-cleaned dedicated sampling tools will be used to collect and homogenize the soil sample prior to transferring it into the sample jar(s) provided by the laboratory. When collected, the field duplicate, split sample, MS/MSD sample, and investigative sample will be taken from the same soil aliquot homogenized in the container.

vi. Soil sample(s) will be collected from underlying sample intervals by continuing to remove soil in the same hole as described above.

vii. Descriptions of the soil type encountered in each sample interval will be recorded on SCFS. At each borehole location, the following information will be logged: soil stratigraphy; depth to refusal or bedrock, where encountered; and the depths to the soil interface, native soil/clay interface and fill/native soil interface, if possible and where present.

2.3.3 Reporting of Results, Quality Assurance (QA)/Quality Control (QC) and Data Usability

Soil, sediment, and groundwater samples will be analyzed by laboratory that is a United States Environmental Protection Agency (USEPA) approved laboratory. Chemical labs used for all endpoint sample results and contingency sampling will be NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified. The analytical laboratory must maintain current NYSDOH certifications during the project. Sample analysis will be performed primarily using methodology contained in *Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Office of Solid Waste, EPA 1986 (with updates).* Additional methodology is contained in *Methods for the Evaluation of Water and Waste, EPA 600/4-79-02, revised March 1983 (with updates).*

All analyses will be performed in accordance with the USEPA protocol established for the specified analyses. The specific parameters, quantitation limits, and analytical methods to be used for analysis of the samples in addition to the QA/QC protocols that will be utilized during the implementation of the RAWP are detailed in the Quality Assurance Project Plan (QAPP) which is presented in Section 3.2.7, below.

2.3.4 Reporting of Endpoint Data in FER

The analytical data generated for the endpoint confirmation samples (collected following the onsite remedial actions) will be used to assess the soil quality that will constitute the Residuals Management Zone. The FER will include tables and figures representing the soil quality for the endpoint samples. The soil quality results for the endpoint samples will be compared to the RUSCOs for Restricted Residential use. All areas in which endpoint samples exceed the RUSCOs will be presented in the FER.

2.4 Estimated Material Removal Quantities

Following an assessment of the current Site condition, it is anticipated that a maximum volume of approximately 1,000 cubic yards (~1,500 tons) of C&D debris will be removed from the Site to facilitate the implementation of the RAWP. This estimate assumes that segregation activities are possible in the field. Additionally, the actual volume may be reduced in select portions of the onsite concrete slab are left in place. The C&D debris removal will be performed as part of the pre-remedial Site preparation activities performed prior to the commencement of the RAWP field activities.

Based on field observations and analytical results for the past contamination delineation sampling, the estimated volumes and weights of "hot spot" contaminated materials are approximately: 1,283 cubic yards (1,925 tons) of TSCA hazardous PCB contaminated soil; and approximately 65 cubic yards (98 tons) soil contaminated with elevated concentrations of metals. It should be noted that the actual volumes of waste material may vary due to the field conditions and observations.

Based on field observations and analytical results for the past contamination delineation sampling, it is anticipated that the cover system excavation activities (assuming 2 feet of excavation to facilitate the certified clean cover system) will produce a maximum of approximately 6,800 cubic yards (10,200 tons) of contaminated historical fill material. However, depending on the final grade specifications as specified in the redevelopment plan the amount excavated as opposed to being capped in place may change. The estimated range for the volume and weight of contaminated historical fill material exceeding the RUSCOs – Restricted Residential may range from approximately 1,500 to 14,385 cubic yards. It should be noted that the actual volumes of waste material may vary due to the field conditions and observations.

A current Site soil cover plan presenting the locations of the concrete pad and C&D debris materials; "hot spot" excavations; and historic fill material excavation and are presented in plan view on figure 3. Additionally, the 3 dimensional views of: the concrete pad and C&D debris; the "hot spot" excavations; and the historic fill material excavation are presented on figures 4, 5, 6A and 6B, respectively.

The estimated maximum of quantity of certified clean fill to be imported into the Site for the cover system is approximately 6,800 cubic yards (10,200 tons) of certified clean fill. This volume will facilitate regrading of the exterior undeveloped portions of the Site with a 2-foot certified clean cover system. This volume may be reduced in the event that the redevelopment plans incorporate impermeable cap materials (i.e., concrete, asphalt...) as part of the Site cover system.

Two re-grading alternatives presenting the vertical and horizontal extent of the cover system that will potentially be utilized at the Site are presented on figures 7 and 8.

3.0 REMEDIAL ACTION PROGRAM

3.1 General Remedial Construction Information

3.1.1 Project Personnel Structuring

LBGES/LBG (LBG Engineering Services, P.C./Leggette, Brashears & Graham, Inc.) will act as the environmental consultant (representative for Volunteer) and will be responsible for: coordination of field activities with all related subcontractors; soil sampling; groundwater sampling; air monitoring sampling; waste sampling; hydrogeologic activities, excavation and dewatering plans; health and safety oversight; communications with regulatory officials; and, documentation and reporting for the RA activities. In addition to in-house staff, LBGES/LBG will be utilizing several subcontractors for the completion of the RA activities. Among the subcontractors to be used on this contract, LBGES/LBG will be utilizing several environmental laboratories, a general construction company, a portable groundwater treatment system company, a drilling company; and, waste trucking/hauling companies. An organization chart is included in table 1.

Key project personnel are listed below along with brief descriptions of their experience and anticipated project responsibilities. Resumes of key personnel who will be involved in the implementation of the RAWP are included in Appendix B.

3.1.1.1 Principal-In-Charge

Mr. Dan C. Buzea is one of the managing directors of LBGES/LBG and has been with the firm since 1978. Mr. Buzea has over 40 years of experience with groundwater supply and contamination projects (including New York City projects) in the United States and overseas and, he has been in charge of the New York office since it opened in 1995.

As Principal-in-Charge, Mr. Buzea's responsibilities would include contract execution and overall QA/QC. He will be briefed regularly by the Project Manager and will review all final work products.

3.1.1.2 Remedial Engineer

The Remedial Engineer for this project will be Mr. William Beckman who is a registered professional engineer licensed by the State of New York. Mr. Beckman is the President of LBGES and has been with the firm since 1978. Mr. Beckman's engineering experience includes but is not limited to: remediation system selection and design, operation and maintenance of remedial systems (i.e., air sparging [AS]/soil vapor extraction [SVE]), pump and treat, chemically-enhanced remediation, dual-phase extraction [DPE]), site inspections, environmental site investigation, sensitive receptor impact statements, RIs, feasibility studies, design of storm water collection and detention structures, drainage structure design, wetland impact assessments and mitigation measure design, drainage basin delineation, precipitation-probability curve generation, and hydrologic modeling.

As Remedial Engineer, Mr. Beckman will work with LBGES/LBG personnel and collaborate directly with the Principal-in-Charge as well as the Project Manager. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the Site (NYSDEC BCA Site No. C224099, Index No. W2-1069-0506). The Remedial Engineer will certify in the FER that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in this RAWP and any other relevant provisions of Environmental Conservation Law (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, and/or LBGES/LBG representatives under his supervision, 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, and/or LBGES/LBG representatives under his supervision, will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this RAWP. The Remedial Engineer will provide the certifications (presented in Section 8.1, below) in the FER.

3.1.1.3 Project Manager

Mr. Sean Groszkowski has been with LBGES/LBG since 2000 and has been a Senior Associate with the company since 2012. Mr. Groszkowski has worked on many contaminated site remediation projects in New York for both public and private entities with a specialization in the NYSDEC BCP. Mr. Groszkowski has extensive experience completing long-term hazardous soil remediation projects in collaboration with State regulatory agencies. As such, he is very familiar with Federal and State regulations governing hazardous waste remediation projects.

As Project Manager, Mr. Groszkowski would be the primary contact for the project and would be responsible for coordinating and conducting all tasks necessary to complete the required scope of work. These tasks would include coordination and oversight of all tasks necessary to complete the required scope of work. Mr. Groszkowski would work with all associated subcontractors and would report directly to the Principal-in-Charge and the Remedial Engineer.

3.1.1.4 Project Field Supervisor

Mr. Brian Hawe and/or qualified LBGES/LBG representatives under his supervision will serve as Project Field Supervisor for this project. Mr. Hawe, a Senior Hydrogeologist, has been with LBGES/LBG since 2005. His hydrogeologic experience includes but is not

limited to: hazardous waste remediation projects; soil excavation oversight; collection of soil, groundwater, soil vapor and indoor air samples; drilling supervision and formation sampling; well design; installation of groundwater/NAPL monitor and recovery wells; underground storage tank (UST) closures, development and test pumping of recovery wells, supervision of hazardous soils/liquids removal; and air monitoring.

The Project Field Supervisor will be responsible for implementation and oversight of all RAWP activities performed as part of remedial field activities. This will include the supervision and coordination of all onsite RAWP activities. The Project Field Supervisor will be responsible for conducting daily tailgate meetings with all contractors involved in the remedial project that day. Additionally, the Project Field Supervisor will be responsible for documenting the daily activities associated with the implementation of the RAWP on Daily Field Sheets. The Daily Field Sheets will outline remedial activities performed for each day and will be submitted to the NYSDEC and NYSDOH Project Managers (via e-mail) at the end of each day following the reporting period.

The Project Field Supervisor will work alongside the Health and Safety Officer (HSO) during the implementation of the RAWP. The Project Field Supervisor will report directly to the Project Manager and Remedial Engineer.

3.1.1.5 Health and Safety Officer

Mr. David Morelli has been with LBGES/LBG since 2002 and has been a Senior Hydrogeologist with the company since 2008. Mr. Morelli's hydrogeologic experience includes but is not limited to: project management for soil and groundwater remediation sites; community air monitoring activities; collection of soil, groundwater, soil vapor and indoor air samples; well design; drilling supervision and installation of groundwater/NAPL monitor and recovery wells; UST closures; development and test pumping of recovery wells; and air monitoring.

As HSO, Mr. Morelli and/or designated LBGES/LBG representatives under his supervision would be responsible for implementation, enforcement and monitoring of the Health and Safety Plan (HASP). This responsibility will primarily consist of field oversight to ensure work activities/conditions are completed/maintained in compliance with the HASP. This

includes but is not limited to: the performance of the pre-project Health and Safety meeting; the performance of the daily Health and Safety tailgate meeting (during implementation of the RAWP); oversight of field work and halting activities in the event of an observed Health and Safety condition. As HSO, he will also be responsible for the pre-decontamination indoctrination and periodic training of all personnel entering and/or working at the Site with regard to the HASP. The HSO will also be responsible for alerting the Project Manager, the Remedial Engineer and the NYSDEC Project Manager of any Health and Safety issues that arise in association with the onsite remedial activities.

The HSO will work alongside the Project Field Supervisor during the implementation of the RAWP. The HSO will report directly to the Project Manager and Remedial Engineer.

3.1.2 Field Activity Policy and Procedures

3.1.2.1 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings (NYCDOB) construction code requirements or according to specific variances issued by that agency. The anticipated work hours for activities outlined in this RAWP will be from approximately 7:00 a.m. until 3:00 p.m. Exceptions to these work hours will be necessary during the implementation of long-term dewatering activities necessary for the performance of the "hot spot" soil excavations.

The NYSDEC will be notified by the Volunteer of any variances issued by the NYCDOB. NYSDEC reserves the right to deny alternate remedial construction hours.

3.1.2.2 Site Safety and Security

All remedial action activities will be performed in accordance with the HASP. A copy of the HASP (outlined in Section 3.2.1, below) is presented in Appendix C. During all remedial activities, access onsite and offsite will be limited. All persons entering the Site will be required to sign a log book and persons entering the active remediation areas will be required to meet all applicable health and safety requirements. All excavations will be secured during non-working hours. Offsite work areas will be regulated so that the public will be protected from injury or accident. Adequate danger signs, barriers, etc., will be placed to effectively

warn the public of hazards as well as to restrict access to dangerous areas. Necessary barricades, walkways, lighting and posting will be provided for the protection of the public prior to the start of remedial action activities. Excavation operations on or near State, County, or city streets, access ways, or other locations where there is extensive interface with the public and/or motorized equipment will not start until the area surrounding the work zone has been made safe for the public. Additionally, the onsite HSO will monitor operations during the remedial activities to ensure that applicable protective measures are in place and functioning.

Additionally, safe access will be provided for employees, including installation of walkways, stairs, ladders, etc. When operations are conducted during hours of darkness, adequate lighting will be provided at the excavation, borrow pits and waste areas.

3.1.2.3 Traffic Control

The basic objective of traffic control is to permit the contractor to work within the public right of way efficiently and effectively while maintaining a safe, uniform flow of traffic. The construction work and the public traveling through the Site access points in vehicles, bicycles or as pedestrians must be given equal consideration when developing a traffic control plan.

When road traffic is needed to be diverted and/or stopped to accommodate remedial action activities, a flagger will be used. The flaggers will wear hard hats and high-visibility dayglow vests. When/if working at night, the vest will have light-reflective strips. The HSO will assign the traffic control personnel.

All construction vehicles will be equipped with backing alarms and *Slow Moving Vehicle* signs when appropriate. All operators must be qualified and trained to operate the equipment they are using. If a vehicle will be parked alongside the road, orange safety cones will be placed around it to alert drivers.

Offsite transport vehicles will be inspected at the exit pad to ensure they meet the requirements established for offsite waste transport. They will be inspected for caked on soils or debris, and for transport integrity (i.e., leaking trailer bed, appropriately covered). At this location, corrective measure will be taken prior to leaving the Site. If necessary, transport vehicles will proceed to a decontamination pad which will be prepared and maintained by the

Contractor. Cleaning of the vehicle wheels and under carriage will be performed to eliminate soils tracked offsite by transport vehicles exiting the Site.

3.1.2.4 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. Chemical analytical work will be performed for full scan parameters (TAL metals; Target Compound List [TCL] volatiles and semivolatiles, 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 telephone to NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

3.1.2.5 Worker Training and Monitoring

All personnel working on the Site as part of the RA activities will have at a minimum a 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) certification. This certification will be validated with annual 8-hour refresher courses. Additionally, all personnel will be subject to their specific company medical monitoring program (i.e., annual physical).

All personnel performing work at the Site as well as those certifying any aspect of the project will have the appropriate required certification(s).

3.1.2.6 Agency Approvals

All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

A Release and Covenant Not To Sue (Release) will not be issued for the project unless conformance with zoning designation is demonstrated. The planned end use for the Site is in

conformance with the current zoning for the property as determined by New York City Department of City Planning (NYCDCP).

The need for the following permits, certificates or other approvals or authorizations are anticipated to perform the remedial and development work:

- NYCDOB Shoring Permit;
- NYCDOB Excavation Permit;
- NYCDOB Dewatering Permit.

As per NYSDEC State Pollutant Discharge Elimination System (SPDES) regulations, discharges associated with the implementation of the RAWP do not require a SPDES permit under ECL Article 17, Titles 7 or 8. Any discharge in compliance with an order issued pursuant to ECL 27-1313 to implement a Department approved inactive hazardous waste remedial site program provided that such discharge complies with the substantive requirements of a SPDES permit, or any discharge under any remedial or corrective action work plan approved by the Department provided that such work plan includes public notification and response to the public equivalent to that required under either ECL 27-1313 or Part 621 of this Title, and provided that such discharge complies with the substantive requirements of a SPDES permit.

Additionally, activities associated with the RAWP will comply with all substantive requirements applicable to the following NYSDEC permits:

- NYSDEC SPDES General Permit GP-02-01 for Storm Water Discharges from Construction Activities; and,
- NYSDEC SPDES Discharge Permit for discharge of treated groundwater (resulting from groundwater extraction activities onsite) to the Gowanus Canal.

If any additional permits are deemed necessary, they will be obtained by the Volunteer's representatives. In addition to the required local NYCDOB permits, compliance with all substantive requirements associated with the SPDES regulated activities will be maintained. This includes activities associated with the soil excavation activities as well as the dewatering and groundwater treatment system effluent discharge activities.

3.1.2.7 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 NYSDEC BCP. The sign will meet the detailed specifications as outlined in DER-10 and as provided by the NYSDEC Project Manager. A sample of the NYSDEC BCP project sign is included in Appendix D.

3.1.2.8 Pre-Construction Meeting with NYSDEC

A pre-construction meeting outlining major construction activities to be performed in conjunction with the RA implementation will take place prior to the start of major construction activities. This meeting will include at a minimum the Volunteer's representative, the remediation contractor and the NYSDEC Project Manager.

Additionally, the field supervisor and HSO will conduct daily meetings (project scope and health and safety hazards for the day's work).

3.1.2.9 Emergency Contact Information

An emergency contact sheet with names and telephone numbers is included in table 2. This document defines the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

3.2 Governing Documents

3.2.1 Site-Specific Health and 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 the Federal OSHA.

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 HASP and for the implementation of that work according to that plan and applicable laws. As such, LBGES/LBG has prepared a Site-specific HASP to govern all onsite activities completed in association with the environmental remediation activities per-

formed in association with the Site. The Site-specific HASP is presented in Appendix C. The HASP and requirements detailed in the RAWP will pertain to all remedial and invasive work performed onsite and offsite.

As outlined in Section 3.1.1.5, the Site HSO will be Mr. David Morelli. A copy of his resume is included in Appendix B.

3.2.2 Construction Quality Assurance Plan (CQAP)

During the performance of all RA construction activities, the Construction Quality Assurance Plan (CQAP) will be implemented to ensure appropriate QA/QC methodologies are applied in the field and in the lab to ensure quality. The CQAP provides details related to 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 methodologies will consist of performing required activities to industry standards. All personnel will have had the proper training and experience necessary to fulfill project-specific responsibilities. Project coordination meetings will occur between the Volunteer and its representatives, the construction manager, excavation contractor, remedial or environmental subcontractors, and other involved parties prior to each major phase of the RA activities.

3.2.2.1 Monitoring Testing and Frequency

Real-time air monitoring will be performed to assess the onsite and perimeter air quality during the performance of the RAWP field activities. Onsite monitoring will be performed in accordance with the Community Air Monitoring Plan (CAMP) as presented in Section 3.2.4, below. If required based on the air monitoring results, mitigation measures will be implemented to control migration of particulates and/or volatiles.

3.2.2.2 Sampling Activities

Soil monitoring will be performed in combination with field observations (visual and olfactory) to assess the extent of onsite excavations. These factors will be used in association with field conditions to determine the final extents of onsite excavation activities.

Excavation endpoint sampling activities at the Site will be performed as outlined in Section 2.3, above. The size of the excavations may include but not be limited to one or more of the following factors: utilities; clearance; building infrastructure; proximity to adjacent properties; subsurface obstructions; and site redevelopment specifications. At a minimum, all endpoint confirmation soil samples will be analyzed for parameters regulated under both 6 NYCRR Part 375-6 RUSCOs for restricted residential use, and NYSDEC CP-51: Soil Clean-Up Guidance Supplemental Soil Cleanup Objectives.

The sampling frequency as well as analytical parameter requirements for waste characterization analyses will be performed in accordance with the requirements established for the approved waste disposal facilities (for each respective waste stream). At a minimum, all waste characterizations samples will be analyzed for VOCs, SVOCs, PCBs, total Resource Conservation and Recovery Act (RCRA) metals, Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals, corrosivity (pH), reactivity and flashpoint.

3.2.2.3 Requirements for Project Coordination Meetings

The Volunteer and its representatives will schedule meetings between the environmental consultant, excavation contractor, remedial or environmental subcontractors, and other involved parties. These coordination meetings will, at a minimum, consist of a conference call between all parties involved outlining upcoming remedial activities.

There will be an initial health and safety meeting prior to the commencement of the RAWP activities. Additionally, there will be a daily tailgate meeting with onsite personnel covering the daily scope of work as well as project scope-specific health and safety requirements/issues.

3.2.2.4 Final Documentation Retention

Copies of all final documentation (including reports, lab analysis, permits, etc.) will be retained by the Volunteer and made available for review upon request.

3.2.3 Soil/Materials Management Plan (SoMP)

This Soil/Materials Management Plan (SoMP) outlines detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport and disposal. It 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 will be utilized during all remedial action activities performed onsite as outlined in this RAWP, as well as for any future ground invasive work (if necessary) that is performed under the subsequent SMP.

As part of redevelopment or any future onsite ground-intrusive activities, the Site will require grading prior to cover system installation. Excavated soil meeting Part 375-6.7(d) criteria and any construction debris piles (asphalt and concrete which may be reused at the Site) generated during intrusive activities will be graded to the surface required for redevelopment. Trees, shrubs, roots, brush, masonry, rubbish, scrap, debris, pavement, curbs, fences, etc. (i.e., solid waste) will be removed and properly disposed offsite or temporarily stockpiled in accordance with applicable solid waste regulations prior to proper offsite disposal. Only exempt materials as defined in 6 NYCRR Part 360-7.1(b)(1) are allowed for stockpiling. Prior to cover system replacement, protruding material will be removed from the ground surface.

3.2.3.1 Soil Screening Methods

During onsite remedial construction activities, the excavation of soil/fill material will be necessary. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion (NOC). During all excavation activities, the soil/fill will be inspected for staining and will be field screened for the presence of VOCs with a PID. Based on the soil that is observed to be discolored, tinted, dyed, unnaturally mottled, or has a sheen, or excavated soil/fill that is visibly stained or produces elevated PID readings (i.e., above background) will be considered potentially con-

taminated and stockpiled on the Site for further assessment. The potentially contaminated soil/fill will be stored in labeled drums and/or a lined and covered roll-off container and then sampled for waste characterization. The waste will then be transported offsite to a permitted waste management facility for disposal.

If buried drums or USTs are encountered during excavation activities, they will be properly removed (in the case of drums) or closed per 6 NYCRR Part 595 and/or Part 613 (in the case of tanks), and any associated waste will be characterized and disposed offsite. The soil/fill surrounding the buried drums or USTs will be considered as potentially contaminated and will be stockpiled and characterized. Post-excavation samples will be collected and analyzed from the sidewalls/bottom of any drum or tank excavation as per DER-10 Section 5.4.

Soil/fill screened in the field as having PID concentrations below background and exhibiting no visual or olfactory evidence of contamination may be left onsite below the demarcation fabric and certified cover fill.

Visual, olfactory and PID soil screening and assessment will be performed by or under the supervision of the Field Project Supervisor and/or HSO and will be reported in the FER.

3.2.3.2 Stockpile and Temporary Storage Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, trenches, grading, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded on the daily field sheets and will be available for inspection by NYSDEC. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced. All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt

fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

Due to the proposed dewatering activities in addition to the DPE activities, contaminated groundwater will likely be generated during the implementation of the RAWP. A temporary water treatment system will be used onsite to treat the extracted groundwater to comply with discharge requirements established by either NYSDEC (for SPDES discharge to the Gowanus Canal) or the New York City Department of Environmental Protection (NYCDEP) (for discharge to the sanitary sewer). If a temporary water treatment system is used onsite, extracted groundwater will be temporarily stored in onsite 21,000-gallon fractionation tanks (or similar) prior to treatment and discharge.

As an alternative to the temporary water treatment system, vacuum trucks will be available for extraction/containment of contaminated groundwater and subsequent offsite disposal.

3.2.3.3 Characterization of Excavated Materials

Based on the extent of the Site use history, the onsite subsurface contamination cannot be attributed to a documented commercial or industrial process. Therefore, onsite waste generated as part of remedial actions will not be classified as hazardous waste as a listed waste. Alternatively, hazardous waste characterization will be determined based on evaluation of hazardous waste characteristics.

Laboratory analytical sampling will be utilized to identify and define a characteristic of hazardous waste at the Site. The classification of a solid waste as hazardous based on a characteristic of toxicity will be determined using the Toxicity Characteristic Leaching Procedure (TCLP), test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846.

For soil/fill and C&D debris (where required) excavated from the Site under the remedial program, grab and composite waste characterization samples will be collected and sent to a New York State approved laboratory for waste characterization analysis for 375-6.8 requirements of VOCs, SVOCs, TAL metals, cyanide, PCBs and pesticides. The sampling plan will consist of collecting a representative number of samples for the respective volume of material to be disposed. As per DER-10 Table 5.4(e)10, the following recommended number of soil

samples (frequency for various quantities of soil) for soil imported to or exported from a Site have been established:

Contaminant	VOCs	SVOCs, Inorganic and PCBs/Pesticide
Soil Quantity (Cubic Yards)	Discrete Samples	Composite Samples
0-50	1	1
50-100	2	1
100-200	3	1
200-300	4	1
300-400	4	2
400-500	5	2
500-800	6	2
800-1,000	7	2
Greater than 1,000	An additional 2 VOC and 1 Composite for each additional 1,000 cubic yards	

In addition to the 6 NYCRR Part 375-6.8(b) analytical parameters, excavated soil/fill and/or other excavated media that will be transported off-Site for disposal will be sampled in accordance with the requirements of the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this RAWP.

EPA regulations in 40 CFR 268.40 describe the treatment standards for the disposal of hazardous wastes in landfills. Materials for disposal must be tested to meet these limits for disposal. Disposal facility waste acceptance criteria (WAC) prescribe requirements for identification and reporting of waste constituents. Each waste class must be tested for key constituents to properly classify these wastes for disposal.

3.2.3.4 Materials Excavation, Load-Out and Departure

The Project Field Supervisor, Project Manager or designee overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;

- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this RAWP are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site; and,
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials. Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior NYSDEC approval.

3.2.3.5 Offsite Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off-Site disturbance. Off-Site queuing will be minimized. Outbound truck transport routes are included as figure 9. The trucking routes take into account the following factors:

1. limiting transport through residential areas and past sensitive sites;
2. use of mapped truck routes;
3. minimizing off-Site queuing of trucks entering the facility;
4. limiting total distance to major highways;

5. promoting safety in access to highways; and,
6. overall safety in transport.

To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

Transportation of contaminated waste from the Site to the prescribed treatment/disposal facility will utilize: Department of Transportation (DOT) approved steel 55-gallon drums, lined roll-off containers and/or lined dump trucks. Permits, licenses and insurance will be provided as per regulations.

All vehicles transporting waste from the Site for offsite disposal will adhere to the truck routes outlined in figure 9.

3.2.3.6 Materials Disposal Offsite

The following documentation will be established and reported by the Remedial Engineer for each disposal destination used in association with the remedial program to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations:

1. A letter from the Remedial Engineer or designee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at a NYSDEC BCP environmental remediation Site in Brooklyn, New York. The letter will provide the project identity and the name and phone number of the Remedial Engineer or designee. The letter will include as an attachment a summary of all chemical data for the material being transported.
2. A letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the FER.

