SAW MILL CREEK

WETLAND MITIGATION BANK

Environmental Assessment

Project Location: Community District 2
Borough of Staten Island
Richmond County, New York

Lead Agency:

New York City Office of Management and Budget
255 Greenwich Street
New York, New York 10007

Lead Agency Contact:

Calvin Johnson
Assistant Director, Community Development Block Grant – Disaster Recovery

Applicant:

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

Prepared by:

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June 2015

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ENVIRONMENTAL REVIEW RECORD

Documentation of an Environmental Assessment for Projects/Activities Found at 24 C.F.R. Part 58.36, Which Are Subject to the Federal Laws and Authorities Found at 24 C.F.R. Part 58.5 and Other Requirements found at 24 C.F.R. Part 58.6

Project/Activity Information, Executive Summary, Determinations, and Certification:

Project Name: Saw Mill Creek Wetland Mitigation Bank

Project Location: Saw Mill Creek, Community District 2, Staten Island, New York

Project Funding Program: CDBG-DR

Project Loan or Grant Number: B13-MS-36-0001

Project Total Development Cost (provide best estimate): $14.5 Million

Project HUD assistance: $12 Million

Grant Recipient: New York City Office of Management and Budget
[24 C.F.R. Part 58(a)(5)]

Grant Recipient's Address: 255 Greenwich Street, 8th Floor, New York, NY 10007

Project Representative: Calvin Johnson, Assistant Director, Community Development Block Grant – Disaster Recovery, New York City Office of Management and Budget

Project Representative's Telephone Number: (212) 788-6024

Responsible Entity (RE) New York City Office of Management and Budget
[24 C.F.R. Part 58.2(a)(7)]

Certifying Official: Calvin Johnson
[24 C.F.R. Part 58.2(a)(2)]

Statement of Purpose and Need for the Proposed Action:
[40 C.F.R. Part 1508.9(b)]

Saw Mill Creek is located along Staten Island's West Shore which was subject to deep and severe flooding and inundation during Hurricane Sandy, with many locations sustaining more than 6 feet of water and inundation that pressed more than a mile inland from the coast (See **Figures 1-1 and 1-5** in the attached Environmental Assessment [EA]). The need for the proposed Saw Mill Creek Wetland Mitigation Bank (proposed project) is rooted in three major goals: (1) to provide a targeted investment on behalf of New York City to increase resiliency against storm events, flooding, and the effects of climate change and sea level rise; (2) to restore a significant ecological habitat in the New York Bight watershed; and (3) to streamline the process of mitigating authorized unavoidable impacts to wetlands and aquatic resources within a particular region

(1) **Coastal Resiliency**. *A Stronger and More Resilient New York*, the 2013 report released by the New York City Special Initiative for Rebuilding and Resiliency (SIRR) as a follow up to the effects of Superstorm Sandy, sets out coastal protection strategies, including enhancing wetlands to serve a protective role as buffers to inland areas. In the full suite of report recommendations, Saw Mill Creek is specifically identified as a wetland complex capable of retaining stormwater and minimizing upland inundation during storms and flooding. The implementation of the proposed project would directly contribute to providing coastal protection on the northwest shore of Staten Island. The City does not intend to return the marsh (nor the surrounding area) to pre-disaster conditions, but instead proposes to transform the Sandy-damaged marsh into a fully-functioning tidal wetland habitat with a forested buffer, thereby protecting both the marsh and impacted businesses and homes during future weather events, while also restoring an important natural resource that provides a multitude of additional benefits to the surrounding community. A fully functional tidal wetland would have sustained better during Sandy and provided better protection to those impacted businesses and homes on the northwest shore of Staten Island.

(2) **Wetland Restoration**. Saw Mill Creek is part of the Arthur Kill/Kill Van Kull complex which has been designated as a Significant Habitat Complex of the New York Bight Watershed by the U.S. Fish and Wildlife Service. The site is threatened by pervasive illegal dumping and its environmental conditions are currently degraded. Portions are covered by over ten feet of fill material and paved with asphalt, earthen berms have significantly impaired the site's tidal hydrology, and large areas of wetland and upland within the project area have been overrun by non-native, invasive vegetation that compromises the site's ecological functions. The proposed project would result in the restoration and enhancement of degraded wetland habitat within the Saw Mill Creek watershed, and the creation of a self-sustaining and heterogeneous natural aquatic ecosystem. It would restore tidal flow with new tidal creeks, provide the correct site topography to support the desired tidal marsh vegetation and features, and establish native vegetation and habitat, maximizing wetland functions and services for wildlife habitat, species diversity, and water quality improvement.

(3) **Wetland Mitigation Process**. The Bank would be established to compensate for unavoidable impacts to waters of the U.S (including wetlands) which result from activities authorized under Sections 404 and 401 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, New York State Environmental Conservation Law (ECL) Article 15, Title 5 (Protection of Waters/Stream Disturbance) and New York State ECL Article 25 (Tidal Wetlands) related to authorized projects within the Bank's Primary and Secondary Service Areas.

The Bank's ***Primary Service Area*** would include portions of the Lower Hudson River Basin, also known as Hydrologic Unit Code 06 (HUC06) 020301, that are within the New York City Municipal limits. This Primary Service Area includes portions of the following HUC08 subbasins: Lower Hudson River and Sandy Hook-Staten Island and excludes the HUC12 subwatershed region: Raritan Bay-Lower Bay Deep. The Primary Service Area includes the Boroughs of Staten Island and Manhattan and portions of the Boroughs of the Bronx, Brooklyn and Queens.

The Bank's ***Secondary Service Area*** would also include portions of Long Island Basin, also known as Hydrologic Unit Code 06 (HUC06) 020302, that are within the New York City Municipal limits. The Secondary Service Area includes portions of the following HUC08 subbasins: Bronx River, Long Island Sound, Northern Long Island and Southern Long Island,

and includes the HUC12 subwatershed region: Raritan Bay-Lower Bay Deep. The Secondary Service Area includes portions of the Boroughs of the Bronx, Brooklyn and Queens.

Currently, wetland impacts are mitigated by individual projects at sites on or near each project site, and/or through compensation to other planned projects related to aquatic resource restoration, creation, or enhancement. The existing process complicates permit approvals, creates uncertainty over the ability of the chosen mitigation to offset actual project impacts, and requires the dedication of permitting agency resources to post-construction monitoring on individual sites. The proposed Bank would standardize the application of mitigation measures through the implementation of a predictable and efficient credit system that would allow projects to mitigate for wetland impacts on the watershed level by supporting other projects in the region.

See Chapter 1, Project Description, of the attached Environmental Assessment (EA) for a more detailed discussion regarding the purpose and need for the proposed project.

Description of the Proposed Action:

(Include all contemplated actions which logically are either geographically or functionally a composite part of the project, regardless of the source of funding. [24 C.F.R. Part 58.32, 40 C.F.R. Part 1508.25])

The New York City Economic Development Corporation (EDC) has engaged in an initiative with the City and State of New York to protect and enhance the City's coastal resources. As part of the Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES) initiative, EDC is pursuing the first Mitigation Banking Instrument (MBI) in New York City as a means of facilitating both the long term improvement and protection of critical coastal resources, and providing a predictable, efficient and environmentally responsible process to serve the mitigation needs of permit applicants in the geographical service area.

The proposed Saw Mill Creek Wetland Mitigation Bank is located on the western shore of Staten Island in the Bloomfield area and within Community District 2. The Bank would be established within an approximately 68.94-acre site (project site) that is bisected by Chelsea Road (oriented north to south) into a western section and an eastern section.

Under the proposed project, the City would restore, enhance, and maintain 68.94 acres of emergent wetlands, scrub shrub wetlands, forested wetlands, open water channels/pools, mudflat habitat, and upland forests on the project site in accordance with the provisions of the MBI and regulatory permits. The proposed project aims to achieve its wetland restoration goals by removing urban fill, improving tidal hydrology exchange, reestablishing native plant species, controlling invasive species, increasing fish and wildlife habitat, and minimizing contamination risks. Specifically, site improvements and plantings include:

- Tidal Marsh Wetland Restoration (reestablishment) - converting filled uplands, including a defunct parking lot, to tidal marsh and tidal creeks (7.04 acres);
- Tidal Marsh Wetland Restoration (rehabilitation) - improving degraded wetlands by removing debris, fill and invasive species, restoring tidal flow and circulation, and planting native vegetation (16.72 acres);
- Forested and Tidal Wetland Enhancement -removing debris and invasive species from functioning wetlands and protecting them from future encroachment (35.23 acres); and
- Upland Buffer Rehabilitation - improving degraded upland forest buffers by removing debris and invasive species, planting native vegetation, and installing measures to discourage dumping in the area (9.95 acres).

The proposed Restoration Design Plan is illustrated in **Figure 2-12** of the attached EA. Construction of the proposed project would last approximately eight months, beginning in Fall 2015 and ending in Spring/Summer 2016.

See Chapter 1, Project Description, of the attached EA for more information.

Existing Conditions and Trends:

(Describe the existing conditions of the project area and its surroundings, and trends likely to continue in the absence of the project. [24 C.F.R. Part 58.40(a)])

The Bank would be developed on the 68.94-acre project site situated on the northwest shore of Staten Island. The project site consists mainly of undeveloped tidal marsh and upland areas with some areas of fill and development from adjoining parcels. The environmental conditions of the project site are currently degraded as the site has a history of being subject to pervasive illegal dumping.[1] Under existing conditions, the site is littered with waste and discarded debris, portions are covered by over ten feet of fill material and paved with asphalt, and earthen berms have significantly impaired the site's tidal hydrology. Large areas of wetland and upland within the project area have been overrun by non-native, invasive vegetation that compromises the site's ecological functions. The dominance of *Phragmites* throughout portions of the site has created a monoculture of habitat, limiting habitat and wildlife species diversity. *Phragmites* has replaced native plant species and its dense cover has adversely affected hydrology and the use of open water and marsh surface by aquatic species.

The project site comprises 11 city-owned parcels and is largely mapped within the jurisdiction of the New York City Department of Parks and Recreation (Parks Department). The portions of the project site that are not under Parks jurisdiction are zoned for manufacturing uses; specifically zoning districts M3-1 and M2-1. Additional zoning districts within the project area include M1-1 and C4-3.

The primary land use of parcels within the vicinity of the project site is depicted in **Figure 1-2** of the attached EA. The surrounding area is largely composed of open space, vacant land, and industrial land use. These uses buffer the site from proximate residential areas. The residential areas closest to the project site are generally located approximately 3,500 to the south, south of Meredith Avenue and east of Route 400 in the vicinity of Cannon Avenue and Victory Boulevard; and approximately 4,000 feet to the northeast in the vicinity of Signs Road and Victory Boulevard. Residential uses in these areas are predominantly single-family homes, with some two-family homes and a limited number of apartment buildings. Refer to Section 3.2.2, Land Use and Zoning, of the attached EA for a detailed description of the existing project area.

Absent the proposed project, a continuation of existing management and operations would be expected, where portions of the project site would be evaluated and receive ongoing, incremental restoration over time as funding permits. In the future without the proposed project, a comprehensive plan to restore and enhance the existing marshlands would not be implemented. Thus conditions generally would be similar to existing conditions, where wetland functions and wildlife habitat would continue to slowly degrade; invasive species and filled wetlands would likely remain; Hurricane Sandy storm surge-driven debris as well as historic debris would not be removed expeditiously; potential subsurface contamination would be unlikely to be cleaned up; and

[1] The off-ramp from the West Shore Expressway/Route 440, running on the eastern and southern boundary of the project site, is a hot spot for the illegal dumping. According to correspondence from the Parks Department, garbage bags and construction debris appear on a regular basis, and dump trucks allegedly use diesel fuel to wash truck beds resulting in leaching into the project site.

the threat of illegal filling and dumping would persist. Absent the proposed project, the traditional wetland mitigation process (which can complicate permit approvals and requires the dedication of permitting agency resources to post-construction monitoring on individual sites) would continue and a viable compensatory wetland mitigation bank option that provides a predictable, efficient and environmentally responsible process would not be available to serve the mitigation needs of permit applicants in the geographical service area.

Based on correspondence with the New York City Department of City Planning Staten Island Borough office and the New York City Department of Transportation and a review of online resources, no planned or approved projects or initiatives that would be completed by the 2016 analysis year have been identified within the immediate project area (i.e. within the land use study area which includes the area within 400 feet of the project site boundary). Under the No Action Alternative, typical background growth will occur, but substantial new development is not expected to be constructed in the vicinity of the project.

