

ON THE SOUND
CITY ISLAND, BRONX, NEW YORK

Remedial Action Work Plan

NYC VCP Number: 14CVCP169X
OER Project Number: 13RH-A145X

Prepared for:

CityIsland Reserve LLC
152 West 57th Street – 60th Floor
New York, NY10019
(212) 649-9700

Prepared by:

Carlin-Simpson & Associates
61 Main Street
Sayreville, NJ08872
732-432-5757

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REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C/D	Construction/Demolition
COC	Certificate of Completion
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
BCA	Brownfield Cleanup Agreement
NOC	Notice of Completion
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	NYSDEC Division of Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
OSHA	US Occupational Health and Safety Administration
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate

Acronym	Definition
RI	Remedial Investigation
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

CERTIFICATION

I, Robert B. Simpson, P.E., am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the On The Sound Site, Site numbers 14CVCP169X and 13RH-A145X.

I, Meredith R. Anke, P.E., am a Qualified Environmental Professional as defined in §43-140. I have primary direct responsibility for implementation of the remedial action for the On The Sound Site, Site numbers 14CVCP169X and 13RH-A145X.

I certify that this Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Robert B. Simpson, P.E.
Name

081840
NYS PE License Number

Signature

Date



Meredith R. Anke, P.E.
QEP Name

QEP Signature

Date

EXECUTIVE SUMMARY

City Island Reserve LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 6.4 acre site located at 226 Fordham Place in City Island, Bronx, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Current Usage

The Site is located at 226 Fordham Place in the City Island section in Bronx, New York and is identified as Block 5643 and Lot 235 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 6.4 acres and is bounded by the Fordham Street and a New York City Department of Corrections ferry terminal to the north, a multi-family residential property to the south, the Long Island Sound to the east, and Fordham Place to the west. Currently, the Site is vacant and undeveloped.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of will consist of 21 two-family residential buildings, one (1) single family building, plus a club house building. Select structures will also have a detached garage. All structures will be slab on grade. Layout of the proposed site development is presented in Figure 2. The current zoning designation is R3A, which is a residence district that features modest single-family and two-family detached residences. The proposed use is consistent with existing zoning for the property.

The proposed construction will also include new underground utilities, asphalt paved roads, and landscaped areas. In addition, there will be a pedestrian walkway/esplanade from Fordham Street to the easternmost portion of the site, which will be an open space/viewing area that will be open to the public. As part of the proposed development, the site will be re-graded using the on-site soil material. Cuts are planned for portions of the property but the majority of the site will be filled to achieve the proposed site grades. Landscape areas and open space areas

shall be capped with two (2) feet of clean imported fill material.

The redevelopment of the Site may be performed in two (2) phases. There is a potential that the Phase 2 work could begin approximately 6 to 12 months after the Phase 1 work was completed. During the dormant time, the portion of the site that remains undeveloped will be fenced to restrict access to this portion of the property. In addition, the undeveloped area will be vegetated to reduce erosion and stormwater runoff.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Summary of Past Uses of Site and Areas of Concern

The Site was developed prior to 1893 for use as a shipyard with woodworking, storage, a machine shop, and a dwelling. The Site has been used since that time for various maritime related uses, including ship and yacht building, boat storage and boat repair, sail making, and a diving business. From 1976 to 1978, the Site was also used as a contractor's yard. Sometime between 1978 and 1981, the Site was filled to its current grade.

The following structures on the property were demolished in 2012: 1) a two-story wood frame structure in the northern portion of the site, which was reportedly used as an office building; 2) a one-story metal building in the western portion of the site, which was reportedly used as a machine shop; 3) a two-story metal building in the center, northern portion of the property, which was reportedly used as a garage and was also used by a diving business; and 4) a dilapidated two-story wood frame structure in the southwest corner of the site, which was at one time identified as a carpentry building.

The following Areas of Concern have been identified and addressed under previous remedial actions:

1. Two (2) 10,000-gallon USTs which were removed and documented by HDR's August 2007 Tank Closure Report;
2. Previous boring B-3 and a 550-gallon UST which has not been located since GTA's 2003 Investigation. This tank is believed to have been removed based on multiple test pits and GPR surveys;

3. A former drum storage area which was excavated and documented by Carlin-Simpson's July 2012 RACR. Residual levels of SVOCs and metals above Restricted Residential SCOs remain and are believed to be associated with historic fill;
4. Stained surface area west of the former garage building which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was stockpiled on-site until the 2011-2012 Remedial Action;
5. Stained surface area near southeast corner of the site which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was stockpiled on-site until the 2011-2012 Remedial Action;
6. Area of discarded batteries which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was stockpiled on-site until the 2011-2012 Remedial Action;
7. Discolored area east of the office building which was excavated and documented by Carlin-Simpson's July 2012 RACR; Residual levels of SVOCs and metals above Restricted Residential SCOs remain and are believed to be associated with historic fill;
8. Previous boring B-10 and an area of high metal concentrations which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was stockpiled on-site until the 2011-2012 Remedial Action;
9. Previously stockpiled areas which were removed. Residual levels of SVOCs and metals above Restricted Residential SCOs remain and are believed to be associated with historic fill; and
10. Groundwater contamination which was addressed under NYSDEC Petroleum Spill 07-02222 by installing an absorbent sock in a groundwater well in response to a sheen/ lens identified during excavation. No petroleum was identified, and no oil recovery was required. The spill was closed on October 17, 2012.

Summary of Environmental Findings

1. The majority of the Site is relatively flat with surface elevations ranging from approximately elevation +10.0 feet to elevation +20.0 feet. In the eastern portion of the property, the surface elevations slope down steeply to the adjacent Long Island Sound, which has a mean high water level at elevation +2.05.
2. Depth to groundwater ranges from 10.25 feet to 14.25 feet below the existing ground surface at the Site. Groundwater flow beneath the Site is tidally influenced as a result of the adjacent Long Island Sound.
3. Depth to bedrock is approximately 13 feet in the northwest portion of the Site. Bedrock is more than 25 feet below the surface in the remainder of the site.
4. The stratigraphy of the site, from the surface down, consists of 6 feet to 22 feet of fill material (Class 7) that is underlain by medium dense to dense Sand or Silty Sand with Gravel and occasional cobbles (Class 3b).
5. Soil/fill samples collected during the RI showed that there is historic fill material present throughout the Site and that the fill material showed no detectable concentrations of PCBs. One VOC (acetone) was detected in one sample at a concentration that exceeds the Unrestricted Use SCO but is well below the Residential Use SCO. All other VOCs detected were found to be at very low levels, including PCE at a max concentration of 0.0007 ppm. One pesticide (4,4'-DDT) was detected at a concentration that slightly exceeded the Unrestricted Use SCO but is well below the Residential Use SCO. Five SVOCs including benzo(a)anthracene (max 3.2 ppm), benzo(a)pyrene (max 3.9 ppm), benzo(b)fluoranthene (max 4.7 ppm), dibenz(a,h)anthracene (max 0.80 ppm), and indeno(1,2,3-cd)pyrene (max 3.1 ppm) exceeded Restricted Residential Use Soil Cleanup Objectives (SCOs) in most shallow and roughly a quarter of the deep soil samples. These SVOCs are all in a class of compounds known as polycyclic aromatic hydrocarbons (PAHs) which are commonly found in historic fill material. Eight metals exceeded Track 1 Unrestricted Use SCOs, and six of these metals, arsenic (max of 20.0 ppm), barium (max of 506 ppm), chromium (max of 113 ppm), copper (max of 382 ppm), lead (max of 3,960

