FEASIBILITY STUDY

250 South Washington Avenue
Block 1885, Lot 35
Staten Island, New York

July 11, 2013
Revised August 5, 2013

Prepared for:
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PROJECT NO. 08BR049

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1.0 INTRODUCTION

1.1 Introduction and Scope

Brinkerhoff Environmental Services, Inc. (Brinkerhoff) was retained by Walter M. Baker (Baker) to develop and implement a Feasibility Study (FS) which details the Remedial Action Objectives (RAOs) and the development, screening, and selection of remedial action alternatives for the industrial property identified as 250 South Washington Avenue, Staten Island, New York (hereinafter referred to as the "Site" or "subject property"). The location of the Site is shown on Figure 1 - Site Location Map and Figure 2 – Property Boundary Map. The recommendation to prepare the FS was presented in the Remedial Investigation Report (RIR), dated January 2013, prepared by Brinkerhoff and submitted to the New York State Department of Environmental Conservation (NYSDEC). A FS Workplan, based upon a meeting with the NYSDEC on June 3, 2013, was sent to the NYSDEC on June 13, 2013. The NYSDEC did not disapprove or provide any comments to the FS Workplan.

1.2 Applicable Regulations

The FS has been prepared in accordance with Title 6 of the New York Code of Rules and Regulations (NYCRR) Part 375 for remedial action selection, the NYSDEC's "Technical and Administrative Guidance Memorandum (TAGM) #4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites," dated May 1990, and the "Division of Environmental Remediation (DER), DER-10, Technical Guidance for Site Investigation and Remediation", dated May 2010.

The framework for the FS was originally discussed during a September 2012 meeting with representatives of the NYSDEC and Baker. A draft of the FS was provided to the NYSDEC on January 24, 2013. The NYSDEC submitted certain comments to the draft FS and a meeting was held on June 3, 2013, which resulted in mutually agreed parameters for preparing and submitting the final FS. In the draft FS, Brinkerhoff recommended the implementation of institutional controls for sediment as a remedial action. However, at the June 3, 2013, meeting, the NYSDEC and Brinkerhoff mutually agreed to propose and accept focused/targeted remediation (described under Sediment/Item No. 3, below) as the approved remedy for sediment rather than institutional controls. This was further confirmed in the June 13, 2013 FS Workplan. The NYSDEC also agreed that the remedial recommendations for the uplands area of the Site as set forth in the draft FS are acceptable.

The FS considers the following four remedial actions for polychlorinated biphenyls (PCBs) found in sediments at the Site:

1. No action.

2. No action with monitored natural attenuation. The monitoring would consist of biota sampling using the target species, ribbed mussel, sampled every two years over a six year period. No other sampling will be required.

3. Focused/targeted remediation adjacent to two “hot spots” identified by sample C-1 (29.0 parts per million [ppm]) and sample WT-1 (36 ppm). The vertical extent of the focused/targeted remediation would consist of the removal of sediment in the tidal wetlands from the existing surface to the base of the peat layer. The depth of the excavation is estimated to be between one to three feet. The removed sediment would be replaced with suitable clean fill capable of supporting hydrophytic vegetation. The horizontal extent of the focused/targeted remediation would begin at the hot spot and extend outward until the 5 ppm contour line, a tidal channel or the edge of upland fill layer is met as shown on Figure 3 – Area of Proposed Soil and Sediment Excavation Under Alternative No. 3 prepared by Brinkerhoff. The horizontal and vertical boundaries would be confirmed by field/visual observations by an environmental scientist at the commencement of remediation. No addition sampling is required.

4. Remediation from the base of the upland fill layer around the perimeter of the Site outward to the 5 ppm contour. The vertical extent would be the same as described above in Alternative No. 3. While the NYSDEC requested that this option be included in the final FS, it agreed that the option was not feasible or technically suitable for the Site.

As stated, the NYSDEC accepted Item No. 3 as the approved remedy.

1.3 Purpose and Report Organization

The purpose of this FS is to identify and evaluate remedial alternatives to address environmental impacts related to the Site. The primary impacts are the presence of PCBs in the soil, sediment, and groundwater of the Site. As set forth in Brinkerhoff’s January 2013 RIR and confirmed by the NYSDEC at the June 2013 meeting, the delineation at the Site is complete. A summary of the delineation is included in this FS.

The FS process begins with the establishment of RAOs to address the risks posed by the presence of contaminants at concentrations in excess of the cleanup objectives and cleanup levels established for the Site: 6 NYCRR Part 375 (soils) and NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 (groundwater). General response actions (GRAs) are then developed for the impacted media that address the RAOs. The identification and screening of technologies applicable to each GRA is the next step in the FS process. Following the identification and screening of process options, remedial alternatives are developed. The remedial alternatives are then screened to determine which alternatives are candidates for detailed evaluation consistent with the guidelines established in TAGM 4030. The detailed evaluation is conducted by applying the following criteria:

- Overall protection of public health and the environment;
- Compliance with Standards, Criteria, and Guidelines (SCGs);
- Short-term effectiveness;
- Long-term effectiveness;
- Reduction of toxicity, mobility, or volume through treatment;
- Implementability;
- Cost; and,
- Land use.

The results of this FS will be used for the selection of a final remedial action for the Site as discussed herein, the preparation of a Record of Decision (ROD) by the NYSDEC, and the preparation of a remedial design, as described in the Order on Consent.

This FS Report is comprised of eight sections and was organized in accordance with Section 4.4(b) of the DER's *Technical Guidance for Site Investigation and Remediation* (*DER-10*) - "Remedy Selection Reporting Requirements". The organization and content of the report are as follows:

<u>Section 1 - Introduction</u> - This section describes the scope of this report.

<u>Section 2 - Site Description and History</u> - This section describes the Site features, location, surrounding area, and other historical site information.

<u>Section 3 - Summary of Remedial Investigations and Exposure Assessment</u> - This section summarizes the previous site and remedial investigations (including contaminants of concern and area extent) and potential exposures to contaminated media.

<u>Section 4 - Remedial Action Goals and Objectives</u> - This section lists the goals and objectives of the remedial alternatives evaluated for this Site.

<u>Section 5 - General Response Actions</u> - This section describes the general types of remedial actions that were evaluated for this Site.

<u>Section 6 - Technology Identification and Screening</u> - This section includes a listing of potential remedial technologies that met the GRAs and a preliminary evaluation of each technology with regard to effectiveness, implementability, and cost.

<u>Section 7 - Remedial Alternatives Development and Analysis</u> - This section includes a description of the remedial alternatives assembled from the technology screening and the evaluation of each remedial alternative with regard to the evaluation criteria in DER-10.