The FER will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the FER.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility). A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the FER. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

3.2.3.7 Potential Disposal Facilities

Laboratory waste characterization of the segregated stockpiles of soil/fill will be completed prior to the loading and transport to the disposal facility. Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. Based on the results of the laboratory analysis, the soil will be classified as either hazardous or non-hazardous. The disposal/treatment facility to be utilized will be determined based on the contaminant(s) present and the contaminant concentrations as determined by the waste characterization analysis. Based on the Site COCs, it is anticipated that the waste generated at the Site will be disposed of at one of the following facilities listed below.

3.2.3.7.1 Clean Earth of North Jersey, Inc.

Clean Earth of North Jersey, Inc.
115 Jacobus Avenue
South Kearny, NJ 07032
Telephone: (973) 344-4004
Fax: (973) 344-8652

Clean Earth of North Jersey, Inc., located in South Kearny, New Jersey, operates a state-of-the-art RCRA Part B Facility, considered to be the premier Treatment Storage and Disposal Facility in the New York/New Jersey Metropolitan Area. Its location makes Clean Earth of North Jersey, Inc. the facility of choice for some of America's largest corporations. Clean Earth of North Jersey, Inc. specializes in the management of heavy metal contaminated soil, (fuel blending) flammable liquids, PCB transformers and drum waste. Clean Earth of North Jersey, Inc. is also permitted to manage lab-pack waste for an unlimited variety of waste streams. This facility provides fuel blending technology, stabilization of RCRA metals, lab-pack services, management of PCB transformers, wastewater blending and a wide variety of drum waste disposal services. Clean Earth of North Jersey, Inc. also provides manifesting and transfer services for some of the United States and Canada's most well respected RCRA incinerators and landfills.

For waste soil/fill classified as non-hazardous, it may qualify to be transported to the Clean Earth facility located in Philadelphia, Pennsylvania.

3.2.3.7.2 Clean Earth of Carteret, Inc.

Clean Earth of Carteret, Inc.
Fixed Base Bioremediation Services
24 Middlesex Avenue
Carteret, NJ 07008
Telephone: (732) 541-8909

Clean Earth of Carteret, Inc. (CEC) is the first "fixed based" bioremediation facility permitted in the State of New Jersey and the largest (of its design) operating in the United States. The facility has 80,000 sf of treatment area, with an additional outside storage capacity of 45,000 sf. The facility utilizes an onsite laboratory to ensure compliance and quality control for incoming waste streams. Heated air is generated with overhead radiant heaters to provide climate control capability for year round operation. All treatment of soils is conducted under a "negative air" (New Jersey Department of Environmental Pro-

tection [NJDEP]-Designed) air handling system that exchanges clean air through the facility and processes airborne organics via baghouse followed in series by two activated carbon absorption units.

CEC is permitted and capable of processing 400,000 tons of petroleum contaminated soil per year.

3.2.3.7.3 Soil Safe, Inc.

Soil Safe
378 Route 130
Logan Township, NJ 08085
Toll Free: (800) 562-4365
Telephone: (410) 872-3990
Fax: (410) 872-9082

The Soil Safe Logan facility is located on 160 acres in southern New Jersey. Soil Safe's unique micro-encapsulation process eliminates future liability by fully processing industrial waste and contaminated soil into a safe and usable end product. The Soil Safe process binds contaminants at a molecular level into a high quality sub-base material. The sub-base has been used in government and private construction projects.

Soil Safe offers a complete continuum of turnkey services. From testing, excavation, loading, transportation, recycling of waste material, and final placement of the recycled sub-base material.

Soil Safe specializes in handling petroleum contaminated soils, metals contaminated soils, and a variety of other industrial wastes. Soil Safe's specialization in construction waste and encapsulation process enables a unique opportunity to save money on remediation. Soil Safe's competitive advantages allow for recycling of soil for less than thermal treatments and landfilling and also saving up to sixty-five percent on paving projects using a recycled material. Soil Safe believes they provide the solution to a situation which would otherwise be an environmental problem.

3.2.3.7.4 Waste Management, Inc. - CWM Chemical Services, LLC

Office Address
1550 Balmer Road
Youngstown, NY 14174
Phone: 716-286-1550
Fax: 716-286-0211

Mailing Address
P.O. Box 200
Model City, New York 14107
Telephone: (716) 286-1550

Waste Management's Industrial Services Group design specialized waste collection, transportation and disposal services such as recycling, hazardous and special waste disposal and fuels blending operations to customers in a wide range of industries. We provide daily on-site management of these services, with a Waste Management representative. Contact us about developing a safe and environmentally sound plan for your business. CWM Chemical Services, LLC is a waste disposal facility operating under NYSDEC approval for disposal of the following waste streams:

1. Storage of Solid & Liquid, Hazardous & Non-Hazardous Waste in Containers;
2. Storage of Liquid Hazardous & Non-Hazardous Waste in Tanks;
3. Treatment of Liquid Hazardous & Non-Hazardous Waste in Tanks;
4. Treatment (Stabilization, Immobilization & Encapsulation) of Solid Hazardous & Non-Hazardous Waste in Tanks;
5. Storage of Liquid Hazardous & Non-Hazardous Waste (Post-Treatment) in Surface Impoundments;
6. Disposal of Solid Hazardous & Non-Hazardous Waste in a Landfill (Residual Management Unit - One (RMU-1));
7. Commingling of Liquid Hazardous Waste and Repackaging of Laboratory Chemical Waste for Shipment;
8. Implementation of Final Corrective Action Remedies for Site-Wide Contamination; and,

9. Groundwater Monitoring and Perpetual Post-Closure Care at All On-Site Land Disposal Units.

TSCA waste (greater than 50 mg/kg PCBs) generated at the Site will be transported under Uniform Hazardous Waste Manifests to the CWM Chemical Services, LLC facility in Model City, New York for disposal as PCB remediation waste in accordance with TSCA

3.2.3.7.5 Republic Environmental Systems (PA), LLC

Republic Environmental Systems (PA), LLC
2869 Sandstone Drive
Hatfield, PA 19440
Telephone: (215)822-8995

Republic Environmental Systems (PA), LLC (PSC) is a state of the art waste treatment facility, which accepts hazardous and non-hazardous wastes offsite from industrial sources and site clean-up activities. The treatment operations have been designed to handle a wide variety of wastes including liquids, solids, and contaminated soils containing both organic and inorganic constituents. The facility provides waste management, which stresses waste minimization and environmentally sound methods of waste treatment. Waste accepted for chemical and or physical wastewater treatment are aqueous based. The constituents in all waste managed at the facility are known and monitored closely The waste source, description of waste, contaminants present, and contaminant limitations are established for all categories of bulk liquid wastes treated at the facility. The concentrations of the constituents/contaminants are measured upon receipt from the generator.

PSC is a waste management facility which treats, stores and transfers hazardous and non-hazardous (Residual) wastes. The primary waste management activities conducted at RESPA are the storage and or treatment of numerous categories of waste including but not limited to, aqueous wastes, oil and petroleum production waste, industrial solids and sludge's, solvents, paints and

organic waste, contaminated debris/soil, lab packs and PCB contaminated wastes.

3.2.3.7.6 Hazleton Creek Properties, LLC

Hazleton Creek Properties, LLC
282 South Church Street
Hazleton, PA 18201
Telephone: (570)501-5050

Hazleton Creek Properties, LLC (Hazleton Creek) The site is an abandoned mine site that has been severely impacted by past deep and surface mining practices containing 277 acres of un-reclaimed abandoned mine pits and spoil piles. Portions of the site (approximately 50 acres) were subsequently used for disposal of municipal and industrial waste in several mine pits.

The site is a brownfield site and is a designated Special Industrial Area under the PA Act 2 and has been designated a Brownfield Action Team site (BAT) by the Governor of Pennsylvania giving the site priority attention for remediation. Hazleton Creek is authorized to conduct the site reclamation and remediation using the residual materials approved under WMGR085, WMGRO96, WMGR097, and WMGR125.

The Hazleton Reclamation Project site has the capacity to accept over 10 million cubic yards of residual materials to complete the site reclamation. Hazleton Creek is a permitted site for the beneficial use of the following: dredge material, coal ash, cement kiln dust, lime kiln dust, C&D fines, regulated fill material, PA clean fill materials, concrete, brick block and asphalt.

3.2.3.7.7 Michigan Disposal Waste Treatment Plant

Michigan Disposal Waste Treatment Plant
49350 North I-94 Service Drive
Belleville, MI 48111
Telephone: (800)592-5489

Michigan Disposal Waste Treatment Plant (MDWTP) is the largest stabilization and treatment facility in North America (by volume) with the ability

to process hazardous and non-hazardous materials through stabilization, chemical oxidation/reduction, deactivation, micro encapsulation and other permitted technologies. MDWTP manages more than 600 federal and state waste codes. The facility also features a Regenerative Thermal Oxidation (RTO) system, and is the only treatment and stabilization facility in North America that is fully compliant with RCRA Subpart CC emissions standards. This allows MDWTP to treat organic waste streams with high concentrations of Volatile Organic Compounds (above 500 ppm) as a more cost-effective option than incineration. MDWTP is ISO 9001:2000, ISO 14001:2004 and OHSAS 18001:2007 certified.

3.2.3.7.8 Wayne Disposal, Inc. Site#2 Landfill

Wayne Disposal, Inc. Site#2 Landfill
49350 North I-94 Service Drive
Belleville, MI 48111
Telephone: (800)592-5489

Wayne Disposal is the only commercial hazardous waste landfill in Michigan and the only landfill in EPA Region V permitted to accept PCB contaminated wastes. WDI's state-of-the-art containment cells feature double composite liners comprised of natural clay, two 80-mil HDPE plastic liners and two leachate collection zones. WDI is ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007 certified.

3.2.3.7.9 Clean Water of New York, Inc.

Clean Water of New York, Inc.
3249 Richmond Terrace
P.O. Box 030312
Staten Island, NY 10303-0312
Telephone: (718) 981-4600

Clean Water of New York, Inc. (Clean Water) offers a wide variety of services. Those applicable to the RAWP activities include water processing and drum disposal. Clean Water's state of the art, water treatment plant has a ca-

pacity of over 4,000,000 gallons at a processing flow of 250 gpm (gallons per minute). This provides the capability of handling large jobs quickly.

Clean Water can manage drum removal projects of any size, from one drum to trailer loads. Oil and oily water streams are managed at Clean Water's facility. Solids are consolidated for offsite disposal. Landfill and incineration are two disposal methods offered for solids.

3.2.3.7.10 Clear Flo Technologies, Inc.

Clear Flo Technologies, Inc.
1110A Route 109
Lindenhurst, NY 11757
Telephone: (631)956-7600

Clear Flo Technologies, Inc. (Clear Flo) specializes in the receiving, processing, and disposal of non-hazardous liquid wastes for: restaurants, shopping centers, shopping malls, car wash, pharmaceutical plants, manufacturing plants, textile manufacturing plants, automobile manufacturing plants, sewage treatment facilities, water treatment facilities, landfills and other waste facilities.

3.2.3.8 Materials Reuse Onsite

Soil and fill that is derived from the property that meets the RUSCOs established in this plan may be reused on-Site. Material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, will be subject to future management under the SMP. The Remedial Engineer will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed. The placement locations of reused material will be presented in the FER.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the Site for grading or other purposes will not be reused within the 2-foot certified clean cover soil layer or within landscaping berms.

3.2.3.9 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to provide a visual reference. It is expected that solid cap materials (i.e., concrete and/or asphalt) may be used on portions of the Site as part of the redevelopment plan. Concrete may be used in areas that will become slab-on-grade structures, utilities, footings, foundations, or signs supports. Asphalt may be used for the development in areas that will become roads, sidewalks, and parking lots. Where solid cap materials are used for redevelopment grades, these materials will constitute the demarcation layer and will be considered an acceptable cover system to comply with the Track 4 cleanup requirements.

This demarcation layer will constitute the top of the Residuals Management Zone, the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the SMP. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the Residuals Management Zone in the SMP. A map showing the survey results will be included in the FER and the SMP.

3.2.3.10 Import of Backfill Soil From Offsite Sources

Offsite material will be utilized to achieve the 2-foot certified clean cover requirement. The backfill brought to the Site for use as a cover will be comprised of soil or other unregulated material as set forth in 6 NYCRR Part 360. Additionally, due to the selected cleanup track for restricted-residential use, the imported backfill and cover soil may not exceed the lower of the protection of groundwater or the protection of public health SCO for restricted-residential use, as set forth in 6 NYCRR Part 375-6.8(b). For each source of backfill that is imported to the Site, one of the following will be completed prior to importing the backfill.

a. documentation will be provided to NYSDEC as to the source of the material and the consistency of the material in accordance with the exemption for no chemical testing listed in DER-10 Section 5.4(e)(5); **OR**,

b. chemical testing will be completed in accordance with Table 5.4(e)10 of DER-10.

In the event that laboratory analytical testing is conducted, the results for each new source of fill must meet the values provided in Appendix 5 of DER-10 for the identified use (of potential future use) of the Site and must receive approval by the NYSDEC. Copies of the summary tables presenting the Imported Fill Soil Quality Standards (Appendix 5 of DER-10) are included in Appendix A.

Backfill brought to the Site for use as a cover will require sampling and laboratory analysis in accordance with this subdivision and Table 5.4(e)10. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Samples of the fill will be collected based on the soil quantity and type of constituents identified in the table and will be a combination of discrete and composite samples, handled as follows:

1. for VOCs only, grab samples are allowed. These grab samples are one or more discrete samples taken from the fill, with the number as specified in the volatile column of Table 5.4(e)10 for the soil quantity in question, and analyzed for the VOCs identified in Appendix 5 of DER-10; or,
2. for SVOCs, inorganics and PCBs/pesticides:
   a. one or more composite samples are collected from the volume of soil identified in Table 5.4 for analysis, with each composite from a different location in the fill volume;
   b. each composite is prepared by collecting discrete samples from 3 to 5 random locations from the volume of soil to be tested; and,

c. the discrete samples are mixed, and after mixing, a sample of the mixture is analyzed for the SVOCs, inorganic and PCBs/pesticide constituents identified in Appendix 5 of DER-10.

As per DER-10 Table 5.4(e)10, the following recommended number of soil samples (frequency for various quantities of soil) for soil imported to or exported from a Site have been established:

Contaminant	**VOCs**	**SVOCs, Inorganic and PCBs/Pesticide**
Soil Quantity (Cubic Yards)	**Discrete Samples**	**Composite Samples**
0-50	1	1
50-100	2	1
100-200	3	1
200-300	4	1
300-400	4	2
400-500	5	2
500-800	6	2
800-1,000	7	2
Greater than 1,000	An additional 2 VOC and 1 Composite for each additional 1,000 cubic yards	

For remedial projects where large amounts of cover material/backfill are required (as is the condition at the Site), DER-10 allows for a reduction in the sampling frequency from that specified in Table 5.4(e)10 once a trend of compliance is established.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- the Remedial Engineer or designee is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and,

- fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

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

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations; and,
- clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYSDEC.

Prior to the installation of concrete or asphalt paving, the surface will be prepared by compaction and regrading with a sub-grade base. The sub-grade base will then be leveled off, compacted and covered with a polyethylene liner. If necessary, the perimeter extent of the asphalt/concrete area will be prepared with required framing. Once the surface preparation is completed, the pavement cap will be installed. The cap material is anticipated to consist of either: a 3-inch thick (minimum) steel rebar or welded-wire mesh reinforced 4,000 psi (pounds per square inch) concrete slab with adequate expansion joints; or a 3-inch thick (minimum) asphalt pavement. The pavement caps will be installed according to the industry standard for commercial properties. For areas where concrete is installed, a representative number of concrete test cylinders (approximately 1 cylinder per load of concrete) will be collected. After a 30-day cure period, these concrete test cylinders will be tested as a QA/QC to certify the compressive strength and to verify that the concrete meets the contracted specifications. Alternate surface cover cap materials may be utilized as part of redevelopment, and specifications for all cap materials will adhere to industry standards.

RCA may be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the FER. The Remedial Engineer or designee is responsible to ensure that the facility is compliant with 6 NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. *RCA material is not acceptable for, and will not be used as cover material.*

All materials received for import to the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP. The FER will document the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

3.2.3.11 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations.

If a temporary water treatment system is used onsite, then discharge of water generated during remedial construction to surface waters (i.e., the Gowanus Canal) will require a SPDES permit issued by NYSDEC. Prior to any discharge, the water treatment system effluent will be sampled and submitted to a New York State approved laboratory for analysis of parameters required under the NYSDEC SPDES discharge permit. The extracted groundwater will be pretreated (i.e., sediment filters to reduce total suspended solids) as necessary to comply with NYCDEP discharge criteria.

Liquids discharged into the NYC sewer system will receive prior approval by NYCDEP. The NYCDEP regulates discharges to the NYC sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the NYC sewer system will require an authorization and sampling data demonstrating that the groundwater meets the NYCDEP discharge criteria. Prior to any discharge, the water treatment system effluent will be sampled and submitted to a New York State approved laboratory for analysis of parameters required under the NYCDEP discharge criteria. The extracted groundwater will be pretreated (i.e.,

sediment filters to reduce total suspended solids) as necessary to comply with NYCDEP discharge criteria.

If discharge to the NYC sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

3.2.3.12 Storm-Water Pollution Prevention

All aspects of stormwater management related to the scope of the RAWP will be implemented and regulated according to a Site-specific Storm Water Pollution Prevention Plan (SWPPP) which is outlined in Section 3.2.5, below. Applicable laws and regulations pertaining to storm-water pollution prevention as well as erosion and sediment control measures will be addressed during the implementation of the remedial actions.

3.2.3.13 Contingency Plan

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to NYSDEC Project Manager. Petroleum spills will be reported to the NYSDEC Spill Hotline. These findings will be included in the daily progress report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to Office of Environmental Remediation (OER).

Chemical analytical testing will be performed for TAL metals, TCL volatiles and semivolatiles, TCL pesticides and PCBs, as appropriate.

3.2.3.14 Odor, Dust and Nuisance Control

All necessary means will be employed to prevent on- and off-Site odor 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) use of foams to cover exposed odorous soils.

If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (a) direct load-out of soils to trucks for off-Site disposal; and (b) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC (and NYSDOH if required) will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the Remedial Engineer certifying the Final Engineering Report or a designee.

Dust management during invasive on-Site work will include, at a minimum:

- use of a dedicated water spray methodology for roads, excavation areas and stockpiles;
- use of properly anchored tarps to cover stockpiles;
- exercise extra care during dry and high-wind periods; and,
- use of gravel or RCA on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. NYSDEC (and NYSDOH if required) will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the Remedial Engineer certifying the FER or a designee.

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards. Rodent control will be provided, during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances.

3.2.4 Community Air Monitoring Plan (CAMP)

Environmental air monitoring and visual observation will be conducted during implementation of all remedial activities onsite and offsite. The proposed program consists of two

primary forms of environmental monitoring: particulates (dust) and VOCs. The purpose of the community air monitoring is to ensure that the ECs designed to protect the community from fugitive releases are functioning properly and, should any such releases occur, ensure immediate notice thereof so that appropriate abatement actions may be implemented. A CAMP has been prepared for this Site and is included in Appendix E.

3.2.5 Storm Water Pollution Prevention Plan (SWPPP)

Storm water management is an important component of the remedial construction at the Site. All necessary and appropriate actions will be taken to ensure that New York State Storm Water Management Regulations (including physical methods to control and/or divert surface water flows and to limit the potential for erosion and migration of Site soils, via wind or water) are met. All aspects of stormwater management related to the scope of the RAWP will be implemented and regulated according to a Site-specific Storm Water Pollution Prevention Plan (SWPPP). The Site-specific SWPPP is included in Appendix F.

Section 402 of the Clean Water Act requires permits for storm water discharges from construction activities that disturb one or more acres of land to obtain a permit. To implement the law, the NYSDEC issues General Permit GP-02-01 for Storm Water Discharges from Construction Activities. This permit is administered under the NYSDEC SPDES. In order to obtain a permit, a Notice of Intent (NOI) must be prepared and submitted to the NYSDEC. Although the RAWP activities are exempt from the permitting requirements under the BCP, all substantive requirements associated with the permit remain effective and RAWP activities must be performed in compliance with said requirements. This includes preparation and submission of the NOI, with the required site-specific information. A copy of the NOI application is included in Appendix G.

A requirement to submit the NOI and obtain the permit, a SWPPP that conforms to the requirements of NYSDEC Division of Water Guidelines is required. The purpose of a SWPPP is to ensure that appropriate steps are taken to keep storm water from picking up pollutants or sediment and creating further problems downstream. To comply with the substantive requirements of the SPDES permit, a Site-specific SWPPP has been developed and is included in Appendix F.

3.2.6 Citizen Participation Plan (CPP)

All historical documents related to the environmental activities performed at the Site have been filed with the NYSDEC as well as public document repositories. The document repositories will be inspected prior to implementation of the RAWP to ensure/verify that they contain all applicable project documents.

The Fact Sheets will be mailed out to the project contact list by the NYSDEC. No changes will be made to Fact Sheets following NYSDEC approval and authorization for mail-out. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

The CPP for this project is attached in Appendix H. Document repositories have been established at the following locations and contain all applicable project documents:

Document Repository 1
Brooklyn Public Library - Pacific Branch Library
25 4th Avenue
Brooklyn, NY 11217
Telephone: (718) 638-1531
Hours of Operation:
Tue., Thur. & Fri. - 10 a.m. to 6 p.m.
Wed. - 1 p.m. to 8 p.m.
Sat. - 10 a.m. to 5 p.m.
Sun. and Mon. – Closed

Document Repository 2
Brooklyn Public Library - Park Slope Library
431 6th Avenue
Brooklyn, NY 11215
Telephone: (718) 832-1853
Hours of Operation:
Mon., Wed., & Fri. - 10 a.m. to 6 p.m.
Tue. and Thur. - 1 p.m. to 8 p.m.
Thur. and Fri. - 1 p.m. to 6 p.m.
Sat. - 10 a.m. to 5 p.m.
Sun. – Closed

In addition to the above-listed public document repository locations, all files and/or reports associated with the environmental activities at the Site are maintained and available for review at the NYSDEC Headquarters in Albany, New York as well as in the NYSDEC Region 2 Office. The information for these offices is:

NYSDEC - Albany Headquarters Office
Bureau of Environmental Remediation
625 Broadway
Albany, NY 12233-7016
(518) 402-9767 (call in advance for appointment)
Hours: Mon. to Fri. 9 a.m. to 5 p.m.

NYSDEC Region 2 Office
Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
(718) 482-4900 (call in advance for appointment)
Hours: Mon. to Fri. 9 a.m. to 5 p.m.

3.2.7 Quality Assurance Project Plan (QAPP)

The QAPP is a formal document describing in comprehensive detail the necessary QA/ QC and other technical activities that must be implemented to ensure that the results of the work performed will satisfy the stated performance criteria. The QAPP provides a framework for how environmental characterization samples will be collected to achieve specific project objectives, and describes the procedures that will be implemented to obtain data of known and adequate quality. This document includes proposed sampling methods and analytical methods for both characterization sampling and endpoint sampling.

The QAPP will provide sufficient detail to demonstrate that: the project technical and quality objectives are identified and agreed upon; the intended measurements, data generation, or data acquisition methods are appropriate for achieving project objectives; assessment procedures are sufficient for confirming that data of the type and quality needed and expected are obtained; and, any limitations on the use of the data can be identified and documented.

Most environmental data operations require the coordinated efforts of many individuals, including managers, engineers, scientists, statisticians and others. The QAPP integrates the contributions and requirements of everyone involved into a clear, concise statement of what is to be accomplished, how it will be done, and by whom. It provides understandable instructions to those who must implement the QAPP, such as the field sampling team, the analytical laboratory, and the data reviewers.

In order to be effective, the QAPP specifies the level or degree of QA and QC activities needed for the particular environmental data operations. Because this will vary according to the purpose and type of work being done, a graded approach will be used in planning the work. The QAPP is composed of elements covering the entire project from planning, through implementation, to assessment. All applicable elements, including the content and level of detail under each element, are addressed in the QAPP. If an element is not applicable, it will be stated in the QAPP. Documentation, such as the approved RAWP may be referenced in response to a particular required QAPP element to reduce the size of the QAPP.

The QAPP that will constitute a governing document for the completion of the onsite RAWP activities is included in Appendix I.

3.2.8 Established Regulatory Agency Guidance Documents

In addition to all of the above listed Site-specific governing documents applicable to the implementation of the RAWP, the following SCG documents will be followed where deemed applicable:

New York State Standards

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response;
- 40 CFR Part 144 - Underground Injection Control Program;
- 10 NYCRR Part 67 – Lead;
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures;
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998);
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998);
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998);
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998);
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998);
- 6 NYCRR Part 376 - Land Disposal Restrictions;
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources;
- 6 NYCRR Part 608 - Use and Protection of Waters;
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations;
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998);

- 6 NYCRR Part 750 through 758 - Implementation of National Pollutant Discharge Elimination System (NPDES) Program in NYS ("SPDES Regulations"); and,
- Technical Guidance for Screening Contaminated Sediments (January 1999).

New York State Guidance

- Technical and Administrative Guidance Memorandum (TAGM) 4013 - Emergency Hazardous Waste Drum Removal/Surficial Cleanup Procedures (March 1996);
- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994);
- TAGM 4059 - Making Changes To Selected Remedies (May 1998);
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy;
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997);
- TOGS 1.1.1 - Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations;
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works;
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites; and,
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants.

3.3 Site Preparation

3.3.1 Mobilization

Mobilization for RA activities will be performed on a daily basis. A dedicated portion of the Site will be utilized to store heavy machinery and/or excavating equipment. If this is not possible, then required machinery will be mobilized to the Site daily. No remedial equipment, materials, or temporary structures shall be placed on the streets without proper local permits.

3.3.2 Construction Entrance(s)

Continuity will be established between the arrival path, the dedicated truck wash area and the egress path so that trucks do not spread contaminated material when departing the Site. Prior to the commencement of the invasive work at the Site, the Site security will be evaluated. If necessary, Site security will be implemented at the Site to ensure access to the Site only from authorized representatives.

3.3.3 Equipment and Material Staging

Due to size of the equipment involved with the RAWP as well as the mobilization costs associated with such, equipment will be staged at the Site during dedicated phases of the implementation of the RAWP. The staging of equipment and materials will be contingent on the establishment of adequate Site security.

In addition to the equipment staging, large volumes of materials will be utilized as part of the RAWP activities. These materials include but are not limited to: fencing, demarcation layer filter fabric; sheeting/shoring materials; and, certified clean fill material. If material staging and/or stockpiling is performed, adequate measures will be taken to ensure that the material is segregated from the residual onsite contamination.

The proposed location of the equipment and material staging area(s) are shown on the Site Staging Plan included as figure 10.