- ppm), and mercury (max of 4.9 ppm), also exceeded Track 2 Restricted Residential Use SCOs. These sampling results, with the exception of two shallow hotspot areas, one for lead and one for mercury, are consistent with findings in historic fill material at Sites throughout NYC.
6. Groundwater samples collected during the RI showed that dissolved metals including antimony, cobalt, iron, magnesium, manganese, and sodium exceeded the New York State 6 NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Two SVOCs (benzo(a)anthracene and benzo(b)fluoranthene) were detected above GQSs in one sample. Three petroleum-related VOCs were also detected at trace concentrations, but were well below their GQSs. Groundwater samples showed no detectable concentrations of PCBs or pesticides. Given that the Site is located immediately adjacent to the Long Island Sound, we expect that the groundwater below the Site is brackish.
 7. Soil vapor samples collected during the RI showed several petroleum and chlorinated VOCs at generally low concentrations. Acetone (maximum of 89 $\mu\text{g}/\text{m}^3$) and carbon disulfide (maximum of 79 $\mu\text{g}/\text{m}^3$) were detected in all samples. Most other detections were generally less than 10 $\mu\text{g}/\text{m}^3$. PCE was identified in nine of ten soil vapor samples at a maximum concentration of 12 $\mu\text{g}/\text{m}^3$, TCE was identified in two of the ten soil vapor samples at a maximum concentration of 1.0 $\mu\text{g}/\text{m}^3$, carbon tetrachloride was identified in two samples at a max concentration of 1.0 $\mu\text{g}/\text{m}^3$, and 1,1,1-TCA was identified in five samples at a max concentration of 6.2 $\mu\text{g}/\text{m}^3$. None of these chlorinated VOCs were identified in groundwater samples collected during this RI, and only PCE was identified at trace levels in soil. All soil vapor concentrations were reported below the monitoring level ranges established within the NYS DOH soil vapor guidance matrices. Methane was only detected in one sample at 0.032 percent which is well below its explosive limit. The soil vapor results are attached in Appendix A of the RI Report.

Summary of the Remedy

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan (CPP).
2. Performance of a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-Specific Soil Cleanup Objectives (SCOs). Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs in the two hotspot areas.
4. Pre-delineation sampling in two (2) identified hotspot areas that exceed the Track 4 SCOs to determine the horizontal and vertical limits of the soil/fill exceeding the Track 4 Site-Specific SCOs.
5. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations;
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal,

and this plan. Sampling and analysis of excavated media as required by disposal facilities.

9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs if additional hotspots are encountered during the remedial action.
10. Import of material to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
11. Demarcation of residual soil/fill.
12. Installation of a Vapor Barrier System (minimum of 20 mil thickness) beneath each of the building slabs and outside foundation sidewalls below grade. Seal all utility entries and other penetrations through the slab or foundation sidewall below grade.
13. Construction and maintenance of an engineered Composite Cover System consisting of a 5 inch concrete slab in the building areas, 4 inches of concrete in sidewalk areas, 2.5 to 3.5 inches of asphalt in the paved areas, 4 inches of concrete pavers over 6 inches of clean soil in the esplanade area, and two (2) feet of clean imported soil in open space and landscape areas to prevent human exposure to residual soil/fill remaining under the Site.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
16. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for maintenance, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
17. Establishment of common ownership of the land within the project area by a homeowners association and continuous management of Site Management requirements by this common owner/homeowners association to ensure that engineering controls and

institutional controls remain in place. The RAR will provide satisfactory evidence that requirements for maintenance, inspection and certification of engineering and institutional controls will be implemented by the common owner/homeowners association.

18. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
19. The property will continue to be registered with a RE designation with the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The Office of Environmental Remediation created the New York City Voluntary Cleanup Program (NYC VCP) to provide governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies that show the location of contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a very high level of protection for neighboring communities and also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Remedial Investigation and Cleanup Plan. Under the NYC VCP, a thorough cleanup study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses. Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care facilities, hospitals and residential areas. The cleanup program was then tailored to address the special conditions of this community.

Qualitative Human Health Exposure Assessment. An important part of the cleanup planning for the Site is the performance of a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan. This cleanup plan includes a Construction Health and Safety Plan (CHASP) that is designed to protect community residents and on-Site workers. The elements of this plan are in compliance with safety requirements of the United States Occupational Safety and Health Administration (OSHA). This plan includes many protective elements including those discussed below.

Site Safety Coordinator. This project will have a designated Site safety coordinator to implement the Health and Safety Plan. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is Meredith Anke of Carlin-Simpson & Associates and can be reached at 732-432-5757. There will also be a Site Safety Coordinator from SCE Environmental (the General Contractor) during the general construction work.

Worker Training. Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan. Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a 'Contingency Plan').

Odor, Dust and Noise Control. This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the Project Manager Thomas Pugliese at 212-649-9792 or NYC Office of Environmental Remediation Project Manager Hannah Moore at 212-442-6372.

Quality Assurance. This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

Storm-Water Management. To limit the potential for soil erosion and discharge, this cleanup plan has provisions for storm-water management. The main elements of the storm water management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation. The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the general hours of operation are between 7:00 am and 5:00 pm Monday through Friday.

Signage. While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program, provides project contact names and numbers, and locations of project documents can be viewed.

Complaint Management. The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager Thomas Pugliese at 212-649-9792, the NYC Office of Environmental Remediation Project Manager Hannah Moore at 212-442-6372, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

Utility Mark-outs. To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and construction work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal. All soil and liquid material removed from the Site as part of the cleanup will be transported and disposed of in accordance with all applicable City, State and Federal regulations and required permits will be obtained.

Soil Chemical Testing and Screening. All excavations will be supervised by a trained

and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Stockpile Management. Soil stockpiles will be kept covered with tarps to prevent dust, odors and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed to protect storm water catch basins and other discharge points.

Trucks and Covers. Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with all laws and regulations.

Imported Material. All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on-Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination. All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping. Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing. Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or

idle in the local neighborhood.

Final Report. The results of all cleanup work will be fully documented in a final report (called a Remedial Action Report) that will be available for you to review in the public document repositories located at the City Island Library.

Long-Term Site Management. To provide long-term protection after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation (OER). The site will be registered with an E Designation at the NYC Buildings Department. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 SITE BACKGROUND

City Island Reserve LLC has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 226 Fordham Place in the City Island section of Bronx, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. The RAWP has been compiled as part of requirements of a Restrictive Declaration that was agreed to on 18 April 2007 (Document ID No. 2007050101595001). This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

1.1 SITE LOCATION AND CURRENT USAGE

The Site is located at 226 Fordham Place in the City Island section in Bronx, New York and is identified as Block 5643 and Lot 235 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 6.4 acres and is bounded by the Fordham Street and a New York City Department of Corrections ferry terminal to the north, a multi-family residential property to the south, the Long Island Sound to the east, and Fordham Place to the west. Currently, the Site is vacant and undeveloped.

1.2 PROPOSED REDEVELOPMENT PLAN

The proposed future use of the Site will consist of 21 two-family residential buildings, one (1) single family building, plus a club house building. Select structures will also have a detached garage. All structures will be slab on grade. Layout of the proposed site development is presented in Figure 2. The current zoning designation is R3A, which is a residence district that

features modest single- and two-family detached residences. The proposed use is consistent with existing zoning for the property.

The proposed construction will also include new underground utilities, asphalt paved roads, and landscaped areas. In addition, there will be a pedestrian walkway/esplanade from Fordham Street to the easternmost portion of the site, which will be an open space/viewing area that will be open to the public. As part of the proposed development, the site will be re-graded using the on-site soil material. Cuts are planned for portions of the property but the majority of the site will be filled to achieve the proposed site grades. Landscape areas and open space areas shall be capped with two (2) feet of clean imported fill material.

The redevelopment of the Site may be performed in two (2) phases. There is a potential that the Phase 2 work could begin approximately 6 to 12 months after the Phase 1 work was completed. During the dormant time, the portion of the site that remains undeveloped will be fenced to restrict access to this portion of the property. In addition, the undeveloped area will be vegetated to reduce erosion and stormwater runoff.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The area immediately surrounding the Site generally consists of residential and commercial properties. There are single family and multi-family residential properties to the west and multi-family residential buildings to the south. To the north of the site, across Fordham Street, are commercial and residential properties. There are no sensitive receptors such as schools, hospitals, or day care facilities within a 500-foot radius of the site. Figure 1 and Figure 2 show the surrounding land usage.