<u>Section 8 - Remedy Selection and Recommendation</u> - This section describes the remedial alternative recommended for implementation at this Site and the basis for the recommendation.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The Site (located at 250 South Washington Avenue, Staten Island, New York, as shown in Figure 1) consists of approximately 5.5 acres of industrial property owned by Baker, zoned as Manufacturing District (M3-1) Heavy Industrial. The Site is located within a mixed-use area which includes commercial and industrial sections. The subject property boundary is shown on Figure 2 - Property Boundary Map. Currently, a maintenance garage and a small office trailer are present on the Site, and the remainder of the Site is covered in marshland and tidal flats. The average elevation of the Site is 14 feet above mean sea level. The Site is located in an area of flat terrain with a general topographic gradient sloping northwest. The undeveloped portion of the subject property is located in a tidal wetland. The subject property lies within the 100-year flood zone (elevation 13.0 feet above mean sea level) and, as such, is subject to flooding. The Site is, in general, bordered as follows:

Northeast: Immediately by the approach to Goethals Bridge (Interstate 278) on land owned by the Port Authority of New York and New Jersey (PANYNJ) (Block 1885/Lot 50). Beyond the bridge are the entrance to the New York Container Terminal and undeveloped land containing wetlands.

Southwest: Immediately by undeveloped land (Block 1885/Lot 75) owned by the New York City Economic Development Corporation (NYC EDC) that consists of wetlands. Farther southwest is Old Place Creek, beyond which is a parcel formerly occupied by the GATX oil terminal (now owned by 380 Development LLC.).

Southeast: Immediately by wetlands owned by the NYC EDC. This land is also part of Block 1885/Lot 75.

Northwest: Bordered by the Old Place Creek. Wetlands are located across the creek on land that is owned by the NYC EDC (Block 1895/Lot 1).

2.2 Site History

The Site has been owned by Baker since 1967 and was developed initially in approximately 1970 with a single structure (based on historical aerial photographs). The Site has been used for industrial purposes, including the storing of construction equipment by various companies, including R. Baker & Son Machinery Dismantlers, Inc. (R. Baker & Son). From 1967 to 1977, R. Baker & Son stored its demolition equipment on the subject property. There presently exist several steel-framed garage structures and trailers on the property. The structures are not occupied except for short periods of time for working on machinery. The facility is used only for storage of equipment at the present time.

3.0 SUMMARY OF REMEDIAL INVESTIGATION AND EXPOSURE ASSESSMENT

3.1 Summary of Remedial Investigation

Previous sampling and analysis conducted by the NYSDEC in the 1970s and 1980s and by the PANYNJ in the 1990s identified the presence of PCBs in certain soil, sediment, and groundwater samples collected at the Site.

Pursuant to the NYSDEC's authority under ELC Article 27, Title 13 and ECL 3-0301, the NYSDEC and R. Baker & Son All Industrial Services, Inc. and Walter Baker (together the Bakers) entered into an Order on Consent and Administrative Settlement (Order on Consent) on August 27, 2009. The Bakers entered into the Order on Consent without any admission of fact, liability or wrongdoing. The Order on Consent resolved the Bakers' alleged liability to the State for the Site as provided for in 6 NYCRR 375-1.5 (b)(5). Pursuant to the Order on Consent, between May 2008 and December 2012, various environmental documents were prepared by Brinkerhoff and submitted to the NYSDEC. These documents included Remedial Investigation Work Plans, Site Investigation Reports, and Supplemental Remedial Investigation Reports. The work plans were approved by the NYSDEC prior to implementation. Once the approved sampling and analyses were completed, a Site Investigation Report was prepared and submitted to the NYSDEC.

In December 2012, the vertical and horizontal extents of the contaminants were fully delineated and a Fish and Wildlife Impact Analysis (FWIA) completed.

3.1.1 Site Investigation - November 2010 Report

The November 2010 Report indicated that, based upon extensive sampling, the highest concentrations of PCBs were located in the east central upland portion of the property, concentrated in the front of the main building located on the eastern end of the property. PCBs increased with depth in this area. The vertical extent of PCBs in this area was not delineated as of November 2010.

Surface soil impact varied throughout the property. A concentration of 0.2 ppm was detected in the northwestern corner of the property, with PCB concentrations ranging from 0.07 ppm to two (2) ppm in the southwestern corner of the property. PCB concentrations ranged from 26 ppm to 14 ppm in the central to east-central portion of the property. Additional sampling was recommended to delineate the horizontal limits of the PCBs over NYSDEC Subpart 375-6 Soil Cleanup Objectives (SCO) for Industrial Use of 25 ppm.

In the adjacent wetland sediments, PCBs were detected at less than 0.1 ppm along the northwestern edge of the fill, 15 ppm along the western edge of the fill, and 36 ppm along the southwestern edge of the fill.

Soil sampling results identified the presence of several volatile organic compounds (VOCs), specifically benzene, chlorobenzene, and 1,2,4-trichlorobenzene, below the SCO for

Industrial Use. Semi-volatile organic compounds (SVOCs), specifically polynuclear aromatic hydrocarbons (PAHs) and heavy metals, were detected over the NYSDEC SCO in several samples. The compounds and analytes reported are the result of urban historic fill and not from site operations.

Four (4) monitoring wells were installed and sampled at the Site. Little to no impact was detected in groundwater from PCBs. PCBs were reported at nondetectable concentrations in three (3) of the four groundwater monitoring wells. PCBs were detected at 0.543 part per billion (ppb) in MW-2, exceeding the NYSDEC Ambient Water Quality Standards (AWQS) for PCBs (0.09 ppb). The VOC chlorobenzene was detected in two (2) wells, and 1,3 dichlorobenzene and 1,4 dichlorobenzene were detected in one (1) well. The compound 2,4-dichlorophenol was identified in one (1) well. The maximum VOC concentration found was the 1,4 dichlorobenzene in MW-4 with a concentration of 200 ppb, which exceeds the AWQS at 3 ppb.

3.1.2 Supplemental Remedial Investigation – September 2011 Report

As part of the field investigation approved by the NYSDEC, 18 additional soil samples were collected in March 2011 at various depths and analyzed for PCBs. One (1) additional sample was collected and analyzed for VOCs, and seven (7) additional sediment samples were collected and analyzed for PCBs. The four (4) existing groundwater monitoring wells were resampled and analyzed for VOCs and PCBs. The results of the investigation completed the delineation of soil at the Site impacted with PCBs and VOCs, which the NYSDEC accepted.

Groundwater sampling results identified VOCs and PCBs in groundwater, similar to the data previously reported. The maximum PCB concentration detected was Aroclor 1260 in MW-2, exceeding the NYSDEC AWQS (0.09 ppb). The maximum VOC concentration found was the 1,4 dichlorobenzene in MW-4 with a concentration of 490 ppb, which exceeded the AWQS at 3 ppb. Based on the results of the sediment data, five (5) additional sediment samples were collected in the tidal area on and adjacent to the Site and analyzed for PCBs. The results of that sampling completed the delineation of PCBs in the sediments in the tidal area, which the NYSDEC accepted.

3.1.3 NYSDEC-Approved Remedial Investigation – January 2013 Report

In June 2012, Arcadis US, Inc. (Arcadis), as directed by the PANYNJ, performed a shellfish evaluation. Refer to Section 3.1.5.

On July 5, 2012, Brinkerhoff collected eight (8) additional sediment samples from around the perimeter of the subject property. The samples were collected from zero to six (6) inches below the grade of the wetlands. Laboratory results indicated that PCBs were below the applicable standard of one (1) ppm in all samples except two. These two samples had detections of 1.8 ppm. When incorporated into the prepared "PCBs in Sediments Isopleth Contour Map", these data points are consistent with the previously drawn contours. As such, the PCBs in sediments surrounding the subject property have been successfully delineated to one (1) ppm. No further sampling of the sediments was proposed or necessary, which the NYSDEC accepted.