3.3.4 Decontamination Areas

To facilitate working in the containment area while ensuring the safety for workers and the public, the Site will be divided into three (3) delineated areas:

- ***The "Work Zone"***

  The work zone is the area where potentially hazardous contaminants and physical hazards to Site workers may be encountered. Personnel will not be allowed in the work zone without the proper personal protective equipment (PPE), medical authorization, and training certification. In addition, all personnel entering the work zone or decontamination zone shall practice the buddy system. The buddy system requires that at least two individuals work as a team, and remain in close proximity to each other to maintain voice and visual contact. At the

discretion of the HSO, when the work zone and decontamination zone present minimal hazards (e.g., low flow monitoring well sampling with low dissolved concentrations of contaminants) one member of the buddy pair may remain outside the zone if voice and visual contact can be maintained. In addition, some monitoring of minimally invasive activities require a single person; the buddy system does not have to be used at these locations.

The work zone will be designated around the specific excavation, sampling, drilling, or other such work locations. The size of the work zone may be altered to accommodate Site conditions. All equipment and personnel leaving a work zone shall undergo appropriate decontamination.

When using a drill rig or backhoe to penetrate the earth, the work zone perimeter will be set at a distance of 20 feet from the rig in all directions unless space restrictions preclude it. In restricted space areas, the largest work zone possible shall be established; however, a minimum distance of 10 feet from the back of the rig shall be maintained during operation of the rig, and sufficient space around the rig to permit safe operations of the rig. The rig shall be shut down, as appropriate, when persons other than Site workers enter within 20 feet of an operating rig. The size of the work zone must be approved by the HSO and Field Project Manager.

In addition to the perimeter fencing, dust suppression will be implemented as needed to limit fugitive dust emissions. Utilizing hoses, dust generation will be controlled and prevented with a water spray, and any accumulated dust shall be washed off of individuals, tools and equipment.

- ***The "Decontamination Zone"***

The Site will include two (2) decontamination zones. One decontamination zone will be established for the decontamination of all onsite equipment. This will be used to ensure there is no cross-contamination (where applicable) as well as for cleaning of equipment prior to removal from the Site. Additionally, this will be utilized to prevent the spread of contamination in association with the project via equipment that has been in contact with gross contamination.

A second decontamination area will be established at the Site construction entrance/exit. This will be utilized for decontamination of personnel as well as any trucks prior to leaving the Site. All construction equipment exiting the work zone must first be decontaminated regardless if the equipment has come in contact with contaminated materials. During remediation, soil and liquids adhered to construction vehicles and equipment will be removed in the decontamination area prior to such vehicles and equipment leaving the zone. After wetting with potable water, brooms or shovels will be utilized for the gross removal of soil from vehicles and equipment. The decontamination procedure for the removal of the remaining soil and liquids will consist of washing with potable water. Activities conducted in the decontamination zones will require the proper PPE, as deemed by the HSO.

All waste material generated by the decontamination process will be stockpiled and tested prior to offsite disposal. Decontamination liquids will be collected and tested prior to offsite disposal.

- ***The "Clear Zone"***

All remaining areas of the Site not included in the "work zone" or the "decontamination zone", shall be considered the clear zone. The clear zone will be situated in a clean area where the chance to encounter Site contaminants and/or hazardous material and conditions is minimal. Therefore, Modified or Standard Level D PPE will be required, as deemed necessary by the HSO. The clear zone shall serve as the staging area for emergency response. Emergency equipment such as first aid kits, fire extinguishers, and eyewash will be stored

in this zone and transported to other work areas as necessary. Site access and the majority of Site operations will be controlled from this area.

3.3.5 Erosion and Sedimentation Controls

Erosion and sedimentation controls will be employed during ground invasive activities which are located in areas exposed to the elements (i.e., outside excavation activities). For these activities, if the duration of the excavation activity will be longer than a single day, then the erosion and sedimentation controls will be implemented following each day's work, if necessary. When and where applicable, silt fencing will be utilized as a temporary erosion and sedimentation control measure. This measure will be employed during active construction stages as deemed necessary or upon request by the NYSDEC. Prior to any construction activity, temporary silt fencing and straw bales (where required) will be installed and maintained until such time that they are no longer required for RA activities.

As sediment collects along the silt fences, they will be cleaned to maintain desired removal performance and prevent structural failure of the fence. Accumulated sediment will be removed and/or the silt fences will be repositioned when 50% of the storage capacity of the silt fence is full. Removed sediment will be stockpiled and characterized prior to offsite disposal. The perimeter silt fences will remain in place until construction activities in the area are completed. Details regarding the erosion and sedimentation control measures for the Site are presented in the Site-specific SWPPP which is included in Appendix F.

3.3.6 Site Clearing and Grubbing

Following the installation of required Site controls, clearing and grubbing activities will be performed. These activities will consist of removal of all trees, brush, stumps and any other miscellaneous items located above grade. For materials that extend into the subsurface soils, these will be segregated and analyzed prior to offsite disposal. Of note, the clearing and grubbing activities will not include any C&D debris.

3.3.7 Baseline Certified/Licensed Site Survey

A grade elevation survey has been conducted by a New York State licensed surveyor. A copy of this survey is included in Appendix J.

As per DER-10, the locations and elevations of the final excavation extents and endpoint confirmation samples are required to be surveyed by a New York State licensed surveyor. The Site survey will be amended to include dedicated Site-specific benchmarks established by a New York State licensed surveyor. The locations and elevations of the final excavation extents and endpoint confirmation samples will then be recorded in the field by the Remedial Engineer (or designated representative) using a Trimble GPS unit. As per discussions with the NYSDEC, the GPS survey results will then be integrated with the surveyed benchmarks for quality control validation.

3.3.8 Utility Marker and Easements Layout

The Volunteer and its contractors will be 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 will 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 the NYSDEC does not constitute satisfaction of these requirements.

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

3.3.9 Sloping, Sheeting and Shoring

Sheeting and bracing shall be provided in all excavations where required and shall conform to all pertinent OSHA regulations. Where conditions allow, trench boxes or shields may be used instead of sheeting and bracing.

Appropriate management of structural stability of onsite or offsite structures during excavation activities will be evaluated and implemented as necessary and if deemed feasible. The

Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. Prior to any sheeting and/or shoring activities (if performed), any local, State or Federal permits or approvals that may be required to perform work under this RAWP will be obtained. Additionally, all necessary health and safety measures will be implemented during performance of work under the approved RAWP.

It is anticipated that the excavation extents throughout the majority of the Site (excluding select "hot spot" excavations) will permit the excavation of material in lifts and will only require moderate sloping or benching.

For the "hot spot" excavations, benching will be utilized where permitted (i.e., excavations to approximately 10 ft bg [feet below grade]). However, for the deep TSCA hazardous PCB soil "hot spot" excavations, temporary steel sheeting will be required to facilitate the required excavation activities. For these locations, dedicated dewatering will also be required to facilitate excavation to the required depths of 20 ft bg and 22 ft bg.

This temporary steel sheeting will be installed to a depth necessary to allow excavation within the two deep PCB contamination hot spots. The maximum allowable deflection of the temporary sheet piling shall be no more than 2 inches (typical). After completion of the excavation and sampling activates, installation of the demarcation layer and backfilling of the excavation with certified clean fill, the temporary sheet piling will be removed.

TSCA hazardous PCB contaminated soil will be excavated from two deep excavations located west of the onsite building. The approximate dimensions of the excavations are: 20 feet x 20 feet x 22 feet deep; and 20 feet x 20 feet x 20 feet deep. Following NYSDEC approval of the RAWP, full details of the excavation sheeting specifications will be prepared and submitted to the NYCDOB as part of the excavation permit application. The excavation sheeting specifications will be developed to address the following aspects of the RAWP:

- design specifications for the temporary steel sheeting to support the control of groundwater into the excavations during the excavation activities and to ensure worker safety;
- procedures that will be followed to excavate contaminated soil to the extent and depth required;

- contingency measures required to dry any saturated soil, such as using gravity drying pads, adding kiln cement or other material to stabilize the water within the excavated material, so that it meets disposal or transport requirements; and
- to detail the certified clean backfill and temporary steel sheeting removal procedures following the excavation activities.

The excavation shall be protected from any source of surface water and stormwater runoff at all times. At no time shall the excavated area be allowed to fill with storm water runoff. Proper temporary drainage structures will be utilized to detour runoff from the excavated areas.

3.3.10 Appropriate Groundwater Control

The "hot spot" excavations will be advanced to a depth that is below the observed groundwater table elevation. Each location will be dewatered in advance of the excavation to reduce the volume of water in the excavated soil and to provide a solid bottom to place clean backfill material.

Necessary dewatering equipment will be maintained onsite to remove all groundwater from excavations and keep water at least 12 inches below the excavation bottoms. This equipment will be maintained until all backfill is in place to at least 24 inches above anticipated water levels before dewatering activities are discontinued. All dewatering activities shall be subject to approval by the Engineer.

The methodology by which the excavations will be dewatered (i.e., the location of all pumps, sumps, pipelines, sediment filters, sedimentation basins, and other necessary equipment) will be prepared and submitted to the NYCDOB as part of the excavation permit application. The plan will also include a list of the products to be used for dewatering. The piping materials, route to discharge, and the location of the storage tanks will be included in the plan. Dewatering of excavations (where required) will maintain the saturation zone at least one foot below the bottom of the excavation. The contractor will be responsible for the disposal of all liquids generated by the dewatering operation. The contractor will be required to obtain all necessary permits (and any sampling and analysis necessary for those permits) to either

transport and dispose of extracted groundwater or treat and discharge the extracted groundwater (to the sanitary sewer or to the Gowanus Canal).

3.3.11 Backfill of Excavation Areas

Backfilling will be performed following the endpoint confirmation sampling, sample location surveying and installation of the demarcation layer. The demarcation layer will be installed overlying the onsite soils that will remain in-place, and will consist of a geotextile fabric (or similar material) that will adequately stabilize the grade. Geotextile fabrics provide filtration through their defined openings that retain soil particles but allow the flow of water. This results in a free-draining demarcation layer.

Initial backfill shall be with select material and compacted prior to placement of remaining backfill. All backfill material imported to the Site will be comprised of soil or other unregulated material that is free from mud, refuse, construction debris, organic material, boulders, frozen or otherwise unsuitable material, and which meets the specifications as outlined in Section 3.2.3.10, above. Backfill material will be staged onsite in a dedicated staging area pending use for backfilling activities.

Upon commencement of backfilling activities, the backfill material will be placed within the completed excavation in horizontal layers not exceeding 12 inches in loose material thickness before compaction. Each layer will be satisfactorily compacted by mechanical means. Backfilling shall be carried up evenly and shall be compacted to a minimum of 95 percent density when tested in accordance with American Society for Testing and Materials (ASTM) D 698. Each layer of backfill will be compacted into place by tamping before the next layer is applied. The compacting method used will be selected based on the characteristics of the excavation area (i.e., the deep "hot spot" excavations or the surface layer excavations). Several of the compaction methods that may be used onsite include:

- *Flat Plate Vibrators*

  These are flat plate vibrators, with a gasoline engine mounted to a unit that causes a flat skid plate to vibrate. These will do an excellent job on sands and small gravels, compacting to a depth or lift thickness of about 8-12 inches. Commonly used on small trenches and for small diameter pipe installation.

- *Vibratory Hammer*

  The vertical vibration in the pile disturbs or "liquefies" the soil and causes the soil particles to lose their frictional grip on the pile. The pile moves downward under its own weight, plus the weight of the vibratory hammer. Amplitude of at least one inch is usually required to cause enough soil disturbances to achieve pile driving. Vibratory compaction works well as the soil disturbance due to vibration, causes the soil particles to move into a denser configuration. Large amplitude results in a high soil strain level, a greater influence radius and higher degree of compaction.

- *Vibratory Rollers*

  This type of equipment is designed to consolidate granular soils to a high density, compacting very efficiently to shallow depths. They come in different sizes and different ton capacity. It is anticipated that vibratory rollers will be utilized for the compaction of the 2-foot cover system throughout the majority of the undeveloped portion of the Site.

Continuous field surveying will be performed during the backfilling activities. The surveying activities will ensure that the required backfill cover system thickness is achieved. Grade elevation monitoring will also be assessed by the use of grade stakes and string lines set at approximately 50-foot centers.

Under roads, streets and other paved areas, a 6-inch thick sub-base layer will be mechanically tamped using heavy duty pneumatic tampers or similar equipment. For areas which were previously excavated, additional regrading layers (required to meet the required grade elevation) will be compacted in 6-inch lifts. Each layer will be compacted to a density equivalent of not less than 100% of an ASTM D 698 Proctor Curve.

For backfill of permanent utility trenches at the Site, the bottom extent of trenches will be leveled and backfilled with a suitable sand material. The sand layer will consist of a 4-inch thickness below, surrounding and above the utility line/pipe. The remainder of the trench will be backfilled with a general backfill layer as required for the subgrade of impervious cap surfaces (i.e., concrete or asphalt).

Any depression resulting from settlement of a backfilled excavation prior to the date of project completion will be brought to proper grade and surface and made to match the adjacent surface.

3.4 Reporting

This section outlines the project documentation reports that will be prepared during and following the implementation of the RAWP.

3.4.1 Daily Field Sheets

Daily Field Sheets will be maintained by onsite field personnel. These field sheets will outline remedial activities performed for each day. These Daily Field Sheets will be submitted to the NYSDEC and NYSDOH Project Managers (via e-mail) at the end of each day following the reporting period. The report format will comply with DER-10 Section 5.7, and will include:

- an update of progress made during the reporting day;
- locations of work and quantities of material imported and exported from the Site;
- a summary of any and all complaints with relevant details (names, phone numbers);
- a summary of CAMP findings, including excursions; and,
- an explanation of notable Site conditions.

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

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

Daily reports will include a description of daily activities as well as a summary of air monitoring results, odor and dust problems and corrective actions, and all complaints received from the public. Photos for daily activities will be available to the NYSDEC Project Manager upon request. Daily reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. Alpha/Numeric Work Area Identification Map, which will be used for identification of locations described in reports submitted to NYSDEC is attached as figure 11.

The NYSDEC project number assigned to the Site (BCP Site No. C224099 and/or Index No. W2-1069-0506) will appear on all reports.

3.4.2 Monthly Reports

Monthly reports (if requested) 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; and,
- an update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

3.4.3 Annual Hazardous Waste Reporting

For calendar years where hazardous waste is generated at the Site and disposed of at an offsite facility, an annual Hazardous Waste Report must be submitted to the NYSDEC. This report will outline the waste classification(s) of hazardous waste generated at the Site, as well as the disposal facility information and the waste disposal method.

This report must be submitted to the NYSDEC by March 1st of the year following the generation and disposal of hazardous waste.

3.4.4 Other Reporting

Photographs will be taken of all remedial activities. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to final RAs will be recorded. Representative photos of each contaminant source, source area and structures before, during and after remediation will also be recorded. Photos will be made available to the NYSDEC and NYSDOH in digital (JPEG) format. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's Project Manager (1 copy). CD's will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical RA components. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval. Additionally, photos documenting the activities performed under the RAWP will be included in the FER.

Job-site recordkeeping for all remedial work will be appropriately documented. Upon request, these records will be available for inspection by NYSDEC and NYSDOH staff.

3.4.5 Complaint Management Plan

Complaints from the public regarding nuisance or other site conditions will be handled on an individual basis. Once a complaint is filed with regard to site RA activities, the NYSDEC will be notified and all required steps will be taken to rectify the cause of the complaint.

3.4.6 Deviations from the Remedial Action Work Plan

Upon institution of the RAWP, should Site conditions require deviation from the approved RAWP, the NYSDEC will be notified in writing once the necessity is evident. A request for a change to the RAWP will be submitted to the NYSDEC. The written request will outline the effect of the deviations on overall remedy. Upon approval for changes/additions to the RAWP from the NYSDEC, the modifications will be implemented.

4.0 REMEDIAL ACTION

4.1 Contaminated Material Excavation and Disposal

The primary remedial strategy that will be implemented as part of the RAWP will consist of excavation and removal of residual contaminated subsurface source material. The COCs and concentrations vary throughout the Site, with three main anticipated waste streams. Of note, all onsite excavation activities will be performed after the installation of the Site perimeter fencing and completion of the Site clearing and grubbing activities. A description of the excavation activities (and associated activities) for the three main anticipated waste streams are detailed in the following sub-sections.

LBGES/LBG or another representative authorized by GAII will notify the NYSDEC in writing, at least 15 business days in advance of implementation of the RAWP, which is anticipated to disturb residual delineated contamination. Currently, this notification will be made to:

Mr. Brian Davidson, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation; Bureau B/Section C
625 Broadway
Albany, NY 12233-7016
Telephone: (518) 402-9767
e-mail: bhdavids@gw.dec.state.ny.us

Subsequent notifications will submitted to the NYSDEC prior to the following scope activities related to the NYSDEC:

- identification of disposal facilities for potential waste streams; and,
- identification of sources of any anticipated backfill, along with certification from the fill site owner or operator that the material is not from an industrial source and there is no knowledge or evidence of chemical contamination.

4.1.1 TSCA Regulated PCB and Significantly Elevated Metals Soil Contamination

Prior to the implementation of the remedial excavation activities, segregation and disposal activities associated with the miscellaneous building C&D debris and municipal waste debris piles and additional pre-remedial Site preparation activities will be/were performed at the Site. These pre-remedial Site preparation activities will be/were completed in accordance with the NYSDEC approval scope. Following the completion of the pre-remedial Site preparation activities, the remedial activities onsite will begin with the "hot spot" excavations. This RA will be performed to address the locations onsite where the highest concentrations of COCs (PCBs and metals) were delineated via the RI activities.

The USEPA has established cleanup levels and are based on the kind of material and the potential exposure to PCBs left after cleanup is completed. Bulk PCB remediation waste includes, but is not limited to, the following non-liquid PCB remediation waste: soil, sediments, dredged materials, muds, PCB sewage sludge, and industrial sludge. The cleanup level for bulk PCB remediation waste in high occupancy areas for unrestricted site use is less than 1 ppm, without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations greater than 1 ppm and less than or equal to 10 ppm shall be covered with a cap composed of a minimum of 10 inches of compacted soil or a minimum of 6 inches of asphalt. The cleanup level for bulk PCB remediation waste in low occupancy areas is less than or equal to 25 ppm. Bulk PCB remediation wastes may remain at a cleanup site at concentrations greater than 25 ppm and less than or equal to 100 ppm if the site is covered with a cap composed of a minimum of 10 inches of compacted soil or a minimum of 6 inches of asphalt.

4.1.1.1 Remedial Design Investigations

Supplemental remedial design investigations are required prior to the performance of the excavation activities (specifically the deep excavation activities), to characterize the onsite hydraulic properties. This is required to ensure that a properly designed and sized dewatering system (capable of achieving and maintaining drawdown of the groundwater table) is utilized for the two deep PCB contamination "hot spot" excavations.

In order to characterize the subsurface stratigraphic profile and hydraulic properties in the vicinity of the proposed deep excavations; two (2) groundwater wells will be installed, one each in the vicinity of the two proposed deep excavations. The proposed locations of these two deep PCB contamination "hot spot" excavations as well as the two remedial design groundwater monitoring/extraction wells are presented in plan view on figure 3. A 3 dimensional view is presented on figure 5. The locations are selected so that they can be used as dewatering wells for the excavation activities in addition to being used for calculating the onsite hydraulic properties of the subsurface.

The monitoring wells will be constructed of 20 feet of 4-inch diameter PVC, 20-slot well screen and approximately 15 feet of riser pipe. The annular space around the screen will be filled with #2 filter sand. The remaining space will be backfilled with a bentonite seal from immediately above the well screen continuing to grade.

During installation, soil samples will be collected at 5-foot intervals from grade to boring termination. Each sample will be described on a geologic log and screened for the presence of VOCs using a PID. Following the installation of the monitoring wells, a top of casing elevation survey will be performed. Considering these wells are going to be temporary, the top of casing elevation survey will be performed relative to the existing onsite groundwater monitoring wells. For each boring, two soil samples will be collected and submitted to a New York State approved laboratory for analysis of VOCs, SVOC, metals and PCBs. The analytical results (in conjunction with the boring locations relative to the proposed excavations) will be used to assess the delineation of the contamination "hot spots".

In order to characterize the hydraulic properties in the vicinity of the proposed deep excavations, slug tests will be performed using the newly installed monitoring wells. The slug tests will be performed using a pneumatic slug test apparatus in conjunction with in-well

dataloggers. These slug tests will provide rising head well recovery data for calculating the hydraulic parameters. Prior to beginning each slug test, an in-well electronic pressure transducer will be installed near the bottom of the well and following several minutes of groundwater equilibration, the static groundwater level within each well will be recorded. Additionally, a barologger will record the local site barometric readings to account for any significant short-term variabilities. A polyvinyl chloride (PVC) manifold will then be attached to the top of the monitoring well. The well will be pressurized using compressed air to increase the drawdown of the water column in the well, pushing the groundwater into the surrounding formation. Using a pressure gauge and regulator, the groundwater will be depressed until it reaches the top of the well screen. Upon reaching the top of the well screen, the pressure gauge will register a drop in pressure. At this point, a pressure relief valve on the slug test manifold will be opened. This will allow the groundwater level to rebound and the hydraulic head will rise to reach equilibrium with the static groundwater table elevation. The water levels will be continuously recorded as the groundwater recharges via the pressure transducers within the well. On each monitoring well, three separate pneumatic slug tests will be conducted in order to ensure that the results can be similarly replicated. Following each individual slug test, the electronic pressure transducer will be removed from the well and the data will be transferred to a laptop computer and the results of the tests downloaded and reviewed. The barologger data will also be downloaded and used as part of the data evaluation. The slug tests will be performed to determine subsurface hydraulic parameters which will include transmissivity, hydraulic conductivity and seepage velocity, where possible. The hydraulic properties will then be used to calculate the extraction rate required to generate and maintain sufficient drawdown to facilitate the deep "hot spot" excavation activities.

4.1.1.2 "Hot Spot" Excavation Endpoint Confirmation Sampling

To ensure the "hot spot" excavations encompass the full extent of the TSCA hazardous PCB contaminated soils and metals contaminated soil, in-situ "hot spot" excavation endpoint confirmation soil samples will be collected prior to excavation samples. Endpoint confirmation soil samples for the "hot spot" excavations will be collected in accordance with the procedures as outlined in Section 2.3.1, above. All endpoint confirmation soil samples will be collected in

laboratory supplied sample jars and stored in a cooler on ice. Samples will be shipped under chain of custody to a New York State approved laboratory for analysis of Part 375-6.8 parameters including VOCs, SVOCs, TAL metals, cyanide, PCBs and pesticides.

As per DER-10, the locations and elevations of the final excavation extents and endpoint confirmation samples are required to be surveyed by a New York State licensed surveyor. The Site survey will be amended to include dedicated Site-specific benchmarks established by a New York State licensed surveyor. The locations and elevations of the hot spot" excavation endpoint confirmation soil samples will then be surveyed and recorded in the field using a Trimble GPS unit. As per discussions with the NYSDEC, the GPS survey results will then be integrated with the surveyed benchmarks for quality control validation. The survey will define the geographic coordinates of the endpoint confirmation samples as well as the top elevation and lateral extents of residual contaminated soils. The survey will also define the grade elevation of the endpoint confirmation samples. The sample collection elevation will be extrapolated based on the sample collection depth for each soil boring.

4.1.1.3 Deep "Hot Spot" Excavation Shoring Activities

The proposed plan view dimensions for the two (2) deep PCB contaminated soil "hot spot" excavations are 20 feet by 20 feet. The proposed depths for the two PCB contamination "hot spot" excavations are 22 ft bg and 20 ft bg. The steel sheeting will be installed from grade to approximately 30 ft bg. Final dimensions of the excavations will be determined based on the results of the in-situ "hot spot" excavation endpoint confirmation soil sampling activities.

After finalizing the excavation dimensions and prior to performing the two (2) deep PCB contaminated soil "hot spot" excavations (west of the building), interlocking corrugated steel sheet piling will be driven into the subsurface to facilitate the required dewatering activities and subsequent excavation below the water table. The sheeting will be advanced to a depth to ensure that the excavation extent is no less than 2 feet above the bottom of the sheeting. Final design specifications will be submitted with the Excavation Work Plan (EWP) following NYSDEC approval of the RAWP. The excavation sheeting plans will be submitted to the NYCDOB along with the proposed dewatering plan.

Following the installation of the corrugated steel sheet piling, the dewatering wellpoints will be installed for the respective excavations. The conceptual specifications for the dewatering system are presented in Section 4.1.2.3, below. Final specifications will be prepared and submitted to the NYSDEC and NYCDOB after the subsurface hydraulic parameters for the excavation locations are characterized (via the remedial design investigation activities).

4.1.1.4 Dewatering - Groundwater Extraction and Treatment

The dewatering and groundwater treatment system specifications necessary for adequately maintaining hydraulic control during the "hot spot" soil excavations which will be advanced beyond the static groundwater table elevation will be finalized following completion of the hydraulic characterization activities.

The dewatering method to be employed as well as the specifications of the dewatering system and groundwater treatment system will be outlined and provided to the NYSDEC. The specifications of the dewatering system will include but not be limited to: quantity, location, depth and size of wellpoints, headers, sumps, ditches, size and location of discharge lines, capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from the Site to the selected discharge point. The specifications of the groundwater treatment system will include anticipated quality of the extracted groundwater, the sizing of the treatment system components, and the calculated effluent discharge water quality.

Based on preliminary data, the dewatering method to be employed at the Site will consist of wellpoint dewatering. This will consist of extracting groundwater from multiple wellpoints along the excavation perimeter to lower the groundwater table a sufficient distance to facilitate remedial and construction activities. The equipment anticipated to be utilized as part of this activity includes (but is not limited to): header pipes, suction and discharge hoses, gate and ball flow valves, necessary manifold connections, vacuum hose, vacuum gauges, all plastic wellpoints with filter screens (if used), riser pipes, adaptors, and all other necessary groundwater extraction materials.

Initial excavation activities above the groundwater table may begin prior to the completion of the installation of the steel sheeting and/or dewatering. After the groundwater table is

stabilized at an elevation sufficient to lower the groundwater table beneath the proposed final excavation depth, final excavation activities will be completed.

Following the finalization of the system specifications, a written summary report will be prepared outlining: system start-up procedures; system operation and maintenance activities; and control procedures to be adopted if dewatering problem arises.

Materials submitted shall be in a format acceptable for inclusion in required permit applications to any and all regulatory agencies for which permits for discharge water from the dewatering system are required due to the discharge reaching regulated bodies of water. All required permits will be acquired prior to the dewatering and/or excavation activities. All required inspection reports related to issued permits will be completed and submitted to the applicable regulatory agency(ies).