Alternatives to the Proposed Action

Alternatives and Project Modifications Considered

[24 C.F.R. Part 58.40(e), 40 C.F.R. Part 1508.9]

(Identify and discuss all reasonable alternative courses of action that were considered and were not selected, such as alternative sites, designs, or other uses of the subject site(s). Describe the benefits and adverse impacts to the human environment of each alternative, in terms of environmental, economic, and design contexts, and the reasons for rejecting each alternative. Also, finally discuss the merits of the alternative selected.)

See Chapter 2, Project Alternatives, of the attached EA.

No Action Alternative

[24 C.F.R. Part 58.40(e)]

(Discuss the benefits and adverse impacts to the human environment of not implementing the no action alternative.)

See Chapter 2, Project Alternatives, of the attached EA.

Summary of Findings & Conclusions

(Briefly summarize all important findings and conclusions, discussing direct impacts, indirect impacts, and cumulative impacts.)

The proposed project would not result in significant adverse impacts, as discussed in Chapter 3, Affected Environment and Potential Environmental Impacts, of the attached EA.

Summary of Recommended Mitigation Measures

[24 C.F.R. Part 58.40(d), 40 C.F.R. Part 1508.20]

(Summarize the proposed mitigation measures identified and intended for implementation to eliminate or minimize adverse environmental impacts.)

Archaeological Resources
Documentary studies to evaluate the potential for archaeological resources on the project site recommended the preparation of a Phase IB archaeological testing protocol to assess the presence of archaeological resources during construction. A Programmatic Agreement (PA) was developed with an archaeological monitoring protocol among the U.S. Army Corps of Engineers (USACE), the New York State Office of Parks, Recreation and Historic Preservation's State Historic Preservation Office (SHPO), the New York City Landmarks Preservation Commission (LPC) and EDC. The implementation of the PA would ensure that if archaeological resources are encountered during the construction of the project, mitigation measures (such as further testing, data recovery, curation, etc.) would be implemented in coordination with the regulatory agencies.

Construction Best Management Practices
EDC will require the construction contractor to implement the following measures to minimize potential impacts during the construction of the proposed project:

- Soil Erosion and Sediment Control
  - Best management practices would be employed to ensure that erosion and delivery of sediment to Saw Mill Creek and the Arthur Kill and associated wetlands are prevented or minimized. These measures would include performing in-water work during periods of low tide, employing turbidity barriers to minimize migration of turbidity offsite, and re-stabilizing soils with plants after construction is completed.
  - A Stormwater Pollution Prevention Plan (SWPPP) and Soil Erosion and Sediment Control Plan was prepared and submitted to the New York State Department of Conservation (NYSDEC) as part of the State Pollutant Discharge Elimination System (SPDES) application process. Implementation of these control measures would minimize potential impacts.

- Noise
  - As required by the local noise code, the contractor would develop a Noise Mitigation Plan that would include source controls, path controls and receptor controls. These federal and local regulations also mandate that construction material be handled and transported so as not to create unnecessary noise, and limit construction activities to weekdays between the hours of 7 am and 6 pm, except for special circumstances.
  - After hour and weekend work requires a permit from the New York City Department of Buildings (DOB) and in certain instances, also requires that an Alternative Noise Mitigation Plan be filed with the New York City Department of Environmental Protection (DEP) (in addition to the noise mitigation plan for normal weekday hours).

- Air Quality
  - Potential air quality impacts would be minimized by the incorporation of construction best management practices (BMPs), and compliance with the New York City Air Pollution Control Code which regulates fugitive dust.
  - Appropriate dust control measures would be employed by the chosen contractor, including covering contaminated soil stockpiles with a minimum of 10-millimeter (or 2 layers of 6-millimeter) polyethylene sheeting, or an equivalent material.
  - The contractor would implement construction BMPs to minimize emissions, such as covering haul trucks/soil piles, watering exposed soil during dry weather and limiting idling on-site to five minutes or less in accordance with state law.[2] Equipment over 50

[2] http://www.dec.ny.g
http://www.nyc.gov/html/dep/pdf/ll77.pdfov/regs/4256.html

horsepower would be required to comply with New York City's requirements for emissions control equipment (diesel particulate filters on older or Tier 4-compliant equipment) and use ultra-low sulfur diesel.[3]

- Hazardous Materials
  - As outlined in the Wetland Restoration Plan, contaminated areas would be excavated and planted with native salt marsh species. Areas where clean soil horizons have not been discovered through sampling would be over-excavated in accordance with the approved Design Plan and provided with two feet of clean material.
  - All excavated soil and material would be taken from the site to a licensed disposal facility in accordance with all federal, state, and city laws and regulations governing the transportation and disposal of excavated soils and materials. Certified load tickets from the disposal facility for the material transported to it would be provided.
  - All excavated soils deemed contaminated would be segregated and stored separately from non-contaminated soil areas. Sampling and testing of the segregated excavated soils for Hazardous Waste Toxic Substances Control Act (TSCA) Toxicity Characteristics Leaching Procedure (TCLP) constituents would be implemented. Proper transportation and disposal of all contaminated soils with TCLP sampling results classifying soil as a TSCA regulated hazardous waste would be implemented. All other excavated soils would be handled and disposed of in accordance with 6 NYCRR Part 375 Environmental Remediation Programs.
  - Excavated material would be dewatered on site, stockpiled and allowed to dry before hauling to disposal site. Any wet material would be carted from site in trucks with watertight dump bodies that include tail gates with gaskets. A plan would be developed by the chosen contractor for handling of all excavated materials in wet areas during the time of excavation as portions of the site will be inundated twice daily with the tide cycles. Dewatering operations would be performed in accordance with applicable Federal and State laws, rules and regulations, the Specifications, and the direction of the contractor's project engineer.
  - As part of the project's construction, discarded and dumped items and project site-wide debris would be removed from the project site and properly disposed of at an off-site location, in accordance with all applicable city, state, and federal laws and regulations.
  - The approved Construction Health and Safety Pan (CHASP) would be implemented during the construction of the proposed project. Prior to the start of construction, after EDC choses a contractor through a competitive bidding process, the CHASP would be updated to include the names and contact information of the EDC construction manager, the Site Supervisor, the Site Health and Safety Officer, an alternate Site Health and Safety Officer, and the Emergency Response Coordinator. The CHASP would also include any additional/ incremental hazards if other general hazards, or a hazard specifically associated with a Principal Task are identified after a detailed construction sequence is determined. An exposure monitoring program would be included, as well as any Standard Operating Procedures implemented by the chosen contractor. A map of the project site—showing site boundaries, designated work zones, and points of entry and exit—would be included once construction drawings are finalized.

Conditions for Approval

(List all mitigation measures adopted by the responsible entity to eliminate or minimize adverse environmental impacts. These conditions must be included in project contracts or other relevant documents as requirements. [24 C.F.R. Part 58.40(d), 40 C.F.R. Part 1505.2(c)])

[3] http://www.nyc.gov/html/dep/pdf/ll77.pdf
http://www.nyc.gov/html/dep/pdf/air/ll77-amendment-2011.pdf

The following are conditions of approval for the proposed project:

- Acquire all required federal, state, and local permits before beginning construction and comply with permit conditions during construction;
- Conduct Phase IB monitoring/testing during (and in coordination with) construction in accordance with the Programmatic Agreement among the USACE, the SHPO, LPC and EDC (See Section 3.3.2 of the attached EA and **Appendix B**);
    - Approval of the Mitigation Banking Instrument (MBI) by the Interagency Review Team (IRT) which comprises the U.S. Army Corp of Engineers; the U.S. Environmental Protection Agency; the U.S. Fish and Wildlife Service; National Oceanic and Atmospheric Administration's National Marine Fisheries Service; the New York State Department of Environmental Conservation; and the New York Department of State. The MBI includes the means and methods to establish, monitor and maintain the site as well as long-term stewardship provisions.
- EDC will require the construction contractor to implement the following measures during the construction of the proposed project:
    - Compliance with the "Construction Best Management Practices" outlined above in the Summary of Recommended Mitigation Measures.
    - Compliance with City of New York stormwater management regulations and requirements for stormwater management controls, spill prevention and solid waste management, maintenance and inspections as detailed in the Stormwater Pollution Prevention Plan for Compliance with the NYSDEC General Permit GP-0-10-001 for Stormwater Dischargers from Construction Activities (April 2014) (See **Appendix D** for NYSDEC acknowledgment of coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity).

Additional Studies Performed

(Summarize and attach all special studies performed to support the environmental assessment analysis.)

See Chapter 3, Affected Environment and Potential Environmental Impacts, of the attached EA.

Finding:
[24 CFR Part 58.40(g)]

X Finding of No Significant Impact
(The project will not result in a significant impact on the quality of the human environment)

___ Finding of Significant Impact
(The project may significantly affect the quality of the human environment)

Environmental Review Preparer's Information:

Environmental Preparer's name, title, and organization (printed or typed):

Niek Veraart, ASLA, AICP, Vice President, Louis Berger Group, Inc.

Environmental Preparer's signature: _____

Date: June 23, 2015

Responsible Entity, Representative's Information/Certification:

Responsible Entity, Representative's name, title, and organization (printed or typed):

Calvin Johnson, Assistant Director, Community Development Block Grant – Disaster Recovery, New York City Office of Management and Budget

Responsible Entity, Representative's signature: _____

Date: 7/6/15

(For each listed statute, executive order (E.O.), or regulation, record the determinations made. Summarize all reviews and consultations completed as well as any applicable permits or approvals obtained. Attach supporting evidence that all required actions have been accomplished. Summarize any conditions or mitigation measures required. Then, state a determination of compliance or consistency.)

Compliance Factors: Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5	**Compliance Documentation**
Historic Preservation [36 CFR 800]	The proposed project is in compliance (See Section 3.3 Historic and Cultural Resources). A Phase IB Archaeological Survey will be completed during (and in coordination with) construction in accordance with the Programmatic Agreement among the U.S. Army Corps of Engineers, the SHPO, and EDC, with the LPC as a requested consulting party (See **Appendix B**).
Floodplain Management [24 CFR 55, Executive Order 11988]	The proposed project qualifies as an exception per 24 CFR Part 55.12(c)(3) because it restores and preserves the natural and beneficial functions of floodplains and wetlands (See Section 3.4.1). The 8-step process for activities in a floodplain does not apply and no further assessment is required.
Wetlands Protection [Executive Order 11990]	The proposed project qualifies as an exception per 24 CFR Part 55.12(c)(3) because it restores and preserves the natural and beneficial functions of floodplains and wetlands (See Section 3.4.1). The 8-step process for wetlands does not apply and no further assessment is required.
Coastal Zone Management Act [Sections 307(c),(d)]	The proposed project is in compliance (See Section 3.2 Land Use, Zoning and Public Policy). NYCDCP Waterfront and Open Space Division determined that the proposed project is consistent with WRP policies (January 8, 2014) and NYSDOS determined that the proposed project meets their general consistency concurrence criteria (March 10, 2014) (See **Appendix A** and **Figure 3-9** New York State Coastal Zone). No further assessment is required.
Sole Source Aquifers [40 CFR 149], SDWA (42 USC 201,300(f) et seq., and 21 USC 349	The proposed project is not located over, or immediately adjoining, a primary, principal or sole source aquifer,[4] and is therefore in compliance. No impacts would occur and no further assessment is required.
Endangered Species Act [50 CFR 402]	In a letter dated 2/10/15, the USACE determined that the proposed project would have "no effect" to federally listed threatened or endangered species; therefore the proposed project is in compliance (See Section 3.4.6 Wildlife and Special Status Species). No further assessment is required.