1.4 REMEDIAL INVESTIGATION

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, City Island Estates*”, dated May, 2013 (RIR).

Summary of Past Uses of Site and Areas of Concern

The Site was developed prior to 1893 for use as a shipyard with woodworking, storage, a machine shop, and a dwelling. The Site has been used since that time for various maritime related uses, including ship and yacht building, boat storage and boat repair, sail making, and a diving business. From 1976 to 1978, the Site was also used as a contractor's yard. Sometime between 1978 and 1981, the Site was filled to its current grade.

The following structures on the property were demolished in 2012: 1) a two-story wood frame structure in the northern portion of the site, which was reportedly used as an office building; 2) a one-story metal building in the western portion of the site, which was reportedly used as a machine shop; 3) a two-story metal building in the center, northern portion of the property, which was reportedly used as a garage and was also used by a diving business; and 4) a dilapidated two-story wood frame structure in the southwest corner of the site, which was at one time identified as a carpentry building.

The following Areas of Concern have been identified and addressed under previous remedial actions:

1. Two (2) 10,000-gallon USTs which were removed and documented by HDR's August 2007 Tank Closure Report;
2. Previous boring B-3 and a 550-gallon UST which has not been located since GTA's 2003 Investigation. This tank is believed to have been removed based on multiple test pits and GPR surveys;
3. A former drum storage area which was excavated and documented by Carlin-Simpson's July 2012 RACR. Residual levels of SVOCs and metals above Restricted Residential SCOs remain and are believed to be associated with historic fill;
4. Stained surface area west of the former garage building which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was stockpiled on-site until the 2011-2012 Remedial Action;
5. Stained surface area near southeast corner of the site which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was

- stockpiled on-site until the 2011-2012 Remedial Action;
6. Area of discarded batteries which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was stockpiled on-site until the 2011-2012 Remedial Action;
 7. Discolored area east of the office building which was excavated and documented by Carlin-Simpson's July 2012 RACR; Residual levels of SVOCs and metals above Restricted Residential SCOs remain and are believed to be associated with historic fill;
 8. Previous boring B-10 and an area of high metal concentrations which was excavated and documented by HDR's August 2007 Tank Closure Report. Excavated material was stockpiled on-site until the 2011-2012 Remedial Action;
 9. Previously stockpiled areas which were removed. Residual levels of SVOCs and metals above Restricted Residential SCOs remain and are believed to be associated with historic fill; and
 10. Groundwater contamination which was addressed under NYSDEC Petroleum Spill 07-02222 by installing an absorbent sock in a groundwater well in response to a sheen/ lens identified during excavation. No petroleum was identified, and no oil recovery was required. The spill was closed on October 17, 2012.

The scope of work for the RI was developed in response to the proposed development project. An investigation of soil, soil vapor, and groundwater was performed to characterize the Site for potential environmental contamination from historic on-site uses, operations, filling, etc. The sampling event was designed to provide general coverage across the entire site and to characterize the historic fill material that remains on Site.

Summary of the Work Performed under the Remedial Investigation

As part of this investigation, Carlin-Simpson & Associates performed the following scope of work:

1. Installed 12 soil borings across the entire project Site, and collected 19 soil samples

for chemical analysis from the soil borings to evaluate soil quality;

2. Installed 5 groundwater monitoring wells throughout the Site to establish groundwater flow and collected 5 groundwater samples for chemical analysis to evaluate groundwater quality;

In addition, Environmental Maintenance Contractors, Inc. (EMC) performed the following scope of work:

1. Installed 13 soil vapor probes across the project Site and collected 10 samples for chemical analysis. Three probes were not sampled due to a shallow water table.

Summary of Environmental Findings

8. The majority of the Site is relatively flat with surface elevations ranging from approximately elevation +10.0 feet to elevation +20.0 feet. In the eastern portion of the property, the surface elevations slope down steeply to the adjacent Long Island Sound, which has a mean high water level at elevation +2.05.
9. Depth to groundwater ranges from 10.25 feet to 14.25 feet below the existing ground surface at the Site. Groundwater flow beneath the Site is tidally influenced as a result of the adjacent Long Island Sound.
10. Depth to bedrock is approximately 13 feet in the northwest portion of the Site. Bedrock is more than 25 feet below the surface in the remainder of the site.
11. The stratigraphy of the site, from the surface down, consists of 6 feet to 22 feet of fill material (Class 7) that is underlain by medium dense to dense Sand or Silty Sand with Gravel and occasional cobbles (Class 3b).
12. Soil/fill samples collected during the RI showed that there is historic fill material present throughout the Site and that the fill material showed no detectable concentrations of PCBs. One VOC (acetone) was detected in one sample at a concentration that exceeds the Unrestricted Use SCO but is well below the Residential Use SCO. All other VOCs detected were found to be at very low levels, including PCE at a max concentration of 0.0007 ppm. One pesticide (4,4'-DDT) was detected at a concentration that slightly exceeded the Unrestricted Use SCO but is

well below the Residential Use SCO. Five SVOCs including benzo(a)anthracene (max 3.2 ppm), benzo(a)pyrene (max 3.9 ppm), benzo(b)fluoranthene (max 4.7 ppm), dibenz(a,h)anthracene (max 0.80 ppm), and indeno(1,2,3-cd)pyrene (max 3.1 ppm) exceeded Restricted Residential Use Soil Cleanup Objectives (SCOs) in most shallow and roughly a quarter of the deep soil samples. These SVOCs are all in a class of compounds known as polycyclic aromatic hydrocarbons (PAHs) which are commonly found in historic fill material. Eight metals exceeded Track 1 Unrestricted Use SCOs, and six of these metals arsenic (max of 20.0 ppm), barium (max of 506 ppm), chromium (max of 113 ppm), copper (max of 382 ppm), lead (max of 3,960 ppm), and mercury (max of 4.9 ppm), also exceeded Track 2 Restricted Residential Use SCOs. These sampling results, with the exception of two shallow hotspot areas, one for lead and one for mercury, are consistent with findings in historic fill material at Sites throughout NYC.

13. Groundwater samples collected during the RI showed that dissolved metals including antimony, cobalt, iron, magnesium, manganese, and sodium exceeded the New York State 6 NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Two SVOCs (benzo(a)anthracene and benzo(b)fluoranthene) were detected above GQSs in one sample. Three petroleum-related VOCs were also detected at trace concentrations, but were well below their GQSs. Groundwater samples showed no detectable concentrations of PCBs or pesticides. Given that the Site is located immediately adjacent to the Long Island Sound, we expect that the groundwater below the Site is brackish.
14. Soil vapor samples collected during the RI showed several petroleum and chlorinated VOCs at generally low concentrations. Acetone (maximum of 89 $\mu\text{g}/\text{m}^3$) and carbon disulfide (maximum of 79 $\mu\text{g}/\text{m}^3$) were detected in all samples. Most other detections were generally less than 10 $\mu\text{g}/\text{m}^3$. PCE was identified in 9 of ten soil vapor samples at a maximum concentration of 12 $\mu\text{g}/\text{m}^3$, TCE was identified in two of the ten soil vapor samples at a maximum concentration of 1.0 $\mu\text{g}/\text{m}^3$, carbon tetrachloride was identified in two samples at a max concentration of 1.0 $\mu\text{g}/\text{m}^3$, and 1,1,1-TCA was identified in five samples at a max concentration of 6.2 $\mu\text{g}/\text{m}^3$. None of these

chlorinated VOCs were identified in groundwater samples collected during this RI, and only PCE was identified at trace levels in soil. All soil vapor concentrations were reported below the monitoring level ranges established within the NYS DOH soil vapor guidance matrices. Methane was only detected in one sample at 0.032 percent which is well below its explosive limit. The soil vapor results are attached in Appendix A of the RI Report.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 REMEDIAL ACTION OBJECTIVES

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

Groundwater

- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

Soil

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.
- Prevent migration of contaminants that would result in groundwater contamination.