Following the installation of the excavation support, the dewatering system extraction points will be installed. The groundwater extraction and treatment system will consist of a trailer mounted unit. It will be mobilized to the Site upon notification that the excavation preparation activities are completed.

All equipment and facilities required to divert, collect, control, and remove water from the excavation will be provided. Standby equipment will be available for immediate operation, as may be required to adequately maintain dewatering on a continuous basis and in the event that all or any part of the system may become inadequate or fail. Drainage features shall have sufficient capacity to avoid flooding of work areas. Drainage features shall be so arranged and altered as required to avoid degradation of the final excavated surface(s).

Dewatering equipment will be provided to remove and dispose of all surface and groundwater entering the excavation. Prior to any excavation below the groundwater table, the dewatering system will be operated to lower the water table as necessary. The system will be started and will be operated continuously to achieve and maintain hydraulic control below the proposed extent of the "hot spot" excavation. The dewatering system will operate continuously 24 hours a day, 7 days a week until the excavation activities are completed. The groundwater table elevation within the excavation will be maintained at a minimum of 1 foot below the prevailing excavation surface at all times. This hydraulic control will permit exca-

vation activities below the static groundwater elevation and will facilitate the removal of the TSCA hazardous PCB contaminated soils.

The excavations shall be kept dry during excavation activities and continually thereafter until and the excavation extents are surveyed, the demarcation layer is installed, the lateral extraction pipe is installed and the certified clean backfill material is installed and compacted as per the approved permit. The continued hydraulic control is required to ensure that the excavation will not be compromised from hydrostatic pressure or flotation.

All groundwater generated during the dewatering activities will be treated using the trailer mounted dewatering and groundwater treatment system. All groundwater pumped from the excavation will be stored onsite in fractionation tanks prior to treatment, treated via the onsite trailer mounted dewatering and groundwater treatment system. Subsequently, the treated effluent water will be discharged to the Gowanus Canal. All groundwater discharge activities will be in compliance with all Federal, State and/or local regulations. Specifically, all extracted groundwater will be treated to meet the substantive requirements prescribed by the NYSDEC regulations for New York State SPDES discharge permitting. An alternative discharge route would be to the sanitary sewer system (regulated by the NYCDEP).

4.1.1.5 "Hot Spot" Excavation Activities

USEPA established cleanup levels are based on the kind of material and the potential exposure to PCBs left after cleanup is completed. Bulk PCB remediation waste includes, but is not limited to, the following non-liquid PCB remediation waste: soil, sediments, dredged materials, muds, PCB sewage sludge, and industrial sludge. The cleanup level for bulk PCB remediation waste in high occupancy areas is $\leq$1 ppm without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations $>$1 ppm and $\leq$10 ppm shall be covered with a cap composed of a minimum of 10 inches of compacted soil or a minimum of 6 inches of asphalt. The cleanup level for bulk PCB remediation waste in low occupancy areas is $\leq$25 ppm. Bulk PCB remediation wastes may remain at a cleanup site at concentrations $>$25 ppm and $\leq$100 ppm if the site is covered with a cap composed of a minimum of 10 inches of compacted soil or a minimum of 6 inches of asphalt.

"Hot spot" excavation activities will be performed using appropriately sized excavators, backhoes or similar equipment. The initial "hot spot" excavation activities will focus on the areas where the contamination is limited to shallow depths. These excavations are anticipated to be approximately 4-7 feet deep. These excavations can be performed using direct excavation, sloping or benching. If required based on the field observations, the excavation may be advanced by benching. The locations of the localized contaminated soil "hot spot" excavations, along with the proposed aerial extents and excavation depths, are presented on figure 3 and figure 5.

A localized mercury contaminated soil "hot spot" was identified to the southwest of the building. This soil contamination was detected from 16-18 ft bg. This depth is at or below the static groundwater elevation. Soil characterization was not conducted on the overlying soil, however concentrations reduce an order of magnitude below 18 ft bg. It is proposed that the overlying soil in this area be excavated using trench boxes. The proposed location and depth of the mercury contaminated soil "hot spot" excavation is presented on figure 3 and figure 5. This will facilitate deeper soil excavation activities in this localized area. Of note, the trench box excavation method is only feasible for excavation of soil to the groundwater table.

The deep PCB contaminated "hot spots" will be performed following the installation and operation of the recovered steel sheeting and dewatering system. The proposed locations of the two deep PCB contaminated "hot spot" excavations adjacent to the west and northwest of the building are presented on figure 3 (plan view) and figure 5 (3 dimensional). These deep excavations will be advanced to depths of approximately 20 ft bg and 22 ft bg.

For all "hot spot" excavations, as the excavations are advanced to greater depth the surface soils will be segregated (based on historical characterization analytical data) and stockpiled separately. The segregated materials, previously characterized as historic fill material and/or petroleum contaminated soil, will be stockpiled and subsequently incorporated in with the future historic fill excavation soil stockpiles.

Excavated "hot spot" soil will be stockpiled onsite on a minimum of double 6-mil polyethylene sheeting with raised berms along the base. Additionally, following each day's excavation/stockpiling/loading activities, the stockpile will be covered by a minimum of one layer of 6-mil polyethylene sheeting which is sufficiently anchored to prevent any wind and water

erosion. The stockpile protective sheeting will be maintained until the waste is transported offsite for disposal. The cover will be inspected at least once per day with corrective action taken as needed. The inspections and any corrective actions will be documented in logs and will occur until the fill materials have been properly removed and disposed offsite.

Alternatively, the soil that is anticipated to contain the highest levels of contamination can be transferred directly into approved lined roll-off containers. This would eliminate additional handling required following the waste characterization sampling, although at an additional expense. The Field Project Supervisor will screen the removed fill for visual and olfactory observations and for total volatile compounds using a PID. If screening results (in combination with the historical analytical results) indicate the presence of localized areas lower contamination (typical historic fill), the excavated material will be segregated into a discrete stockpile. This segregation activity will be implemented in an effort to reduce the volume of significantly contaminated material required for disposal.

4.1.1.6 "Hot Spot" Excavation Demarcation and Backfilling Activities

Following completion of the excavation activities, the final excavation extents will be surveyed and a demarcation layer will be installed within the "hot spot" excavations. The locations and elevations of the final excavation extents will also be surveyed in the field by the Remedial Engineer (or designated representative) using a Trimble GPS unit. As per discussions with the NYSDEC, the GPS survey results will then be integrated with the surveyed benchmarks for quality control validation. The survey will define the geographic coordinates of the endpoint confirmation samples as well as the top elevation and lateral extents of residual contaminated soils. The physical demarcation layer will consist of orange snow fencing material, geotextile fabric or equivalent material and will be installed along the "hot spot" excavation surfaces (where feasible) to provide a visual demarcation reference. This demarcation layer will constitute the boundary of the Residuals Management Zone, the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in this SMP. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the Residuals Management

Zone in the SMP. A map showing the survey results will be included in the FER and the SMP.

Following (or concurrent with) the installation of the demarcation layer, the excavation will be backfilled. Prior to performing backfilling activities, all equipment that has come into contact with impacted soils will be decontaminated on the decontamination pad. Decontamination procedures are outlined in the HASP, which is included in Appendix C.

Following the completion of the "hot spot" excavation located adjacent to the western side of the building, installation of a lateral well screen and riser pipe will be incorporated with the backfilling activities. The lateral well screen will consist of a ten foot length of 4-inch diameter stainless steel well screen fitted with a cap on one end and a 90-degree elbow on the other. The lateral screen will be installed at a depth of approximately 20 ft bg. A solid riser pipe will be connected to the elbow and will extend to grade. This lateral screen will be installed perpendicular to the hydraulic gradient beneath the building (towards the Gowanus Canal). Installation of this lateral screen within the backfilled excavation will facilitate future use of the lateral screen for targeted use as a monitoring point or as an extraction and/or application point. The excavation will be backfilled to 3 feet above the static groundwater elevation with permeable crushed stone (or similar) to ensure high hydraulic conductivity in the backfill surrounding the screen. A cross section diagram illustrating of the proposed lateral well screen and "hot spot" excavation backfill is presented on figure 12.

The backfill material will be imported from an approved source and documentation will be provided to demonstrate that the imported soil conforms to the RUSCOs. All material imported to the Site for use as certified clean backfill will comply with all applicable requirements as outlined in Section 3.2.3.10, above. If the imported backfill cannot be placed in the excavation immediately upon arrival, it will be temporarily stockpiled in a designated staging areas.

The backfill will be installed within the excavations to an elevation that is two feet below the proposed final grade elevation. The backfill will be installed and compacted in one foot lifts. Because the "hot spot" excavation adjacent to the western side of the building will have a lateral recovery well installed, that excavation will be backfilled to the groundwater table using porous backfill media. Upon completion of the backfilling activities to the pre-

scribed elevations, a filter fabric liner will be installed on the top surface of the excavation. This will prevent cross contamination of the completed excavation during the additional historic fill excavation activities.

Final backfilling and regrading (to the final redevelopment grade elevation) will be performed in conjunction with the historic fill excavation and backfilling activities. Diagram showing the design detail for the cover systems installed on the undeveloped portions of the Site (following excavation and backfill) as well as a map showing the aerial distribution of each of the cover types will be included in the FER.

4.1.1.7 "Hot Spot" Excavation Soil Disposal

Following completion of the "hot spot" excavation activities, grab samples and representative grab and composite samples will be collected from the waste stockpiles. These samples will be used for waste characterization and profiling. Based on field observations and analytical results, the estimated volumes and weights of "hot spot" contaminated materials are approximately: 1,283 cubic yards (1,925 tons) of TSCA hazardous PCB contaminated soil; and approximately 65 cubic yards (98 tons) soil contaminated with elevated concentrations of metals. However, it should be noted that the actual volumes of waste material may vary due to the field conditions and observations as well as the volume of material required to perform the Site regrading activities associated with redevelopment. Determination of TSCA hazardous classification will be achieved via laboratory waste characterization analysis. This volumetric estimate assumes that segregation activities are possible in the field. All efforts will be made to segregate waste streams based on the historical soil quality analytical data.

Waste characterization (grab and composite samples) will be collected from the waste stockpiles and submitted to a New York State approved laboratory for waste characterization analysis in accordance with the procedures as outlined in Section 3.2.3.3, above. The required sample frequency will be determined based on the volume of waste material. All waste characterization soil samples will be collected in laboratory supplied sample jars and stored in a cooler on ice.

Bulk PCB remediation waste being transported offsite for disposal must be either dewatered onsite or transported offsite in containers meeting the requirements of the New York

State Department of Transportation (NYSDOT) Hazardous Materials Regulations (HMR) at 49 CFR Parts 171 through 180. Bulk PCB remediation wastes with a PCB concentration ≥50 ppm shall be disposed of in a hazardous waste landfill permitted by USEPA under Section 3004 of RCRA, or by a State authorized under Section 3006 of RCRA. At least 15 days before the first shipment of bulk PCB remediation waste from the Site, written notice must be provided to each offsite facility where the waste is destined for an area not subject to a TSCA PCB Disposal Approval. This notification must include the quantity to be shipped and highest concentration of PCBs.

The following documentation will be kept in relation to waste streams:

- correspondence from the facility accepting the waste stream;
- waste profiles;
- waste characterization sampling, and results;
- manifests;
- bills of lading; and,
- weight tickets.

Details of proposed trucking companies and disposal facilities that will be utilized for handling the contaminated waste material are presented in Sections 3.2.3.5 and 3.2.3.7, above After final selection of the trucking companies and disposal facilities that will be used for the waste disposal and prior to shipping the waste, a notification will be submitted to the NYSDEC as outlined in Section 3.2.3.6, above. All tracking for waste generated at the site and transported offsite for treatment/disposal will be provided in the FER.

4.1.1.8 "Hot Spot" Equipment Removal and Decontamination

Following completion of the deep "hot spot" excavations, the steel sheeting excavation support materials will be removed from the subsurface. After each steel sheet is removed from the subsurface, it will be transported to the decontamination station. The sheets will be decontaminated prior to loading for removal from the Site. Equipment and materials used in the performance of the PCB contaminate soil excavation activities will be decontaminated using the following procedure:

1. The equipment/material will be washed with clean water and detergent, using a brush if necessary, to remove particulate matter and surface films. Steam

cleaning (high pressure hot water with detergent) may be necessary to remove matter that is difficult to remove with the brush. Drilling equipment that is steam cleaned should be placed on racks or sawhorses at least two feet above the floor of the decontamination pad. Hollow-stem augers, drill rods, etc., that are hollow or have holes that transmit water or drilling fluids, should be cleaned on the inside with vigorous brushing.

2. Rinse thoroughly with tap water.
3. Remove from the decontamination pad and cover with clean, unused plastic. If stored overnight, the plastic should be secured to ensure that it stays in place.

Following the completion of the decontamination procedures, the steel sheeting will be transferred to the materials staging area pending decontamination of the remaining materials. Following decontamination of all of the steel sheeting, the supplier will be contacted for pick-up of the materials and removal from the Site.

4.1.2 Historical Fill and VOC Soil Contamination

Following the completion of the segregation and disposal activities associated with the miscellaneous building C&D debris and municipal waste debris piles, the remedial activities onsite will shift to the capping and/or excavation and capping of the 2-foot surface soil layer characterized as historic fill material.

If permitted by the NYSDEC, the historic fill material will be relocated from areas where excess material is present to raise the areas of the Site with lower elevation and which redevelopment does not required additional excavation. These proposed locations include areas in which the existing grade elevation is already more than 2 feet below the proposed redevelopment grade. The shallow surface soils/fill at the Site contain contaminant concentrations consistent with historic fill above the RUSCOs for Restricted Residential use. The excavation activities are being performed to remove residual contamination from the undeveloped portions of the Site, as well as to allow the regrading of the Site (as part of the redevelopment) with the requisite EC consisting of 2-foot thick certified clean backfill cover.

This is the redevelopment requirement necessary to be eligible for a restricted residential land use under the Track 4 cleanup track.

4.1.2.1 Historic Fill Excavation Endpoint Confirmation Sampling

To ensure that the post-excavation soil quality (based on the proposed redevelopment grade elevations) meet the RUSCOs for the Site, in-situ excavation endpoint confirmation soil samples will be collected prior to excavation samples. Endpoint confirmation soil samples for the surface soil (representative of the final redevelopment grade prior to final installation of cover material) will be collected in accordance with the procedures as outlined in Section 2.3.1, above. All endpoint confirmation soil samples will be collected in laboratory supplied sample jars and stored in a cooler on ice. Samples will be shipped under chain of custody to a New York State approved laboratory for analysis of Part 375-6.8 parameters including VOCs, SVOCs, TAL metals, cyanide, PCBs and pesticides.

As per DER-10, the locations and elevations of the final excavation extents and endpoint confirmation samples are required to be surveyed by a New York State licensed surveyor. The Site survey will be amended to include dedicated Site-specific benchmarks established by a New York State licensed surveyor. The locations and elevations of the endpoint confirmation samples (representative of the final excavation extents) will then be recorded in the field by the Remedial Engineer (or designated representative) using a Trimble GPS unit. As per discussions with the NYSDEC, the GPS survey results will then be integrated with the surveyed benchmarks for quality control validation. The survey will define the geographic coordinates and elevations of the endpoint confirmation samples as well as the top elevation and lateral extents of residual contaminated soils. In the event that deep soil samples are collected (via Geoprobe sampling) and actual elevations cannot be surveyed, the survey will also define the grade elevation of the endpoint confirmation samples. The sample collection elevation will be extrapolated based on the sample collection depth for each soil boring. Following the completion of the excavation to the prescribed depth, endpoint confirmation soil samples will be collected from the excavation bottom and sidewalls.

4.1.2.2 Historic Fill Excavation Activities

The existing grade elevation at the Site ranges from approximately 18.5 ft msl (feet above mean sea level) on the western portion of the Site to 8-10 ft msl on the south-southwestern property line boundary. Prior to excavation and stockpiling activities, a comparative evaluation will be performed between the current grade elevation and the proposed redevelopment grade elevation. A copy of the topographical survey performed for the Site reflecting conditions as of February 2, 2013 is included in Appendix J. The results of the grade elevation evaluation will be used to prepare volumetric estimates of the historic fill that will be excavated.

In addition to the proposed redevelopment grade elevation, the extent of the historic fill surface soil excavation will be determined by the results of the in-situ excavation endpoint confirmation soil sampling. The soil quality analysis may require the expansion of excavation activities to ensure the removal of additional soil contamination.

The excavation and handling activities of the historic fill layer (contaminated material) will be performed using a bulldozer, excavator, loader, backhoe or other appropriate equipment. Continuous surveying will be performed during the excavation activities to ensure the grade elevations correlate with the endpoint confirmation soil sample locations. The excavation of overlying historic fill material will be completed in all of the undeveloped portions of the Site to the depth required to facilitate the installation of a 2-foot thick certified clean cover system. The proposed excavation extent of the historic fill material surface layer is shown on figure 3 (plan view) and figure 6A and figure 6B (3 dimensional). These excavation activities will exclude the areas in which the "hot spot" excavation activities had already been performed for PCB contaminated soil and significantly elevated metals contaminated soil. These approximate extents of the excluded "hot spot" excavation areas (previously addressed) are shown on figure 5.

Excavated historic fill material will be stockpiled onsite on a minimum of double 6-mil polyethylene sheeting with raised berms along the base. Additionally, following each day's excavation/stockpiling/loading activities, the stockpile will be covered by a minimum of one layer of 6-mil polyethylene sheeting which is sufficiently anchored to prevent any wind and water erosion. The stockpile protective sheeting will be maintained until the waste is transported offsite for disposal. The cover will be inspected at least once per day with corrective

action taken as needed. The inspections and any corrective actions will be documented in logs and will occur until the fill materials have been properly removed and disposed offsite. The Field Project Manager will screen the removed fill for visual and olfactory observations and for total volatile compounds using a PID. If screening results indicate the presence of localized areas of elevated contamination (exceeding typical historic fill), the excavated material will be segregated into a discrete stockpile. This segregation activity will be implemented in an effort to reduce the volume of significantly contaminated material required for disposal.

4.1.2.3 Backfilling, Demarcation and Regrading Activities

Rough grading will already have been completed before the backfilling and regrading. This activity will have been performed prior to the endpoint confirmation sampling and installation of the demarcation layer. Following completion of the endpoint confirmation sampling, excavation activities and surveying, the physical demarcation layer will be installed overlying the completed excavation extent.

A physical demarcation layer, consisting of orange snow fencing material, geotextile fabric or equivalent material will be placed on the excavation extent surfaces to provide a visual demarcation reference. This demarcation layer will constitute the Residuals Management Zone, the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in this SMP. The survey will measure the excavation extents that are covered by the demarcation layer before the placement of cover soils, pavement and subsoils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the Residuals Management Zone in the SMP. A map showing the survey results will be included in the FER and the SMP.

After the installation of the demarcation layer, the Site will be backfilled to the proposed final grade of the development. Prior to performing backfilling activities, all equipment that has come into contact with impacted soils will be decontaminated on the decontamination pad. Decontamination procedures are outlined in the HASP, which is included in Appendix C.

Because the RAs are going to be completed in conjunction with the Site redevelopment, to facilitate the installation of the required infrastructure (i.e., conduit piping, utility lines...)

the backfill will include appropriate stone, piping and other materials necessary for their construction.

The backfill material will be imported from an approved source and documentation will be provided to demonstrate that the imported soil conforms to the RUSCOs. All material imported to the Site for use as certified clean backfill will comply with all applicable requirements as outlined in Section 3.2.3.10, above.

Due to the large volume/quantity of backfill that will be required for regrading the Site, the imported fill will be dumped onsite in a dedicated staging area pending its use throughout the Site. The backfill will be spread throughout the Site for regrading with a bulldozer, and properly compacted to minimize future settling. Material handling will be minimized to reduce the potential for damaging the demarcation layer material. Continuous surveying will be performed during the regrading to ensure the 2-foot cover is achieved throughout the Site (where required). Following placement, the soil cover will be seeded.

In areas where asphalt or concrete are installed, a proof roller will be used following grading to smooth the subgrade surface. Once the subgrade is prepared, a gravel sub-base will be placed using a bulldozer to provide stability for construction and limit subsidence. Asphalt or concrete will be placed on the sub-base in accordance with standard construction practices.

Final backfilling and regrading (to the final redevelopment grade elevation) will be performed (in part) concurrent with the "hot spot" excavation and backfilling activities. Diagram showing the design detail for the cover systems installed on the undeveloped portions of the Site (following excavation and backfill) as well as a map showing the aerial distribution of each of the cover types will be included in the FER.

4.1.2.4 Historic Fill Excavation Soil Disposal

Based on field observations and analytical results for the past contamination delineation sampling, it is anticipated that the cover system excavation activities (assuming a maximum of 2 feet of excavation to facilitate the certified clean cover system) will produce approximately 6,800 cubic yards (10,200 tons) of contaminated historical fill material. However, depending on the final grade specifications as specified in the redevelopment plan, the estimated range for the volume and weight of contaminated historical fill material exceeding the RUSCOs Re-

stricted Residential may range from approximately 1,500 to 14,385 cubic yards (2,250 to 21,577 tons). It should be noted that the actual volumes of waste material may vary due to the field conditions and observations. The anticipated horizontal extent of the historic fill material excavation is presented on figure 3. Two potential redevelopment alternatives will result in varying vertical excavation extents. The vertical excavation extents for the two redevelopment alternatives are presented on figure 6A and figure 6B.

All efforts will be made to segregate waste streams based on the historical soil quality analytical data. It is anticipated that, due to the volume of material that will be generated, soil excavation activities will be performed simultaneous with stockpile loading for offsite transport and disposal. Once a stockpile is sampled for waste characterization analysis, no additional material may be added. This will ensure that waste material that is staged on a pre-approved stockpile will not be impacted from the analytical results of subsequent waste characterization sampling.

Waste characterization (grab and composite samples) will be collected from the waste stockpiles and submitted to a New York State approved laboratory for waste characterization analysis in accordance with the procedures as outlined in Section 3.2.3.3, above. The required sample frequency will be determined based on the volume of waste material present in the respective stockpile (and preceding stockpiles to establish an aggregate waste volume). All waste characterization soil samples will be collected in laboratory supplied sample jars and stored in a cooler on ice.

Following completion of the historic fill material excavation activities, grab samples and representative composite samples will be collected from the waste stockpiles. The waste disposal sampling plan for the soil stockpiles will consist of collecting a representative number of samples for the volume of material to be disposed. The sampling frequency will be performed as outlined in Table 5.4(e)10 of DER-10. This sampling frequency would consist of 7 discrete VOC samples and 2 composite samples (for the remaining parameters) for the first 1,000 cubic yards. Any additional samples required (based on a volume exceeding 1,000 cubic yards) will be characterized with 2 additional discrete samples for VOCs and 1 composite sample for the remaining parameters. The grab and composite waste characterization samples will be sampled and sent to a New York State approved laboratory for waste characterization

analysis for 375-6.8 requirements of VOCs, SVOCs, TAL metals, cyanide, PCBs and pesticides. Additional analytical requirements may be required based on the disposal facility requirements.

The following documentation will be kept in relation to waste streams:

- correspondence from the facility accepting the waste stream;
- waste profiles;
- waste characterization sampling, and results;
- manifests;
- bills of lading; and,
- weight tickets.

Details of proposed trucking companies and disposal facilities that will be utilized for handling the contaminated waste material will be included in the final EWP, which will be submitted following NYSDEC approval of the RAWP. All tracking for waste generated at the site and transported offsite for treatment/disposal will be provided in the FER.

4.1.2.5 Equipment Decontamination

Following completion of the excavation, loading, transportation and disposal activities for the contaminated historic fill topsoil, the excavation equipment will be decontaminated. Equipment and materials will be decontaminated using the following procedure:

1. The equipment/material will be washed with clean water and detergent, using a brush if necessary, to remove particulate matter and surface films. Steam cleaning (high pressure hot water with detergent) may be necessary to remove matter that is difficult to remove with the brush.
2. Rinse thoroughly with tap water.

Following the completion of the decontamination procedures, the excavation equipment will be permitted for use in the certified clean backfilling and regrading activities. If backfill and regrading activities are performed simultaneous to the excavation/stockpiling/loading of contaminated historic fill, dedicated equipment (not exposed to the work zone) will be used.

4.2 In-Situ High Vacuum Extraction

Based on the results of the RI, residual contamination is present beneath the building slab. In one location, there was a record of NAPL overlying the groundwater table. Due to the recorded thickness of the concrete slab (approximately 8 to 13 feet thick), excavation activities are not a feasible alternative to access the subsurface contamination. As a result, in-situ remediation was selected as the preferred alternative to address the residual contamination beneath the building concrete slab.

In order to characterize the extent of the NAPL beneath the building, product delineation/extraction wells will be installed within the building basement. Following the installation of the product delineation/extraction wells, targeted high vacuum DPE will be used for point source NAPL contaminant removal activities. The NAPL DPE activities will be performed to remove residual source material that is contributing to soil and dissolved phase contamination to the subsurface beneath the building. The DPE activities will utilize the extraction/treatment system that was mobilized and utilized for the "hot spot" excavation dewatering activities.

The results of the additional subsurface characterization activities as well as the operational parameters obtained from the targeted high vacuum DPE activities will be used to assess the feasibility and/or need for additional RAs for the residual sub-slab contamination following the completion of the RAWP activities.

4.2.1 Installation of Delineation/Extraction Points

In order to address documented historical NAPL beneath the building as well as to facilitate targeted high vacuum DPE activities at the Site, LBGES/LBG will supervise the installation of an additional four (4) product delineation/extraction wells within the building basement. The proposed locations for the product delineation/extraction wells are presented on figure 13.

The locations of the proposed product delineation/extraction wells were selected based on the results of the historical investigations as well as information obtained from the historical powerhouse building designs maintained by the New York Transit Museum. The relevant details are included on figure 13. The proposed well locations and the placement rationale are summarized below:

1. In the vicinity of Boring GB-13 which was drilled during the RI in the northeastern portion of the building basement. NAPL was measured within this boring at a thickness of 8 inches. However, no sample was collected and therefore no laboratory analysis was performed to identify the constituents.
2. On the western side of the building in the vicinity of Boring GB-9 which was drilled during the RI. This boring location is upgradient of the PCB "hot spot" excavation. No measurable thickness was recorded in this boring, however; sheen was observed on the groundwater within this boring.
3. In the vicinity of Boring GB-14 which was drilled during the RI in the southeastern portion of the building basement. No measurable NAPL thickness or sheen was recorded in this boring, however; historical plan review indicated the past presence of an oil tank in this area.
4. Approximately 50 feet east and 35 feet south of the northern building interior wall. This well is proposed in the location of two historical oil tanks that were associated with the powerhouse AC and DC generating turbine engines.