[4] NYSDEC EAF Mapper. Accessed 11 April 2015 at http://www.dec.ny.gov/eafmapper/

Compliance Factors: Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5	**Compliance Documentation**
Migratory Bird Treaty Act [50 CFR 10, 20, 21, Executive Order 13186]	The proposed project is in compliance (See Section 3.4.6 Wildlife and Special Status Species). No further assessment is required (see **Appendix D** for U.S. Fish & Wildlife Service correspondence).
Coastal Barrier Resources Act 16 U.S.C 3501-3510	The proposed project is not located with a Coastal Barrier Resource Area or buffer zone (See **Figure 3-10** Coastal Barrier Resources).[5] No impacts would occur and no further assessment is required.
Wild and Scenic Rivers Act [Sections 7 (b), (c)]	The proposed project is in compliance. The project site is not located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666.[6] No impacts would occur and no further assessment is required.
Air Quality [Clean Air Act, Sections 176 (c) and (d), and 40 CFR 6, 51, 93]	The proposed project is in compliance (See Section 3.1.10 Air Quality and 3.6.4 Construction Impacts - Air Quality and Noise). No further assessment is required.
Farmland Protection Policy Act [7 CFR 658]	The proposed project is in compliance. The project site does not contain soils classified as Prime per the US Department of Agriculture (USDA) soil classifications[7] (See **Appendix E**), and the proposed project would not involve the conversion of farmland to non-agricultural use. No further assessment is required.
Environmental Justice [Executive Order 12898]	The proposed project is in compliance (See Section 3.7 Environmental Justice). No further assessment is required.
HUD Environmental Standards	**Determinations and Compliance Documentation**
Noise Abatement and Control [24 CFR 51 B]	The proposed project is in compliance (See Section 3.1.12 Noise and 3.6.4 Construction Impacts - Air Quality and Noise). No further assessment is required.
Explosive and Flammable Operations [24 CFR 51C]	The proposed project qualifies as an exception per 24 CFR 51(c) because it does not involve new residential construction, conversion of non-residential buildings to residential use, rehabilitation of residential properties that increase the number of units, or restoration of abandoned properties to habitable condition. No further assessment is required.
Toxic Chemicals and Radioactive Materials	In a letter 1/14/15, the New York City Department of Environmental Protection approved the proposed project's

[5] U.S. Fish & Wildlife Service. Coastal Barrier Resources System polygons data set. Accessed March 2015 at: http://www.fws.gov/CBRA/Maps/Data_Disclaimer_Shapefiles.html.
[6] NYSDEC EAF Mapper. Accessed April 2015 at: http://www.dec.ny.gov/eafmapper/
[7] United State Department of Agriculture Natural Resources Conservation Service. Custom Soil Report for Richmond County, New York, Saw Mill Creek Wetland Mitigation Bank. Accessed April 2015 at: http://websoilsurvey.sc.egov.usda.gov/WssProduct/3341s0emqkczxjdbvzoruawx/DL_00000/20150411_14302802223_12_Soil_Report.pdf.

Compliance Factors: Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5	**Compliance Documentation**
[24 CFR 58.5(i); HUD Notice 79-33]	remediation plan and Construction Health and Safety Plan (CHASP) (See Section 3.5 Hazardous Materials). The proposed project is in compliance and no further assessment is required.
Airport Clear Zones and Accident Potential Zones [24 CFR 51 D]	The proposed project is in compliance because it is not located within 2,500 feet of the end of a civil airport runway or 8,000 feet of the end of a military airfield runway. The airport closest to the project site, Linden Airport, is more than 12,000 feet (2.4 miles) from the site (see **Figure 3-11** Airport Clear Zones). No further assessment is required.
Magnuson-Stevens Fishery Conservation and Management Act [16 USC 1801 et seq]	The proposed project is in compliance (See Section 3.4.6 Wildlife and Special Status Species). No further assessment is required.
Fish and Wildlife Coordination Act [16 USC 661-666c]	The proposed project is in compliance (See Section 3.4.6 Wildlife and Special Status Species). No further assessment is required.
Agriculture and Markets Law [Title 1 NYCRR Section 139.2]	The project site, or any portion of it, is not located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304.[8] No impacts would occur and no further assessment is required.

Environmental Assessment Checklist

[Environmental Review Guide HUD CPD 782, 24 CFR 58.40; Ref. 40 CFR 1508.8 &1508.27]

Evaluate the significance of the effects of the proposal on the character, features and resources of the project area. Enter relevant base data and verifiable source documentation to support the finding. Then enter the appropriate impact code from the following list to make a finding of impact.

Impact Codes: **(1)** No impact anticipated; **(2)** Potentially beneficial; **(3)** Potentially adverse; **(4)** Requires mitigation; **(5)** Requires project modification. Note names, dates of contact, telephone numbers and page references. Attach additional materials as needed.

Project Name.: Saw Mill Creek Wetland Mitigation Bank

Land Development	Code	Source or Documentation
Conformance with Comprehensive Plans and Zoning	2	See Section 3.2 Land Use, Zoning and Public Policy.

[8] NYSDEC EAF Mapper. Accessed April 2015 at: http://www.dec.ny.gov/eafmapper/

Compatibility and Urban Impact	1	See Section 3.1.5 Urban Design and Visual Resources.
Slope	1	See Section 3.4 Natural Resources.
Erosion	1	See Section 3.6 Construction Impacts.
Soil Suitability	1	See Section 3.4 Natural Resources.
Hazards and Nuisances including Site Safety	1	See Section 3.6 Construction Impacts.
Energy Consumption	1	See Section 3.1.8 Energy.
Noise - Contribution to Community Noise Levels	1	See Section 3.1.12 Noise.
Air Quality Effects of Ambient Air Quality on Project and Contribution to Community Pollution Levels	1	See Section 3.1.10 Air Quality.
Environmental Design Visual Quality - Coherence, Diversity, Compatible Use and Scale	1	See Sections 3.1.5 Urban Design and Visual Resources and 3.1.14 Neighborhood Character.
Socioeconomic	**Code**	**Source or Documentation**
Demographic Character Changes	1	See Section 3.1.1 Socioeconomic Conditions.
Displacement	1	See Section 3.1.1 Socioeconomic Conditions.
Employment and Income Patterns	1	See Section 3.1.1 Socioeconomic Conditions.
Community Facilities and Services	**Code**	**Source or Documentation**
Educational Facilities	1	See Section 3.1.2 Community Facilities and Services.
Commercial Facilities	1	See Section 3.1.1 Socioeconomic Conditions.
Health Care	1	See Section 3.1.2 Community Facilities and Services.
Social Services	1	See Section 3.1.2 Community Facilities and Services.
Solid Waste	1	See Section 3.1.7 Solid Waste and Sanitation Services.
Waste Water	1	See Section 3.1.6 Water and Sewer Infrastructure.
Stormwater	2	See Section 3.1.6 Water and Sewer Infrastructure and Section 3.4.8 Floodplains.
Water Supply	1	See Section 3.4 Natural Resources.
Public Safety - Police	1	See Section 3.1.2 Community Facilities and Services.
- Fire	1	See Section 3.1.2 Community Facilities and Services.
- Emergency Medical	1	See Section 3.1.2 Community Facilities and Services.
Open Space and Recreation - Open Space	2	See Section 3.1.3 Open Space.
- Recreation	1	See Section 3.1.3 Open Space.
- Cultural Facilities	1	See Section 3.3 Historic and Cultural Resources.
Transportation	1	See Section 3.1.9 Transportation.

Natural Features	Code	Source or Documentation
Water Resources	2	See Section 3.4.5 Wetlands and Open Water Areas.
Surface Water	2	See Section 3.4.3 Surface Water Hydrology.
Unique Natural Features and Agricultural Lands	1	For unique natural features, see Section 3.4.5 Wetlands and Open Water Areas. For agricultural lands, see Section 3.4.9.
Vegetation and Wildlife	2	See Section 3.4.4 Vegetation and Section 3.4.6 Wildlife and Special Status Species.
Other Factors	**Code**	**Source or Documentation**
Historical and Cultural Resources	1	See Section 3.3 Historic and Cultural Resources.
Coastal Zone Management	1	See Section 3.2.3 Public Policy.
Agriculture and Markets	1	The project site does not contain agricultural lands and is not located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304.[9]

Note:

The Responsible Entity must additionally document compliance with 24 CFR §58.6 in the ERR, particularly with the Flood Insurance requirements of the Flood Disaster Protection Act and the Buyer Disclosure requirements of the HUD Airport Runway Clear Zone/Clear Zone regulation at 24 CFR 51 Subpart D.

[9] NYSDEC EAF Mapper. Accessed April 2015 at: http://www.dec.ny.gov/eafmapper/

Compliance Checklist for 24 CFR §58.6, Other Requirements

Complete for all projects, including Exempt (§58.34), Categorically Excluded Subject to §58.5 [§58.35(a)], Categorically Excluded Not Subject to §58.5[§58.35(b)], and Projects Requiring Environmental Assessments (§58.36)

Project Name: Saw Mill Creek Wetland Mitigation Bank

§58.6(a) and (b) Flood Disaster Protection Act of 1973, as amended; National Flood Insurance Reform Act of 1994

Does the project involve new construction, major rehabilitation, minor rehabilitation, improvements, acquisition, management, new loans, loan refinancing or mortgage insurance?

☒ Yes ☐ No

If No, compliance with this section is complete.
If Yes, continue.

Is the project located in a FEMA identified Special Flood Hazard Area?

☒ Yes ☐ No

If No, compliance with this section is complete.
If Yes, continue.

Is the community participating in the National Flood Insurance Program (or has less than one year passed since FEMA notification of Special Flood Hazards)?

☒ Yes ☐ No

If Yes, Flood Insurance under the National Flood Insurance Program must be obtained. If HUD assistance is provided as a grant, insurance must be maintained for the economic life of the project and in the amount of the total project cost (or up to the maximum allowable coverage, whichever is less). If HUD assistance is provided as a loan, insurance must be maintained for the term and in the amount of the loan for the life of the property (or up to maximum allowable coverage, whichever is less). A copy of the flood insurance policy declaration must be kept on file in the ERR.
If No, Federal assistance may not be used in the Special Flood Hazards Area.

Source Document: Flood Insurance under the National Flood Insurance Program is not required as the new construction is not a building (residential or commercial) but rather, wetland restoration.[10]

[10] National Flood Insurance Program. Accessed on April 2015 at: https://www.floodsmart.gov/floodsmart/pages/about/when_insurance_is_required.jsp.

§58.6(c) Coastal Barrier Improvement Act, as amended by the Coastal Barriers Improvement Act of 1990 (16 U.S.C. 3501)

Does the project involve new construction, conversion of land uses, major rehabilitation of existing structure, or acquisition of undeveloped land?

☒ Yes ☐ No

If No, compliance with this section is complete.
If Yes, continue below.

Is the project located in a coastal barrier resource area?

☐ Yes ☒ No

If No, compliance with this section is complete.
If Yes, Federal assistance may not be used in such an area.

Source Document: According to the U.S. Fish & Wildlife Service, the proposed project is not located with a Coastal Barrier Resource Area or buffer zone. The nearest Coastal Barrier Resource Area to the project site is located in Jamaica Bay. See http://www.fws.gov/cbra/Maps/Locator/NY_Long_Island.pdf.

§58.6(d) Runway Clear Zones and Clear Zones [24 CFR §51.303(a) (3)]

Does the project involve the sale or purchase of existing property?

Yes ☐ No ☒

If No, compliance with this section is complete.
If yes, continue below.

Is the project located within 2,500 feet of the end of a civil airport runway (Civil Airport's Runway Clear Zone) or within 15,000 feet of the end of a military runway (Military Airfield's Clear Zone)?

Yes ☐ No ☒

If No, compliance with this section is complete.
If Yes, If yes, the responsible entity must advise the buyer that the property is in a runway clear zone or clear zone, what the implications of such a location are, and that there is a possibility that the property may, at a later date, be acquired by the airport operator. The buyer must sign a statement acknowledging receipt of this information and be maintained in this ERR. For the appropriate content, go to: http://www.hud.gov/offices/cpd/environment/review/qa/airporthazards.pdf.

Source Document:

Attachments:

List of Sources, Agencies, and Persons Consulted

[40 C.F.R. Part 1508.9(b)]

(List and attach all evidence of inquiries and responses received at all stages of consultation and analysis.)