On July 17, 2012, Arcadis installed one (1) soil boring in the area where elevated concentrations of PCBs were formerly detected at a depth greater than 20 feet below grade. The boring was installed at depths including 18, 22.5, 24, 25, 27 and 29 feet to define the vertical migration of PCBs in this area. Laboratory results indicated that PCBs were detected at 6.7 ppm at a depth of 18 feet below grade and at less than one (1) ppm or non-detectable at depths greater than 18 feet below grade. PCBs did not exceed 25 ppm (the projected subsurface soil cleanup objective for the Site) below the peat layer. Based on the previous sampling conducted by Brinkerhoff and the sampling by Arcadis, the vertical and horizontal delineation of PCBs in the surface and subsurface sediments was complete for the Site, and no further sampling was proposed.

3.1.4 NYSDEC-Approved Qualitative Human Health Exposure Assessment (HHEA)

In the January 2013 RIR, a qualitative HHEA was performed to evaluate and document the potential exposure pathways related to PCBs in soil and sediment as they pertain to the current and anticipated future use of the Site. The New York State Department of Health (NYSDOH) defines an exposure pathway as consisting of: (1) a contaminant source; (2) release and transport mechanism; (3) a point of exposure; (4) a route of exposure; and, (5) a receptor population.

While potential for complete exposure pathways for Site contaminants to Site human receptors under current conditions exists, management of the limited operations will prevent a completed pathway. Risk to humans under current conditions is relatively low, if any, due to the limited time spent on the subject property by workers.

There would be a moderate risk of exposure during the construction and remediation activities. This risk would be minimized by following the appropriate health and safety, vapor and dust suppression, and Site security measures.

The existence of a complete exposure pathway for Site contaminants to human receptors after the construction and remediation is unlikely since contaminated soils will have been removed.

There is no complete exposure pathway from the migration of Site contaminants to off-site human receptors for current, construction, or future conditions.

3.1.5 Fish and Wildlife Impact Analysis (FWIA)

As reported in the January 2013 RIR, Step I and Steps IIA and IIB of the FWIA were completed by Brinkerhoff. In July 2012, Arcadis, contracted by the PANYNJ, performed a tidal wetland shellfish evaluation within the southeast quadrant of the Site. As directed by the NYSDEC, the evaluation collected specimens of ribbed mussel (*Geukensia demissa*) within the tidal wetlands for PCB lipid analysis. Arcadis's field sampling procedures for the shellfish evaluation were observed by an environmental scientist from Brinkerhoff. All shellfish samples, determined mature enough for sampling and collected by Arcadis, exhibited healthy characteristics for the species.

The laboratory results of Arcadis's evaluation, provided to Brinkerhoff, showed non-detectable levels for PCBs for all samples with the exception of one, identified as "Client ID:S-1". Aroclor 1260 was reported at 173 micrograms per kilogram (.173 ppm) at this location. In comparison, the current tolerance level established by the US Food and Drug Administration (last published in 2009) for the human consumption of fish and shellfish is 2.0 ppm. The results of the Arcadis evaluation indicate the local ribbed mussel population has not been impacted by the PCBs in sediments.

Field observations performed in support of the FWIA identified characteristics of a healthy tidal salt marsh community, including the area with the highest reported PCB concentrations. In addition, surface water observed within the salt marsh was clear with no stained soil or sheens, and no dead or dying fish or wildlife was observed. The observations, in combination with the shellfish evaluation, demonstrate the contaminants at the Site have not adversely affected the ecological environment.

4.0 REMEDIATION ACTION GOALS AND OBJECTIVES

4.1 Remedial Action Goals

The NYSDEC remedial program identifies the goal for site remediation under 6 NYCRR Sub-Part 375-2.8(a) as "…restore that site to pre-disposal conditions, to the extent feasible. At a minimum, the remedy selected shall eliminate or mitigate all significant threats to the public health and to the environment presented by contaminants disposed at the site through the proper application of scientific and engineering principles and in a manner not inconsistent with the national oil and hazardous substances pollution contingency plan as set forth in section 105 of the Comprehensive Environmental Resource Conservation and Liability Act (CERCLA), as amended as by Superfund Amendments and Reauthorization Action (SARA)."

Where site restoration to pre-release conditions is not feasible, the NYSDEC may approve alternative criteria based on the site-specific conditions as stated in 6 NYCRR Sub-Part 375-2-8(b)(1): "The remedial party may propose site-specific soil cleanup objectives which are protective of public health and the environment based upon other information."

4.2 Remedial Action Objectives (RAOs)

RAOs are defined in DER-10 as medium or operable unit-specific objectives for the protection of public health and the environment and are developed based on SCGs for the specific contaminant(s). The applicable SCGs for the Site are as follows:

Division of Environmental Remediation (DER) SCGs:

- DER-10 – Technical Guidance for Site Investigation and Remediation
- DER-15 – Presumptive/Proven Remedial Technologies
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Part 375-6 – Remedial Program Soil Cleanup Objectives

Division of Fish Wildlife and Marine Resources

- Technical Guidance for Screening Contaminated Sediments

Division of Water SCGs:

- 6 NYCRR Part 703 - Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards

NYSDOH SCGs:

- NYSDOH Drinking Water Standards

As per the applicable SCGs, the generic, medium-specific RAOs are as follows:

4.2.1 Protection of Public Health

Soil

- Prevent ingestion/direct contact with contaminated soil.

Sediment

- Prevent ingestion/direct contact with contaminated sediment.

Groundwater

- Prevent ingestion of contaminated groundwater.

4.2.2 Protection of the Environment

Soil

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Sediment

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Groundwater

- Prevent the discharge of contaminants to surface water.

5.0 GENERAL RESPONSE ACTIONS (GRAs)

Based on the results of the investigative activities, soil, sediment and groundwater on the Site have been determined to be the impacted media of concern and are considered for GRAs. The elevated concentrations of PCBs are localized in the east-central upland portion of the property, concentrated in the front of the main building located on the eastern end of the property. In this area, the deepest impacts are confirmed at approximately 18 feet. There is also limited PCB impact in the adjacent wetland sediments. Limited impact from PCBs occurred in groundwater, mostly in the immediate down-gradient area where the elevated PCBs were detected in the soil.

The GRAs discussed below will be evaluated as means of achieving the RAOs set forth in Section 4.2. A brief description of the GRAs and example technologies are presented below.

5.1 Soil

5.1.1 No Action

A No Action response for soil would not involve any remedial efforts. No Action does not limit disturbance of soil during any future construction or Site redevelopment activities; therefore, this GRA would not successfully achieve the RAOs for soil at the Site.

5.1.2 Institutional Controls

An institutional control for soil would not involve remedial efforts. However, an institutional control would not limit disturbance of the area during any future construction or Site redevelopment activities, unless combined with an engineering control. This GRA would not achieve the RAOs for soil at the Site unless combined with an engineering control.