Soil Vapor

- Prevent migration of potential soil vapor into dwellings and other occupied structures.

3.0 REMEDIAL ALTERNATIVES ANALYSIS

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing Remedial Action Objectives (RAOs) for media in which chemical constituents were found in exceedence of applicable standards, criteria and guidance values (SCGs). A remedy is then developed based on the following ten criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance;
- Land use; and
- Sustainability.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. As required, a minimum of two (2) remedial alternatives (including a Track 1 scenario) are evaluated, as follows:

Remedial Alternative 1 (Track 1 Cleanup) involves:

1. Establishment of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
2. Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Previous investigations indicated that the historic fill material extends to a depth of 22 feet in portions of the property. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs were still present at the base of the excavation, additional excavation would be performed to ensure complete

- removal of soil that does not meet Track 1 Unrestricted Use SCOs.
3. No Engineering or Institutional Controls are required for a Track 1 cleanup, but a vapor barrier would be installed beneath the foundation and behind foundation sidewalls of each of the new structures as a part of development to prevent any potential future exposures from off-Site soil vapor.
 4. Placement of a final cover over the entire Site as part of new development.

Remedial Alternative 2 (Track 4 Cleanup) involves:

1. Establishment of Track 4 Site-Specific SCOs.
2. Removal of all shallow soil/fill exceeding Track 4 Site-Specific SCOs. The limits of soil/fill exceeding the Track 4 SCOs were determined by pre-delineation sampling prior to excavation. Based on the results of the remedial investigation, this alternative will require excavation of two (2) identified hotspot areas. Refer to Figure 3 for locations. Therefore, if soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the new buildings is complete, additional excavation will be performed to meet Track 4 Site-Specific SCOs.
3. Placement of a composite cover consisting of concrete slabs, roadways and two feet of clean fill in landscaped areas over the entire Site to prevent exposure to remaining soil/fill.
4. Installation of a vapor barrier beneath the building slabs and behind foundation sidewalls for each of the residential structures as a part of development.
5. Establishment of use restrictions including prohibitions on the use of groundwater from the site and prohibitions on sensitive site uses, such as farming or vegetable gardening, to prevent future exposure pathways.
6. Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended. One comprehensive SMP will be prepared to manage all 22 residential buildings and club house. SMP will note that the property management (owners) and property owner's successors and assigns must comply with the

approved SMP.

7. Establishment of common ownership of the land within the project area by a homeowners association and continuous management of Site Management requirements by this common owner/homeowners association to ensure that engineering controls and institutional controls remain in place. The RAR will provide satisfactory evidence that requirements for maintenance, inspection and certification of engineering and institutional controls will be implemented by the common owner/homeowners association.
8. The property will be registered with a RE designation with the NYC Department of Buildings to memorialize the remedial action and the Engineering and Institutional Controls to ensure that future owners of the Site continue to maintain these controls as required.

3.1 THRESHOLD CRITERIA

Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. Protection of public health and the environment must be achieved for all approved remedial actions.

Alternative 1 would be protective of human health and the environment by removing all contaminated soil/fill exceeding Track 1 SCOs, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contamination leaching into groundwater.

Alternative 2 would achieve comparable protections of human health and the environment by removing identified areas that exceed the Track 4 SCOs and ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCOs as well as by placement of institutional and engineering controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Establishment of Track

4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater. Implementing institutional controls including registration of the site with a RE designation with the NYC Building Department would ensure that the composite cover system remains intact and protective.

For both Alternatives, potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a Construction Health and Safety Plan (CHASP), an approved Soil/Materials Management Plan, and a Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use would be prohibited by the city laws and regulations. An RE designation would be maintained on the property. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier below the new building's basement slab and continuing the vapor barrier around foundation walls.

3.2 BALANCING CRITERIA

Compliance with Standards, Criteria and Guidance (SCGs)

This evaluation criterion assesses the ability of the alternative to achieve applicable standards, criteria and guidance.

Alternative 1 would achieve compliance with the remedial goals, chemical specific SCGs and RAOs for soil through removal to Track 1 Unrestricted Use SCOs and Groundwater Protection Standards. Compliance with SCGs for soil vapor would also be achieved by installing a vapor barrier below the new residential buildings slab and continuing the vapor barrier around foundation walls, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical specific SCGs and RAOs for soil through removal of shallow soil to meet Track 4 Site-Specific SCOs. Compliance with SCGs for soil vapor would also be achieved by installing a vapor barrier below the new building's basement slab and continuing the vapor barrier around foundation walls. A Site Management Plan (SMP) would ensure that controls remained protective for the long term.

Health and safety measures contained in the CHASP and Community Air Monitoring Plan (CAMP) that comply with the applicable SCGs shall be implemented during Site redevelopment under this RAWP. For both alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-term effectiveness and impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their effects on public health and the environment during implementation of the remedial action, including protection of the community, environmental impacts, time until remedial response objectives are achieved, and protection of workers during remedial actions.

Both alternatives 1 and 2 have similar-short term effectiveness during their respective implementations, as each requires excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. However, the scale of removal necessary to achieve Alternative 1 given the depth of historical fill material, is much greater than Alternative 2 and thus the associated impacts are also potentially much higher.

Both alternatives would employ appropriate measures to prevent short term impacts, including a Construction Health and Safety Plan (CHASP), a Community Air Monitoring Plan (CAMP), and a Soil/Materials Management Plan (SMMP) during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Health and Safety Plan (CHASP) will be protected

from on-Site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones).

Long-term effectiveness and permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of ECs/ICs that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of Engineering Controls.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soil/fill and enabling unrestricted usage of the property. Removal of on-Site contaminant sources will prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing some on-Site contamination and generally attaining Track 4 Site-Specific SCOs, establishing Engineering Controls including a composite cover system across the Site, establishing Institutional Controls to ensure long-term management including use restrictions, a Site Management Plan (SMP), and registration of the site with a RE designation to memorialize these controls for the long term. The SMP will ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy will provide a continuous high level of protection in perpetuity.

Both alternatives would result in removal of soil contamination exceeding the SCOs providing a high level, effective, and permanent remedy over the long-term and would address contaminated soil and eliminate or minimize any leaching to groundwater.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

Alternative 1 would permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all soil in excess of Track 1 Unrestricted Use SCOs.

Alternative 2 would remove some of the impacted soil present on the Site and remaining shallow soil beneath the composite cover would meet Track 4 Site-Specific SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

The techniques, materials, and equipment to implement Alternatives 1 and 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. They use standard materials and services that are well established. The reliability of both alternatives is high. However, Alternative 1 would be challenging to implement due to the large amount of excavation that would be required across the entire site to meet the Track 1 Unrestricted Use SCOs. Moreover, Alternative 1 would require excavation of soil/fill below the

water table in order to meet the Track 1 Unrestricted Use SCOs. This may not be achievable below certain depths due to engineering and health and safety issues. In addition, construction dewatering is not practical given that the Long Island Sound is located immediately adjacent to the Site.

Cost effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Costs associated with Alternative 1 would be significantly higher than Alternative 2 based on both the volume of soil/fill that requires excavation and off-Site disposal and the volume of material that would be imported to the Site to replace the excavated soil/fill. In addition, shoring and dewatering would be required to achieve Unrestricted Use SCOs for Track 1 remedy. The long-term costs for Alternative 2 are higher than Alternative 1 based on implementation of a Site Management Plan as part of Alternative 2.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

Both remedial actions provide for protection of public health and the environment and minimize potential contaminant exposures. This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan (CPP) for the project is provided in Appendix B. Observations here will be supplemented by public comment received on the RAWP.