Sources:

Sawmill Creek Wetland Mitigation Bank Environmental Assessment, consisting of the following sections:

CHAPTER 1: PROJECT DESCRIPTION
CHAPTER 2: PROJECT ALTERNATIVES
CHAPTER 3: AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL IMPACTS
- 3.1 Environmental Issues Considered and Dismissed
  - 3.1.1 Socioeconomic Conditions
  - 3.1.2 Community Facilities and Services
  - 3.1.3 Open Space
  - 3.1.4 Shadows
  - 3.1.5 Urban Design and Visual Resources
  - 3.1.6 Water and Sewer Infrastructure
  - 3.1.7 Solid Waste and Sanitation Services
  - 3.1.8 Energy
  - 3.1.9 Transportation
  - 3.1.10 Air Quality
  - 3.1.11 Greenhouse Gas Emissions and Climate Change
  - 3.1.12 Noise
  - 3.1.13 Public Health
  - 3.1.14 Neighborhood Character
- 3.2 Land Use, Zoning and Public Policy
- 3.3 Historic and Cultural Resources
- 3.4 Natural Resources
- 3.5 Hazardous Materials
- 3.6 Construction Impacts
- 3.7 Environmental Justice
- 3.8 Conclusion

CHAPTER 4: INDIRECT EFFECTS AND CUMULATIVE IMPACTS
- 4.1 Indirect Effects
- 42 Cumulative Impacts

Agencies and persons consulted:

Melissa Alvarez, National Marine Fisheries Service

John Cantilli, U.S. Environmental Protection Agency

Len Garcia-Duran, Borough Director, New York City Department of City Planning Staten Island Borough Office

Naomi Handell, U.S. Army Corps of Engineers, New York District Regulatory Branch – Eastern Section

Marit Larson, Director of Wetlands and Riparian Restoration, New York City Department of Parks and Recreation

Michael Marrella, Director of Waterfront and Open Space Planning, New York City Department of City Planning

John McLaughlin, Director of Ecological Services, New York City Department of Environmental Protection

New York State Department of Environmental Conservation, New York Natural Heritage Program - Information Services

Steve Papa, US Fish and Wildlife Service

Phillip Perazio, New York State Office of Parks, Recreation and Historic Preservation Division for Historic Preservation"

Naim Rasheed, Director of Traffic Planning, New York City Department of Transportation

Gina Santucci, Director of Environmental Review, New York City Landmark Preservation Commission

Eric Schrading, U.S. Fish & Wildlife Service

Maurice Winter, Deputy Director of Site Assessment, New York City Department of Environmental Protection

Steve Zahn, Natural Resources Supervisor, New York State Department of Environmental Conservation

Jeffrey Zappieri, Division of Coastal Resources Consistency Review Unit, New York State Department of State

Appendices:

(As required.)

Appendix A	Coastal Zone Consistency
Appendix B	Cultural Resources Programmatic Agreement
Appendix C	Construction Impacts Appendix
Appendix D	Agency Correspondence
Appendix E	Custom Soil Resource Report for Richmond County, New York, Saw Mill Creek Wetland Mitigation Bank
Appendix F	Combined Finding of No Significant Impact and Notice of Intent to Request Release of Funds
Appendix G	Authority to Use Grant Funds

CHAPTER 1: PROJECT DESCRIPTION

The City of New York (the City) is proposing to enter into a grant agreement with the U.S. Department of Housing and Urban Development (HUD) to disburse Community Development Block Grant-Disaster Recovery (CDBG-DR) Funds for the construction of the Saw Mill Creek Wetland Mitigation Bank ("proposed project") in the borough of Staten Island, New York. Refer to **Figure 1-1** for a project location map. The City of New York would be the grantee of the CDBG-DR grant, and CDBG-DR funding would be provided to the New York City Office of Management and Budget (OMB), which is serving as the responsible entity (RE) for complying with the National Environmental Policy Act (NEPA) and other federal environmental requirements on behalf of HUD per 24 CFR 58. The project is being proposed on behalf of the City of New York by the New York City Economic Development Corporation (EDC), and therefore is expected that the EDC would be the project administrator and the funding subrecipient.

1.1 Proposed Project

The New York City Economic Development Corporation (EDC) has engaged in an initiative with the City and State of New York to protect and enhance the City's coastal resources. As part of the Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES) initiative, EDC is pursuing the first Mitigation Banking Instrument (MBI) in New York City as a means of facilitating both the long-term improvement and protection of critical coastal resources, and providing a predictable, efficient and environmentally responsible process to mitigate wetland and aquatic habitat impacts resulting from the construction of public and private projects proposed for Manhattan's waterfronts on the Hudson River and East River, the East River waterfronts of the boroughs of Brooklyn and Queens, and the Upper New York Bay.

The proposed project entails the implementation of the preferred restoration design plan described in Section 2.3.2. Under the proposed project, the City would restore, enhance, and maintain 68.94 acres of emergent wetlands, scrub shrub wetlands, forested wetlands, open water channels/pools, mudflat habitat, and uplands on the project site in accordance with the provisions of the MBI and regulatory permits. The proposed project would remove urban fill, improve tidal hydrology exchange, reestablish native plant species, control invasive species, increase fish and wildlife habitat, and minimize contamination risks. The restored site would become a wetland mitigation bank where public agencies and private property owners with authorized wetland or aquatic habitats impacts[1] could purchase mitigation credits. Once constructed, the bank would be monitored and maintained by the

[1] Authorized wetland/ aquatic habitat impacts are those that have been identified through a U.S. Army Corps of Engineers (USACE) or New York State Department of Environmental Conservation (NYSDEC) permitting process; where permittees have met all applicable regulatory requirements including avoidance and minimization,

city (specifically by EDC, as project sponsor) to ensure the successful establishment of the proposed habitats. After closure of the bank, the site would be maintained in perpetuity by the New York City Department of Parks and Recreation (Parks Department or NYCDPR) as the long-term steward (see Section 1.4 Overview of Wetland Mitigation Bank Operations). Construction of the proposed project would last approximately eight months, beginning in Fall 2015 and ending in Spring/Summer 2016.

1.1.1 Habitat Restoration Program

The proposed project would result in the restoration and enhancement of degraded habitat within the Saw Mill Creek watershed, and the creation of a self-sustaining natural aquatic ecosystem. As detailed in Section 2.3.2, the intent of the habitat restoration program is to restore and maintain targeted tidal hydrology by restoring tidal flow with new tidal creeks. The restoration design would also provide the correct site topography to support the desired tidal marsh vegetation and features. Once appropriate tidal hydrology and topography are established on the site, the next objective is to establish native vegetation and habitat. To encourage native plants, an invasive species control plan would be implemented, followed by the planting of native saltmarsh species. In addition to the proposed plantings, additional native species, such as salt marsh fleabane (*Pluchea odorata, P. purpurescens)*, are anticipated to colonize the site. The growth of these native species would be encouraged while the growth of invasive species, such as *Phragmites australis* (common reed), would be discouraged by establishing a more natural tidal hydrology as well as by the select (and limited) application of a USEPA-approved herbicide, administered consistent with any required approvals.

The final objective for the restoration design is to maximize wetland functions and services, particularly for wildlife habitat and water quality improvement. The site's location designates it as part of the Atlantic Flyway, which provides a crucial stopover site for birds during their southbound migration in late summer and fall. It also serves as an oasis for wildlife in a predominantly urban watershed, offering natural habitat in a watershed limited with such resources. The dominance of *Phragmites* throughout portions of the site has created a monoculture of habitat, which limits habitat and decreases wildlife species diversity. *Phragmites* has replaced native plant species and its dense cover has adversely affected hydrology and the use of open water and marsh surface by aquatic species. By restoring the marsh to contain heterogeneity of habitats, wildlife species diversity would improve. Avian species, in particular, are found to be attracted to a variety of habitats in comparison to a single habitat type. The combination of mud flat, open water, low marsh, high marsh, scrub-shrub marsh, and forests proposed for the site would provide the diversity of habitat types needed to support a variety of wildlife species, whether on a migratory stopover or as a resident. Restoring tidal flow allows fish, shellfish, and aquatic invertebrate species to use the tidal channels and provides valuable foraging opportunities for bird species along mudflats during low tide.

1.2 Project Site

The proposed project would be located on the western shore of Staten Island in the Bloomfield area, within Community District 2. The 68.94-acre project site is bisected by Chelsea Road (oriented north to south) into a western section and an eastern section. The western section of the project site is generally bounded by railroad tracks to the west, a Williams-Transco underground natural gas pipeline valve house access road to the north, Chelsea Road and privately-owned parcels to the east and by Saw Mill Creek to the south. The eastern section of the project site is bounded by open tidal marsh to the east, followed by Route 440 (West Shore Expressway). The southern boundary consists of Chelsea Road and an off-ramp from Route 440 to Chelsea Road. Beyond Chelsea Road is a self-storage facility and beyond the off-ramp is wooded land. The northern boundary comprises Edward Curry Avenue and its right-of-way, beyond which is Flagstone Landscape and Garden Supply, Faztec Industries (an apparent recycling and materials business), a sportsmen's club, and an office building. Chelsea Road and Chelsea Playground (400 Chelsea Road), Island Charter (380 Chelsea Road; a bus rental company), private parking lots and Cambridge Paving Stones storage comprise the western boundary (of the eastern section of the project site; see **Figure 1-2**.

The project site comprises portions of 11 city-owned parcels. Portions of the site are mapped within the jurisdiction of the Parks Department (see **Figure 1-3** for e tax block and lot map that includes the jurisdiction of each parcel).

As discussed in greater detail in Section 2.3.2 Proposed Project: Restoration Design Plan, the project site consists mainly of undeveloped tidal marsh and upland areas with some areas of fill and development. In its current state, approximately ten percent of the site contains uplands (including a defunct parking lot), 24 percent of the site is covered by degraded wetlands, 14 percent of the site includes degraded upland forest buffer, and 51 percent of the site contains functioning forested and tidal wetlands that are threatened by invasive species and debris. See **Figures 1-4b and 1-4c** for photographs of the project site (**Figure 1-4a** is the key map for the photographs).

Much of the Saw Mill Creek project area was originally tidal salt marsh, but the topography of the area has been significantly altered over the past century by human activities such as wetland ditching and filling. The environmental conditions of the project area have been degraded as a result of these and other human activities, including residential and industrial development, introduction and spread of invasive species (e.g. common reed, poison ivy, and Japanese knotweed) and obstructions of surface water movement.

1.3 Project Purpose and Need

The primary purpose of the proposed project is to provide mitigation for authorized unavoidable impacts to waters of the U.S (including wetlands) which result from activities authorized under Sections 404 and 401 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, New York State Environmental Conservation Law (ECL) Article 15, Title 5 (Protection of Waters/Stream Disturbance) and New York State ECL Article 25 (Tidal

Wetlands). The need for the proposed project is rooted in three major goals: to provide a targeted investment on behalf of New York City to increase resiliency against storm events, flooding, and the effects of climate change and sea level rise; to restore a significant ecological habitat in the New York Bight watershed; and to streamline the process of mitigating impacts to wetlands and aquatic resources within a particular region. Each goal is described more specifically below.

1.3.1 Coastal Resiliency

Saw Mill Creek is located along Staten Island's West Shore which was subject to deep and severe flooding and inundation during Superstorm Sandy, with many locations sustaining more than 6 feet of water and inundation that pressed more than a mile inland from the coast (**Figure 1-5**). *A Stronger and More Resilient New York*, the 2013 report released by the New York City Special Initiative for Rebuilding and Resiliency (SIRR) as a follow up to the effects of Superstorm Sandy, stated that "the City believes that it must bulk up its defenses, improving the coastline with protective measures. This will not eliminate all flooding from all conceivable storms—an impossible goal—but mitigate the effects of sea level rise where the risk is greatest and reduce the effects of storm waves and storm flooding significantly." [2] The report sets out coastal protection strategies, including enhancing wetlands to serve a protective role as buffers to inland areas. In the full suite of report recommendations, Saw Mill Creek is specifically identified as a wetland complex capable of retaining stormwater and minimizing upland inundation during storms and flooding. The implementation of the proposed project would directly contribute to providing coastal protection in this area of western Staten Island.

In October 2014, Mayor Bill de Blasio announced targeted resiliency and infrastructure investments to support businesses and jobs in neighborhoods impacted by Superstorm Sandy, including a host of major new investments in neighborhoods that include the Rockaways, Staten Island, Coney Island, and Hunts Point. These investments are components of the federal disaster aid that has been allocated by HUD through the Community Development Block Grant – Disaster Recovery (CDBG-DR) program. The proposed project is identified in New York City's CDBG-DR Action Plan (Amendment 8B, December 19, 2014) as an important component to protect businesses and residents on the West Shore of Staten Island from future storm-related flooding by providing a buffer of functioning wetlands between Arthur Kill and developed areas to the east of the project site.[3] More than 200 businesses are located within one half mile of the Saw Mill Creek marsh while over 20,000 residents live in the areas immediately north and east of the marsh; all within the 100-year floodplain. The proposed wetland restoration and resultant

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[2] *A Stronger and More Resilient New York*, page 65. The New York City Special Initiative for Rebuilding and Resiliency. June 11, 2013.