5.1.3 Engineering Control

An engineered control (cap) consisting of physical barriers, would prevent contact with the impacted soil. The cap would also prevent migration via erosion and may be designed to restrict infiltration. While effective at preventing direct contact with impacted soils, this response action does not reduce toxicity, mobility, or volume. It is most effective when combined with other remediation technologies such as hot spot excavation and use of institutional controls.

5.1.4 Excavation

This response action consists of the removal of the hot spots and subsequent treatment or off-site disposal of impacted soils. While excavation in the unsaturated zone could be accomplished using conventional construction equipment and methods, excavation below the water table, due to the high groundwater table at the Site, would require significant earth support and, depending on the depth of the excavation, dewatering. If dewatering is required, extracted groundwater may require treatment and disposal. Excavation would also require the replacement of excavated material with clean fill from off-site sources.

5.2 Sediment

5.2.1 No Action

A No Action response for sediment would not involve any remedial efforts. This GRA would not successfully achieve the RAOs for sediments at the Site.

5.2.2 No Action with Monitored Natural Attenuation

No Action with Monitored Natural Attenuation involves allowing existing processes (physical, chemical and/or biological) to contain, destroy, alter, or otherwise reduce the bioavailability and toxicity of contaminants. A variety of natural processes can contribute to this action, including natural sedimentation in depositional environments, chemical transformation, and sequestration and stabilization. Long-term monitoring would confirm the rate of degradation and track the progress of the remediation.

5.2.3 Focused/Targeted Remediation

Focused/Targeted Remediation involves the removal of impacted sediments adjacent to PCB hot spots identified as sample C-1 (29.0 ppm) and sample WT-1 (36 ppm). The vertical extent of the focused/targeted remediation would consist of the removal of sediment in the tidal wetlands from the existing surface to the base of the peat layer. The removed sediment would be replaced with suitable clean fill capable of supporting hydrophytic vegetation. The horizontal extent of the focused/targeted remediation would begin at the hot spot and extend outward until the 5 ppm contour line, a tidal channel or the edge of upland fill layer is met as shown on Figure 3 – Area of Proposed Soil and Sediment Excavation Under Alternate No. 3 prepared by Brinkerhoff. The boundaries would be determined by field/visual observations with no sampling required. Focused/Targeted Remediation would limit the impact to the adjacent tidal wetlands system requiring minor amount of vegetation to be restored.

The NYSDEC approved this remedial option as being feasible and technically suitable for the Site.

5.2.4 Remediation to 5 PPM

Remediation to 5 ppm involves sediment removal from the base of the upland fill layer around the perimeter of the Site outward to the 5 ppm contour. The vertical extent would be from the existing surface to the base of the peat layer. Remediation to 5 ppm would require significant disturbance and restoration of vegetation of tidal wetlands.

As stated above, the NYSDEC has agreed that this option is not feasible or technically suitable for the Site.

5.3 Groundwater

5.3.1 No Action

A No Action response for groundwater would not involve any remedial efforts. This GRA would not successfully achieve the RAOs for groundwater at the Site.

5.3.2 No Action, Continued Monitoring

No Action, Continued Monitoring involves allowing existing processes (physical, chemical and/or biological) to contain, destroy, alter, or otherwise reduce the bioavailability and toxicity of contaminants. When combined with soil excavation, monitoring of environmental restoration would confirm the rate of degradation and track the effectiveness of the remediation completed. This action is easily implementable at low cost.

5.3.3 Pump and Treat

Pump and treat is used for groundwater plume control and treatment would involve pumping the PCB-impacted groundwater out of the subsurface for treatment likely via carbon adsorption. This GRA could potentially achieve the RAOs for groundwater at the Site but at a very high cost.

6.0 TECHNOLOGY IDENTIFICATION AND SCREENING

The following section presents the remedial technologies identified and screened for use at the Site. Each remedial technology was screened according to its effectiveness, implementability, and relative cost.

6.1 Soil

6.1.1 No Action

Although the No Action GRA would not successfully achieve the RAOs for soil, it provides a baseline for other remedial technology alternatives; therefore, it is carried through the remedial technology screening. This alternative is easily implementable at no cost.

6.1.2 Institutional Controls

This alternative restricts development to industrial uses, restricts use of groundwater, requires periodic certification controls are still in place, and requires compliance with the Site Management Plan (SMP). Institutional controls would be cost effective and implementable if combined with an engineering control. The capital costs associated with this alternative are related to preparing the appropriate documentation for the land use restriction and preparing the SMP. Annual Operation & Maintenance (O&M) costs associated with this alternative include costs associated with inspection and maintenance of ground cover materials and preparation of an annual certification report.

6.1.3 Engineered Soil Cap

An engineered soil cap is effective at preventing soil from contacting with surface water and, therefore, may reduce toxicity, mobility, or volume. It is most effective when combined with other remediation technologies such as "hot spot" removal. This technology is proven and readily implemented, and the cost is low compared to other technologies.

6.1.4 Excavation

This alternative includes the excavation/removal in hot spots of unsaturated and saturated soil, to the extent practical, that exhibits constituents at concentrations exceeding the 25 ppm industrial use SCOs for individual constituents as presented in 6 NYCRR Part 375-6.8(b). This alternative would address impacted unsaturated and saturated soil at the Site through removal. Soil would be removed from an area in the northeastern and the south central portions of the Site. The removal would be performed from depths ranging from one (1) foot below grade to approximately 15 feet below grade.

The capital costs associated with this alternative include site preparation, possible groundwater dewatering, soil excavation, soil stabilization, transportation, and disposal. Annual O&M costs associated with this alternative do not apply to this option.

6.2 Sediment

6.2.1 No Action

Although the No Action GRA would not successfully achieve the RAOs for sediment, it provides a baseline for other remedial technology alternatives; therefore, it is carried through the remedial technology screening. This alternative is easily implementable at no cost.

6.2.2 No Action with Monitored Natural Attenuation

No Action with Monitored Natural Attenuation can be implemented as a sole remedy. The monitoring consists of biota sampling using the shellfish species, ribbed mussel, every two years over a six year period. This alternative which would include institutional controls, would limit disturbance of the sediment in the adjacent tidal wetlands, preventing migration of PCBs from sediment to other impacted media. This alternative would be effective and is implementable at

6.2.3 Focused/Targeted Remediation

Focused/Targeted Remediation involves the removal of impacted sediments adjacent to PCB hot spots identified as sample C-1 (29.0 ppm) and sample WT-1 (36 ppm). The vertical extent of the focused/targeted remediation would consist of the removal of sediment in the tidal wetlands from the existing surface to the base of the peat layer. The removed sediment would be replaced with suitable clean fill capable of supporting hydrophytic vegetation. The horizontal extent of the focused/targeted remediation would begin at the hot spot and extend outward until the 5 ppm contour line, a tidal channel or the edge of upland fill layer is met as shown on Figure 3 – Area of Proposed Soil and Sediment Excavation Under Alternative No. 3 prepared by Brinkerhoff. The boundaries would be determined by field/visual observations with no sampling required. Focused/Targeted Remediation would limit the impact to the adjacent tidal wetlands system requiring minor amount of vegetation to be restored. This alternative, which has been accepted by the NYSDEC, is implementable at moderate cost.