The utilization of the previously drilled borings (GB-13, GB-9 and GB-14) will eliminate the need to core through the recorded 8-13 feet of concrete slab. Due to the thickness of the building slab, a concrete core may be advanced (in the location of the well proposed in the area of the former oil tanks) prior to continuing the boring into the subsurface soils.

The new monitoring wells will be installed using the hollow-stem auger drilling method (or acceptable alternative drilling method). Soil sampling will not be performed for the borings previously characterized under the RI activities. For these locations, the drilling will consist of advancing to the boring total depth and installation of the wells. During drilling in the new boring location, soil samples will be collected continuously (once beyond the bottom of the concrete slab) using a split-spoon sampler to characterize soil quality. The soil samples will be examined in the field by an LBGES/LBG hydrogeologist. A geologic log showing the soil characterization, PID concentrations and subsequent well construction specifications for soil boring will be prepared in the field. One soil sample will be collected from immediately beneath the concrete slab and one soil sample will be collected from the groundwater interface.

The soil samples will be placed into laboratory supplied containers and stored in a cooler with ice. The soil samples will then be submitted to a New York State certified laboratory under chain of custody procedure, for analysis of 6 NYCRR Part 375 parameters (VOCs, SVOCs, TAL metals, cyanide, PCBs and pesticides).

Following the boring completion, product delineation/extraction wells will be installed in the completed borings. The wells will be constructed with approximately 10-15 feet of 4-inch diameter 20-slot stainless steel well screen set from 15 feet below the bottom of the building slab. Each well will then be completed from the bottom of the building slab to approximately 0.5 ft bg with 4-inch diameter stainless steel riser. The annular space surrounding the well screen will be filled with No. 2 quartz filter sand from the bottom of the boring to 2 feet above the top of the well screen. A 1-foot bentonite cap will be placed above the filter sand. The sand pack around the well screen will prevent clogging of the screen, particularly under pulsing conditions. The remaining annular space above the bentonite cap will be filled with a bentonite/cement grout. The grout seal will ensure an adequate seal to prevent short-circuiting of the vacuum induced via the wellhead. The wells will be completed within 12-inch flush mount manholes (or similar) and will be capped with a well plug.

These product delineation/extraction wells will be maintained onsite following the completion of the RAWP DPE activities and will be incorporated into the final groundwater monitoring well network to be used for long-term monitoring of the Site.

Drill cuttings will be contained in 55-gallon drums and stored onsite pending waste characterization, profiling and offsite disposal. Composite soil samples will be collected from the drums and will be submitted for laboratory analysis of disposal waste characterization in accordance with the selected licensed disposal facility.

4.2.2 Targeted High Vacuum DPE Extraction Activities

Following the installation of the product delineation/extraction wells, targeted high vacuum DPE will be performed using the wells. Prior to performing the DPE activities, fluid-level measurements will be gauged for the newly installed wells. If NAPL is observed within the wells, a sample will be collected and submitted to a New York State certified laboratory for fingerprint analysis to identify the constituent compounds.

Following water-level measurements, groundwater samples will be collected using the low-flow sampling method (USEPA Low Flow Groundwater Sampling Procedures, April 1996) a copy of which is included in Appendix K. During sampling, groundwater parameters will be monitored continuously using a Horiba U-22XD multi-parameter water-quality monitoring system. Measurements for pH, conductivity, turbidity, dissolved oxygen (DO), temperature, and oxygen reduction potential (ORP) will be obtained as the groundwater is purged through a flow-cell at a rate of 100 to 500 ml/minute (milliliter per minute). In addition, the turbidity of the water will be measured. Upon reaching stabilization of all parameters, a groundwater sample will be collected for laboratory analysis. The groundwater sample will be stored on ice in a cooler to maintain a constant temperature until delivery to a New York State certified laboratory for VOCs, SVOCs, PCBs and total metals. The groundwater quality results for the samples collected prior to the DPE activities (end subsequent DPE rounds) will be used to evaluate the effectiveness of the targeted DPE activities as a remedial action.

The DPE activities may be performed using a high vacuum extraction truck capable of extracting 6,500 gallons of liquid per event. Any groundwater extracted during the DPE rounds will be transported offsite to an approved water treatment facility. Precharacterization laboratory analytical will be performed prior to the DPE event(s) to ensure that the extracted groundwater complies with all analytical requirements for the water treatment facility.

Alternatively, the DPE activities (and associated groundwater treatment and discharge activities) will be performed using the trailer mounted treatment system used for the "hot spot" excavation dewatering activities. The dissolved phase contaminant concentrations obtained from the groundwater sampling will be used to estimate contaminant mass extraction rates for the wells. This information will be useful in estimating the capacity treatment system and anticipate change-out events for spent treatment media (i.e., activated carbon).

The trailer-mounted DPE system will be equipped with the following equipment (or similar):

- 15 hp (horsepower) liquid ring vacuum pump capable of 300 cfm (cubic feet per minute) at 28 inches of Hg (mercury);
- manifold equipped with vacuum gauge, flow meter, and control valve;
- hosing to connect to the 4-inch diameter DPE wells and stinger packages to enable extraction setting to 30 feet;
- additional connecting hoses with sampling ports to facilitate operation of multiple extraction points simultaneously;
- multiple vapor flow meters (total effluent and make-up flow volumes);
- 150-gallon liquid/gas separator knockout tank;
- sediment/bag filters (if needed to ensure continuous operation);
- a groundwater storage tank (approximately 22,000 gallons);
- a product recovery tank;
- 36 kW (kilowatt) generator;
- a 55-gallon vapor phase carbon treatment vessel (for use if necessary);
- two 15 gpm transfer pumps;
- 1-inch totalizing flow meter; and,
- 150 gallon water tank.

Set-up will include equipment and personnel mobilization to the Site and installation and set-up of the mobile treatment system.

The newly installed product delineation/extraction wells will be utilized for this remedial measure. Once the extraction activities commence, vacuum will be applied to the subsurface with the DPE system. This will create vapor-phase pressure gradients toward the vacuum well. Typically, a greater amount of NAPL may be recovered using vacuum-enhanced DPE compared to the fraction of product recoverable using gravity drainage alone. The higher the applied vacuum, the larger the hydraulic gradients that can be achieved in both vapor and liquid phases, and thus the greater the vapor and liquid recovery rates.

Prior to commencing the DPE activities, a drop tube (stinger) will be inserted into the extraction well to approximately 8-15 ft bg. The actual drop tube settings will be determined based on the depth to the bottom of the concrete slab, groundwater elevation, and groundwater recharge of the respective extraction point. In the event of excessive groundwater recharge, the drop tube setting will be modified appropriately. The DPE system will be activated and the extracted total fluids will be discharged into the phase separator. The extracted groundwater will be treated using the treatment system, the extracted product will be drummed for later offsite disposal and the extracted soil vapor will be discharged to the atmosphere (treated if necessary). The phase separator will be continually monitored throughout the duration of the DPE activities to monitor NAPL recovery rates.

During the active DPE activities for each extraction well, operating parameters (including groundwater elevation, wellhead pressure, make-up air volume, and extraction system settings) will be measured at approximately 15 to 30-minute intervals. In addition to the extraction parameters monitored during the DPE activities, the VOC concentrations in the effluent vapor stream (as detected in the DPE pre-treatment exhaust) will be screened using a PID. All recorded values for each extraction well will be recorded on field sheets. A sample DPE Field Sheet is included in Appendix L. Additionally, following the completion of the active DPE activities, the fluid levels within the extraction well will be continually monitored to assess potential recharge of NAPL (if present).

It should be noted that the installation of the delineation/extraction wells may be performed prior to the submission/approval of this RAWP as a pre-remedial design investigation. In the event that NAPL is observed in any of the delineation/extraction wells installed during the pre-remedial design investigation, periodic high vacuum extraction events may be performed using vacuum trucks to remove any accumulated NAPL. All activities performed prior to the submission/approval of this RAWP will be fully documented, and the results of any activities will be incorporated into the Final Engineering Report.

4.2.3 DPE Extraction Effectiveness Evaluation

The results of the targeted high vacuum DPE activities within the building will be evaluated to assess the remedial benefits. Additionally, if required a cost benefit analysis will be performed to evaluate long-term implementation of DPE activities as part of the Site remedy.

4.3 Building Interior Closure Sampling

Based on the historical property use, there is the potential that the interior building surfaces have been negatively impacted. To evaluate the condition of the interior surfaces, wipe sampling will be performed. Following the characterization of the interior surfaces, adequate surface treatments will be performed where required. It should be noted that following the completion of any surface decontamination activities (if necessary), a soil vapor barrier will be installed on all interior floor and wall surfaces (which extend beneath the respective exterior grade elevation) to mitigate the potential for soil vapor intrusion (SVI) (due to residual subsurface contamination that will be left in place).

4.3.1 Interior Surface Sampling Activities

Based on the presence of PCB contamination at the Site in addition to the historical Site operations, the interior surfaces of the onsite building will be sampled to ensure there is no PCB impact. Non-impervious solid surfaces will be sampled. Non-impervious solid surfaces are solid surfaces which are porous and are more likely to absorb spilled PCBs prior to completion of the cleanup requirements prescribed in this policy. Non-impervious solid surfaces include, but are not limited to, wood, concrete, asphalt, and plasterboard.

The sampling will be performed on high-contact surfaces. High-contact residential/commercial surfaces are surfaces which are repeatedly touched, often for relatively long periods of time. Doors, wall areas below 6 feet in height, uncovered flooring, windowsills, fencing, bannisters, stairs, automobiles, and children's play areas such as outdoor patios and sidewalks are examples of high-contact residential/commercial surfaces. Examples of low-contact residential/commercial surfaces include interior ceilings, interior wall areas above 6 feet in height, roofs, exterior structural building components (e.g., aluminum/vinyl siding, cinder block, asphalt tiles), and pipes.

A representative number of wipe samples will be collected from the interior walls and floors to evaluate the surfaces for PCB concentrations. This will consist of at a minimum: one sample for each interior perimeter wall per building floor; one sample of the uncovered floor per building floor; and, one sample from each stairwell handrail per building floor.

Samples will be collected on large, nearly flat, non-porous surfaces by dividing the surface into roughly square portions approximately two (2) meters on each side. Sampling will be performed in accordance with the procedures outlined in 40 CRF §761.302(a). It is not necessary to sample small or irregularly shaped surfaces.

Standard wipe test procedures will be performed according to the following procedures:

1. A standard-size template (10 cm [centimeters] × 10 cm) will be used to delineate the areas of impact and extent of the area requiring cleanup.
2. The wiping medium will be a gauze pad or glass wool of known size which has been saturated with hexane. It is important that the wipe be performed very quickly after the hexane is exposed to air. USEPA strongly recommends that the gauze (or glass wool) be prepared with hexane in the laboratory and that the wiping medium be stored in sealed glass vials until it is used for the wipe test.
3. USEPA requires the collection and testing of field blanks and replicates for QA/QC.

The wipe samples will be stored in laboratory provided sampling containers. The samples will be shipped under chain of custody to a NYSDOH certified laboratory for analysis of PCBs by USEPA Method 8082. It should be noted that due to the proposed soil vapor barrier installation in the basement of the building, the surface sampling will not be required.

In high occupancy areas, the surface PCB cleanup standard is ≤10 ug (micrograms) per 100 cm^2 (square centimeters) of surface area. If areas are identified which exceed the cleanup standard, the surfaces will be cleaned/decontaminated to a PCB concentration of 10 ug/100 cm^2. Of note, the surface cleanup standard for low occupancy areas is < 100 ug/100 cm^2 of surface area.

4.3.2 Interior Surface Decontamination Activities

It should be noted that in the event PCB concentrations exceed the cleanup standard for the basement floor and walls, decontamination activities will not be required to address the potential exposure to PCBs. This is due to the fact that these surfaces will be encapsulated by the proposed soil vapor barrier as outlined in Section 6.2, below. If required due to PCB concentrations, any waste generated during the surface preparation activities will be handled according to all appropriate rules and regulations.

If surface decontamination is necessary as per the wipe sampling analytical results, the double wash/rinse surface decontamination procedures will be used. The double wash/rinse procedure is used to quickly and effectively remove PCBs on surfaces. It is important to select and use the proper cleanup equipment, to conduct the procedure correctly so as not to redistribute PCBs, and to comply with disposal requirements for all cleanup materials. The double wash/rinse procedure is outlined below:

1. First Wash - Cover the entire surface with concentrated or industrial strength detergent or non-ionic surfactant solution. Contain and collect all cleaning solutions for proper disposal. Scrub rough surfaces with a scrub brush or scrubbing pad, adding cleaning solution such that the surface is always very wet, such that each 900 cm^2 (1 sf) is washed for 1 minute. Wipe smooth surfaces with a cleaning solution-soaked disposable absorbent pad such that each 900 cm^2 (1 sf) is wiped for 1 minute. Wash any surface <1 sf for 1 minute. Mop up or absorb the residual cleaner solution and suds with a clean, disposable, absorbent pad until the surface appears dry. This cleaning should remove any residual dirt, dust, grime, or other absorbent materials left on the surface during the first wash.
2. First Rinse - Rinse off the wash solution with 1 gallon of clean water per square foot and capture the rinse water. Mop up the wet surface with a clean, disposable, absorbent pad until the surface appears dry.
3. Second Wash - Cover the entire surface with organic solvent in which PCBs are soluble to at least 5 percent by weight. Contain and collect any runoff solvent for disposal. Scrub rough surfaces with a scrub brush or disposable scrubbing pad and solvent such that each 900 cm^2 (1 sf) of the surface is always very wet

for 1 minute. Wipe smooth surfaces with a solvent-soaked, disposable absorbent pad such that each 900 cm^2 (1 sf) is wiped for 1 minute. Any surface <1 sf shall also be wiped for 1 minute. Wipe, mop, and/or sorb the solvent onto absorbent material until no visible traces of the solvent remain.

4. Second Rinse - Wet the surface with clean rinse solvent such that the entire surface is very wet for 1 minute. Drain and contain the solvent from the surface. Wipe the residual solvent off the drained surface using a clean, disposable absorbent pad until no liquid is visible on the surface.

Following any decontamination activities, closure sampling will be conducted as per the methodology outlined in Section 4.3.1, above.

4.4 Installation of Replacement Monitoring Well Network

Following the completion of the onsite excavation and regrading activities, a replacement groundwater monitoring well network will be installed throughout the Site. As part of future Site management, a groundwater monitoring program will be implemented at the Site to collect Site data that will be evaluated to assess the effectiveness of the RA. If existing onsite groundwater monitoring wells are not damaged as a result of the RAWP activities, they will be utilized as part of the monitoring well network.

To ensure the monitoring well network provides sufficient coverage of the Site, nine (9) replacement groundwater monitoring wells will be installed at the Site. The proposed locations of these wells are presented on figure 14.

The new monitoring wells will be installed using the hollow-stem auger drilling method (or acceptable alternative drilling method). Prior to installing the well, the locations will be cleared by hand to a depth of 4-5 ft bg. This hand clearing will be performed to ensure that no subsurface utilities are located at the proposed well location.

During drilling, soil samples will be collected continuously (starting at the bottom of the certified clean backfill layer) using a split-spoon sampler to characterize soil quality. An alternative sampling technique would consist of soil sampling using a Geoprobe® drill rig to characterize soil prior to well installation. The soil samples will be examined in the field by an

LBGES/LBG hydrogeologist. A geologic log showing the soil characterization, PID concentrations and subsequent well construction specifications for soil boring will be prepared in the field. The soil sample which exhibits the highest PID concentration and the soil sample from the groundwater interface will be collected in laboratory supplied containers and stored in a cooler with ice. The soil samples will then be submitted to a New York State certified laboratory under chain of custody procedure, for laboratory analysis of VOCs, SVOCs, PCBs and total metals.

Following the soil sampling and completion of each boring location, a monitoring well will be installed in the completed boring. The wells will be constructed with approximately thirty (30) feet of 2-inch diameter 20-slot PVC well screen set approximately 5-25 ft bg and completed with 2-inch diameter PVC riser to approximately 0.5 ft bg. The annular space surrounding the well screen will be filled with No. 2 quartz filter sand from the bottom of the boring to 2 feet above the top of the well screen. A 1-foot bentonite cap will be placed above the filter sand. The sand pack around the well screen will prevent clogging of the screen, particularly under pulsing conditions. The remaining annular space above the bentonite cap will be filled with a bentonite/cement grout. The grout seal will ensure an adequate seal to prevent short-circuiting of the vacuum induced via the wellhead. The wells will be completed within street boxes, with stick-up pipes or with flush mount manholes. Each well will be capped with a well plug.

The newly-installed monitoring wells will be developed to remove fine material from the sand pack and from within the well screen by surging them with a check valve and over-pumping turbid well water with a reciprocating (Waterra) pump in combination with a suction pump. All development water will be contained in 55-gallon drums and stored onsite pending waste characterization and offsite disposal. Soil cuttings generated during drilling will be transferred to NYSDOT approved 55-gallon steel drums and stored temporarily onsite pending waste characterization and offsite disposal. Composite soil samples will be collected from these drums (for each respective property) and will be submitted for laboratory analysis of disposal waste characterization in accordance with the selected licensed disposal facility.

In addition to the replacement groundwater monitoring wells, four (4) product delineation/extraction wells will be installed within the building basement. These wells (in-

stalled for the targeted high vacuum DPE activities) will be maintained onsite and will be incorporated into the Groundwater Monitoring Well network. These wells will be available for use as groundwater/NAPL monitoring, groundwater extraction and/or chemical oxidant application(s) activities. Monitoring results obtained from post remedial groundwater sampling of these new monitoring points will be used to determine the efficacy of the RAs and to determine if additional RAs are required for the Site.

Following the installation of all replacement groundwater monitoring wells, a licensed survey will be performed to record the lateral locations of the wells in addition to the top of casing elevations for each well.

Drill cuttings that exhibit field screening evidence of VOC contamination will be containerized, sampled, and transported for disposal by the drilling contractor to an appropriate disposal facility. Drill cuttings that exhibit VOC contamination by field screening methods will be sampled and analyzed for VOCs, SVOCs, PCBs, pesticides, and TCLP metals to determine whether special handling/disposal procedures will be required. Excess drill cuttings from native soil generated during the sampling program that exhibit no observable contamination will be placed back into the borehole. Excess drill cuttings that contain fill material will be handled in the same manner.

Well development and purging fluids from the groundwater monitoring wells will be drummed and classified on a well-by-well basis. The groundwater sample(s) collected from the monitoring wells will be analyzed for VOCs, SVOCs, PCBs, pesticides, and TAL Metals. The results will be used to characterize the development/purge fluids. Decontamination fluids generated during the sampling program will be disposed as contaminated waste, without further sampling.

4.5 Site Demobilization Activities

Following the completion of the RA activities, all disturbed areas at the Site and surrounding properties (both investigation areas as well as support areas [e.g., staging areas, decontamination areas, storage areas, temporary water management area(s), and access areas]) will be restored to pre-remediation conditions. Additionally, temporary access areas (whether onsite or offsite) will be restored to pre-remediation conditions. All general refuse, as well as

materials associated with sediment and erosion control measures utilized at the Site (if applicable), will be disposed of in accordance with applicable rules and regulations.

All equipment used in association with the contaminated materials onsite will be properly decontaminated. Exterior surfaces on small equipment used onsite (e.g., tools, monitoring instruments, radios, clipboards) will be washed in a detergent solution and rinsed with clean water, air dried, and stored or serviced for reuse. The decontamination of sampling devices or tools requiring the use of solvents or acids will be conducted in a separate location within each decontamination zone. All large mechanical and motorized equipment is to be steamed cleaned by subcontractor.

Spent cleaners or other liquid waste generated during investigation activities shall be containerized onsite for future disposal at an appropriate disposal facility. All decontamination water and rinsate shall be containerized, and labeled for future disposal at an appropriate disposal facility. Any decontamination waste generated at the Site will be sampled and submitted to a New York State certified laboratory for waste characterization and will be transported offsite to a permitted waste management facility for disposal.

Following the decontamination of all equipment and materials used for handling contaminated materials in association with the RAWP, the onsite decontamination station and truck wash station will be deconstructed. All materials utilized in their construction and/or residual waste generated during their use (gravel, dirt, sludge, wastewater...) will be sampled and submitted to a New York State certified laboratory for waste characterization for VOCs, SVOCs, PCBs, pesticides, and TCLP metals to determine whether special handling/disposal procedures will be required. Following waste characterization, the waste will be transported offsite to a permitted waste management facility for disposal. Additional construction materials used during the implementation of the RAWP will be disposed of as like contamination based on the analytical waste characterization results associated with their use.

Project generated trash will be segregated into two categories, potentially contaminated trash, and general trash. Potentially contaminated trash includes disposable PPE and disposable sampling supplies such as well purge tubing, bailers, and plastic scoopulas. Potentially contaminated trash accumulated during the RA activities will be containerized, managed, and disposed as a contaminated material.

General trash includes items such as lunch debris, or other miscellaneous trash that does not come in contact with potentially contaminated materials. The individual subcontractors will be responsible for properly disposing of general trash.

5.0 RESIDUAL CONTAMINATION TO REMAIN ONSITE

Following the implementation of the RAWP, residual contamination will remain onsite. The residual contamination will consist of material representative of historical fill and dissolved phase contamination in groundwater. Since residual contaminated soil and groundwater will exist beneath the Site after the remedy is complete, ECs and ICs will be required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a Site specific SMP that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have two (2) primary EC systems. These are: (1) an interior soil vapor barrier installed on the existing basement floor and walls (interior surfaces that are below the respective exterior grade elevations) and an overlying concrete skimcoat; and (2) an exterior cover systems consisting of either 2 feet of certified clean fill overlying a demarcation filter fabric or asphalt/concrete covered areas, roads and sidewalks.

Additionally, ICs will be established for the Site to appropriately manage activities which may disturb residual contamination. The Site will have two (2) primary ICs. These are: the Environmental Easement; and the SMP.

The FER will report residual contamination on the Site in tabular and map form. This will include presentation of exceedances of RUSCOs for Restricted Residential use. Additionally, the FER will include the SMP as well as certification of the filing of the Environmental Easement.

6.0 ENGINEERING CONTROLS: COVER SYSTEMS

Exposure to residual contaminated soils will be prevented by an engineered, cover system(s) that will be installed on the Site. The composite cover system will consist of: (1) an

interior soil vapor barrier installed on the existing basement floor and walls (interior surfaces that are below the respective exterior grade elevations) and an overlying concrete skimcoat; and, (2) an exterior cover system consisting of either 2 feet of certified clean fill overlying a demarcation filter fabric or asphalt/concrete covered areas, roads and sidewalks. Details of each of these cover systems are presented in detail below.

6.1 Exterior Cover Systems

Exterior cover systems will be installed throughout the undeveloped portions of the Site. A summary of the backfill and cover system installation activities are presented in Sections 3.3.11, 4.1.2.6 and 4.1.3.3, above. The cover system will consist of a physical demarcation layer, consisting of orange snow fencing material, geotextile fabric or equivalent material, installed overlying the entire extent of the excavation surfaces. This physical marker will function as a visual demarcation reference marker. This demarcation layer will constitute the Residuals Management Zone, the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in this SMP. Surveying activities will measure and record the post-excavation grade elevation (which will also constitute the elevation of the demarcation layer) as well as the redevelopment grade elevations during the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the Residuals Management Zone in the SMP.

Following placement of the certified clean fill, the soil cover will be seeded or overlain with sod. A final survey will be performed upon the completion of the installation and re-grading of the cover systems. A map showing the survey results will be included in the FER and the SMP.

A figure showing the design detail for the cover systems installed on the undeveloped portions of the Site (following excavation, backfill and regrading) as well as a figure showing the aerial distribution of each of the cover types will be included in the FER. A SoMP will be included in the SMP and will outline the procedures to be followed in the event that the cover system and underlying residual contamination are disturbed after the RA is complete. Maintenance of this composite cover system will be described in the SMP, which will be submitted

along with the FER. Following completion of the remedial actions, annual inspections of the cover system will be performed in accordance with the SMP prepared for the Site.

6.2 Interior Soil Vapor Barrier

Based on the evaluation of the VOC concentrations detected in the soil vapor (as well as the depth of the bottom of the concrete slab) obtained from the historical soil vapor surveys, it is anticipated that any elevated soil vapor concentrations beneath the Site are the result of accumulation over time. While exterior excavation activities may reduce the soil vapor concentrations, the thickness of the building slab makes removal for source excavation activities logistically and financially prohibitive.

The targeted DPE activities may reduce concentrations. Also, the thickness of the slab should provide sufficient barrier for preventing SVI. However; residual contamination will be left in-place following the RAs.

Due to the thickness of the building's concrete slab, as well as the depth to which it extends (into the groundwater table), a sub-slab depressurization system (SSDS) is not feasible at the Site. Therefore, to ensure protectiveness of the indoor air quality at the Site, a vapor barrier capable of preventing SVI of VOCs will be installed within the building. Additionally, after installation, the LIQUID BOOT® vapor barrier or equivalent will be overlain by an additional concrete skim coat. Specifications for the proposed vapor barrier materials, LIQUID BOOT® Brownfield Membrane/Liner, are included in Appendix M.

The LIQUID BOOT® vapor barrier (or an equivalent vapor barrier) will cover the basement floor area and walls. A summary of the preparation (applicable to both vapor barrier alternatives) and installation activities (LIQUID BOOT®) are presented below. As per the LIQUID BOOT® manufacturer's specifications, the application surface (slab and walls) will be prepared as listed below. If an alternative equivalent vapor barrier product is utilized at the Site, surface preparation activities will be similar to those of the LIQUID BOOT®.

Prior to the application of the vapor barrier, all application concrete surfaces shall have a roughness of a light broom finish or smoother, and shall be free of any dirt, debris, loose material, release agents or curing compounds. All voids more than 1/4-inch deep and 1/4-inch wide will be patched prior to the vapor barrier installation. Masonry joints, cold joints, and form joints will be struck smooth. All penetrations will be cleaned via pressure washing and

all metal penetrations will be sanded clean with emery cloth. All surface preparation activities will be performed to ensure there is a competent application surface for the installation of the LIQUID BOOT®.

A 3/4-inch minimum cant of LIQUID BOOT®, or other suitable material as approved by manufacturer, will be added at all horizontal to vertical transitions, other inside corners of 120° or less. These transition areas will be allowed to cure overnight before the final application of LIQUID BOOT®. All cracks or cold joints greater than 1/16-inch will be completely grouted with non-shrink grout as approved by the Engineer. Hardcast reinforcing tape will be installed over all cold joints, cracks and form tie holes (after holes and cracks are grouted).