[3] *The City of New York Action Plan Amendments 8A and 8B (Substantial Amendments) for CDBG-DR Funds, Disaster Relief Appropriations Act of 2013 (P.L. 113-2)*, December 19, 2014.

wetland mitigation bank would improve flood attenuation and allow for more effective absorption of storm surge inundations, thus helping to protect critical coastal resources and upland areas against the harmful impacts of storm related flooding, climate change and sea level rise.

Ultimately the City does not intend to return the marsh (or the surrounding area) to pre-disaster conditions, but instead proposes to transform the Sandy-damaged marsh into a fully-functioning tidal wetland, thereby protecting both the marsh and impacted businesses and homes during future weather events, while also restoring an important natural resource that provides a multitude of additional benefits to the surrounding community. This approach is consistent with HUD's encouragement of the use of CDBG-DR Funds to execute activities that not only address disaster-related impacts, but also leave communities sustainably positioned to meet the needs of their post-disaster populations and to further prospects for growth (i.e., for resiliency initiatives). Beyond addressing the localized, direct impacts to individual homes and businesses, which the City is doing with existing programs like Build it Back and the Superstorm Sandy Business Loan and Grant Program, the City feels that it is critical to protect its investment of federal and state dollars by preventing future storms from enacting the same toll on these same homes and businesses. A fully functional tidal wetland would have sustained storm impacts better during Sandy and provided improved protection to those impacted businesses and homes on the northwest shore of Staten Island. Furthermore, this resiliency approach is supported by the *Hurricane Sandy Rebuilding Task Force's Rebuilding Strategy*:

> "Communities at increasing risk from coastal storms can use green infrastructure approaches that restore degraded or lost natural systems (e.g., wetlands and sand dunes ecosystems) and other shoreline areas to enhance storm protection and reap the many benefits that are provided by these systems. There is also quantitative evidence supporting the importance of protecting intact systems where they exist because these systems may provide some wave attenuation capability, particularly in low-energy storm surges. Protecting, retaining, and enhancing these natural defenses should be considered as part of any coastal resilience strategy."[4]

1.3.2 Wetland Restoration

Saw Mill Creek is part of the Arthur Kill/Kill Van Kull complex which has been designated as a Significant Habitat Complex of the New York Bight Watershed by the U.S. Fish and Wildlife Service (USFWS),[5] however the environmental conditions of the project site are currently degraded. Portions of the site are covered by over ten feet of fill material and

[4] Hurricane Sandy Task Force. *Hurricane Sandy Rebuilding Strategy, Stronger Communities, A Resilient Region*. August 2013.

[5] United States Fish and Wildlife Service. Significant habitats and habitat complexes of the New York Bight. 1997. Southern New England New York Bight Coastal Ecosystems Program, Charlestown, RI. http://library.fws.gov/pubs5/begin.htm

paved with asphalt, and earthen berms have significantly impaired the site's tidal hydrology. Large areas of wetland and upland within the project area have been overrun by non-native, invasive vegetation that compromises the site's ecological functions. The project site in its existing condition is threatened by pervasive illegal dumping. The off-ramp from the West Shore Expressway/Route 440, running on the eastern and southern boundary of the project site, is a hot spot for the illegal dumping. Garbage bags and construction debris appear on a regular basis. By including and enhancing these wetlands as part of a mitigation bank, and protecting the site with fencing, signage, and regular inspections, the threat of illegal filling and dumping would be minimized.

1.3.3 Wetland Mitigation Process

The proposed project includes the establishment of a mitigation bank to compensate for wetland and other aquatic resource losses related to authorized projects within the bank's Primary and Secondary Service Areas, as defined below. Currently, wetland impacts in New York City are mitigated by individual projects at sites on or near each project site, and/or through compensation to other planned projects related to aquatic resource restoration, creation, or enhancement. The existing process creates uncertainty over the ability of the chosen mitigation to offset actual project impacts, and requires the dedication of permitting agency resources to post-construction monitoring on individual sites. The mitigation bank would standardize the application of mitigation measures through the implementation of a predictable and efficient credit system that would allow projects to mitigate for wetland impacts on the watershed level by supporting other projects in the region. Unlike traditional compensatory mitigation, the bank would be required to be actively maintained and monitored for several years and meet specific project milestones and ecological performance measures prior to the release of credits. As supported by U.S. Army Corp of Engineers (USACE) compensatory mitigation regulations, mitigation banking provides a potentially more effective way to compensate for authorized wetland impacts through larger-scale restoration, up-front planning based on a watershed approach, established performance measures, dedicated funding for monitoring and maintenance, and a mechanism for long-term protection.[6]

The proposed project would provide a predictable, efficient and environmentally responsible process to serve the mitigation needs of wetland permit applicants in specific geographical service areas. Within the Primary Service Area, the bank would be the preference for providing mitigation for authorized impacts. Within the Secondary Service Area, decisions authorizing use of credits from the bank would be made by the USACE

[6] As noted in 40 CFR 230.93, General compensatory mitigation requirements, "In many cases, the environmentally preferable compensatory mitigation may be provided through mitigation banks or in-lieu fee programs because they usually involve consolidating compensatory mitigation projects where ecologically appropriate, consolidating resources, providing financial planning and scientific expertise (which often is not practical for permittee-responsible compensatory mitigation projects), reducing temporal losses of functions, and reducing uncertainty over project success."

and/or the New York State Department of Environmental Conservation (NYSDEC) on a case-by-case basis in accordance with applicable permit requirements. The Primary and Secondary Service areas are shown in **Figure 1-6** and described below:

- The bank's ***Primary Service Area*** would include portions of the Lower Hudson River Basin, also known as Hydrologic Unit Code[7] 06 (HUC06) 020301, that are within the New York City Municipal limits. This Primary Service Area includes portions of the following HUC08 subbasins: Lower Hudson River and Sandy Hook-Staten Island and excludes the HUC12 subwatershed region: Raritan Bay-Lower Bay Deep. The Primary Service Area includes the Boroughs of Staten Island and Manhattan and portions of the Boroughs of the Bronx, Brooklyn and Queens.
- The bank's ***Secondary Service Area*** would also include portions of Long Island Basin, also known as Hydrologic Unit Code 06 (HUC06) 020302, that are within the New York City Municipal limits. The Secondary Service Area includes portions of the following HUC08 subbasins: Bronx River, Long Island Sound, Northern Long Island and Southern Long Island, and includes the HUC12 subwatershed region: Raritan Bay-Lower Bay Deep. The Secondary Service Area includes portions of the Boroughs of the Bronx, Brooklyn and Queens.[8]

The Service Area boundaries are based on a watershed approach, and take into consideration the locations of ecologically unique and special waterfront areas, such as Jamaica Bay and the Long Island Sound, as well as areas within the Harbor that face acute challenges in finding suitable mitigation for permitted impacts. As such, the bank would be developed in a manner that contributes to the long-term ecological functioning of the Arthur Kill Drainage Basin, with an immediate goal of no net loss and a long-term goal of a net gain of the following wetlands functions and services:

- Improved water quality,
- Improved flood attenuation;

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[7] As per the USGS, the U.S. is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged or nested within each other, from the largest geographic area (regions) to the smallest geographic area (cataloging units). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system. The first level of classification divides the Nation into 21 major geographic areas, or regions; the second level of classification divides the 21 regions into 221 subregions; the third level of classification subdivides many of the subregions into accounting units; and the fourth level of classification is the cataloging unit, the smallest element in the hierarchy of hydrologic units that are sometimes called "watersheds." (Source: http://water.usgs.gov/GIS/huc.html.)

[8] The MBI specifies that a permit applicant in the Secondary Service Area can only use the bank if they have avoided and minimized wetland impacts and prove to the USACE and NYSDEC that there are no other viable mitigation options. Consequently, it is expected that the bank will only infrequently provide mitigation for projects in the secondary service area given that restoration opportunities are available in Jamaica Bay and Long Island Sound.

- Improved sediment quality,
- Increased plant diversity, and
- Increased wildlife species abundance and diversity.

1.4 Overview of Wetland Mitigation Bank Operations

The Saw Mill Creek Wetland Mitigation Bank pilot is being developed under the rules and regulations established under the Clean Water Act and the USACE and EPA's 2008 *Final Rule for Compensatory Mitigation for Losses of Aquatic Resources*.[9] As discussed above in Section 1.3.3, these regulations articulate a preference for mitigation banks over other forms of compensatory mitigation in several ways.[10] Unlike traditional compensatory mitigation, the bank would be required to be actively maintained and monitored for several years and meet specific project milestones and ecological performance measures prior to the release of credits. Mitigation banking provides another tool and a potentially more effective way to compensate for authorized impacts through larger-scale restoration, up-front planning based on a watershed approach, established performance measures, dedicated funding for monitoring and maintenance, and a mechanism for long-term protection.

A Wetland Mitigation Bank Prospectus is the initial step in the wetland mitigation bank process that formally initiates the planning and agency review process for a proposed wetland mitigation bank. The Prospectus serves as the basis for developing the Mitigation Banking Instrument (MBI), which describes the guidelines and responsibilities for the establishment, use, operation, and maintenance of the bank. The Saw Mill Creek Wetland Mitigation Bank Prospectus[11] was prepared in October 2013 and contained a substantial amount of information regarding the Saw Mill Creek site, including the ecological suitability and baseline conditions report and the conceptual restoration design plan. Following the public comment period for the Prospectus (November 14, 2013 to January 13, 2014), the USACE accepted the Prospectus on February 11, 2014.

Once constructed, the wetland mitigation bank would be operated in accordance with the monitoring and maintenance plan and bank closure provisions of the MBI, and the regulatory permits to be approved by USACE and the NYSDEC in consultation with the Interagency Review Team (IRT).[12] The MBI provides the means and methods to ensure that

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[9] Federal Register, Vol. 73, No. 70, April 10, 2008.

[10] See 40 CFR 230.93, General compensatory mitigation requirements.

[11] The Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES) Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank, *Prospectus*. Submitted to The Interagency Review Team, U.S. Army Corps of Engineers, Chair, by the New York City Economic Development Corporation, October 2013.

[12] The Interagency Review Team (IRT) for the proposed Saw Mill Creek Wetland Mitigation Bank includes the U.S. Army Corp of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, the New York State Department of Environmental Conservation and the New York Department of State.

the EDC, as the project sponsor, is responsible for the success of the bank establishment activities and goals. The success of the bank would be measured by performance standards approved by USACE and NYSDEC in consultation with the IRT, as set forth in USACE and NYSDEC permits and the MBI. The standards would define the conditions under which the bank would be judged successful and provide monitoring and maintenance requirements to identify any problems requiring corrective action or adaptive management. Maintenance efforts would be designed to ensure establishment of the target vegetation types, the prevention of invasive species encroachment, and maintenance of temporary goose control fencing to prevent plant eating wildlife until a dense vegetative cover has become established. The bank would be considered successful if the EDC demonstrates to USACE and NYSDEC that the appropriate areas have been restored and/or enhanced and the goals of the bank have been met. The USACE and NYSDEC, in consultation with the IRT, would confirm whether or not the tasks are successfully completed for purposes of releasing credits.

The bank would generate 18.64 credits. When compensatory mitigation credits are released, they would be available for purchase by public agencies and private property owners with permitted wetland impacts (i.e. impacts identified through a USACE or NYSDEC permitting process). The credits would be sold by the EDC to public agencies, private property owners, and any other permittees in the Service Area; provided that such entities have met all applicable regulatory requirements, including avoidance and minimization of wetland impacts, and that the use of credits has been authorized by the appropriate agencies. Use of credits would be established by the USACE and NYSDEC, in consultation with the IRT, in an executed MBI.

Revenues from the sale of credits would be dedicated to maintenance and stewardship to ensure the ecological success of the bank. The bank would be closed at the end of its operational life, which is (i) 5 years after the first full growing season after construction; or (ii) 90 days after the EDC (Bank Sponsor) has satisfied all federal and state permit requirements and conditions, including but not limited to, any monitoring period or invasive plant control; or (iii) 90 days after the last credit of the bank has been sold, unless extended; whichever comes later.