Land use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

The proposed redevelopment of the Site is compatible with its current zoning and is consistent with recent development patterns. Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs, both of which are appropriate for its planned residential use. Improvements in the current environmental condition of the property achieved by both alternatives are also consistent with the City's goals for cleanup of contaminated land, making them safer and bringing such properties into productive reuse. Both alternatives are equally protective of natural resources and cultural resources.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in *PlaNYC: A Greener, Greater New York*. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

Alternative 1 would result in a higher consumption of virgin and non-renewable

resources, such as virgin soil and crushed stone, because a larger volume of material would have to be imported to the Site to replace the excavated soil/fill material. In addition, Alternative 1 would result in more energy consumption and greenhouse gas emissions than Alternative 2 because a larger volume of soil/fill material would have to be excavated and transported off-Site and a larger volume of soil material would have to be imported to the Site.

Alternative 2 is a better alternative with respect to sustainable remedial action because of the reduced volume of soil/fill material to be excavated and transported off-Site and the reduced volume of soil material to be imported to the Site.

4.0 REMEDIAL ACTION

4.1 SUMMARY OF PREFERRED REMEDIAL ACTION

The preferred remedial action alternative is Alternative 2, the Track 4 Alternative. 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 established for the project and addresses applicable SCGs. 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 standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan (CPP).
2. Performance of a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-Specific Soil Cleanup Objectives (SCOs). Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs in the two hotspot areas.
4. Pre-delineation sampling in two (2) identified hotspot areas that exceed the Track 4 SCOs to determine the horizontal and vertical limits of the soil/fill exceeding the Track 4 Site-Specific SCOs.
5. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills

(if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations;

8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities.
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs if additional hotspots are encountered during the remedial action.
10. Import of material to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
11. Demarcation of residual soil/fill.
12. Installation of a Vapor Barrier System (minimum of 20 mil thickness) beneath each of the building slabs and outside foundation sidewalls below grade. Seal all utility entries and other penetrations through the slab or foundation sidewall below grade.
13. Construction and maintenance of an engineered Composite Cover System consisting of a 5 inch concrete slab in the building areas, 4 inches of concrete in sidewalk areas, 2.5 to 3.5 inches of asphalt in the paved areas, 4 inches of concrete pavers over 6 inches of clean soil in the esplanade area, and two (2) feet of clean imported soil in open space and landscape areas to prevent human exposure to residual soil/fill remaining under the Site;
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
16. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for maintenance, inspection and certification of Engineering and Institutional Controls and

reporting at a specified frequency.

17. Establishment of common ownership of the land within the project area by a homeowners association and continuous management of Site Management requirements by this common owner/homeowners association to ensure that engineering controls and institutional controls remain in place. The RAR will provide satisfactory evidence that requirements for maintenance, inspection and certification of engineering and institutional controls will be implemented by the common owner/homeowners association.
18. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
19. The property will continue to be registered with a RE designation with the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 SOIL CLEANUP OBJECTIVES AND SOIL/FILL MANAGEMENT

Track 4 Site-Specific Soil Cleanup Objectives (SCOs) are proposed for this project. The following Track 4 Site-specific SCOs, also listed in Table 1, are proposed for this Site:

Lead	1,200 ppm
Mercury	2.5 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan (SMMP) in Appendix D. The locations of planned hotspot excavations are shown in Figure 3.

Discrete contaminant sources (such as spills) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Pre-Delineation Sampling for Identified Removal Areas

Removal actions established under this RAWP will be performed in conjunction with pre-delineation sampling, which was performed to determine the horizontal and vertical limits of the shallow soil/fill exceeding the Track 4 Site-Specific SCOs around borings B-110 and B-111 prior to excavation. For comparison to Track 4 SCOs, analytes for the pre-delineation sampling only included lead for the boring B-110 area and mercury for the boring B-111 area; these analytes were approved by OER.

On 5 August 2013, Integral Consulting Inc. performed pre-delineation sampling at the Site. The pre-delineation sampling involved the installation of 16 borings at the two (2) identified removal areas. These areas are identified on Figure 3. The borings were performed using direct-push sampling technology. The borings were performed in rings around the original sample locations (B-110 and B-111) that were performed during the Remedial Investigation. The borings were performed to a maximum depth of 8 feet below grade. In the area of B-110, soil samples for horizontal delineation were collected at each boring location from a depth of 0 to 2 feet below grade. Near B-110, samples were collected for vertical delineation in one-foot intervals to eight feet below grade. At select borings from each of the delineation rings, deeper samples were collected from 4 to 5 feet below grade and 7 to 8 feet below grade. In the area of B-111, soil samples were collected for horizontal delineation at each boring location from a depth of 3 to 4 feet below grade. Near B-111, samples were collected for vertical delineation in one-foot intervals to eight feet below grade. At select borings from each delineation ring, deeper samples were collected from 5 to 6 feet below grade and 7 to 8 feet below grade.

A total of 60 soil samples were collected from the two removal areas for horizontal and vertical delineation purposes. Initially, only the samples collected from the first delineation ring and one deeper sample from the original sampling location (B-110 and B-111) were analyzed. The soil samples from the borings performed around B-110 were analyzed for lead and the soil samples from the borings performed around B-111 were analyzed for mercury. A New York

State ELAP certified lab (Alpha Analytical) was used for all sample analyses. The analytical results were compared to the Track 4 Site-Specific SCOs and a copy of the analytical results is presented in Appendix F.

The analytical results for the B-110 samples indicate that the lead concentrations detected in the first ring of delineation samples and in the deeper sample at B-110 all meet the Track 4 SCO for lead (1,200 mg/kg). Therefore, the removal area around B-110 has been delineated to an area approximately 7 feet by 7.5 feet by 2 feet deep, which is approximately 4.07 cubic yards.

The analytical results for the B-111 samples indicate that the mercury concentrations detected in three of the four samples from the first delineation ring and the deeper sample at B-111 all meet the Track 4 SCO for mercury (2.5 mg/kg). One sample to the north of B-111 exceeded the Track 4 SCO. Subsequent analysis of a sample (in a northerly direction) from the second delineation ring indicates that soil meets the Track 4 SCO for mercury. Therefore, the removal area around B-111 has been delineated to an area approximately 10 feet by 15 feet by 4 feet deep, which is approximately 22 cubic yards.

The final excavation extent in the two removal areas will be based on the analytical results of these soil samples that were collected during the pre-delineation sampling. These limits are shown on Figure 3. The pre-delineation sampling precludes the need for verification sampling after excavation.

Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is approximately 26.07 cubic yards or 45 tons. The actual quantity excavated and disposed off-Site will be reported in the RAR.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

End-Point Sampling for Other Removal Actions

In the event that additional hotspot areas are identified during the remedial program, removal will be performed in conjunction with post remedial end-point samples to ensure that identified areas are fully removed. Analytes for end-point sampling will be those parameters that

are driving the removal action and will be approved by OER. Frequency for end-point sample collection is as follows:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
 - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
 - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation end-point sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

New York State ELAP certified labs will be used for all confirmation and end-point sample analyses. Labs performing confirmation and end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all confirmation and end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be analyzed for compounds and elements as

described above utilizing the following methodology:

Soil analytical methods will include:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

In the event that either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and “finger print analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or “cold-paks” to maintain a temperature of 4°C.

Dedicated disposable sampling equipment will be used for the collection of endpoint samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of one (1) for every eight (8) samples collected. Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water

- Wash withalconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for metals, SVOCs, or pesticides. One (1) blind duplicate sample will be prepared and submitted for analysis every 20 samples.

Import and Reuse of Soils

Import of soils onto the property and reuse of soils already onsite will be performed in conformance with the Soil/Materials Management Plan (SMMP) in Appendix D. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 6,800 cubic yards. The estimated quantity of on-site soil expected to be reused as cover soil on the Site is 2,000 cubic yards. Minor grading (cutting and filling) and relocating of on-Site fill material will also be performed in compliance with the SMMP reuse requirements.