Additionally, LIQUID BOOT® will be spray applied at 60 mils minimum dry thickness around the penetrations; a minimum of 3 inches up the penetration. The LIQUID BOOT® will then be allowed to cure completely, following which all penetrations will be wrapped with a polypropylene cable tie at a point two inches (2") above the base of each penetration. The cable ties will be tightened firmly so as to squeeze, but not cut, the cured membrane collar.

After the surface area and penetrations are prepared, LIQUID BOOT® will be applied to a thickness of 60 mils and let cure for 24 hours, following which it will be inspected for blisters. Due to the nature of concrete as a substrate, it is normal for some blistering to occur. Such blistering is caused by either concrete's tendency to off-gas or water that is temporarily trapped between the concrete and the membrane. With time, blisters will absorb into the concrete without detriment to the membrane. Approximately 10% of the blister heads will be sampled and checked for proper membrane thickness. If the samples have the minimum required membrane thickness, then the remaining blisters will not be punctured or cut. If the samples have less than the minimum required membrane thickness, then the area can either be re-sprayed to obtain the proper thickness, or the blisters can be cut out and the area re-sprayed or patched with LIQUID BOOT® Trowel Grade. If a second coat is required, any standing water will be removed from the membrane before proceeding with the second application.

The membrane will be checked for proper thickness with a blunt-nose depth gauge, taking one reading every 500 square feet. The readings will be recorded and the test area will be marked for repair, if necessary. If repair is necessary, test areas will be patched over with LIQUID BOOT® to a 60 mils minimum dry thickness, extending a minimum of one inch (1")

beyond the test perimeter. If blisters are observed in the vapor barrier, they will be addressed as outlined in this section.

At the base of each penetration, a minimum of 3/4-inch thick membrane cant of LIQUID BOOT®, or other suitable material as approved by manufacturer will be installed. The membrane will be extended at a 60 mil thickness three inches (3") around the base of each penetration and up the penetration a minimum of three inches (3"). The seal will then be allowed to cure overnight before the application of LIQUID BOOT® membrane. Throughout the application of the vapor barrier, the membrane will be kept free of dirt, debris and traffic. Following the complete application of the vapor barrier (if any blisters are repaired) to the basement floor and the walls, it will be allowed to cure for a minimum of 24 hours.

Following installation and QA/QC inspection activities, the basement slab will be overlain with a concrete slab. The construction specifications for this cover layer will be determined following the approval of the RAWP.

Diagrams showing the design detail for the vapor barrier to be installed within the building basement are included in Appendix M.

Following the completion of the RAWP activities, the vapor barrier effectiveness will be verified by an indoor air quality sampling round performed at the Site. This indoor air sampling will be performed in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York - October 2006.

As per the SVI survey conducted as part of the Remedial Investigation Report (RIR), it was determined that there is no plausible offsite exposure scenario for the onsite soil vapor contamination present beneath the Site. Therefore, no additional SVI investigation activities are required in conjunction with the Site remedial program.

A map showing the aerial distribution of each of the cover types on the Site (including the basement soil vapor barrier) will be included in the FER. A SoMP will be included in the SMP and will outline the procedures to be followed in the event that the cover system and underlying residual contamination are disturbed after the RA is complete. Maintenance of this composite cover system will be described in the SMP, which will be submitted along with the FER.

7.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. ECs for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an EE and a SMP. These elements are described in this Section.

7.1 Environmental Easement (EE)

An Environmental Easement (EE) is required when residual contamination is left onsite after the RA is complete. Because the Site will have residual contamination after completion of all RAs, an EE is required. As part of this remedy, a Site-specific EE approved by NYSDEC will be filed and recorded with the Kings County Clerk. A copy of the NYSDEC template for the EE that will be used for the Site is included in Appendix N.

The EE renders the Site a Controlled Property and will 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. Any ICs, ECs, use restrictions and/or any site management requirements applicable to the Site will be contained in the environmental easement, which is created and recorded pursuant to ECL Article 71, Title 36 in compliance with GOL 5-703(1) and ECL 71-3605(2), and recordable pursuant to RPL 291.1-20. The EE will require that the grantor of the EE and the grantor's successors and assigns adhere to all ECs/ICs placed on this Site by this NYSDEC-approved remedy. The EE must be recorded with the Kings County Clerk before the Release can be issued by NYSDEC. The EE will be submitted as part of the FER.

ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. A series of ICs are required under this remedy to implement, maintain and monitor these EC systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil, and restricting the future use of the Site to commercial or industrial uses only. These ICs are requirements or restrictions placed on the Site that are listed in, and required by, the Deed Restriction. ICs can, generally, be subdivided between controls that support ECs, and those that place general restrictions on Site usage or other requirements. ICs in both of these groups are closely integrated with the

SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The anticipated ECs are:

- the cover systems installed on the undeveloped portions of the Site; and,
- the soil vapor barrier installed within the sub-grade portions of the onsite building.

The ICs that support ECs are:

- compliance with the EE by the Grantee and the Grantee's successors and adherence to all elements of the SMP;
- all ECs must be operated and maintained as defined in the SMP;
- all cover system (consisting of certified clean fill (2-foot layer), asphalt covered roads, concrete covered sidewalks, and concrete building slabs) must be inspected, certified and maintained as defined in the SMP;
- the soil vapor mitigation system consisting of a soil vapor barrier installed on the basement floor and all portions of the perimeter walls that are below grade elevation must be inspected, certified and maintained as defined in the SMP;
- all ECs on the Controlled Property (the Site) must be inspected and certified at a frequency and in a manner defined in the SMP;
- periodic groundwater monitoring must be performed as defined in the SMP;
- data and information pertinent to Site Management for the Controlled Property must be reported at a frequency and in a manner defined in the SMP;
- onsite environmental monitoring devices, including but not limited to groundwater monitoring wells must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP; and,
- ECs may not be discontinued without an amendment or extinguishment of the EE.

ICs may be modified, added or deleted from this list as warranted by Site conditions and deemed necessary by NYSDEC. Adherence to these ICs for the Site is mandated by the EE and will be implemented under the SMP (discussed in the Section 7.2, below). The

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

- vegetable gardens and farming on the Site's soil are prohibited without DEC authorization;
- use of groundwater underlying the Site is prohibited without treatment rendering it safe for intended purpose;
- all future activities on the Site that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;
- the Site may not be used for a higher level of use, such as unrestricted residential use without an amendment or extinguishment of the EE;
- the Site (remediated to restricted residential cleanup standards) may be used for restricted commercial or industrial use only, provided the long-term ECs/ICs included in the SMP are employed; and,
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that:
    1. controls employed at the Site 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 would constitute a violation or failure to comply with the SMP).

NYSDEC retains the right to reasonable access to the Site after notice 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.

7.2 Site Management Plan

Site management is the last phase of remediation and begins with the approval of the FER and issuance of the Release for the RA. Long-term management of EC/ICs and of residual contamination will be executed under a Site-specific SMP that will be developed and included in the FER. The SMP will describe appropriate methods and procedures required to ensure compliance with all ECs and ICs that are required by the EE. Once the SMP has been approved by the NYSDEC, compliance with the SMP will be required by the Grantor of the EE and Grantor's Successors and Assigns.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site and surrounding properties following completion of the RA in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all ECs/ICs; (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 remedial systems and/or ECs.

To address these needs, the 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.

The SMP will include a Groundwater Monitoring Plan for groundwater onsite and at the downgradient Site perimeter to evaluate Site-wide performance of the remedy. Appropriately placed groundwater monitor wells will also be installed immediately downgradient of all COC remediation areas for the purpose of evaluation of the effectiveness of the implemented RAWP.

The groundwater monitoring program will utilize the onsite groundwater monitoring well network installed as part of the RAWP, and will be implemented at the Site to collect Site data that will be evaluated to assess the effectiveness of the RA. This program will be conducted until residual groundwater concentrations are found to be below NYSDEC Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards (AWQS), or have become asymptotic over an extended period. Groundwater samples will be collected from all available/accessible onsite and offsite monitoring wells.

The groundwater monitoring program will consist of annual sampling events. The sampling frequency may be modified based on the results of the long-term sampling. The results of the annual groundwater monitoring program will be summarized in a quarterly report and in the annual Site Management Report.

Repairs and/or replacement of wells in the groundwater monitoring well network will be performed based on assessments of structural integrity and overall performance. Well decommissioning, for the purpose of replacement, will be reported to NYSDEC prior to performance and in the annual report. Well decommissioning without replacement must receive prior approval by NYSDEC. Well abandonment will be performed in accordance with NYSDEC's "Ground-Water Monitoring Well Decommissioning Procedures". Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC and NYSDOH. This data will be used to assess and evaluate the overall performance of the remedy.

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

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 Report will be based on a calendar year and will be due for submission to NYSDEC by April 1 of the year following the reporting period. A Periodic Review Report (PRR) evaluating the ICs/ECs employed as part of a remedy, will be completed and submitted to the NYSDEC annually, unless an alternate certification period is provided in writing by the NYSDEC. The PRR certification shall be included in a report summarizing the site management effort for the

certification period, in such form and manner as approved by the NYSDEC, and shall certify that:

1. The inspection of the Site to confirm the effectiveness of the ICs/ECs required by the remedial program was performed under the direction of the Remedial Engineer.
2. The ICs/ECs employed at the Site:
   a. are in-place;
   b. are in the NYSDEC-approved format; and,
   c. that nothing has occurred that would impair the ability of such control to protect the public health and environment.
3. The owner will continue to allow access to the Site to evaluate the continued maintenance of such controls;
   a. nothing has occurred that would constitute a violation or failure to comply with any SMP for such controls;
   b. the report and all attachments were prepared under the direction of, and reviewed by, the Remedial Engineer; and,
   c. to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program, and generally accepted engineering practices; and the information presented is accurate and complete.
4. Only one such certification shall be filed for the Site.
5. In the event that the certification cannot be provided due to a failure of one or more of the ICs/ECs, the NYSDEC will be provided:
   a. a timely notification explaining the cause for such failure;
   b. a work plan to implement the corrective measures necessary in order to be able to provide the certification; and,
   c. a schedule for those corrective measures.
6. In addition to the periodic reporting requirement, the remedial party shall timely notify the NYSDEC of failures of one or more of the ICs/ECs and shall provide a work plan to remedy the failure of the ICs/ECs. The work plan will be re-

viewed by the NYSDEC and the corrective measures shall be implemented in accordance with the approved work plan. A certification shall be submitted upon completion of the corrective measures.

The SMP will be 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 EE and the SMP are performed.

If, following the implementation of the RAWP, the status of the Site is changed to a non-significant threat, the institutional and engineering control certification shall:

1. certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located onsite and at the Site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid;
2. every five years the remedial party or owner shall certify that the assumptions made in the qualitative exposure assessment remain valid; and,
3. the requirement to provide such certifications may be terminated as set forth in ECL 27-1415(7)(c).

8.0 FINAL ENGINEERING REPORT (FER)

A FER and SMP will be submitted to NYSDEC following implementation of the RA defined in this RAWP. The FER will provide 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 and surrounding properties including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete SMP (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the RA 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 RA. 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.

The FER will include written and photographic documentation of all remedial work performed under this remedy. The FER will include an itemized tabular description of actual costs incurred during all aspects of the RA.

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 6 NYCRR Part 375 RUSCOs for Restricted Residential use cleanup. A table that shows exceedances from 6 NYCRR Part 375 RUSCOs for Restricted Residential for all soil/fill remaining at the Site after the RA and a map that shows the location and summarizes exceedances from 6 NYCRR Part 375 RUSCOs for Restricted Residential use with respect to all soil/fill remaining at the Site after the RA will be included in the FER. The FER will provide an explanation for why the material was not removed as part of the RA.

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

Before approval of a FER and issuance of a Release, all project reports must be submitted in digital form on electronic media (portable document format [PDF]).

Subsequent to the issuance of a certificate of completion, the Volunteer shall be entitled to the liability limitation protections set forth at ECL 27-1421, subject to the terms and conditions stated therein.

The certificate of completion entitles the applicant to file for Brownfield tax credits under Articles 21, 22 and 23 of the tax law. Only those costs incurred on or after the effective date of the Brownfield site cleanup agreement are eligible for consideration for credits.

8.1 Certifications

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the Remedial Engineer (William Beckman) 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, William Beckman, 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 Gowanus Village I, LLC (New York State Department of Environmental Conservation Brownfield Cleanup Agreement Site No. C224099, Index No. W2-1069-0506).

I certify that the Site description presented in this Final Engineering Report is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for the Gowanus Village I, LLC 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 New York State Department of Environmental Conservation 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 to 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 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, and that such plan has been approved by the New York State Department of Environmental Conservation.

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

9.0 SCHEDULE

The table below presents the estimated project schedule dates, and deliverable due dates for implementation of the RAWP. It subdivides work elements and provides estimated dates for performance of work and deliverables.

Item Number	Action	Date
1	Submit Draft AA and RAWP	August 30, 2013
2	NYSDEC Review and Comments on AA and RAWP	September 15, 2013
3	Submit Final AA and RAWP	September 30, 2013
4	NYSDEC Approval of AA and RAWP	October 15, 2013
5	End of Public Comment Period	October 30, 2013
6	Implementation of RAWP	November 15, 2013
7	Prepare Draft FER, SMP and EE	TBD
8	NYSDEC Review of Draft FER, SMP and EE	TBD
9	Submit Final FER, SMP and EE	TBD
10	Periodic Certifications	TBD

SCG/dmd
June 18, 2014
f:\reports\sive paget\gowanus\phase 3 - bcp alternatives analysis & remedial action work plan\rawp\workplan w2-1069-0506 c224099 2014-05-19 powerhouse rawp.doc

TABLES

TABLE 1

GOWANUS VILLAGE I, LLC
322 3rd AVENUE
BROOKLYN, KINGS COUNTY, NEW YORK

NYS BCP SITE NO. C224099
INDEX NO. W2-1069-0506

Project Organization Chart

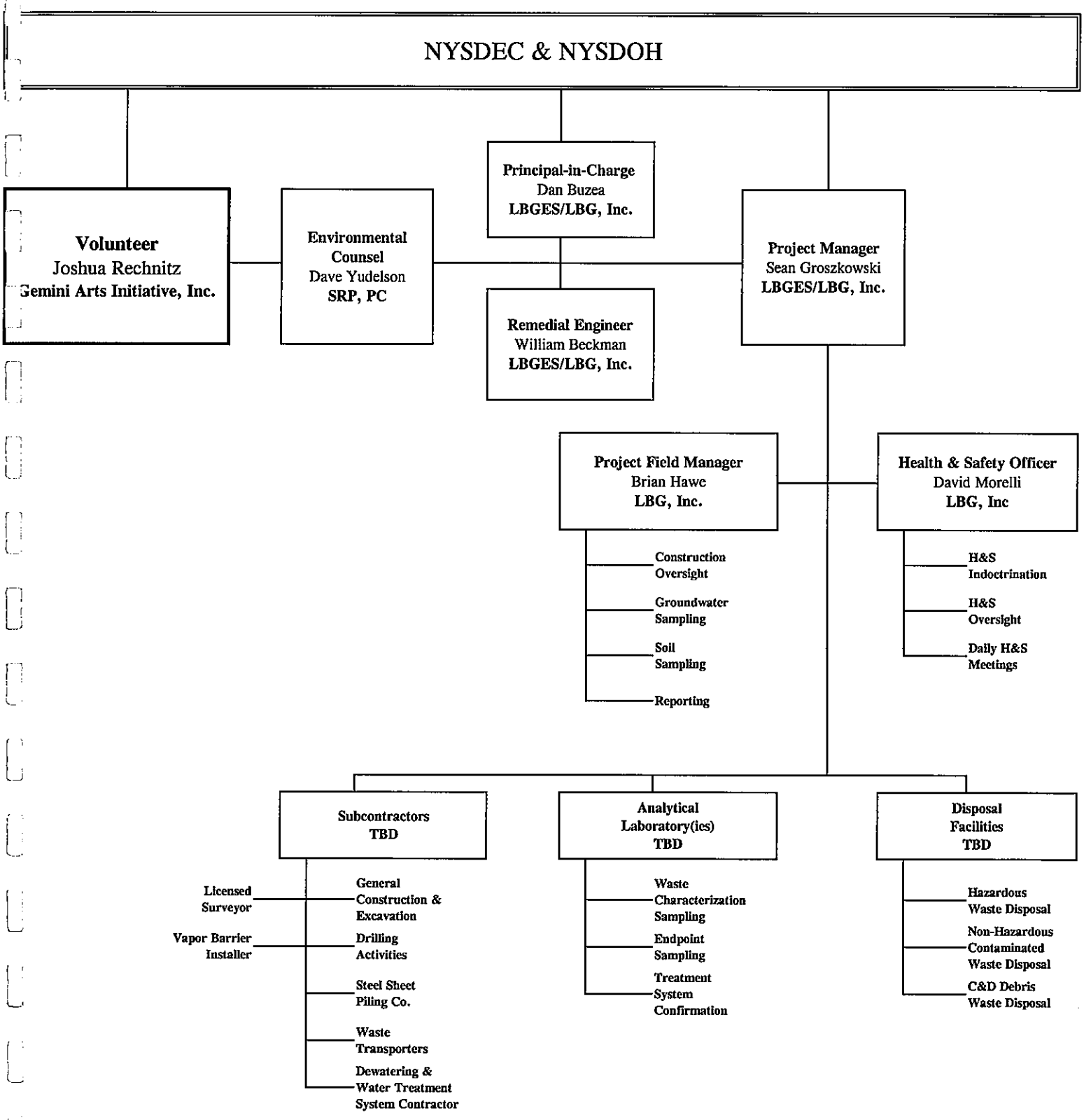


TABLE 2

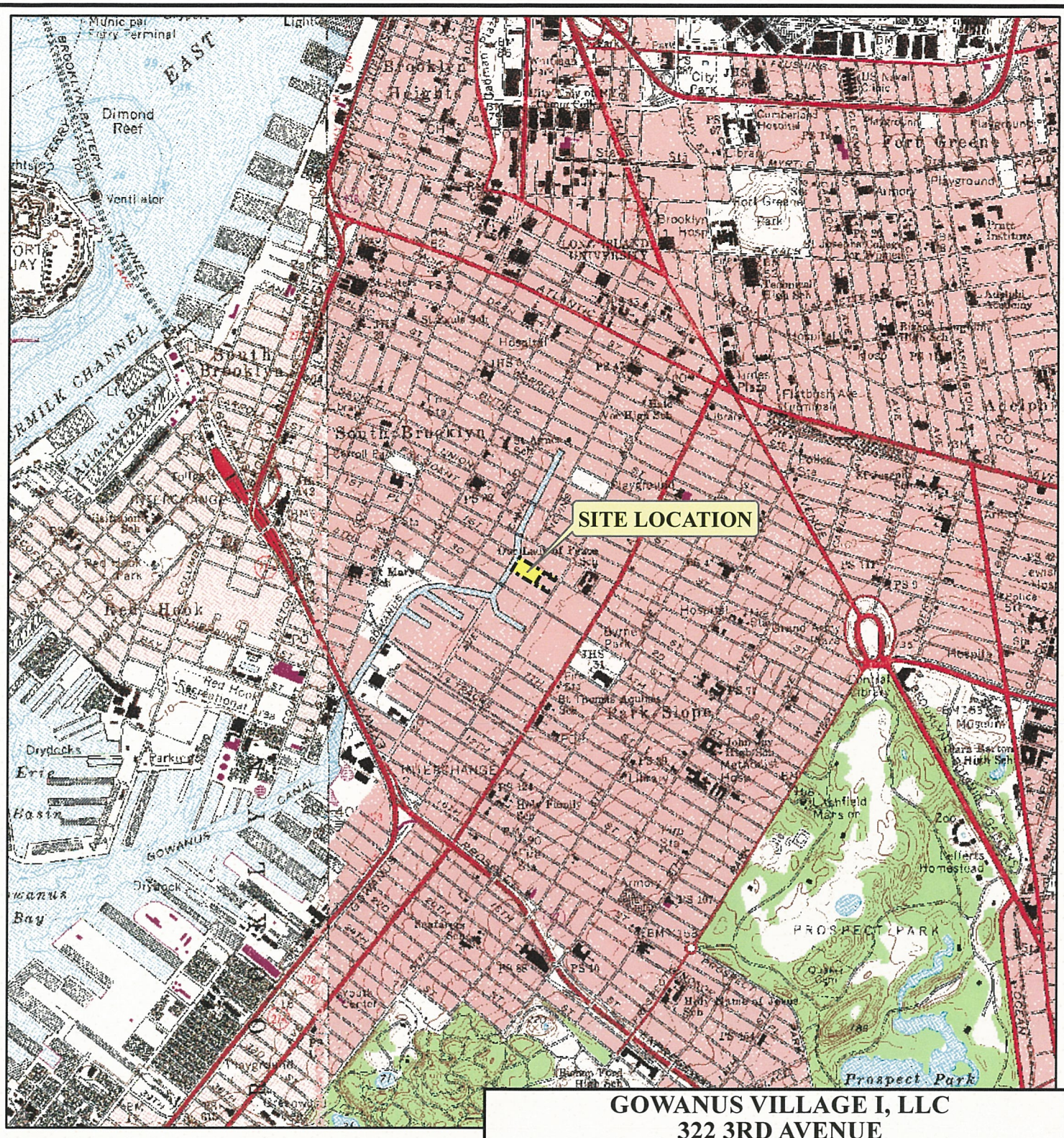
GOWANUS VILLAGE I, LLC
322 3rd AVENUE
BROOKLYN, KINGS COUNTY, NEW YORK

NYS BCP SITE NO. C224099
INDEX NO. W2-1069-0506

Emergency Contact List

Name	Organization	Project Role	e-mail	Phone	Mailing Address
Brian Davidson	NYSDEC Department of Environmental Remediation	Environmental Regulatory Oversight	bhdavids@gw.dec.state.ny.us	(718) 482-4065	625 Broadway Albany, NY 12233-70161
Christopher M. Doroski	NYSDOH Bureau of Environmental Exposure Investigation	Environmental Health Regulatory Oversight	Not Available	(518) 402-7860	New York State Department of Health Bureau of Environmental Exposure Investigation Corning Tower, Room 1787 Albany, NY 12237
Thomas Panzone	NYSDEC Division of Public Affairs and Education	Regional Citizen Participation Specialist	tvpanzon@gw.dec.state.ny.us	(718) 482-4953	Hunters Point Plaza 47-40 21st Street Long Island City, NY 11101
Joshua Rechnitz	Gemini Arts Initiative, LLC (Volunteer)	Owner Volunteer	Not Available	Not Available	126 West 74th Street, PH. B New York, NY 10023
David Yudelson	Sive, Paget & Riesel, PC	Volunteer's Environmental Counsel	dyudelson@sprlaw.com	(212) 421-2150 , x219	460 Park Avenue 10th Floor New York, NY 10022
Dan C. Buzea	LBGES, P.C. & LBG, Inc.	Volunteer's Environmental Consultant & Remedial Engineer	buzea@lbgny.com	(914) 694-5711	110 Corporate Park Drive Suite 112 White Plains, NY 10604
Sean Groszkowski			groszkowski@lbgny.com		
William Beckman, P.E.			wbeckman@lbgct.com	(203) 944-5000	4 Research Drive Suite 301 Shelton, CT 06484
Catherine Springer	Springer, LLC	Owner Representative Construction Project Manager	cate@springerllc.com	(718) 852-5965	388 Pacific Street Brooklyn, NY 11217

FIGURES



LEGEND

PROPERTY BOUNDARY

SOURCE: USGS DIGITIAL RASTER GRAPHIC, BROOKLYN QUADRANGLE, USGS, 1979

N
W E
S

0 1,000 2,000 Feet

1:24,000

GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

SITE LOCATION MAP

DATE:	REVISED:	PREPARED BY:
		LEGGETTE, BRASHEARS & GRAHAM, INC.
		Professional Groundwater and Environmental Engineering Services
		110 Corporate Park Drive, Suite 112
		White Plains, New York 10604
		(914) 694-5711

DRAWN:	CHECKED:	DATE:	FIGURE:
PAS	SG	6/10/13	1

LEGEND

- PROPERTY BOUNDARY
- EXISTING BUILDING FOOTPRINT
- ELEVATION CONTOURS (1-FOOT)

N
W E
S

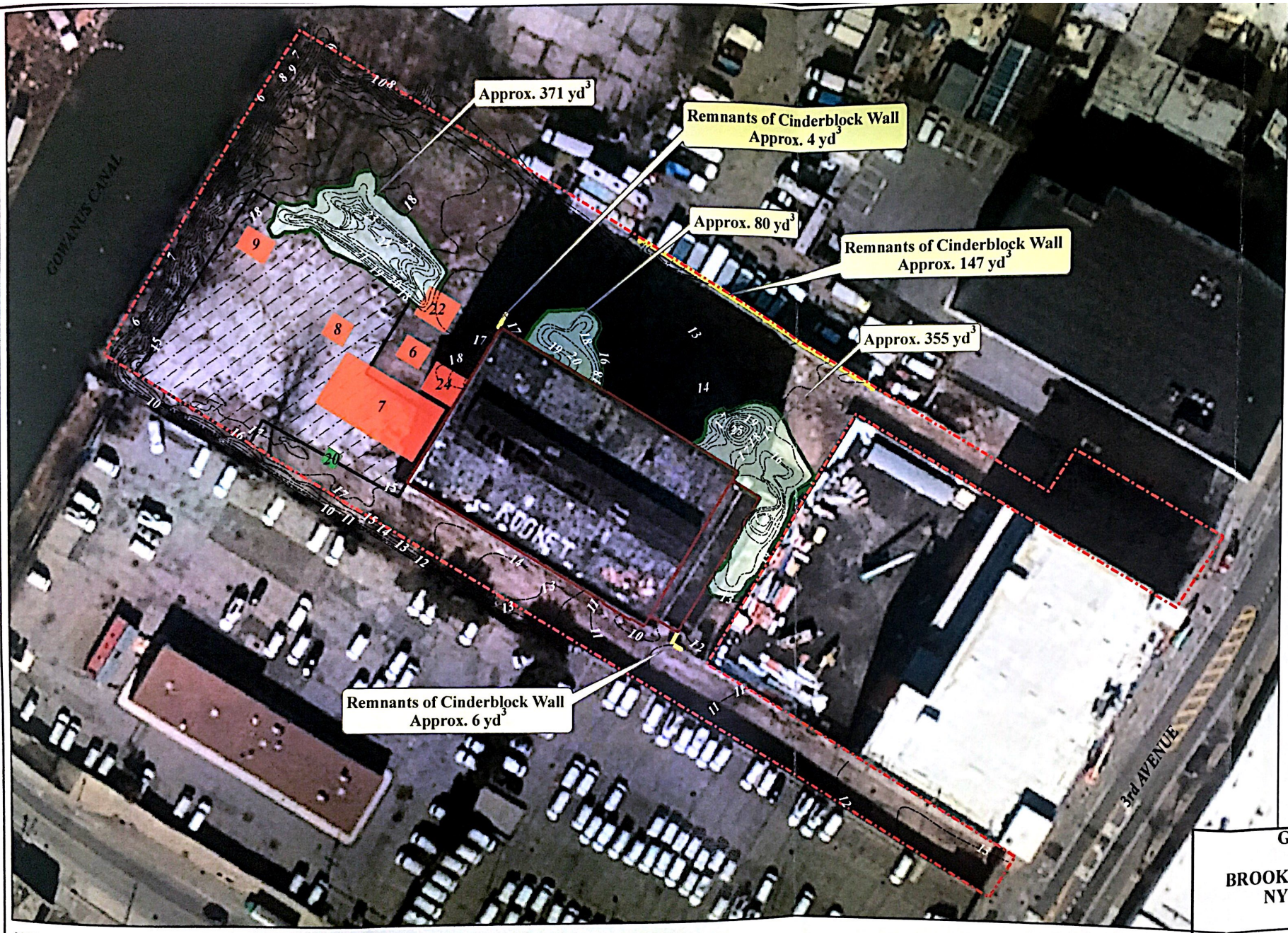
GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