After bank closure, the Parks Department would continue to manage and maintain the bank in perpetuity and would act as the Long-Term Steward. A long-term stewardship fund would be established by the City to be used solely by the Parks Department to provide adequate funding for the operation, maintenance, and long-term management of the bank. The Parks Department would inspect the bank biannually for a period of five years; the requirements of this monitoring period would be described in an executed MBI.

1.5 Regulatory Approvals

The proposed project is seeking funding through the CDBG-DR program which requires a review of the proposed project in accordance with NEPA that is being conducted in this EA. CDBG funding would be provided to the New York City Office of Management and Budget

(OMB), which would be the responsible entity (RE) for complying with NEPA and other federal environmental requirements on behalf of HUD per 24 CFR 58.

The proposed project is being administered by EDC on behalf of New York City and would utilize City-owned property; therefore the proposed project is also subject to the City Environmental Quality Review (CEQR). The CEQR review is being conducted concurrently with the NEPA review, but in a separate document. Finally, the proposed project would also receive funding from the New York State Department of State (NYSDOS) and Empire State Development (ESD's) Regional Economic Development Council. As state entities, NYSDOS and ESD are responsible for evaluating their actions, including funding actions, in accordance with the New York State Environmental Quality Review Act (SEQRA). ESD is expected to adopt the findings of the CEQR environmental review under SEQRA.

The approval of the proposed project would require the approval of the MBI, which describes the mechanisms by which the wetland mitigation bank would be established and would function. The MBI must be signed by the IRT which comprises the USACE, the USEPA, the USFWS, National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), the NYSDEC and NYSDOS.

Other federal and state permits or approvals required for the proposed project include the following:

- Clean Water Act Section 404 Permit and River and Harbors Act Section 10 Permit from USACE.
- Clean Water Act Section 401 Water Quality Certification from NYSDEC
- NYSDEC Article 15 Protection of Waters/Stream Disturbance Permit
- NYSDEC Article 24 Freshwater Wetlands Permit
- NYSDEC Article 25 Tidal Wetlands Permit
- NYSDOS Coastal Zone Consistency Determination
- NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity

The review of the proposed project is being coordinated with Section 106 of the National Historic Preservation Act (NHPA) of 1966 since funding is being sought from HUD. Additional regulations that are applicable to the proposed project are discussed in the various technical sections of Chapter 3, Affected Environment and Potential Environmental Impacts (e.g. Sections 3.4.1 and 3.7.1provide the regulatory context for Natural Resources and Environmental Justice, respectively). As discussed in Section 3.4.1, the proposed project entails wetland restoration and as such, qualifies as an exception from the

Floodplain Management Executive Order (EO) 11988 and the Protection of Wetlands EO 11990 as per 24 CFR Part 55.12(c)(3).[13]

The construction of the proposed project would require a permit from the Parks Department for construction on Parks Department property. This and any other construction period approvals not listed here would be secured by the chosen contractor.

[13] According to 24 CFR Part 55.12(c)(3), a project may be excluded from floodplains and wetlands review if the project *restores and preserves the natural and beneficial functions of floodplains and wetlands*. As the central intent of the proposed project is wetland restoration, the proposed project qualifies as an exception as per 24 CFR Part 55.12(c)(3) and is not required to complete the floodplain or wetlands review processes established by EO 11988 and EO 11990.

CHAPTER 2: PROJECT ALTERNATIVES

In accordance with the implementing regulations of the National Environmental Policy Act (40 CFR Part 1508.9) and United States Department of Housing and Urban Development (HUD) implementing regulations, this Environmental Assessment must include a consideration of reasonable alternatives to the preferred or proposed project, including the No Action Alternative (see Chapter 1, Project Description).

This EA evaluates two alternatives: the No Action Alternative and the Action Alternative (the "proposed project"). The proposed project was selected following a rigorous site selection process from 2011 to 2012 that evaluated a series of potential locations (geographic alternatives) against site selection criteria, and consequently selected the Saw Mill Creek site as the preferred site. In addition, in 2013 and 2014 various design modifications were developed (design alternatives) for the proposed project, which were considered but dismissed from detailed analysis. This Chapter provides an overview of the No Action Alternative, the site selection process and resulting preferred site, and design alternatives considered and dismissed. Impacts associated with the No Action and Action Alternatives are further described in Chapter 3: Affected Environment and Potential Environmental Impacts.

2.1 No Action Alternative

It is assumed that the proposed Saw Mill Creek Wetland Mitigation Bank would not be constructed absent the receipt of U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant-Disaster Recovery (CDBG-DR) funding. The No Action Alternative is characterized as the continuation of existing management and operations, where portions of the project site would be expected to be evaluated and receive ongoing, incremental restoration over time as funding permits. Under the No Action Alternative, the comprehensive plan to restore and enhance the existing marshlands and forests that comprise the proposed project would not be implemented. Thus, conditions generally would be similar to the current scenario, where wetland functions and wildlife habitat would continue to degrade; invasive species and filled wetlands would likely remain; Superstorm Sandy storm surge-driven debris as well as historic debris would not be removed expeditiously; potential surface and subsurface contamination would be unlikely to be cleaned up; and the threat of illegal filling and dumping would persist.

Based on correspondence with the NYCDCP Staten Island Borough office and the New York City Department of Transportation (NYCDOT) and a review of online resources,[14] no

[14] Online resources include the NYCDCP's community portal online web tool (http://www.nyc.gov/html/dcp/html/neigh_info/si02_info.shtml) and the capital projects dashboard available on the NYCityMap online mapping application (http://maps.nyc.gov/doitt/nycitymap/).

planned or approved projects or initiatives that would be completed by the 2016 analysis year have been identified within the immediate project area (i.e. within the land use study area which includes the area within 400 feet of the project site boundary). Under the No Action Alternative, typical background growth will occur, but substantial new development is not expected to be constructed in the vicinity of the project.

The No Action Alternative would not transform the damaged marsh on the project site into a fully-functioning tidal wetland, nor provide the associated flood mitigation or coastal resiliency benefits. The environmental benefits of wetland and forest restoration and enhancement at the project site would not be realized under this alternative. The No Action Alternative would not result in restoration of the existing degraded, *Phragmites* dominated wetland complex, nor removal of existing fill on the site. The *Phragmites* monoculture would remain as relatively low quality habitat.

As discussed in Chapter 1, Project Description, public and private entities and agencies have an acute need for mitigation of anticipated impacts to waters and wetlands in the New York City area. Wetland mitigation is necessary to adhere to the no net loss of wetland functions and services provision. The No Action Alternative would not serve to meet the existing and projected demand for wetland mitigation or need for better mitigation options within New York City, therefore the No Action Alternative does not satisfy the project purpose and need.

2.2 Geographic alternatives

In late 2012 following Superstorm Sandy and early 2013, the Saw Mill Creek site was selected by EDC for the pilot New York City wetland mitigation bank project through an exhaustive consultation process with state agency representatives currently serving on the Interagency Review Team (IRT), as well as discussions with representatives from the New York City agencies that currently steward the City's open spaces. In advance of the start of the IRT process in May 2013, numerous pre-consultations occurred with EDC's partner City agencies. Conversations centered on identifying sites and assessing current conditions at these sites. The site selection process evaluated a series of potential locations (geographic alternatives) before selecting the Saw Mill Creek site as the proposed project site. Of high importance in the early review was screening sites for the likelihood of their being able to provide conditions to sustain the target ecological community as intended by restoration and rehabilitation. An evaluation of these geographic alternatives against the various site selection criteria is provided in Section 2.2.1 below.

2.2.1 Site Selection Criteria

Each site was evaluated for (1) its ability to serve the chosen service area, (2) site ownership and control, (3) the ecological suitability and services that would result from restoration, and (4) technical considerations. Each of these criteria used to screen out alternative sites is expanded on below.

2.2.1.1 Service Area

The Service Area for a given bank, pilot or otherwise, is varied and determined through a negotiated process with resource agencies. Considerations during the delineation of the primary and secondary Service Area for a proposed bank are the area's watershed boundaries, the ecological unit boundaries of surrounding hydrologic basins, and the existence of practical on-site regional mitigation alternatives.

The preeminence of location in guiding the site to be restored and serve as the mitigation bank is due to the role of "Service Area" as defined in Clean Water Act (CWA) 230 404(b)(1): "the geographic area within which impacts can be mitigated at a specific mitigation bank or an in-lieu fee program, as designated in [a mitigation bank] instrument." Most fundamentally, the location of the bank would determine whether sites likely requiring mitigation would have access to mitigation credits.

At the time that the Saw Mill Creek Wetland Mitigation Bank's Prospectus was being composed, the projects listed below in **Table 2-1** were identified as priority projects whose possible mitigation needs should be served by the bank's service area.

Table 2-1: Priority Projects with Potential Wetland Mitigation Needs

City Projects Requiring Mitigation	Waterway Geography
Hunters Point South	East River, Queens Side
Skyport Marina	East River, Manhattan Side
North Shore Marine Transfer Station	Upper East River, Queens
East 91st Street Marine Transfer Station	East River, Manhattan Side
Stormwater/outfall projects	Citywide
Staten Island Bluebelt	Arthur Kill and Raritan Bay, Staten Island
Ferry Landings	Citywide concentrated on East River
Newtown Creek Tidal Barrier	East River, Queens Side
Gowanus Canal Tidal Barrier	Upper New York Bay, Brooklyn Side
39th Street South Bulkhead Rehabilitation	East River, Manhattan Side
Manhattan Cruise Terminal Upgrade	Hudson River, Manhattan Side
St. George Ferry	Upper New York Bay, Staten Island
East Midtown Waterfront Esplanade	East River, Manhattan Side
Brooklyn Bridge Park, Piers 3 and 6	East River, Brooklyn Side

In order for credits created by a mitigation bank to be viable for these projects, the primary Service Area needed to cover all of Manhattan's waterfront, Queens and Brooklyn's East River waterfront, and Staten Island's waterfronts on the Upper New York Bay, the Arthur Kill and Kill van Kull, and Raritan Bay. The existing urban density near these waterfronts means that in most cases, permitted projects are required to find off-site mitigation, instead of mitigating on or near each project site.

In order to mitigate for projects in these areas, the primary service area of the proposed bank site would need to include the portions of the Lower Hudson River Basin, also known as Hydrologic Unit Code[15] 06 (HUC06) 020301, that are within the New York City Municipal limits (see primary service area **Figure 1-4**). Bank sites in closer proximity to the projects for which mitigation credits are required were preferred (e.g., closer proximity to potential impacts).

2.2.1.2 Site Ownership and Control

Site ownership and control were evaluated against six criteria, including the ability of EDC to maintain access and control over the site during construction, public ownership and jurisdictional control of the site, the identification of a long-term steward, and the threat of wetland degradation on-site, as well as how conducive historical and adjacent land uses are to establishing a wetland mitigation bank on site. These site ownership and criteria are discussed below.

a. ***Access and control during construction*.** EDC, acting on behalf of the City of New York, required a site where it was possible for EDC to have full access and control of the site during restoration and rehabilitation work and where post-construction access and control aligned with long-term stewardship requirements required by 40 CFR 230.98.

b. ***Public ownership.*** Given the existence of degraded wetlands already within City owned jurisdiction that need restoration, the acquisition of private wetlands for restoration and rehabilitation was ruled out from the beginning of the process.

c. ***Jurisdictional control.*** The specific jurisdictional control of these wetlands was a fundamental criterion in selecting a site. Currently, control and stewardship of more than 50 percent of publicly owned wetlands in New York City at the local level belongs to New York City Department of Parks and Recreation (NYCDPR or the Parks Department) and New York City Department of Environmental Protection (NYCDEP). The majority of the rest of the wetlands in public ownership are controlled at the State level by the New York State Department of Environmental Conservation (NYSDEC) and at the federal level by the United

[15] As per the USGS, the U.S. is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged or nested within each other, from the largest geographic area (regions) to the smallest geographic area (cataloging units). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system. The first level of classification divides the Nation into 21 major geographic areas, or regions; the second level of classification divides the 21 regions into 221 subregions; the third level of classification subdivides many of the subregions into accounting units; and the fourth level of classification is the cataloging unit, the smallest element in the hierarchy of hydrologic units that are sometimes called "watersheds." (Source: http://water.usgs.gov/GIS/huc.html.)