6.2.4 Remediation to 5 PPM

Remediation to 5 ppm involves sediment removal from the base of the upland fill layer around the perimeter of the Site outward to the 5 ppm contour. The vertical extent would consist of the removal of sediment found from the existing surface to the base of the peat layer. Significant disturbance to tidal wetlands would require restoration. This process is difficult and can only be implemented at significant cost. Brinkerhoff and the NYSDEC agreed that this option is not feasible or technically suitable for the Site.

6.3 Groundwater

6.3.1 No Action

Although the No Action GRA would not successfully achieve the RAOs for groundwater, it provides a baseline for other remedial technology alternatives; therefore, it is carried through the remedial technology screening. This alternative is easily implementable at no cost.

6.3.2 No Action, Continued Monitoring

No Action, Continued Monitoring can be implemented as a sole remedy or as part of a larger remedial strategy incorporating hot spot excavation in the sediment. This action is easily implementable at moderate cost.

6.3.3 Pump and Treat

Given the absence of information regarding the potential capture zone, it is not known if pump and treat would control plume migration at the Site. Pilot testing would need to be performed to determine if this alternative would effectively achieve the RAOs for groundwater at the Site. Pump and treat requires significant infrastructure and O&M. In addition, given the relatively low to moderate hydraulic conductivity values for the overburden, the timeframe to reduce concentrations to the SCGs could be significantly long. Groundwater remediation via pump and treat is only moderately implementable at a very high cost.

7.0 REMEDIAL ALTERNATIVES DEVELOPMENT AND ANALYSIS

According to DER-10, the remedial party should evaluate available remedial technology alternatives using the threshold and primary balancing criteria set forth in 6 NYCRR Part 375. Threshold criteria must be satisfied for a remedial technology to be considered for selection. Once a remedial technology satisfies the threshold criteria, the primary balancing criteria are used to compare the negative and positive aspects of the selected remedial technology. Tables 1 through 3 present a summary of the evaluated remedial alternatives.

7.1 Threshold Criteria

There are two threshold criteria: (1) the ability of the remedial technology to provide overall protectiveness of public health and the environment, and (2) the conformance of the remedial technology with SCGs.

7.1.1 Overall Protectiveness of Public Health and the Environment

The overall protectiveness of public health and the environment criterion was previously outlined above (by media) in order to develop the GRAs as presented in Section 5.0. Those GRAs which remain after the remedial technology screening in Section 6.0 are presented as alternatives by media as follows:

Soil

1. **Alternative 1 – No Action**
   The No Action alternative would leave the impacted soil in place with no remedial efforts. This alternative will not be protective of public health and the environment and is carried forward for comparison purposes only.
2. **Alternative 2 – Institutional Controls**
   This alternative would leave the impacted soil in place with no remedial efforts. This alternative combined with an engineering control will be protective of public health and the environment.
3. **Alternative 3 – Hot Spot Excavation and Engineered Soil Cap**
   Excavation would provide for the hot spot removal of PCB-impacted soil and would be protective of public health and the environment. An engineered soil cap put in place after the excavation would prevent contact with any remaining impacted soil and prevent migration via erosion.

Sediment

1. **Alternative 1 – No Action**
   The No Action alternative would leave the sediment in place with no remedial efforts. This alternative would not be protective of public health and the environment and is carried forward for comparison purposes only.
2. **Alternative 2 – No Action with Monitored Natural Attenuation**
   This alternative would leave the sediment in place with no remedial efforts. This alternative would include monitoring to confirm the rate of degradation and track the

progress of the remediation. This alternative could be protective of public health and the environment and would limit disturbance of the sediment in the adjacent tidal wetlands, thereby preventing migration of the PCBs in the sediment to other impacted media.

3. **Alternative 3 – Focused/Targeted Remediation**
   This alternative would remove the PCB-impacted sediment at two identified hot spots to prevent migration of contaminated sediment downstream. This alternative would provide for limited disturbance of the tidal wetlands and would be protective of human health and the environment.
4. **Alternative 4 – Remediation to 5 PPM**
   This alternative involves sediment removal from the base of the upland fill layer around the perimeter of the Site outward to the 5 ppm contour. While this alternative would be protective of human health and the environment, disturbance to the existing tidal wetlands and the cost would be significant and prohibitive.

Groundwater

1. **Alternative 1 – No Action**
   The No Action alternative would leave the groundwater in place with no remedial efforts. This alternative would not be protective of public health and the environment and is carried forward for comparison purposes only.
2. **Alternative 2 – No Action, Continued Monitoring**
   This alternative would include monitoring to confirm the rate of degradation and track the progress of the remediation after excavation of hot spots. This alternative would protective of the environment.
3. **Alternative 3 – Pump and Treat**
   Groundwater pump and treat addresses the residual groundwater plume contamination. This alternative may be protective of public health and the environment but would be only marginally effective and at a very high cost.

7.1.2 Conformance with Standards, Criteria, and Guidance (SCGs)

Soil

Alternatives 1 (No Action) and 2 (Institutional Controls) generally involve natural degradation processes with no removal or treatment, and the timing and extent of improvement (if any) by natural degradation processes in soil is uncertain. Alternative 3 (Hot Spot Excavation and Engineered Soil Cap) involves removal of the PCB-impacted soil at several subsurface locations and placement of a cap over the Protection of Ecological Resources Soil Cleanup Objective as outlined in 375-6.8(b) and thus will conform to SCGs.

Sediment

Alternative 1 (No Action) and Alternative 2 (No Action with Monitored Natural Attenuation) do not conform, on their own, to the SCGs since there would be no remedial efforts; however, in the long term, PCB concentrations may be reduced to levels below SCGs because of the natural biological or chemical processes. Alternative 3 (Focused/Targeted Remediation) would conform to the SCGs once the area targeted for sediment removal is complete.

Alternative 4 (Remediation to 5 PPM) would conform to the SCGs but would require significant disturbance to the high functioning tidal wetlands and at a significant and prohibitive cost.

Groundwater
Alternative 1 (No Action) does not conform to the SCGs since there would be no remedial efforts; however, in the long term, PCB concentrations may be reduced to levels below SCGs because of the natural biological or chemical processes. Alternative 2 (No Action, Continued Monitoring) would conform to the SCGs once the "hot spot" removal of soil is completed. Alternative 3 would only be marginally effective in conforming with the SCGs and at a very high cost.

7.2 Primary Balancing Criteria

There are six primary balancing criteria for the remedial technology: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility, or volume of contamination; (3) short-term impact and effectiveness; (4) implementability; (5) cost effectiveness; and, (6) current and potential land use. Once the Proposed Remedial Action Plan (PRAP) is produced by the NYSDEC DER and the public comment period has closed, the final criterion for evaluation is community acceptance which is evaluated by the DER prior to remedy selection.

7.2.1 Long-Term Effectiveness and Permanence

Soil
Alternative 2 (Institutional Controls) in combination with Alternative 3 (Excavation and Engineered Soil Cap) would be considered effective in the long term. This would be considered a permanent remedial technology as it removes the impacted soils to below the SCO for Industrial Use and provides protection to human health and the environmental.