4.3 ENGINEERING CONTROLS

Engineering Controls are employed in the remedial action to address residual contamination remaining at the site. The Site has two (2) primary Engineering Control Systems: (1) Composite Cover System across the entire Site; and (2) Vapor Barrier System.

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, Composite Cover System to be built on the Site. The entire property will be covered by an engineered permanent cover system. This cover system will be comprised of the following:

- 2.5 to 3.5 inches of asphalt pavement in the paved areas;
- 4 inches of concrete pavers over six inches of clean soil in the esplanade area;
- 4 inches of concrete in the sidewalk areas;
- 5 inches of concrete slab in the building areas; and

- Two (2) feet of clean cover soil in the open space or landscape areas.

The development plans and details, including details for the components of the remedial cover system, are included in Appendix A. Figure 4 shows the location of each cover type to be built at the Site.

The composite cover system is a permanent engineering control for the Site. The system will be inspected and certified at specified intervals as required by this RAWP and the SMP. A Soil Management Plan will be included in the Site Management Plan (SMP) and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan (SMP) in the RAR.

Vapor Barrier

Migration of potential soil vapor will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of a 20 mil polyethylene vapor barrier liner or OER approved equivalent. The vapor barrier will be installed beneath the entire surface area of the concrete slab for each of the residential buildings. The specifications for installation will be provided to the construction management company and the foundation contractor or installer of the liner. The specifications state that all vapor barrier seams, penetrations, and repairs will be sealed either by the tape method or weld method, according to the manufacturer's recommendations and instructions¹. The PE certifying this Remedial Action will ensure that there is staff under his/her supervision that will provide oversight of installation of the vapor barrier and seals under this cleanup plan to ensure that this work is properly performed.

The proposed vapor barrier membrane will be installed below each building floor slab as shown on Figure 4. Installation details with respect to the proposed building slab, are also provided in Appendix A. The Remedial Action Report will include photographs (maximum of two photos per page) of the installation process, PE certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturer's certificate of warranty.

¹ If a self-adhesive membrane is used, taping and welding will not be conducted, as it is not in conformance with the manufacturer's instructions.

4.4 INSTITUTIONAL CONTROLS

Institutional Controls (IC) have been incorporated in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR. The property will be registered with a RE designation with the NYC Buildings Department.

Institutional Controls for this remedial action are:

- The property will be registered with a RE designation by the NYC Buildings Department;
- This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a Site Management Plan (SMP) in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, inspection and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determine by OER in the SMP and will comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted

pursuant to the soil management provisions in an approved SMP;

- The Site will be used for restricted residential use and will not be used for a higher level of use without prior approval by OER.

4.5 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) operation and maintenance of EC's; and (3) inspection and certification of EC's.

Site management activities, reporting, and EC/IC certification will be scheduled by OER on a periodic basis to be established in the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by July 30 of the year following the reporting period.

4.6 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Investigations reported in the Remedial Investigation Report (RIR) are sufficient to

complete a Qualitative Human Health Exposure Assessment (QHHEA). As part of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Sources

Historic fill material is present at the Site from grade to depths ranging from approximately 6 feet to 22 feet below grade. Based on the results of the Remedial Investigation Report, the contaminants of concern found are as follows:

Soil - Soil/fill samples collected during the RI showed that there is historic fill material present throughout the Site and that the fill material contains SVOCs and metals at concentrations that exceed the Track 1 Unrestricted Use SCOs and the Track 2 Residential Use SCOs. The detected SVOCs are all in a class of compounds known as polycyclic aromatic hydrocarbons (PAHs). The data indicates that the PAHs and metals, which are typical constituents of historic fill material, are widespread across the site at concentrations typical for this material. In addition there are two discrete hotspots for mercury and lead.

Groundwater - Groundwater samples collected during the RI showed that the groundwater contains dissolved metals (antimony, cobalt, iron, magnesium, manganese, and sodium) at concentrations exceeding the Class GA groundwater standards. In addition, two SVOCs (benzo[a]anthracene and benzo[b]fluoranthene) were detected in one sample at concentrations exceeding the Class GA groundwater standards.

Soil vapor - Soil vapor samples collected during the RI indicate that on-site vapor concentrations are well below the NYSDOH monitoring thresholds. Analytical results also indicated that only one sample (VP-2) contains methane at a concentration of 0.0320%, well below its lower explosive level.

Nature, Extent, Fate and Transport of Contaminants

The soil/fill material at the site contains concentrations of SVOCs and metals above applicable standards. The elevated constituents are associated with historic fill, which is present throughout the full extent of the property and ranges from approximately 6 feet to 22 feet in thickness. Groundwater below the site is affected by metals and slightly affected by SVOCs.

Potential Routes of Exposure

The five elements of an exposure pathway are: 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill, or soil;
- Inhalation of vapors and particulates; and
- Dermal contact with water, fill, or soil.

Receptor Populations

On-Site Receptors – The Site is currently vacant. Access to the area is limited by a chain link fence. Potential receptors include site representatives and trespassers. During redevelopment of the Site, the on-Site potential receptors will include construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child residents and visitors.

Off-Site Receptors - Potential off-Site receptors within a 0.25-mile radius of the Site include: adult and child residents, and commercial workers, pedestrians, trespassers, and cyclists based on the following:

1. Residential Buildings (up to 0.25 mile) – existing and future

2. Commercial Businesses (up to 0.25 mile) – existing and future
3. Pedestrians, Trespassers, Cyclists (up to 0.25 mile) – existing and future

Potential Points of Exposure

Current Conditions: There is a potential for exposure to historic fill since the Site is currently uncapped. Groundwater is marginally contaminated but is not exposed at the Site, and because the Site is served by the public water supply and groundwater use for potable supply is prohibited, groundwater is not used at the Site. There are no structures on Site where soil vapor could potentially accumulate.

Construction/ Remediation Activities: Once redevelopment activities begin, construction workers will come into direct contact with surface and subsurface soils, as a result of on-Site construction and excavation activities. Construction workers could also come into direct contact with groundwater. On-Site construction workers potentially could ingest, inhale or have dermal contact with any exposed impacted soil, and fill. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, there will be no potential on-Site or off-Site exposure points. The Site will be fully capped with concrete building slabs, asphalt pavement, concrete sidewalks, or a soil cap limiting potential exposure to soil remaining in place. The Site is served by a public water supply, and groundwater is not used at the Site for potable supply. A Vapor Barrier System will prevent migration of soil vapors into occupied structures.

Overall Human Health Exposure Assessment

Based upon this analysis, complete on-Site exposure pathways appear to be present only during the current unremediated and the construction/remedial action phase. Under current conditions, on-Site exposure is limited by preventing access to the Site and limiting Site activity. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the

Community Air Monitoring Program (CAMP), the Soil/Materials Management Plan (SMMP), and a Construction Health and Safety Plan (CHASP). After the remedial action is complete, there will be no remaining exposure pathways to identified contaminants. The Composite Cover System and use restrictions will prevent contact with residual soil or groundwater. A Vapor Barrier System will prevent migration of soil vapors into occupied structures. Continued protection after the remedial action will be achieved by the implementation of a Site Management Plan (SMP) including periodic inspection and certification of the performance of remedial controls.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 PROJECT ORGANIZATION AND OVERSIGHT

Principal personnel who will participate in the remedial action include Meredith R. Anke, P.E., Project Manager for Carlin-Simpson & Associates and Thomas Pugliese, Project Manager for City Island Reserve, LLC. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Robert B. Simpson, P.E. and Meredith R. Anke, P.E., respectively. The General Contractor (GC) is SCE Environmental.

5.2 SITE SECURITY

Site access will be controlled through gated entrances to the fenced property.

5.3 WORK HOURS

The hours for operation of remedial construction will be between 7:00 am and 5:00 pm Monday through Friday, or as approved by the New York City Department of Buildings. These hours conform to the New York City Department of Buildings construction code requirements.