States National Parks Service (NPS). As one of the first steps in selecting a site for New York City's wetland mitigation bank pilot, the full list of sites was screened to select those with local ownership and access. This meant sites that involved State or Federal jurisdictional interests were determined to be less appropriate for the pilot project. Much of Jamaica Bay and Staten Island's South Shore are jurisdictionally complicated by their close proximity to areas under federal and State site ownership.

d. ***Long-term stewardship.*** Another fundamental criterion for screening appropriate sites early in the selection process was the establishment of the Long-Term Steward. The Long-Term Steward needed to be an entity guaranteed to be in a position to provide stewardship in perpetuity on City-owned land, since title to all parcels included in the bank property are required to be held by New York City and forever remain in New York City's name after the bank is established. This prioritized siting the mitigation bank on land under NYCDPR jurisdictional control, where NYCDPR would be able to serve formally as Long-Term Steward.

e. ***Threat of wetland degradation.*** Sites where wetlands on-site are being degraded or are under external pressure for degradation (e.g., from invasive species, illegal dumping or unauthorized activities) were prioritized. Where wetland losses have occurred previously, on what is now City-owned land, filling and or dumping were major contributors to the degradation of these sites. Critical in the selection of a site for restoration is the assurance that future dumping or filling, as well as trespassing during site restoration and beyond, can be prevented to the maximum extent practicable.

f. ***Historical and adjacent land uses***. Among the degraded sites appropriate for wetland restoration, site history and the history of surrounding land uses were important considerations for not only an appropriate restoration design, but protection from future wetland losses. This criteria considers whether historic site uses are conducive to the establishment of a wetland mitigation bank, the site and adjacent sites are consistent with local land use programs, and the zoning of site and adjacent sites is conducive to establishing a wetland mitigation bank.

2.2.1.3 Ecological suitability and services resultant from restoration

Each site was evaluated against criteria that measured the site's current ecological suitability for the establishment of a wetland mitigation bank, and potential future ecosystem services that would be provided by the site's restoration into a functioning wetland. The ecological services criteria are discussed below.

g. ***Existing ecosystem functions.*** Sites that currently offer some ecological function (e.g. fish or wildlife habitat or foraging areas) were preferred.

h. ***Connectivity to a large connected ecosystem.*** Sites that contribute to a connected ecosystem of wetland/upland natural areas were preferred.

i. ***Adjacency to surviving or thriving marsh.*** Sites where nearby wetlands are healthy and the cause of site degradation is understandable, it is more feasible to re-establish target salinity, hydrologic and vegetative conditions. Therefore, sites were preferred where adjacent areas appear to have the appropriate tidal elevation for salt marsh and are supporting healthy salt marsh vegetation communities.

j. ***Likelihood of success as a wetland mitigation bank.*** Sites were preferred which have a high likelihood of successfully changing the ecological community into a functioning wetland (e.g., nearby wetlands are healthy and the cause of degradation is understandable, so target salinity, hydrologic and vegetative conditions can be easily re-established). A major driver in the selection of a preferred site for the proposed wetland mitigation bank was extensive consultations with NYCDPR's Natural Resources Group (NRG), which is one of the City entities that spearheads restoration decision making in New York City. A top priority for NRG is a consideration of the ultimate long-term benefit of the restoration and rehabilitation actions.

k. ***Maintenance and Sustainability.*** Sites were preferred where ecology would require low-maintenance after wetland re-establishment (e.g., vegetation planted will be self-sustaining and not require constant maintenance).

l. ***Water Quality.*** Sites were preferred that would enhance the water quality of the watershed, considering the existing watershed, problems with baseline water quality, and water quality standards.

m. ***Groundwater.*** As with water quality, sites were preferred that would improve regional groundwater levels.

n. ***Buffers.*** Sites that were preferred have buffers from surrounding developed parcels and seclusion from human activity.

o. ***Maintenance and enhancement of habitat diversity.*** Sites were preferred that would maintain or enhance habitat diversity, including native plants, animals, essential fish habitat, significant natural communities, unique habitats, endangered, rare, or species of special concern.

In addition to these criteria, the Target Ecosystem Characteristics from the *Comprehensive Restoration Plan for the New York-New Jersey Harbor Estuary* (CRE Plan) were considered. The CRE Plan was developed as part of the Hudson-Raritan Estuary (HRE) Ecosystem Restoration Study by the U.S. Army Corps of Engineers - New York District and The Port Authority of New York & New Jersey in partnership with the New York-New Jersey Harbor & Estuary Program and many other federal, state and local resource agencies (originally

dated 2009 and subsequently updated in 2014). The Comprehensive Restoration Plan (CRP) for the HRE states that it "is a master plan to guide ecosystem restoration efforts throughout the estuary. It is intended to be used by all stakeholders, thus allowing the whole region to work towards a series of common restoration goals providing benefits to the estuary." This effort was initiated in 1988, when Congress recognized the New York-New Jersey Harbor as an estuary of national importance and accepted it into the National Estuary Program (NEP).

The CRP identifies 12 measurable objectives for restoration, termed Target Ecosystem Characteristics (TECs), each of which defines specific goals for an important ecosystem property or feature that is of ecological and/or societal value. The TECs reflect the broad interest of HRE stakeholders and address habitat and degradation issues. Each of the six (6) alternative sites was assessed in accordance with its ability to generally achieve the objectives in the TECs, which are intended to increase the sustainability and resiliency of the HRE.

The TECs seek to:

- *create and restore coastal and/or freshwater wetlands at a rate exceeding the annual loss or degradation, to produce a net gain in acreage;*
- *restore and protect roosting, nesting and foraging habitat for long-legged wading birds;*
- *create a linkage of forests accessible to avian migrants and dependent plant communities;*
- *establish sustainable oyster reefs at several locations; establish eelgrass beds at several locations in the HRE study area;*
- *create or restore shoreline and shallow sites with a vegetated riparian zone, an inter-tidal zone with a stable slope, and illuminated shallow water;*
- *create functionally related habitats for fish, crab and lobsters;*
- *reconnect and restore streams to the estuary to provide a range of quality habitats to aquatic organisms;*
- *improve water quality in all enclosed waterways and tidal creeks within the estuary to match or surpass the quality of their receiving waters;*
- *isolate or remove one or more sediment zone(s) that is contaminated;*
- *improve direct access to the water and create linkages to other recreational areas as well as provide increased opportunities for fishing, boating, swimming, hiking, education, or passive recreation; and*
- *protect ecologically valuable coastal lands through the HRE from future development through land acquisition.*[16]

[16] Hudson Raritan Estuary Comprehensive Restoration Plan. Volume II. Target Ecosystem Characteristics. Accessed on April 2014 at

2.2.1.4 Technical Considerations

Each site was evaluated against criteria that measured technical considerations which would impact the site's feasibility for establishment of a wetland mitigation bank. This process assessed criteria typical to wetland mitigation bank design, generally relating to physical characteristics (i.e. extent of restoration opportunities available on the site), chemical characteristics, biological characteristics, and coordination with the Federal Aviation Administration. The technical criteria are discussed below.

p. ***Size.*** Sites were preferred that are comparably larger than other sites, providing contiguous ecological benefits, and with adequate size to meet credit demand (e.g., meets economic threshold).

q. ***Permitting Feasibility.*** Sites were preferred where regulatory approvals and permits would be comparably more feasible than other sites.

r. ***Distance of bank site from airports***. Per the 1996 Federal Aviation Administration (FAA) Wetland Banking Mitigation Strategy (FAA Banking Strategy) and Advisory Circular 150/5200-33 *Hazardous Wildlife Attractants On or Near Airports*, the FAA recommends a separation distance of 10,000 feet for any potential hazardous wildlife attractant for airports that serve turbine-powered aircraft. The FAA Banking Strategy states that "to minimize wetland-related risk to aviation safety, FAA program offices and airport sponsors are strongly encouraged not to establish a bank or purchase credits from banks that are located within 5,000 feet of a runway that serves piston-powered aircraft; or 10,000 feet of a runway that serves turbine-powered aircraft." Sites were preferred that met the FAA separation distance. The location of each of the alternative sites in relationship to regional airports is depicted in **Figure 2-2**.

s. ***Salinity Conditions***. Sites were preferred that do not have low salinity that strongly favors invasive species.

t. ***Sediment Quality.*** Sites were preferred where fill material or potential hazardous materials/site contamination is typical of restoration and rehabilitation opportunities citywide, given the opportunity to remove contaminated sediments during the restoration.

u. ***Geology and Geomorphology.*** Sites were preferred where topography is conducive to the establishment of a wetland mitigation bank.

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http://www.nan.usace.army.mil/Missions/Navigation/NewYorkNewJerseyHarbor/HudsonRaritanEstuary.aspx.

v. ***Hydrology and Hydraulics.*** Sites were preferred with an existing water source, reliable hydrological sources or existing wetlands that would provide continuity with existing wetland resources.

w. ***Vulnerability and Risk Reduction.*** Sites were preferred that are vulnerable to inundation and therefore would benefit from the storm attenuating effects of healthy wetlands (e.g., sites that were significantly inundated during Superstorm Sandy or lie within the 100-year floodplain per the FEMA Preliminary FIRM maps). Sites were preferred that would restore an active, functioning floodplain in order to provide flood mitigation and risk reduction.

x. ***Project Cost.*** Sites were preferred that had lower approximate restoration costs per acre, in which total mitigation cost and credit cost would be comparably lower than other sites.

Other base technical criteria that were considered qualitatively when determining site selection were ease of implementation and the scale of restoration and rehabilitation opportunities. Tidal wetlands are often in less accessible parts of the city and are often bounded by water. Location can present technical implementation challenges concerning access for heavy machinery that is required to perform earthworks and remove fill material in a cost effective manner. When identifying the most appropriate location for the City's first pilot, access and keeping associated logistics simple was considered. In parallel with access for mobilized construction resources, was the question of what restoration opportunities represent a sufficient scale to meaningfully demonstrate the viability of mitigation banking.

2.2.2 Alternative Sites Considered but Eliminated

2.2.2.1 Brookfield

The Brookfield sites are located on the western shore of Staten Island in the Richmondtown area within Community District 2, approximately 0.5 miles east from the corner of Arthur Kill Road at Woodrow Road. Two adjacent degraded wetland sites were considered, approximately 7 and 115-acres each (122 acres total) that extend east to west along the shoreline of Richmond Creek (**Figure 2-4**). The sites are comprised of portions of 6 lots, including Block 2359, Lot 1; Block 4454, Lot 1; Block 4449, Lot 1; Block 5570, Lot 1; Block 5540, Lot 1; and Block 5559, Lot 1. They are bounded to the west by Richmond Avenue, to the east by Richmond Hill Road, to the south by the former Brookfield Landfill, and to the north by open space within La Tourette Park & Golf Course, paralleled by the La Tourette Park Greenway. The sites are also considered Forever Wild Sites, through an

initiative of the Parks Department to protect and preserve the most ecologically valuable lands within the five boroughs.[17]

The Brookfield sites are considered open space and vacant land, comprised mainly of undeveloped estuary/marine wetland, intertidal and high marsh within the Woodbridge Creek-Arthur Kill Watershed Area. A pond has been formed by the impoundment of water by two structures on site, which are the impediments, and a small hill. On one side of the hill, there is a small rock overflow. On the other side, a wooden dam limits drainage of the small upstream pond.[18] The Brookfield Landfill Remediation project is located directly south of the site.[19]

The site is identified in the *Hudson-Raritan Estuary Comprehensive Restoration Plan* as Site 195, "Richmond Creek," within the Arthur Kill/ Kill Van Kull Study Area. [20] Richmond Creek is tidally connected to the Arthur Kill. To establish a wetland mitigation bank on this site would require excavation by an average depth of four feet, marsh terracing and placement of clean fill.

SERVICE AREA

The Brookfield sites *met* the service area criteria for the following reasons:

Primary Service Area	Without an existing IRT approved primary and secondary Service Area for this location along the Arthur Kill, it is not possible to know definitively whether this site would have met the primary and secondary Service Area requirements of the City's pilot mitigation bank. However, the proximity of Brookfield to the existing agreed primary and secondary Service Area map for Saw Mill Creek infers that Brookfield's location along the Arthur Kill likely would have met the selection criterion of being able to provide compensatory mitigation to Manhattan, Queens, and Brooklyn's East River waterfront and Manhattan and Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay.
Watershed boundaries	The site is located in the Staten Island Woodbridge Creek-Arthur Kill Watershed (HUC-12), 020301040201.
Distance of bank site from credit demand	The site is located in close proximity to Manhattan, Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay. It is located in the same borough as the following City projects requiring mitigation: Staten Island

[17] NYC OASIS. Accessed on April 2015 at: http://www.oasisnyc.net/.
[18] Hudson-Raritan Estuary Comprehensive Restoration Plan. Richmond Creek. CRPID: 195. Accessed on April 2015 at: http://www.oasisnyc.net/crp/crpdetails.aspx?id=195.
[19] NYCDEP. Brookfield Landfill Remediation. Accessed on April 2015 at: http://www.nyc.gov/html/dep/html/dep_projects/cp_brookfield_landfill.shtml.
[20] Hudson-Raritan Estuary Comprehensive Restoration Plan. Richmond Creek. CRPID: 195. Accessed on April 2015 at: http://www.oasisnyc.net/crp/crpdetails.aspx?id=195.