Sediment
Alternative 2 (No Action with Monitored Natural Attenuation) includes long-term monitoring and would assess the continuation of ongoing natural processes that result in the decreasing concentrations of PCBs. By reducing uncertainty, long-term monitoring would provide assurance that long-term risks are appropriately managed and controlled. Alternative 3 (Focused/Targeted Remediation) would be effective long term and considered a permanent remedial technology as it removes the impacted sediment. While Alternative 4 (Remediation to 5 PPM) would be considered a permanent remedial technology, it would significantly disturb the existing high functioning tidal wetlands which may cause migration of PCBs to other media.

Groundwater
Alternative 2 (No Action, Continued Monitoring) would be considered effective in the long term.

7.2.2 Reduction of Toxicity, Mobility or Volume of Contamination

Soil
Only Alternative 3 (Excavation and Engineered Soil Cap) would reduce the toxicity, mobility, and volume of the contamination in soil.

Sediment
Alternative 2 (No Action with Monitored Natural Attenuation) would reduce the contamination in sediment since natural biological or chemical processes can attenuate contaminants through biotic or abiotic transformations and interactions. Moreover, this alternative does not require disturbance of any wetlands. Alternative 3 (Focused/Targeted Remediation) would reduce contamination in the sediment while limiting the disturbance to adjacent wetlands. Alternative 4 (Remediation to 5 ppm) would reduce contamination in sediment; however, significant disturbance to the existing high functioning tidal wetlands may cause migration of PCBs to other media.

Groundwater
Alternative 2 (No Action, Continued Monitoring) would reduce the toxicity, mobility or volume of the contamination in groundwater because of the natural biological or chemical processes following the excavation of hot spots.

7.2.3 Short-Term Impact and Effectiveness

Soil
Alternative 2 (Institutional Controls) when combined with Alternative 3 (Excavation and Engineered Soil Cap) are effective and viable in the short term as they limit the potential for ingestion and dermal adsorption from soil.

Sediment
Alternative 2 (No Action, Continued with Monitored Natural Attenuation) alone is not expected to contribute to the goals of RAOs in the short term. Alternative 3 (Focused/Targeted Remediation) would be effective in the short term while limiting the disturbance to the tidal wetlands. While Alternative 4 (Remediation to 5 ppm) would be effective in the short term, it would significantly disturb the existing high functioning tidal wetlands which may cause migration of PCBs to other media.

Groundwater
Alternative 2 (No Action, Continued Monitoring) alone is not expected to contribute to the goals of RAOs in the short term, but if combined with “hot spot” soil removal the goals of RAOs can be achieved.

7.2.4 Implementability

Soil

Alternative 2 (Institutional Controls) does not require any technical implementation. Alternative 3 (Excavation and Engineered Soil Cap) requires significantly more technical and administrative implementation associated with soil disposal, transportation, potential dewatering, and other technologies.

Sediment

Alternative 2 (No Action with Monitored Natural Attenuation) is readily implementable because it requires no action beyond detailed site characterization and monitoring. Alternative 3 (Focused/Targeted Remediation) is readily implementable and has a minor impact on the surrounding tidal wetlands. The decreasing disturbance will allow the wetlands system to be restored and recover more rapidly and limit the vulnerability of the remedial area to intrusion by invasive species. Alternative 4 (Remediation to 5 PPM) is more complex and prohibitively more costly than other approaches due to accommodation of equipment maneuverability, portability and site access. Alternative 4 also requires significant disturbance to existing high functioning tidal wetlands and temporary displacement of fish and wildlife that rely on the wetlands to meet habitat requirements. Under Alternative 4, the area will be more vulnerable to the establishment of invasive species and reduce the Site's ecological function.

Groundwater

Alternative 3 (Pump and Treat) would need to be pilot tested, requires infrastructure and O&M, and is technically and administratively more difficult to implement. Alternative 2 (No Action, Continued Monitoring) is readily implementable.

7.2.5 Cost Effectiveness

Soil

The most effective cost option for the Site is combining the use of Alternative 2 (Institutional Controls) and Alternative 3 (Hot Spot Excavation and Engineered Soil Cap). The cost of Alternative 3 (Excavation and Engineered Soil Cap) would be moderate since it requires significantly more technical and administrative implementation associated with soil disposal, transportation, potential dewatering, and other technologies.

Sediment

The most effective cost option for the Site is Alternative 2 (No Action with Monitored Natural Attention). The cost of Alternative 3 (Focused/Targeted Remediation) is moderate. The cost of Alternative 4 (Remediation to 5 PPM) is significant and prohibitive considering anticipated cost of construction, including, limited access, road construction, off-site disposal, accommodation of equipment maneuverability, dewatering, portability, and restoration and monitoring of tidal wetlands.

Groundwater
The cost of Alternative 3 (Pump and Treat) is significant and requires infrastructure and operation over many years. The cost of Alternative 2 (No Action, Continued Monitoring) is low since only monitoring is required.

Table 4- Alternative 3 and 4 Cost Evaluation attached to the rear of the FS, presents a cost comparison for each media under Alternative 3 and Alternative 4.

7.2.6 Land Use

The Site's current use is zoned heavy industrial (M3-1); a maintenance garage and a small office trailer are currently present. The remainder of the Site is covered in marshland and tidal flats. The current receptor population includes part-time workers and visitors. Baker's anticipated future use of the Site remains the same.

Soil
Alternative 2 (Institutional Controls) and Alternative 3 (Hot Spot Excavation and Engineered Soil Cap) do not impact the current or Baker's anticipated land use or require infrastructure improvements.

Sediment
Alternative 2 (No Action with Monitored Natural Attenuation) does not impact the currently exposed population or tidal wetlands as would Alternative 3 (Focused/Targeted Remediation) and Alternative 4 (Remediation of Sediments to 5 PPM). Alternative 3 would not impact the current or Baker's anticipated land use or require infrastructure improvements.

Groundwater
Alternative 3 (Pump and Treat) would require significant infrastructure and would have impact to the currently exposed population. Alternative 2 (No Action, Continued Monitoring) does not impact the currently exposed population.

8.0 REMEDY SELECTION AND RECOMMENDATION

This section provides the recommended remedial technology based on Section 7.0 - Remedial Alternative Development and Analysis and based upon the meeting on June 3, 2013, at which the NYSDEC agreed to the remedy selection provided below (as confirmed in the draft FS Workplan, dated June 13, 2013).

8.1 Soil

The remedial technology for soil is Alternative 3 (Hot Spot Excavation and Engineered Soil Cap), combined with Alternative 2 (Institutional Controls), as agreed to by the NYSDEC. Excavation will permanently remove the PCB contamination source in soil to below SCO for Industrial Use. An engineered soil cap will prevent future contaminant migration to adjacent wetlands. A Deed restriction would be used as an institutional control. This alternative has both short-term and long-term effectiveness and reduces the toxicity, mobility, and volume of contamination in soil. While this alternative may require more technical and administrative implementation and the cost is moderate to high compared to other alternatives, it provides greater protection to human health and the environment compared to Alternative 1 or Alternative 2 alone.