NOTES:
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

0 30 60 Feet
1 inch equals 60 feet

SITE PLAN

DATE:	REVISED:	PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC. Professional Groundwater and Environmental Engineering Services 110 Corporate Park Drive, Suite 112 White Plains, New York 10604 (914) 694-5711		
DRAWN: PAS		CHECKED: SG	DATE: 6/10/13	FIGURE: 2



LEGEND

- CONTOURS (1-FOOT MSL)
- PROPERTY BOUNDARY
- EXISTING BUILDING FOOTPRINT
- UNSEGREGATED DEBRIS PILES
- CONCRETE SLAB

"HOT SPOT" EXCAVATIONS

- 9 PCB EXCAVATIONS (# DEPTH BELOW GRADE)
- 9 METALS EXCAVATION (# DEPTH BELOW GRADE)

NOTES:
PERSONNEL DECONTAMINATION AREA WILL BE SETUP WITHIN THE BASEMENT OF THE ON-SITE BUILDING

APPROXIMATE EXTENT OF CONCRETE SLAB SHOWN, OVERGROWN IN AREAS

NOTES:
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

0 30 60 Feet
1 inch equals 60 feet

GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

CURRENT SITE SOIL COVER

DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

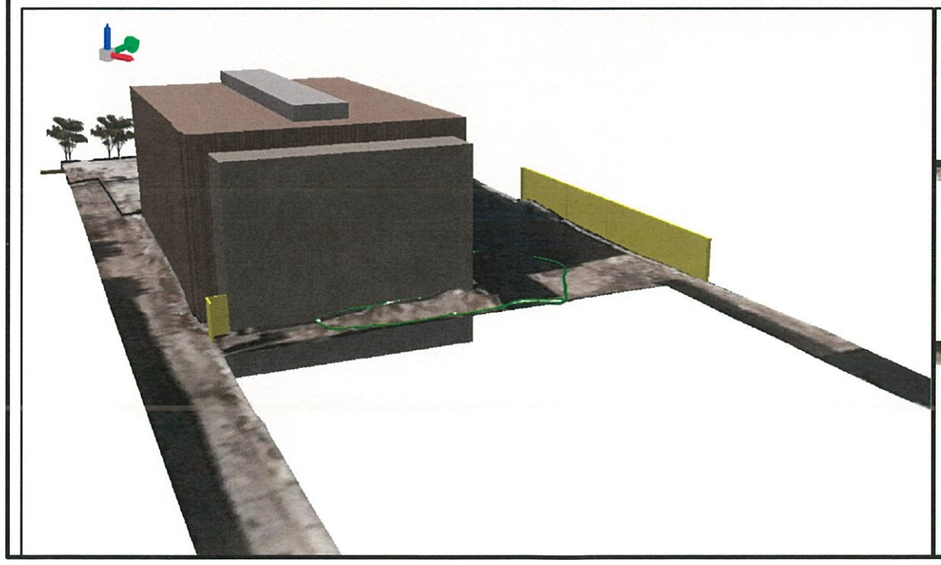
DRAWN: PAS	CHECKED: SG	DATE: 7/1/13	FIGURE: 3

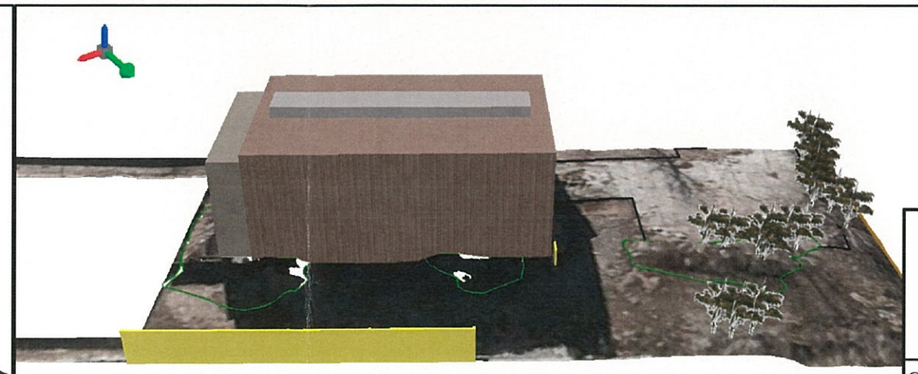
LEGEND

- REMNANTS OF CINDERBLOCK WALLS
- UNSEGREGATED DEBRIS PILES
- CONCRETE SLAB

NOTES:
CREATED IN ARCGIS 10.0 3D ANALYST;
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

NOT TO SCALE





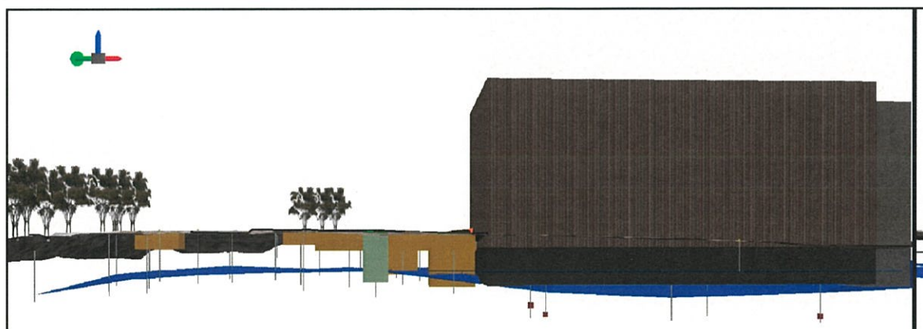
GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

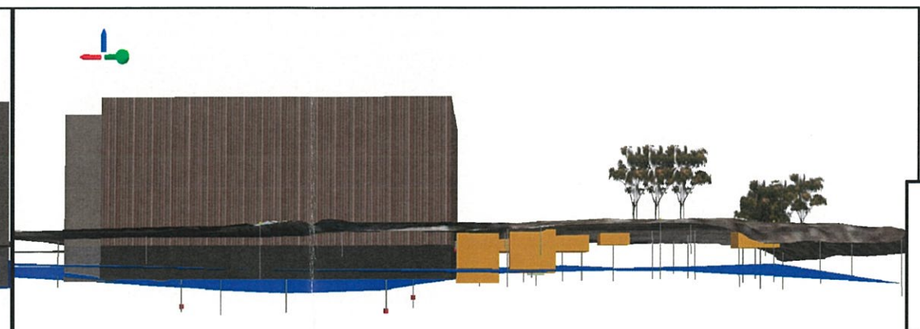
CONCRETE PAD, MUNICIPAL WASTE & C&D DEBRIS PILES

DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

DRAWN: PAS	CHECKED: SG	DATE: 7/17/13	FIGURE: 4





LEGEND

- BORING LOCATION (DEPTH TO BOTTOM)
- EXCEEDANCE OF CRITERIA
- GROUNDWATER ELEVATION

"HOT SPOT" EXCAVATIONS

- PCB EXCAVATIONS (EXCAVATION DEPTH)
- METALS EXCAVATION (EXCAVATION DEPTH)

NOTES:
CREATED IN ARCGIS 10.0 3D ANALYST;
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

NOT TO SCALE

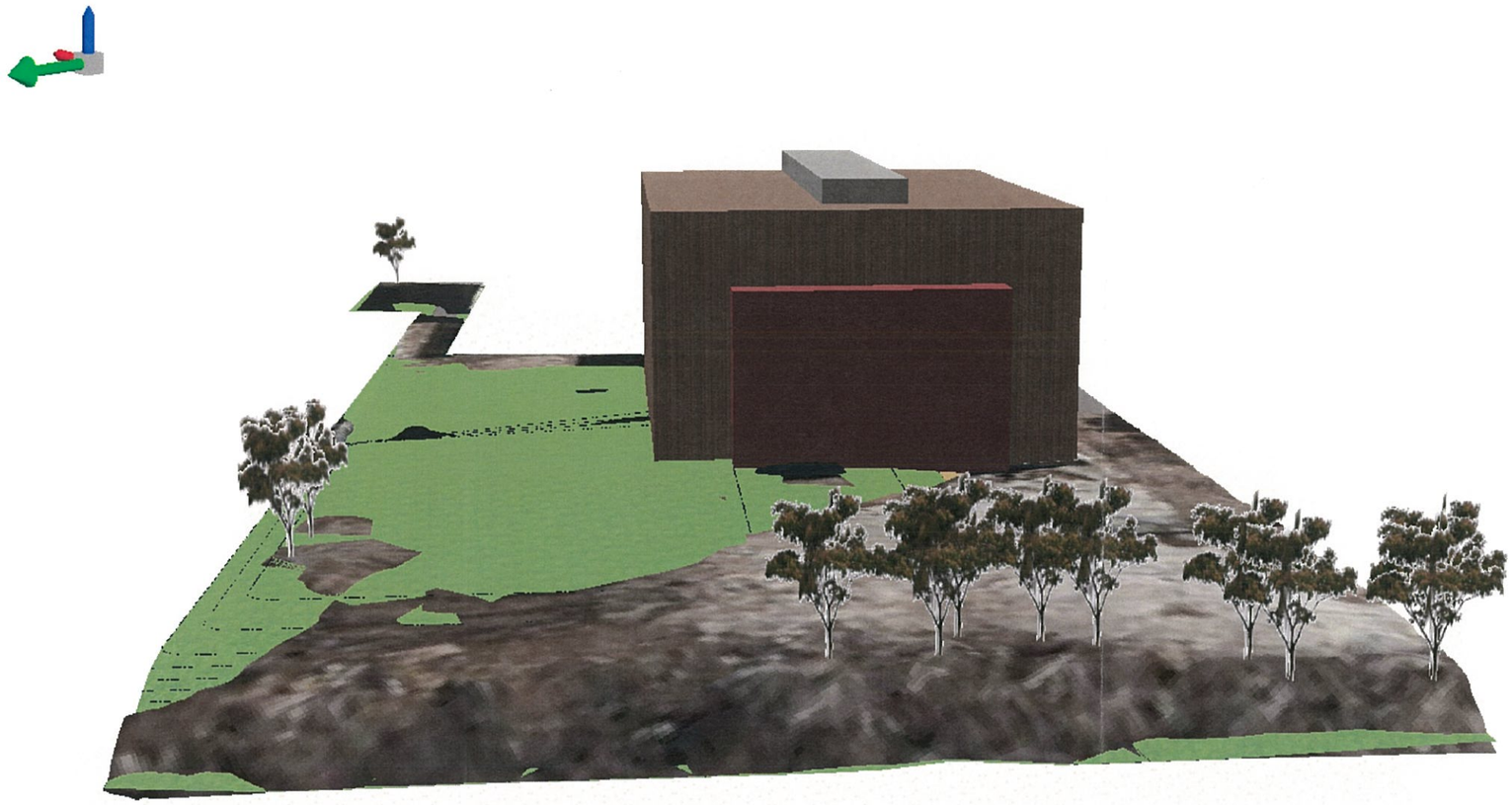
GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

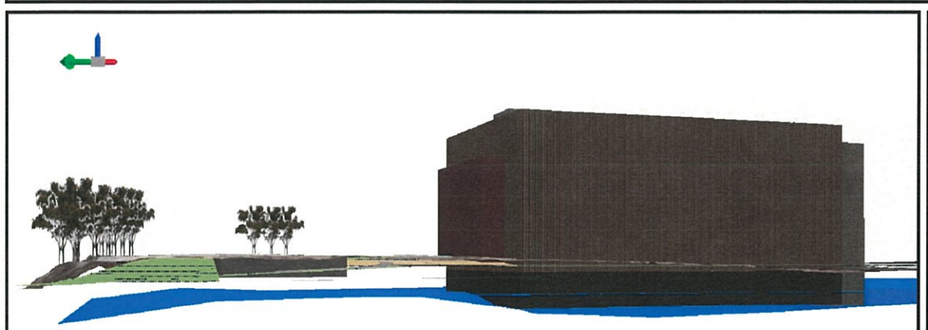
"HOT SPOT" EXCAVATIONS

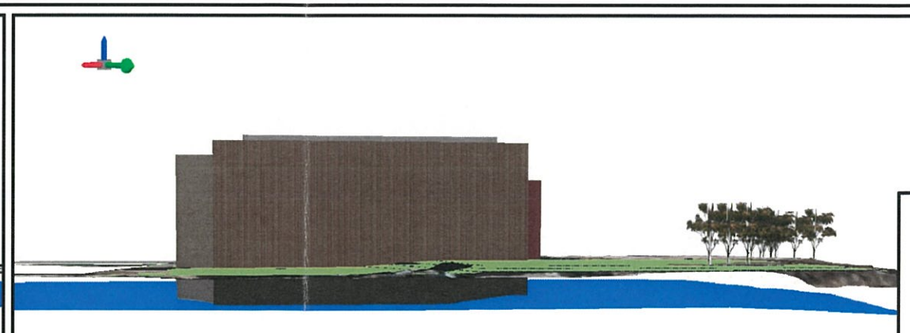
DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

DRAWN:	CHECKED:	DATE:	FIGURE:
PAS	SG	7/17/13	5







LEGEND

ALTERNATIVE 1 SURFACE TIN

GROUNDWATER ELEVATION

NOTES:

CREATED IN ARCGIS 10.0 3D ANALYST;
ALTERNATIVE EXPOSURE REPRESENTED AS FILLS AND CUTS WHERE SEEN ABOVE THE EXISTING TOPOGRAPHY.

EXISTING TOPOGRAPHY SHOWN WITHOUT C&D PILES.

DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

NOT TO SCALE

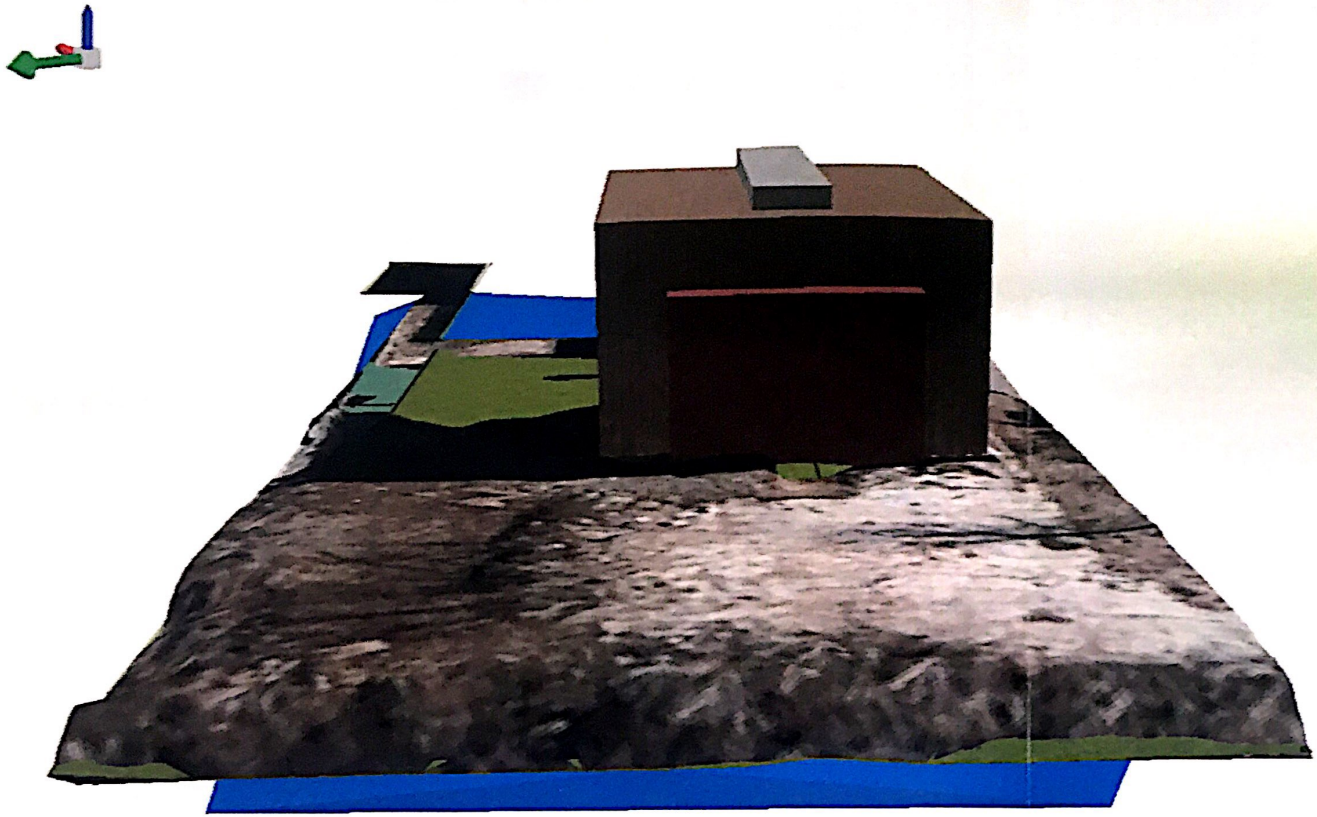
GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

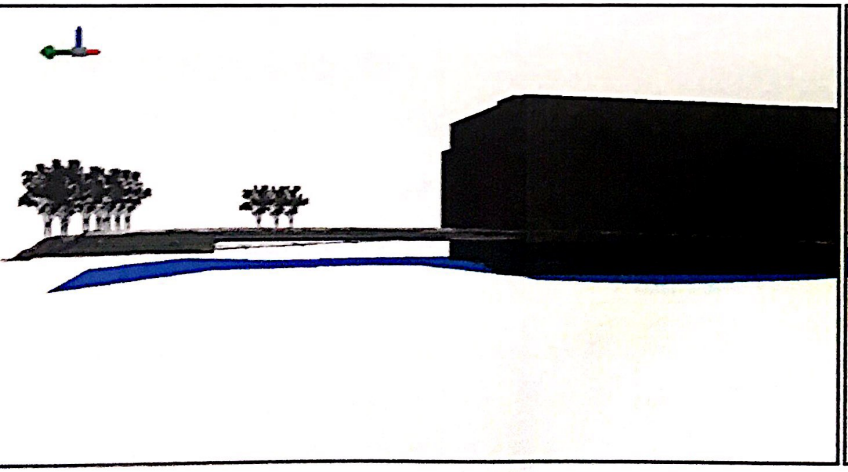
HISTORICAL FILL EXCAVATION - ALTERNATIVE 1

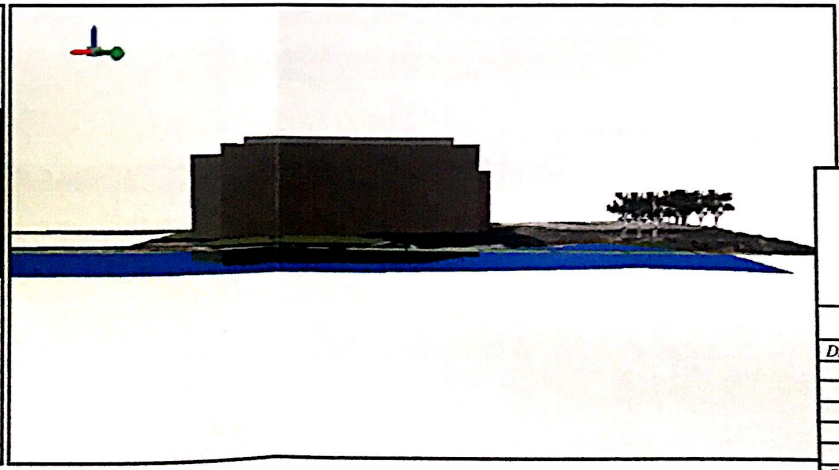
DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

DRAWN:	CHECKED:	DATE:	FIGURE:
PAS	SG	7/17/13	6A







LEGEND

ALTERNATIVE 2 SURFACE TIN

GROUNDWATER ELEVATION

NOTES:

CREATED IN ARCGIS 10.0 3D ANALYST; ALTERNATIVE EXPOSURE REPRESENTED AS FILLS AND CUTS WHERE SEEN ABOVE THE EXISTING TOPOGRAPHY.

EXISTING TOPOGRAPHY SHOWN WITHOUT C&D PILES.

DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

NOT TO SCALE

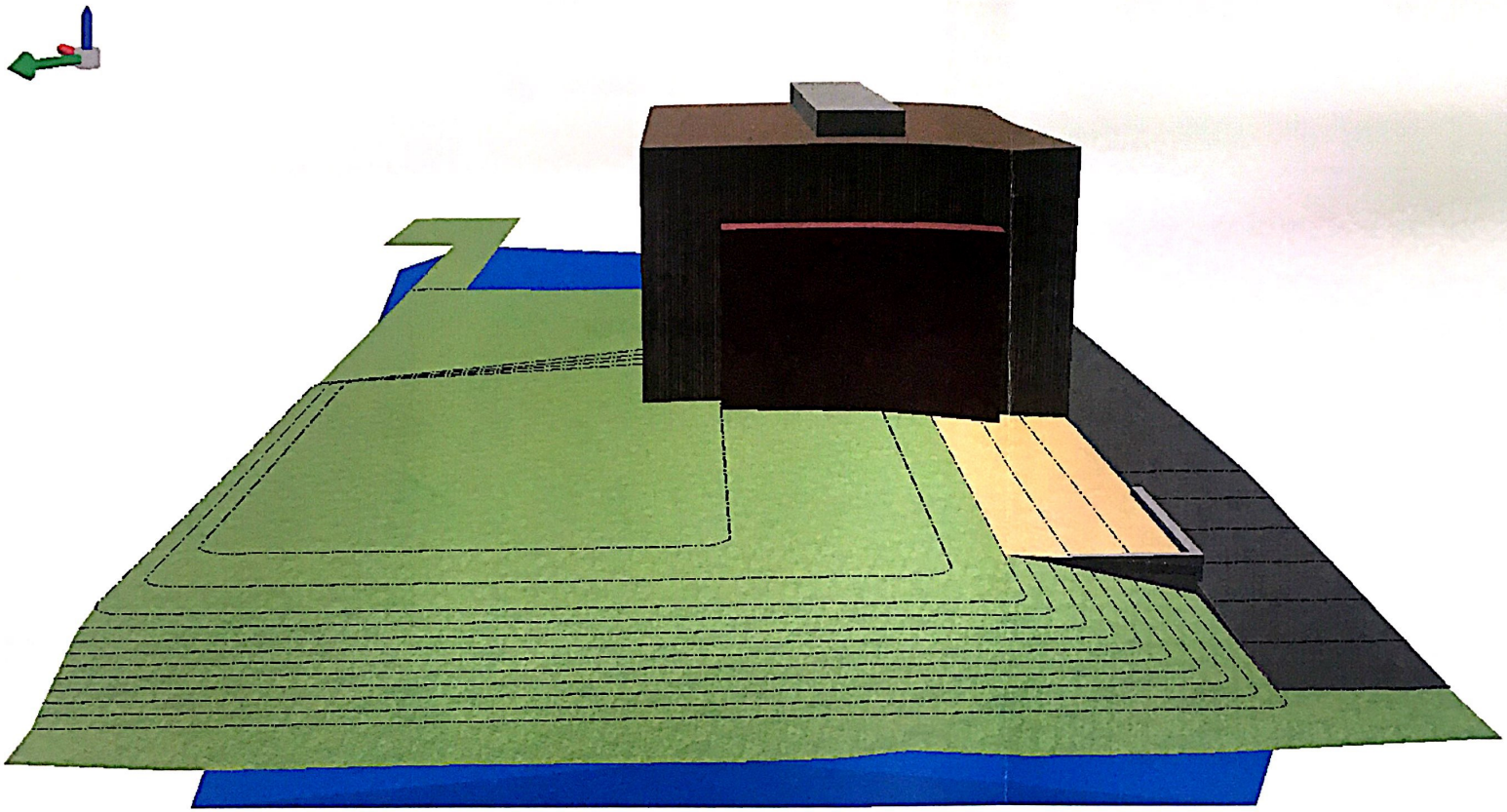
GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

HISTORICAL FILL EXCAVATION - ALTERNATIVE 2

DATE	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5713

DRAWN: PAS | CHECKED: SG | DATE: 7/17/13 | FIGURE: 6B



LEGEND

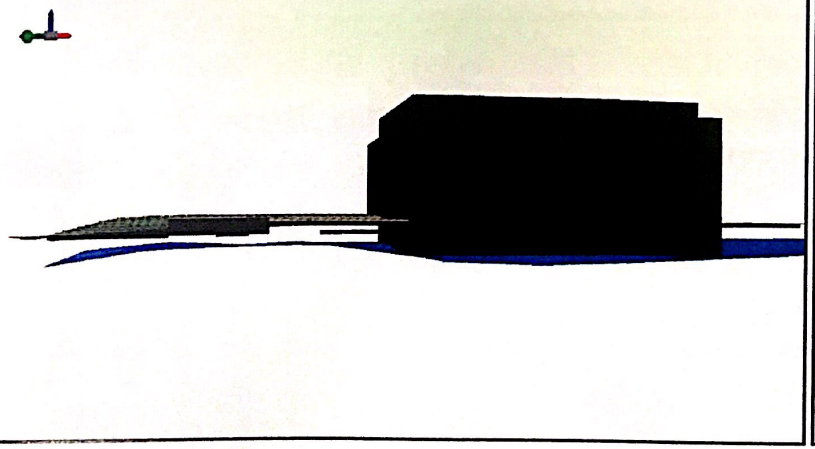
ALTERNATIVE 1 SURFACE TIN

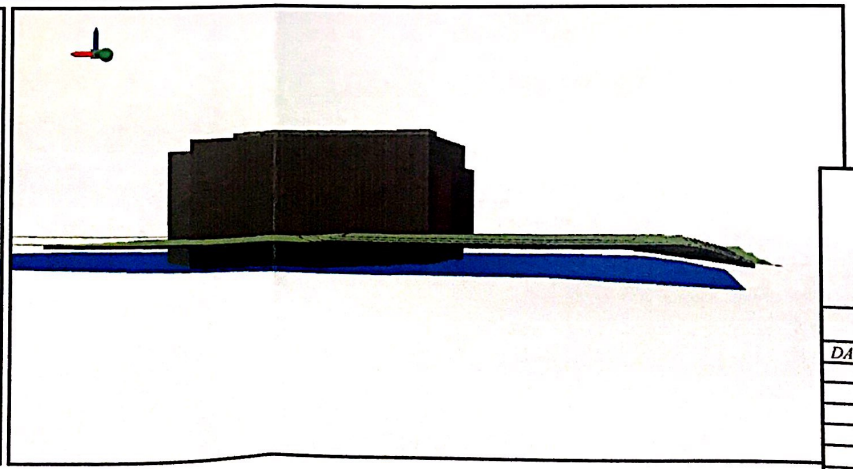
GROUNDWATER ELEVATION

NOTES:

CREATED IN ARCGIS 10.0 3D ANALYST;
TWO-FEET OF FILL PLACED BELOW SHOWN ALTERNATIVE SURFACE.