5.4 CONSTRUCTION HEALTH AND SAFETY PLAN

The Health and Safety Plan is included in Appendix D. The Site Safety Coordinator will be Meredith Anke of Carlin-Simpson & Associates. There will also be a Site Safety Coordinator from SCE Environmental during the general construction work. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, including 40-hour hazardous waste operator training and annual 8-hour

refresher training. Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and be required to sign an HASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the HASP. That document will define the specific project contacts for use in case of emergency.

5.5 COMMUNITY AIR MONITORING PLAN

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER

Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities causing the vapors will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities causing the vapors will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations during invasive work. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work creating the dust will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review.

5.6 AGENCY APPROVALS

All permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction. Approval of this RAWP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

5.7 SITE PREPARATION

Pre-Construction Meeting

OER will be invited to attend the pre-construction meeting at the Site with all parties

involved in the remedial process prior to the start of remedial construction activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions will include use of cleaned asphalt or concrete roads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the NYC VCP Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from holes, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile

covers for soil and fill will be secured by adding weights, such as sandbags, for added security, and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, haybales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Storm-water control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of site access by the property owner. Impacted offsite areas may require characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to the NYS DEC's spill hotline at DEC 800-457-7362. If the source of the spill is ongoing and can be identified, it should

be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

A site inspection report will be submitted to OER at the completion of site inspection. An inspection report established by OER is available on OER's website (www.nyc.gov/oer) and will be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the OER project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

5.8 PHASING OF SITE DEVELOPMENT

The redevelopment of the Site may be performed in two (2) phases. If the site redevelopment work is phased, the work performed during Phase 1 will include any necessary environmental permitting, the clearing and rough grading of the entire site, construction of the entire seawall and esplanade, installation of the storm water quality vault including the associated laterals and outflow structure, construction of select residential buildings and garages, installation of new underground utilities for the new structures, and construction of sidewalks and roadways for the new structures.

The Phase 2 portion of the property will be capped when the Phase 2 work is completed. There is a potential that the Phase 2 work could begin approximately 6 to 12 months after the

Phase 1 work is finished. During the dormant time, the portion of the site that remains undeveloped will be fenced to restrict access to this portion of the property. In addition, the undeveloped area will be vegetated to prevent erosion and reduce stormwater runoff.

The undeveloped portion of the site will also be inspected monthly to ensure that there is no erosion on the site, no surface water runoff is leaving the site, the fencing is intact, and there are no other issues on the site that need to be addressed. In the event that problems are identified during the inspection, remedial measures will be performed promptly and communicated with OER.

5.9 TRAFFIC CONTROL

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is as follows:

- 1) Exit Site via Fordham Place and turn left onto Fordham Street (heading west).
- 2) Turn right onto City Island Avenue (heading north).
- 3) City Island Avenue turns into City Island Road (heading northwest).
- 4) Turn left onto Shore Road (heading south-southwest).
- 5) Follow signs for I-95 (north or south).

5.10 DEMOBILIZATION

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at

the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.11 REPORTING AND RECORD KEEPING

Daily Reports

Daily reports providing a general summary of activities for each day of *active remedial work* will be prepared by either Carlin-Simpson & Associates or SCE Environmental and under the supervision of the PE for the Remedial Action. The reports for each work day shall be emailed to the OER Project Manager by the end of the following day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP excursions, if any;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report. If required, an alpha-numeric site map will be used to identify locations described in reports submitted to OER.

Record Keeping and Photo-Documentation

Job-site record keeping for all remedial work will be performed. These records will be

maintained on-Site during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.12 COMPLAINT MANAGEMENT

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.13 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN

All changes to the RAWP will be reported to the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 REMEDIAL ACTION REPORT

A Remedial Action Report (RAR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan;
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material.
- Account of the origin and required chemical quality testing for material imported onto the Site.
- Registration of the property with a RE designation with the NYC Department of Buildings.

- Reports and supporting material will be submitted in digital form.

Remedial Action Report Certification

The following certification will appear in front of the Executive Summary of the Remedial Action Report. The certification will include the following statements:

I, Robert B. Simpson, P.E. am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the On The Sound Site, Site number 13RH-A145X.

I, Meredith R. Anke, P.E. am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the On The Sound Site, Site number 13RH-A145X

I certify that the OER-approved Remedial Action Work Plan dated August 2013 and Stipulations in a letter dated August 2013, if any, were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

7.0 SCHEDULE

The table below presents the anticipated schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. At this time, it is anticipated that the site will be developed in two (2) phases. The schedule for Phase 2 is unknown at this time. Once a schedule for Phase 2 has been determined, an updated schedule will be submitted to OER. Currently, a 12 month construction period is anticipated for Phase 1.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization for Phase 1	1	1
Remedial Excavation of Hot Spots	2	1 (day)
Phase 1 Site Development Work & Site Capping Secure Phase 2 Perimeter	2	52
Demobilization for Phase 1	52	1
Submit Remedial Action Report for Phase 1	56	-
Mobilization for Phase 2	Unknown	
Phase 2 Site Development Work & Site Capping	Unknown	
Demobilization for Phase 2	Unknown	
Record Declaration of Covenants and Restrictions for the Site	Unknown	
Submit Remedial Action Report for Phase 2	Unknown	

FIGURES

TABLES

Table 1

Track 4 Site-Specific Soil Cleanup Objectives (SCOs)

Parameter	Track 4 SCOs (ppm)
Lead	1,200
Total Mercury	2.5

Table 2
Imported Backfill Limits
Residential Use SCOs (ppm)

Metals	
Arsenic	16
Barium	350
Beryllium	14
Cadmium	2.5
Chromium, hexavalent	22
Chromium, trivalent	36
Copper	270
Total Cyanide	27
Lead	400
Manganese	2,000
Total Mercury	0.81
Nickel	140
Selenium	36
Silver	36
Zinc	2,200

Pesticides/PCBs	
2,4,5-TP Acid (Silvex)	58
4,4'-DDE	1.8
4,4'-DDT	1.7
4,4'-DDD	2.6
Aldrin	0.019
alpha-BHC	0.097
beta-BHC	0.072
Chlordane (alpha)	0.91
delta-BHC	100 ^a
Dibenzofuran	14
Dieldrin	0.039
Endosulfan I	4.8
Endosulfan II	4.8
Endosulfan sulfate	4.8
Endrin	2.2
Heptachlor	0.42
Lindane	0.28
Polychlorinated biphenyls	1

Table 2 (Cont.)
Imported Backfill Limits
Residential Use SCOs (ppm)

Semi-Volatile Organic Compounds (SVOCs)	
Acenaphthene	100
Acenaphthylene	100
Anthracene	100
Benz(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(g,h,i)perylene	100
Benzo(k)fluoranthene	1
Chrysene	1
Dibenz(a,h)anthracene	0.33
Fluoranthene	100
Fluorene	100
Indeno(1,2,3-cd)pyrene	0.5
m-Cresol	100
Naphthalene	100
o-Cresol	100
p-Cresol	34
Pentachlorophenol	2.4
Phenanthrene	100
Phenol	100
Pyrene	100

Volatile Organic Compounds (VOCs)	
1,1,1-Trichloroethane	100
1,1-Dichloroethane	19
1,1-Dichloroethene	100
1,2-Dichlorobenzene	100
1,2-Dichloroethane	2.3
cis-1,2-Dichloroethene	59
trans-1,2-Dichloroethene	100
1,3-Dichlorobenzene	17
1,4-Dichlorobenzene	9.8
1,4-Dioxane	9.8
Acetone	100
Benzene	2.9
Butylbenzene	100
Carbon tetrachloride	1.4
Chlorobenzene	100
Chloroform	10
Ethylbenzene	30
Hexachlorobenzene	0.33
Methyl ethyl ketone	100
MTBE	62
Methylene chloride	51
n-Propylbenzene	100
sec-Butylbenzene	100
tert-Butylbenzene	100
Tetrachloroethene	5.5
Toluene	100
Trichloroethene	10
1,2,4-Trimethylbenzene	47
1,3,5- Trimethylbenzene	47
Vinyl chloride	0.21
Xylene (mixed)	100

APPENDIX A
PROPOSED REDEVELOPMENT PLANS & DETAILS

Appendix B

Citizen Participation Plan

The NYC Office of Environmental Remediation and City Island Reserve LLC have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, City Island Reserve LLC will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Hannah Moore, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

Project Contact List. OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at brownfields@cityhall.nyc.gov.