8.2 Sediment

The remedial technology for sediment, as agreed to by the NYSDEC, is Alternative 3 (Focused/Targeted Remediation). This alternative has both short-term and long-term effectiveness, is readily implementable, and has moderate cost. This alternative removes the contamination in sediment immediately adjacent to the base of the upland fill and with the highest reported PCB concentrations without significant disturbance to the ecological complex tidal wetlands. It will also allow the system to recover more rapidly and limit vulnerability of the remediated area to intrusion by invasive species. It will limit the potential for ingestion and dermal adsorption of PCBs which may be present in the sediment and absorbed by the underlying peat layer. Coupled with the Alternative 3 for Soil (Excavation and Engineered Soil Cap), this alternative meets applicable SCGs for the Site and will prevent future contaminated sediment from potentially migrating off site and entering the downstream waters.

8.3 Groundwater

The remedial technology recommended for groundwater is Alternative 2 (No Action, Continued Monitoring), since the contaminants in groundwater are low, the groundwater will not be used as a potable water source, and the remedial action will also help remediate the groundwater to allow natural attenuation to be effective. This alternative is readily implementable with a low cost.

Tables

Table 1
Summary of Remedial Alternatives for Soil
250 South Washington Avenue
Staten Island, New York

Criteria	**Remedial Alternatives**		
	Alternative 1 - No Action	**Alternative 2 –Institutional Controls**	**Alternative 3 – Excavation and Engineered Soil Cap**
Threshold Criteria			
Overall Protectiveness of Public Health and the Environment	**Protection of Public Health** • Would not prevent ingestion/direct contact with contaminated soil. **Protection of the Environment** • Would not prevent migration of contaminants that would result in groundwater or surface water contamination. • Would not prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.	**Protection of Public Health** • Would prevent ingestion/direct contact with contaminated soil. **Protection of the Environment** • Would not prevent migration of contaminants that would result in groundwater or surface water contamination. • Would not prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.	**Protection of Public Health** • Would prevent ingestion/direct contact with contaminated soil. **Protection of the Environment** • Would prevent migration of contaminants that would result in groundwater or surface water contamination. • Would prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
Conformance with Standards, Criteria and Guidance (SCGs)	• Would not conform to the SCGs for soil	• Would not conform to the SCGs for soil	• Would conform to the SCGs for soil
Primary Balancing Criteria			
Long-Term Effectiveness and Permanence	• Not an effective or permanent alternative.	• Effective permanently and in the long term when combined with Alternate 3	• Effective permanently and in the long term
Reduction of Toxicity, Mobility or Volume of Contamination	• Would not reduce the toxicity, mobility or volume of contamination.	• Would not reduce the toxicity, mobility or volume of contamination.	• Would reduce the toxicity, mobility or volume of contamination.
Short-Term Impact and Effectiveness	• Would have short-term impacts to the currently exposed population, and will not effectively achieve the RAOs for soil.	• Effective in the short term when combined with Alternate 3	• Would have short-term impacts to the currently exposed population, but will effectively achieve the RAOs for soil sediments.
Implementability	• Easily implementable.	• Easily implementable	• Moderately implementable.
Cost Effectiveness	• No cost.	• Low cost.	• Moderate cost.
Land Use	•Does not impact current or anticipated use	• Does not impact current or anticipated use	• Does not impact current or anticipated use

Table 2
Summary of Remedial Alternatives for Sediment
250 South Washington Avenue
Staten Island, New York

Criteria	**Remedial Alternatives**			
	Alternative 1 - No Action	**Alternative 2 –Monitored Natural Attenuation**	**Alternative 3 –Focused Targeted Remediation**	**Alternative 4 – Remediation to 5 PPM**
<u>Threshold Criteria</u>				
Overall Protectiveness of Public Health and the Environment	**Protection of Public Health** • Would not prevent ingestion/direct contact with contaminated sediments. **Protection of the Environment** • Would not prevent migration of contaminants that would result in groundwater or surface water contamination. • Would not prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the terrestrial food chain.	**Protection of Public Health** • Would not prevent ingestion/direct contact with contaminated sediments. **Protection of the Environment** • Would not prevent migration of contaminants that would result in groundwater or surface water contamination. • Would not prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the terrestrial food chain.	**Protection of Public Health** • Would prevent ingestion/direct contact with contaminated sediments. **Protection of the Environment** • Would prevent migration of contaminants that would result in groundwater or surface water contamination. • Would prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the terrestrial food chain.	**Protection of Public Health** • Would prevent ingestion/direct contact with contaminated sediments. **Protection of the Environment** • Would prevent migration of contaminants that would result in groundwater or surface water contamination. • Would prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
Conformance with Standards, Criteria and Guidance (SCGs)	• Would not conform to the SCGs for sediments.	• Would not conform to the SCGs for sediments.	• Would conform to the SCGs for sediments.	• Would conform to the SCGs for sediments.
<u>Primary Balancing Criteria</u>				
Long-Term Effectiveness and Permanence	• Not an effective or permanent alternative.	• Effective in the long term.	• Effective in the long term and permanently.	• Effective in the long term and permanently.
Reduction of Toxicity, Mobility or Volume of Contamination	• Would not reduce the toxicity, mobility or volume of contamination.	• Would not reduce the toxicity, mobility or volume of contamination.	• Would reduce the toxicity, mobility or volume of contamination as the impacted sediment is being removed.	• Would reduce the toxicity, mobility or volume of contamination as the impacted sediment is being removed.
Short-Term Impact and Effectiveness	• Would have short-term impacts to the currently exposed population, and will not effectively achieve the RAOs for sediments.	• No short-term impacts and will not effectively achieve the RAOs for sediments.	• Would have short-term impacts and will effectively achieve the RAOs for sediments.	• Would have short-term impacts and will effectively achieve the RAOs for sediments.

Table 2
Summary of Remedial Alternatives for Sediment
250 South Washington Avenue
Staten Island, New York

Criteria	**Remedial Alternatives**			
	Alternative 1 - No Action	**Alternative 2 –Monitored Natural Attenuation**	**Alternative 3 –Focused Targeted Remediation**	**Alternative 4 – Remediation to 5 PPM**
Implementability	• Easily implementable.	• Easily implementable.	• Easily implementable.	• Difficult to implement.
Cost Effectiveness	• No cost.	• Low cost.	• Moderate cost.	• Significant and prohibitive.
Land Use	• Impact currently exposed population.	• Would not impact currently exposed population and limit the disturbance of the area.	• Limited impact to currently exposed population; no impact to current or anticipated land use.	• Significant impacts on currently exposed population.