NOT TO SCALE





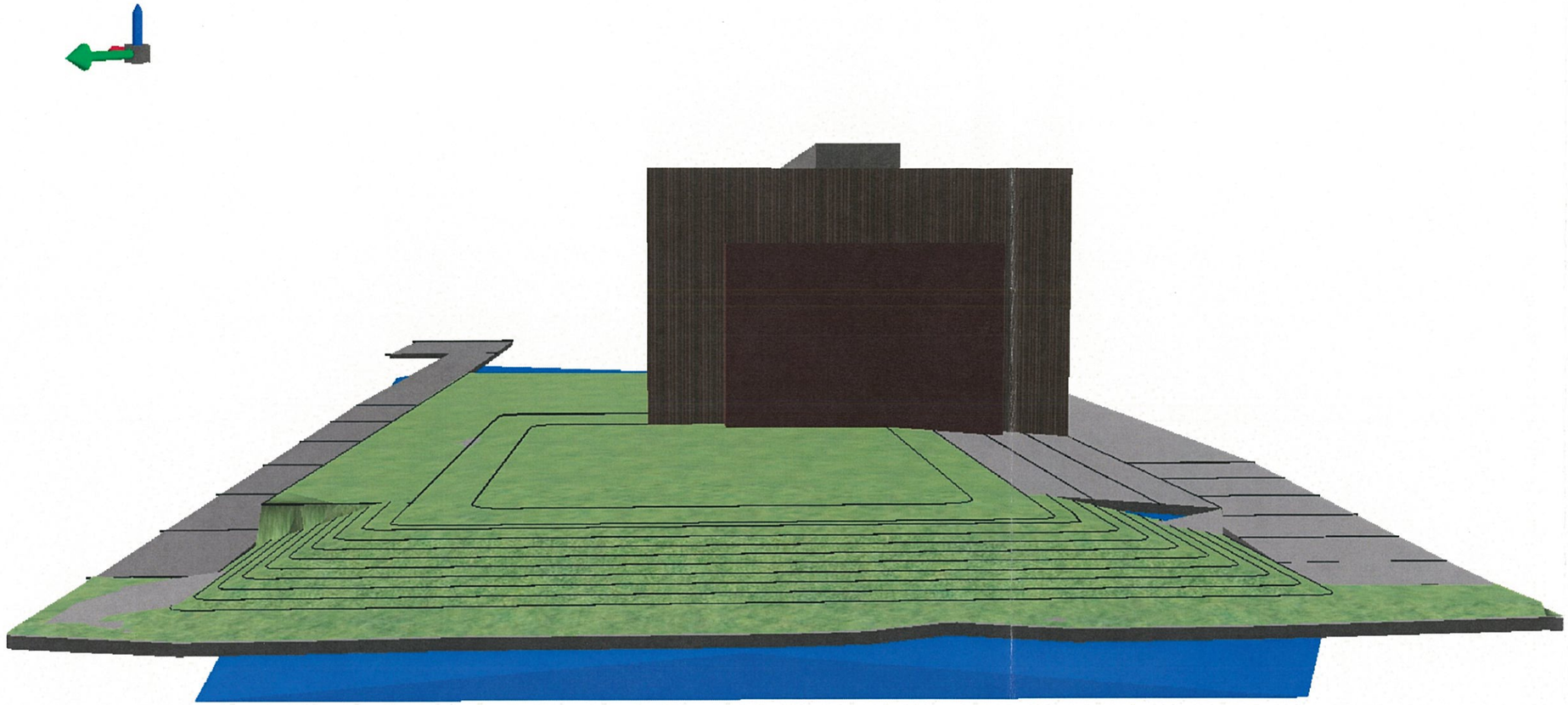
GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

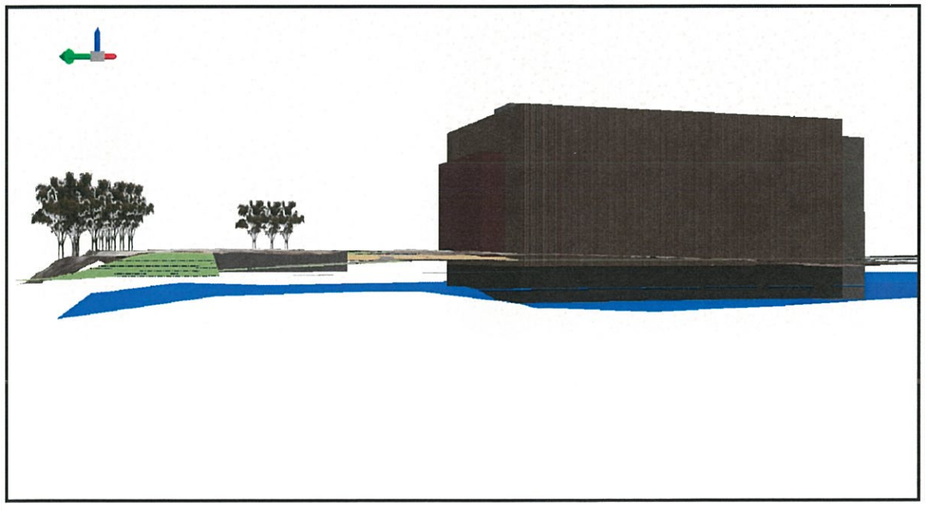
SITE RE-GRADING SOIL COVER - ALTERNATIVE 1

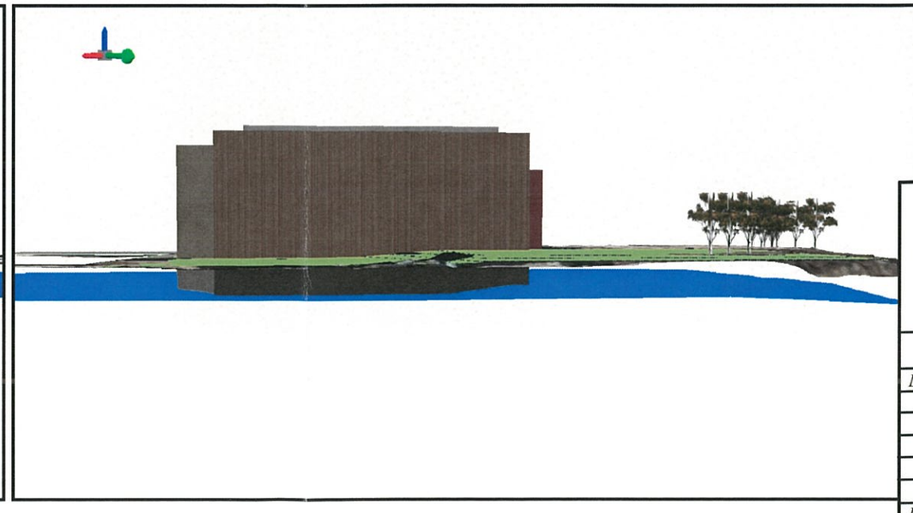
DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

DRAWN: PAS	CHECKED: SG	DATE: 7/17/13	FIGURE: 7







LEGEND

ALTERNATIVE 2 SURFACE TIN

GROUNDWATER ELEVATION

NOTES:

CREATED IN ARCGIS 10.0 3D ANALYST;
TWO-FEET OF FILL PLACED BELOW SHOWN ALTERNATIVE SURFACE.

NOT TO SCALE

GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

SITE RE-GRADING SOIL COVER - ALTERNATIVE 2

DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

DRAWN:	CHECKED:	DATE:	FIGURE:
PAS	SG	7/17/13	8

LEGEND

- THROUGH TUCK ROUTES
- LOCAL TRUCK ROUTES
- PROPERTY BOUNDARY

N
W E
S

GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

OUTBOUND TRUCK TRANSPORTATION ROUTES

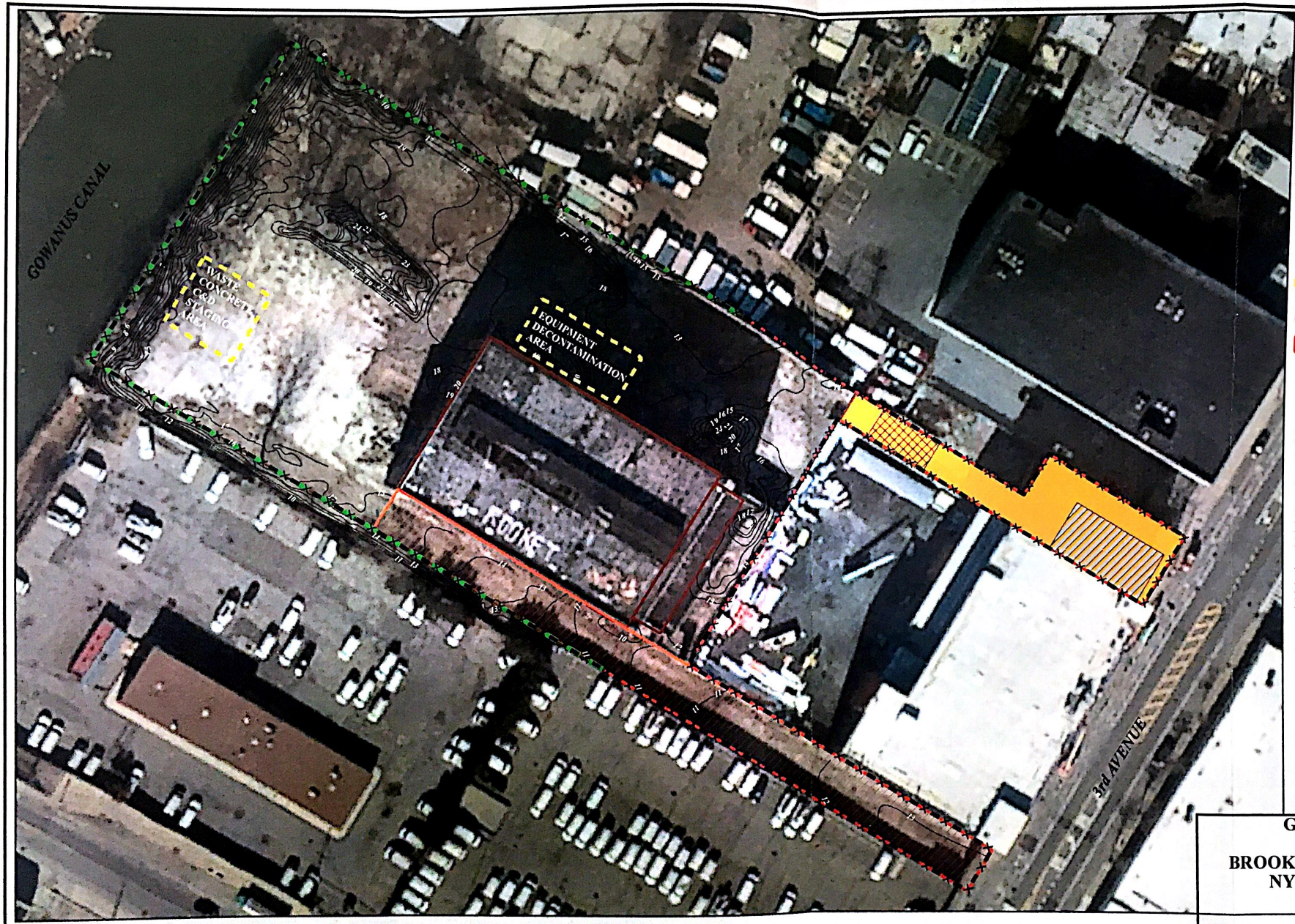
NOTES:
AERIAL IMAGE - 2010 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/); STATEPLANE NAD83 NYEAST.

REFERENCE: NY DOT TRUCK ROUTE MANAGEMENT AND COMMUNITY IMPACT REDUCTION SURVEY, FINAL TECHNICAL MEMORANDUM; TRUCK ROUTING ANALYSIS BY EDWARDS AND KELLEY, MARCH 2007.

0 500 1,000 Feet

1 inch equals 1,000 feet

DATE:	REVISED:	PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC Professional Groundwater and Environmental Engineering Services 110 Corporate Park Drive, Suite 112 White Plains, New York 10604 (914) 694-5711
DRAWN: PAS		CHECKED: SG DATE: 7/18/13 FIGURE: 9



LEGEND

- ELEVATION CONTOURS (1-FOOT)
- PROPERTY BOUNDARY
- EXISTING BUILDING FOOTPRINT
- STRAW BALE
- SILT FENCING
- PRIMARY SITE ACCESS ROAD
- STABILIZED CONSTRUCTION ENTRANCE
- STAGING AREAS
- TRUCK INSPECTION
- ALTERNATE SITE ACCESS ROAD

NOTES:
PERSONNEL DECONTAMINATION AREA WILL BE SETUP WITHIN THE BASEMENT OF THE ON-SITE BUILDING

SLOPES EXCEEDING 25% SHALL HAVE SILT FENCE BACKED BY STRAW BALES FOR SUPPORT

USE ADDITIONAL EROSION CONTROL MEASURES AS NEEDED TO MITIGATE EFFECTS OF RUNOFF DURING CONSTRUCTION

N
W E
S

NOTES:
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

0 30 60 Feet
1 inch equals 60 feet

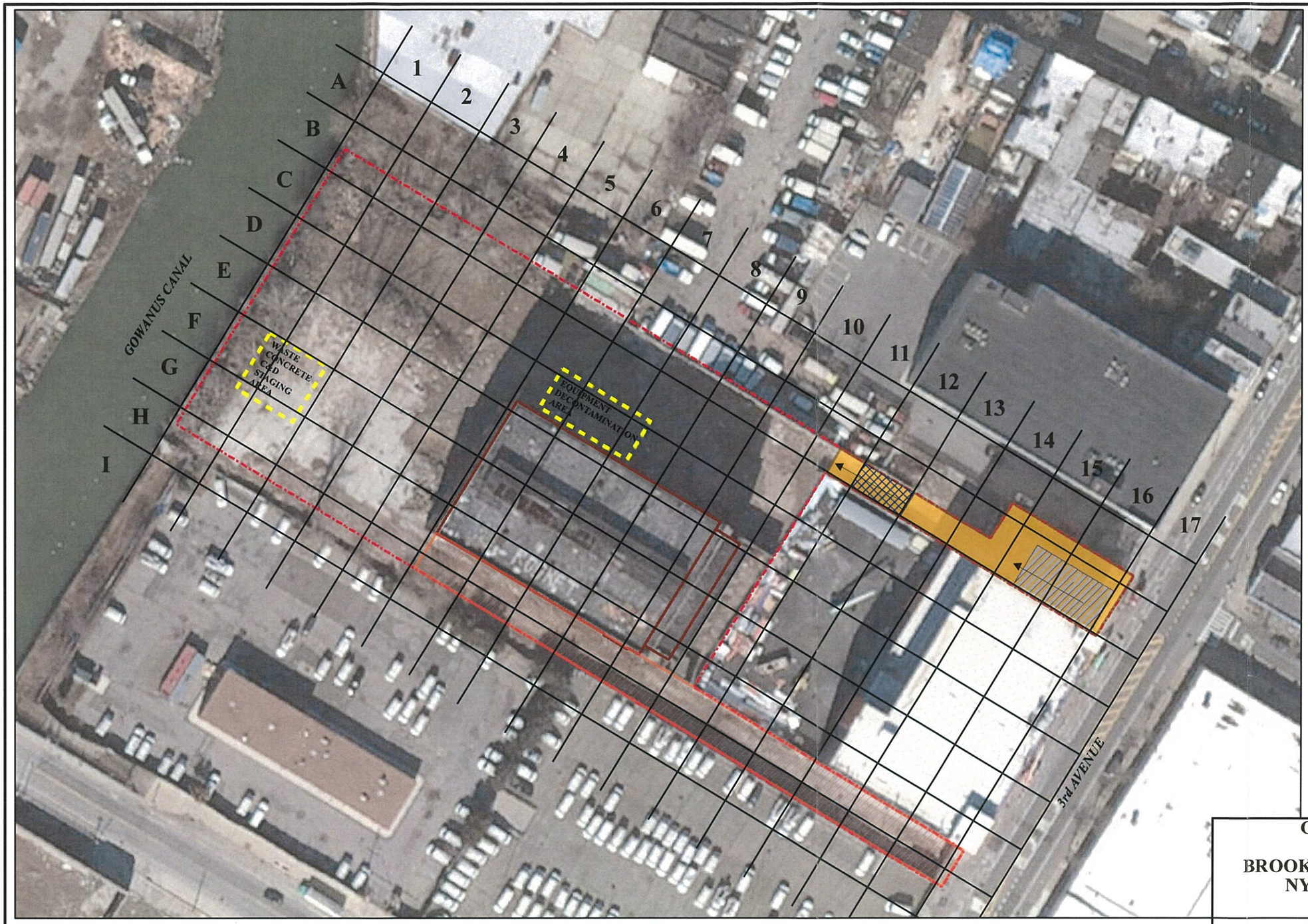
GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

SITE STAGING PLAN

DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

DRAWN:	CHECKED:	DATE:	FIGURE:
PAS	SG	7/1/13	10



LEGEND

- ALPHA NUMERIC GRID
- PROPERTY BOUNDARY
- EXISTING BUILDING FOOTPRINT
- PRIMARY SITE ACCESS ROAD
- STABILIZED CONSTRUCTION ENTRANCE
- STAGING AREAS
- TRUCK INSPECTION
- ALTERNATE SITE ACCESS ROAD

N
W E
S

NOTES:
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

0 35 70 Feet
1 inch equals 70 feet

GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

ALPHA NUMERIC SITE PLAN

DATE:	REVISED:	PREPARED BY:
		LEGGETTE, BRASHEARS & GRAHAM, INC.
		Professional Groundwater and Environmental Engineering Services
		110 Corporate Park Drive, Suite 112
		White Plains, New York 10604
		(914) 694-5711

DRAWN:	CHECKED:	DATE:	FIGURE:
PAS	SG	7/5/13	11

LATERAL WELL SCREEN DETAILS

LEGEND

- ELEVATION CONTOURS (1-FOOT)
- PROPERTY BOUNDARY
- EXISTING BUILDING FOOTPRINT

"HOT SPOT" EXCAVATIONS

- 9 PCB EXCAVATIONS (# DEPTH BELOW GRADE)
- 9 METALS EXCAVATION (# DEPTH BELOW GRADE)

N
W E
S

NOTES:
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

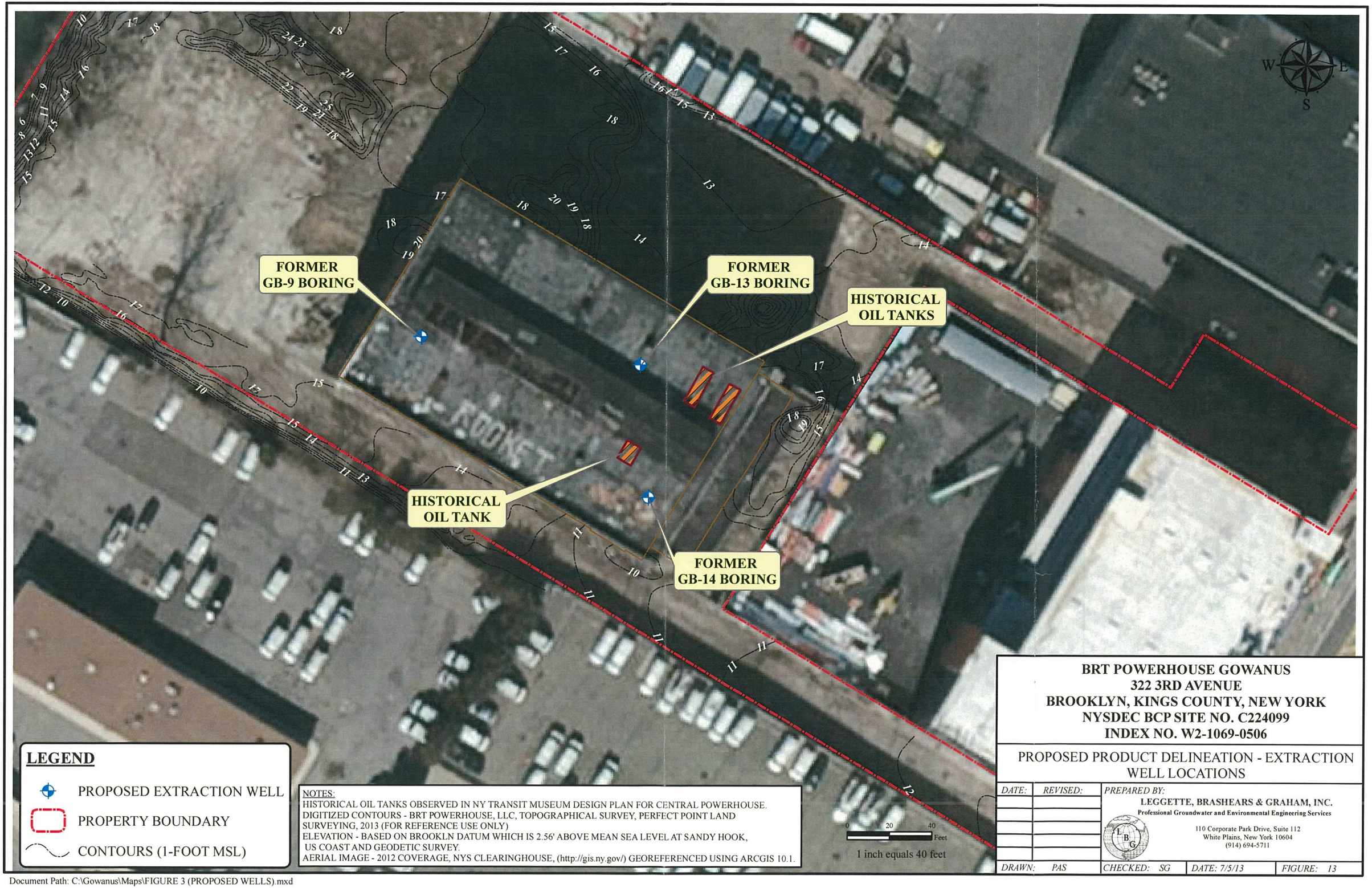
0 30 60 Feet
1 inch equals 60 feet

GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

HOT SPOT EXCAVATION - LATERAL WELL SCREEN DETAIL

DATE:	REVISED:	PREPARED BY:
		LEGGETTE, BRASHEARS & GRAHAM, INC. Professional Groundwater and Environmental Engineering Services
		110 Corporate Park Drive, Suite 112 White Plains, New York 10604 (914) 694-5711

DRAWN: PAS	CHECKED: SG	DATE: 8/29/13	FIGURE: 12



LEGEND

- PROPOSED EXTRACTION WELL
- PROPERTY BOUNDARY
- CONTOURS (1-FOOT MSL)

NOTES:
HISTORICAL OIL TANKS OBSERVED IN NY TRANSIT MUSEUM DESIGN PLAN FOR CENTRAL POWERHOUSE.
DIGITIZED CONTOURS - BRT POWERHOUSE, LLC, TOPOGRAPHICAL SURVEY, PERFECT POINT LAND SURVEYING, 2013 (FOR REFERENCE USE ONLY)
ELEVATION - BASED ON BROOKLN DATUM WHICH IS 2.56' ABOVE MEAN SEA LEVEL AT SANDY HOOK, US COAST AND GEODETIC SURVEY.
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.

BRT POWERHOUSE GOWANUS
322 3RD AVENUE
BROOKLYN, KINGS COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

PROPOSED PRODUCT DELINEATION - EXTRACTION WELL LOCATIONS

DATE:	REVISED:	PREPARED BY:
		LEGGETTE, BRASHEARS & GRAHAM, INC.
		Professional Groundwater and Environmental Engineering Services
		110 Corporate Park Drive, Suite 112
		White Plains, New York 10604
		(914) 694-5711

DRAWN:	CHECKED:	DATE:	FIGURE:
PAS	SG	7/5/13	13

Document Path: C:\Gowanus\Maps\FIGURE 3 (PROPOSED WELLS).mxd

LEGEND

- GROUNDWATER MONITORING WELL LOCATION
- PROPERTY BOUNDARY
- EXISTING BUILDING FOOTPRINT
- STAGING AREAS

N
W E
S

GOWANUS VILLAGE I, LLC
322 3RD AVENUE
BROOKLY KING'S COUNTY, NEW YORK
NYSDEC BCP SITE NO. C224099
INDEX NO. W2-1069-0506

PROPOSED LONG-TERM
GROUNDWATER MONITORING WELL NETWORK

DATE:	REVISED:

PREPARED BY:
LEGGETTE, BRASHEARS & GRAHAM, INC
Professional Groundwater and Environmental Engineering Services
110 Corporate Park Drive, Suite 112
White Plains, New York 10604
(914) 694-5711

DRAWN: PAS	CHECKED: SG	DATE: 7/9/13	FIGURE: 14

0 30 60 Feet
1 inch equals 60 feet

NOTES:
AERIAL IMAGE - 2012 COVERAGE, NYS CLEARINGHOUSE, (http://gis.ny.gov/) GEOREFERENCED USING ARCGIS 10.1.