Repositories. A document repository is maintained in the nearest public library that maintains evening and weekend hours. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. City Island Reserve LLC will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

City Island Library

320 City Island Avenue

(between Bay and Fordham Streets)

Bronx, NY 10464

(tel) 718-885-1703

Monday and Thursday 11:00 am – 7:00 pm

Tuesday and Wednesday 11:00 am – 6:00 pm

Friday and Saturday 10:00 am – 5:00 pm

Sunday Closed

Digital Documentation. NYC OER strongly encourages the use of digital documents in repositories as a means of minimizing paper use while also increasing convenience in access and ease of use.

Public Notice and Public Comment. Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be prepared by City Island Reserve LLC, reviewed and approved by OER prior to distribution and mailed by City Island Reserve LLC. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

Citizen Participation Milestones. Public notice and public comment activities occur at several steps during a typical NYC VCP project. See flow chart on the following page, which identifies when during the NYC VCP public notices are issued: These steps include:

- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan.**

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.

- **Public Notice announcing the approval of the RAWP and the start of remediation**

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.

- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion**

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

APPENDIX C

SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

Reuse of Clean, Recyclable Materials. Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

This project intends to use recycled concrete aggregate wherever possible in grading and backfilling the Site. An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

Reduce Consumption of Virgin and Non-Renewable Resources. Reduced consumption of virgin and non-renewable resources lowers the overall environmental impact of the project on the region by conserving these resources.

The project will reduce the consumption of virgin materials by substituting recycled concrete aggregate for mined gravel and/or sand backfill whenever possible. An estimate of the quantity (in tons) of virgin and non-renewable resources, the use of which will be avoided under this plan, will be quantified and reported in the RAR.

Reduced Energy Consumption and Promotion of Greater Energy Efficiency. Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

Recycled concrete materials and other backfill materials will be locally sourced reducing the energy consumption associated with transporting these materials to the Site. Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Storm-water Retention. Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

The proposed re-development of the site will include a new storm-water management system and unpaved surfaces. An estimate of the enhanced storm-water retention capability of the redevelopment project will be included in the RAR.

Paperless Voluntary Cleanup Program. City Island Reserve LLC is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

Low-Energy Project Management Program. City Island Reserve LLC is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

Trees and Plantings. Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

APPENDIX D

SOIL/MATERIALS MANAGEMENT PLAN

1.1 SOIL SCREENING METHODS

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the RAR. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion.

1.2 STOCKPILE METHODS

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, 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 in a logbook and maintained at the Site and available for inspection by OER. 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.

1.3 CHARACTERIZATION OF EXCAVATED MATERIALS

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE

The PE/QEP 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 plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- 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 OER approval.

1.5 OFF-SITE 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 as follows:

- 1) Exit Site via Fordham Place and turn left onto Fordham Street (heading west).
- 2) Turn right onto City Island Avenue (heading north).
- 3) City Island Avenue turns into City Island Road (heading northwest).
- 4) Turn left onto Shore Road (heading south-southwest).
- 5) Follow signs for I-95 (north or south).

This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. 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.

1.6 MATERIALS DISPOSAL OFF-SITE

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee 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 an environmental remediation Site in Bronx, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (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 RAR.

The Remedial Action Report 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 RAR.

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).

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 RAR. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the RAR. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

1.7 MATERIALS REUSE ON-SITE

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site below the composite cover system. The soil cleanup objectives for on-Site reuse are listed in Table 2. 'Reuse on-Site' means 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, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE/QEP 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. In addition, it is expected that on-site virgin soil material will be excavated from the northwestern portion of the site and reused as cover soil in the northern portion of the property.

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 a cover soil layer or within landscaping berms.

1.8 DEMARCATION

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement

of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer in landscaping areas. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

1.9 IMPORT OF BACKFILL SOIL FROM OFF-SITE SOURCES

This Section presents the requirements for imported fill materials to be used below the cover layer and/or within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. The backfill soil quality objectives are listed in Table 2. Approximately 6,800 cubic yards of soil is anticipated to be imported to the Site for use as clean cover. All imported soil for use as clean soil cover will be uncontaminated, clean soil that meets the lesser of the NYSDEC 6 NYCRR Part 375-6.8(a) Restricted Residential Use SCOs and the NYSDEC 6 NYCRR Part 375-6.8 groundwater protection SCOs.

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. 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;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAWP. The RAR will report 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.

Source Screening and Testing

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 PE/QEP 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.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. 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.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. A PE/QEP is responsible to ensure that the facility maintains a 6NYCRR Part 360 registration 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.

The imported uncontaminated, clean soil cover will be from an approved source/facility and will be evaluated by the PE to ensure:

1. That the material is properly maintained at the source and will not be comingled with any other material prior to importing and grading the clean soil material at the Site;
2. That the material does not include any solid waste, including construction and demolition material, as it's prohibited;
3. That screening for evidence of contamination by visual, olfactory and PID soil screening practices prior to testing at the source as well as upon importing to the Site for grading is completed; and
4. That a maximum five-part composite sample will be collected from the segregated stockpile at the source at a minimum frequency of one sample per 500 cubic yards and analyzed for the following 6 NYCRR Part 375 parameters:
 - VOCs by EPA Method 8260C (rev. 2006)
 - SVOCs by EPA Method 8270D (rev. 2007)
 - Pesticides by EPA Method 8081B (rev. 2000)
 - PCBs by EPA Method 8082A (rev. 2000)
 - TAL Metals by EPA Method 6010C (rev. 2007)

Upon receipt of the segregated stockpile analytical results collected at the source, a Clean Soil Sampling Report will be submitted to OER for review/approval prior to importing. The report will include the following:

1. Summary of number of samples collected and analyzed, tabulated data and comparison to the selected Site Use SCOs;
2. Analytical data sheets and chain of custody documentation;
3. Summary of the quantity;
4. Photographs from the segregated stockpile at the source with sample point locations identified;

5. An affidavit from the source/facility on company letterhead stating that the segregated stockpile has been properly maintained at the source and complies with the requirements listed above; and
6. A copy of source/facility NYSDEC permit;

A highly visible demarcation barrier (i.e. orange geosynthetic fencing material or equivalent) will be installed beneath the clean soil/fill surface cover in landscaped areas. Upon importing and grading the OER approved clean soil cover on top of a highly visible demarcation barrier, the following documentation will be presented in the RAR:

1. Confirmation of OER approved clean soil cover material imported and graded at the site on top of highly visible demarcation barrier;
2. Site plan depicting all areas where the OER approved clean soil cover has been placed; and
3. Photographs documenting the importing and grading of the OER approved clean soil cover across the site with the underlying highly visible demarcation barrier (i.e. orange geosynthetic fencing material or equivalent).

1.10 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. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 STORM-WATER POLLUTION PREVENTION

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the work area and inspected in accordance with NYSDEC regulations (e.g. once a week and after every storm event) to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 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 OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily 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 OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

1.13 ODOR, DUST AND NUISANCE CONTROL

Odor 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: (d) direct load-out of soils to trucks for off-Site disposal; and (e) 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, the work creating the odors will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying the Remedial Action Report.

Dust Control

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.
- Use of gravel or recycled concrete aggregate 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 causing the dust emissions 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. OER will be notified of all dust complaint events. Implementation of all dust

controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying the Remedial Action Report.

Other Nuisances

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.

APPENDIX E
CONSTRUCTION HEALTH AND SAFETY PLAN

APPENDIX F
PRE-DELINEATION SAMPLING
LABORATORY ANALYTICAL RESULTS