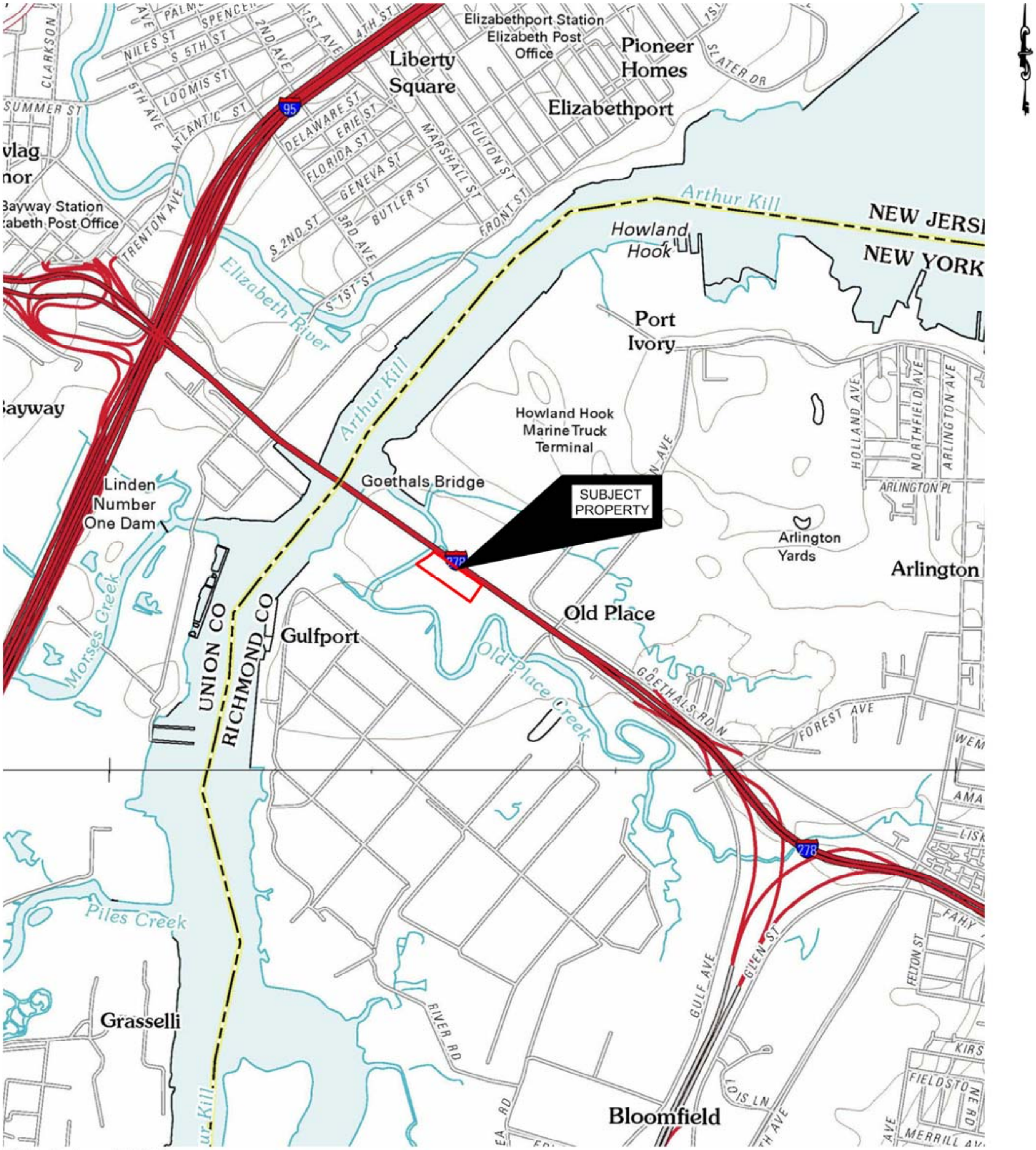
Table 3
Summary of Remedial Alternatives for Groundwater
250 South Washington Avenue
Staten Island, New York

Criteria	Remedial Alternatives		
	Alternative 1 - No Action	**Alternative 2 – No Action, Continued Monitoring**	**Alternative 3 –Pump and Treat**
<u>Threshold Criteria</u>			
Overall Protectiveness of Public Health and the Environment	**Protection of Public Health** • Would not prevent ingestion/direct contact with contaminated groundwater. **Protection of the Environment** • Would not prevent the discharge of contaminants to surface water	**Protection of Public Health** • Would prevent ingestion/direct contact with contaminated groundwater. **Protection of the Environment** • Would prevent the discharge of contaminants to surface water	**Protection of Public Health** • Would prevent ingestion/direct contact with contaminated groundwater. **Protection of the Environment** • Would prevent the discharge of contaminants to surface water.
Conformance with Standards, Criteria and Guidance (SCGs)	• Would not conform to the SCGs for groundwater	• Would conform to the SCGs for groundwater	• Would conform to the SCGs for groundwater
<u>Primary Balancing Criteria</u>			
Long-Term Effectiveness and Permanence	• Not an effective or permanent alternative.	• Effective in the long term.	• Effective in the long term.
Reduction of Toxicity, Mobility or Volume of Contamination	• Would not reduce the toxicity, mobility or volume of contamination.	• Would reduce the toxicity, mobility or volume of contamination.	• Would reduce the toxicity, mobility or volume of contamination.
Short-Term Impact and Effectiveness	• Would have short-term impacts to the currently exposed population, and will not effectively achieve the RAOs for groundwater.	• No short-term impacts to the currently exposed population, and will effectively achieve the RAOs for groundwater.	• No short-term impacts to the currently exposed population, and will effectively achieve the RAOs for groundwater if combined with other alternatives.
Implementability	• Easily implementable.	• Moderately implementable.	• Difficult to implement.
Cost Effectiveness	• No cost.	• Low cost.	• High cost.
Land Use	• Does not impact current or anticipated use	• Would not impact currently exposed population.	• Would require significant infrastructure and impact currently exposed population.

TABLE 4
ALTERNATIVE 3 AND 4
COST EVALUATION
250 North Washington Street
Staten Island, New York

ALTERNATIVE	SOIL	GROUNDWATER	SEDIMENT	TOTAL
Alternative 3	$418,000	$25,000	$110,000	$553,000
Alternative 4	$418,000	$25,000	$1,125,000	$1,568,000

Figures



SCALE: 1 : 24,000
PHOTO REVISED: 2011

0' 1000' 2000'

SCALE: 1"=2000'

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FIGURE 1 - SITE LOCATION MAP
U.S.G.S. TOPOGRAPHIC ARTHUR KILL & ELIZABETH, NJ QUADS
250 SOUTH WASHINGTON AVENUE
BLOCK 1885, LOT 35
STATEN ISLAND, NEW YORK

DATE: 7/9/13	JOB NO.: 08BR049	SCALE: 1" = 2000'

0' 60' 120'
SCALE: 1"=120'

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FIGURE 2
PROPERTY BOUNDARY MAP
250 SOUTH WASHINGTON AVENUE
BLOCK 1885, LOT 35
STATEN ISLAND, NEW YORK

DATE: 1/16/13	JOB NO.: 08BR049	SCALE: 1" = 120'

LEGEND

- ● C-1 – HOTSPOT SEDIMENT SAMPLE LOCATION
- – AREA OF SOIL EXCAVATION TO 1'
- – AREA OF SOIL EXCAVATION TO 18'
- – AREA OF FOCUSED/TARGETED SEDIMENT EXCAVATION 1' TO 3'
- —5— – PCB CONTOUR LINE IN ppm (PARTS PER MILLION)

0' 30' 60'
SCALE: 1"=60'

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FIGURE 3 - AREA OF PROPOSED SOIL AND SEDIMENT EXCAVATION UNDER ALTERNATIVE NO. 3
250 SOUTH WASHINGTON AVENUE
BLOCK 1885, LOT 35
STATEN ISLAND, NEW YORK

DATE: 8/2/13	JOB NO.: 08BR049	SCALE: 1" = 60'