Bluebelt and St. George Ferry (see Table 2-1).

SITE OWNERSHIP AND CONTROL

The Brookfield sites *met* the site ownership and control criteria for the following reasons:

Access and control during construction	EDC would have full access and control of the site during restoration and rehabilitation work, as access would be granted by NYCDPR, NYCDEP, and the New York City Department of Sanitation (NYCDOS).
Public ownership	All of the land within the proposed bank is owned by the City of New York.
Jurisdictional control	The entire Brookfield site is under NYCDEP management during landfill capping, maritime forest and grassland restoration and closure, with NYCDPR and NYCDOS as the property owners, including all adjacent wetlands.
Long-term stewardship	NYCDPR would serve as Long-Term Steward of the property, therefore post-construction access and control align with the long-term stewardship requirements required by 40 CFR 230.98.
Threat of wetland degradation	Wetlands on-site are degraded due to proximity to former surrounding uses and associated earth works that changed area topography.
Historical and adjacent land uses	The site has a history as being adjacent to a former construction and demolition dump, therefore it would benefit from removal of historic fill and debris through wetland restoration. Recent upland restoration improvements at the closed landfill would complement future wetland restoration efforts, and the remainder of adjacent land is considered open space, which would support the restored ecosystem. The site is zoned as parkland, with adjacent residential as well as sparse industrial and commercial zoning.

ECOLOGICAL SUITABILITY AND SERVICES RESULTANT FROM RESTORATION

The Brookfield sites *partially met* the ecological suitability criteria for the following reasons:

Ecological Criteria and Services

Existing ecosystem functions	The Brookfield site offers some ecological functions. It is considered open space and vacant land, comprised mainly of undeveloped estuary/marine wetland, intertidal and high marsh within the Staten Island East-Raritan Bay Watershed Area. A pond has been formed by the impoundment of water by two structures on site.
Connectivity to a large connected ecosystem	The site is part of and contributes to the larger wetland/upland complex that surrounds Richmond Creek. The restoration underway at Fresh Kills Park aligns Brookfield with a broader restoration initiative, however as this restoration is not yet complete, the role and function of a Brookfield mitigation bank is still to be determined.

Adjacency to surviving or thriving marsh	The site is adjacent to large areas of high and low marsh which make up the Richmond Creek ecosystem.
Likelihood of success	The site has a high likelihood of successfully changing the ecological community into a functional wetland. However, the existing community is already a wetland so ecological improvement to the site could only include wetland enhancement and wetland rehabilitation activities. As the improvements would not include wetland re-establishment (converting upland to wetland), the site would generate less wetland functional improvements and less mitigation credits than other locations.
Maintenance and Sustainability	The site would require continued maintenance as the adjacent marshes also contain invasive exotic plant species, which left untreated could recolonize the site.
Water Quality	The site does not include conversion of uplands to wetlands which would enhance water quality. As such, restoration of this site would provide a limited amount of enhancement to water quality of the watershed.
Groundwater	Restoration of the Brookfield site would have minimal effects on regional groundwater.
Buffers	The site has buffers from surrounding developed parcels and seclusion from human activity, but is adjacent to a closed landfill.
Maintenance and enhancement of habitat diversity	Restoration of the site should maintain and enhance habitat diversity of the northern reaches of Richmond Creek. This includes enhancement of native plants and animals, essential fish habitat and significant natural communities.

HRE Target Ecosystem Characteristics (TECs)

No HRE CRP project sheet is available for this site.

TECHNICAL CONSIDERATIONS

The Brookfield sites *met* the technical criteria for the following reasons:

Size	The 7 and 115 acre sites are together comparably larger than other sites, providing contiguous ecological benefits. The size is adequate to have met the credit demand (e.g., to have met the economic threshold).
Permitting Feasibility	Regulatory approvals and permits would be comparable to other sites.
Distance of bank site from airports	Distances from airports are as follows: John F. Kennedy: 101,000 ft.; LaGuardia: 104,500 ft.; Newark: 37,500 ft.; Teterboro: 102,000 ft.; Linden: 27,500 ft. Thus, the site met the FAA criteria that a bank is not within 5,000 feet of a runway that serves piston-powered aircraft or 10,000 feet of a runway that serves turbine-powered aircraft.
Salinity Conditions	The sites do not have low salinity that strongly favors invasive species.

Sediment Quality	Fill material or site contamination are typical of restoration and rehabilitation opportunities citywide.
Geology and Geomorphology	Sites are comprised mainly of undeveloped estuary/marine wetland, intertidal and high marsh and is conducive to the establishment of a wetland mitigation bank.
Hydrology and Hydraulics	The sites have an existing water source and existing wetlands that would support establishment of a wetland mitigation bank. They are comprised mainly of undeveloped estuary/marine wetland, intertidal and high marsh and encompasses portions of Richmond Creek.
Vulnerability and risk reduction	The sites are vulnerable to inundation as the majority of the site is located in a 100-year floodplain[21] and were inundated during Superstorm Sandy[22]. Restoration of the sites would improve stormwaer mitigation and coastal protection to provide flooding mitigation.
Cost	Approximate restoration cost per acre, total mitigation cost, and credit cost would be comparable to other sites.

2.2.2.2 Fresh Kills/Springville Creek

The Fresh Kills sites are located on the western shore of Staten Island in the New Springville area within Community District 2, and would be established within two sites, approximately 17 and 40-acres, respectively (57 acres total) that extend along the northern shoreline of Springville Creek (**Figure 2-6**). Both sites lie within the boundary of Fresh Kills Park. The eastern site encompasses portions of Block 2600, Lots 103 and 250, while the western portion of the site encompasses portions of Block 2600, Lots 1 and 75. The eastern site is bounded to the north by Travis Avenue, to the south by Alley Creek and Richmond Hill Road, to the west by open space and vacant land, and to the east by Richmond Avenue. The western site is bounded to the north by Travis Avenue, to the south and west by Springville Creek and to the east by open space and vacant land. Residential properties are located north of Travis Avenue, commercial properties are located east of Richmond Avenue, and transportation / utility property is located south of Springville Creek.[23]

The sites are considered open space and vacant land within the Arthur Kill Watershed. They are identified in the *Hudson-Raritan Estuary Comprehensive Restoration Plan* as Site 704, "Fresh Kills Landfill," within the Arthur Kill/ Kill Van Kull Study Area.[24] The sites include fresh or slightly brackish marsh, forested wetlands, salt marsh and mudflats. To

[21] FEMA. Preliminary Flood Hazard Area Maps, New York City. Issued December 2013.
[22] USGS. Sandy 3m Surge Inundation Data. 2013.
[23] NYC OASIS. Accessed on April 2015 at: http://www.oasisnyc.net/.
[24] Hudson-Raritan Estuary Comprehensive Restoration Plan. Fresh Kills Landfill. CRPID: 704. Accessed on April 2015 at: http://www.oasisnyc.net/crp/crpdetails.aspx?id=704.

establish a wetland mitigation bank on these sites would require excavation by an average depth of 3.5 feet and planting of native vegetation.

SERVICE AREA

The Fresh Kills sites *met* the service area criteria for the following reasons.

Primary Service Area	Without an existing IRT approved primary and secondary Service Area for this location along the Arthur Kill, it is not possible to know definitively whether this site would have met the primary and secondary Service Area requirements of the City's pilot mitigation bank. However, the proximity of Fresh Kills to the existing agreed upon primary and secondary Service Area map for Saw Mill Creek infers that Fresh Kills' location along the Arthur Kill likely would have met the selection criterion of being able to provide compensatory mitigation to Manhattan, Queens, and Brooklyn's East River waterfronts and Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay waterfronts
Watershed boundaries	The site is located in the Staten Island Woodbridge Creek-Arthur Kill Watershed (HUC-12), 020301040201.
Distance of bank site from credit demand	The site is located in close proximity to Manhattan, Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay. It is located in the same borough as the following City projects requiring mitigation: Staten Island Bluebelt and St. George Ferry (see Table 2-1).

SITE OWNERSHIP AND CONTROL

The Fresh Kills sites *met* the site ownership and control criteria for the following reasons.

Access and control during construction	EDC would have full access and control of the site during restoration and rehabilitation work, as access would be granted by NYCDPR.
Public ownership	All of the land within the proposed bank is owned by the City of New York.
Jurisdictional control	The area surrounding Springville Creek in Fresh Kills met these requirements as the entire site is under NYCDPR jurisdiction.
Long-term stewardship	Existing oversight puts NYCDPR in an ideal position to serves as Long-term Steward.
Threat of wetland degradation	Wetlands on-site are threatened by invasive *Phragmites*.
Adjacent land uses	The site is nearly surrounded by open space, which would support the restored ecosystem. The site is zoned as parkland, with adjacent residential zoning.

ECOLOGICAL SUITABILITY AND SERVICES RESULTANT FROM RESTORATION

The ecological suitability and resulting services of restoration as criteria are *partially met* at Fresh Kills for the following reasons.

Ecological Criteria and Services

Existing ecosystem functions	Some of the area surrounding the site is a closed landfill. There is also a proposed park in the area and breeding areas for a rare species of willet.
Connectivity to a large connected ecosystem	The site contributes to a connected ecosystem of wetland and upland natural habitat.
Adjacency to surviving or thriving marsh	There are several other marshes and wetlands in the area. However, the site is nearby a closed landfill and urban areas.
Likelihood of success	The site has a moderate likelihood of successfully changing the ecological community into a functioning wetland.
Maintenance and Sustainability	Site ecology would require low maintenance after wetland re-establishment.
Water Quality	The site would enhance the water quality of the watershed, considering existing watershed, problems with baseline water quality, and water quality standards.
Groundwater	The site would have little effect on regional groundwater.
Buffers	There is some upland forest habitat that would serve as a buffer from developed parcels. However, there is one area at the northern end of the site that is bordered by a roadway.
Maintenance and enhancement of habitat diversity	Site restoration would enhance diversity by eliminating *Phragmites* and supporting healthy salt marsh vegetation communities.

HRE Target Ecosystem Characteristics (TECs) - In accordance with HRE CRP (2014), this site was identified as CRP Site 704. The HRE CRP project sheet for Site 704, indicates that the following TECs could be restored at the site.

Coastal Wetlands	The master plan indicates opportunities for fresh, tidal and forested wetlands throughout the site. Additionally, the William T. Davis Wildlife Refuge lies within Fresh Kills Park. The restoration priority at these wetlands is *Phragmites* removal and re-planting with native species.
Coastal and Maritime Forests	Master plans include conceptual plans for restored meadow habitat and a million tree project planting.
Tributary Connections	The re-assessment of existing culvert capacity along Travis Avenue would facilitate hydrologic connectivity to the interior marsh and mitigate flooding along Travis Avenue.

Sediment contamination	The site would require potential dredging and capping of sediment based on sediment contamination testing.
Public Access	Master plans include creation of a world-class large scale park to include 6 public access structures fields such as education centers and picnic areas and paths throughout. However, public access (particularly small boat access) at or near William T. Davis Wildlife Refuge is not advisable due to extensive mudflats and stranding threat.

TECHNICAL CONSIDERATIONS

The Fresh Kills sites *partially met* the technical requirements for the following reasons:

Size	Fresh Kills Creek 1: 17 acres, Fresh Kills Creek 2: 40 acres. The site is comparably larger than other sites, providing contiguous ecological benefits. The size is adequate to have met the credit demand (e.g., to have met the economic threshold).
Permitting Feasibility	Regulatory approvals and permits would be comparable to other sites.
Distance of bank site from airports	Distances from airports are as follows: John F. Kennedy: 102,000 ft.; LaGuardia: 101,000 ft.; Newark: 28,000 ft.; Teterboro: 93,500 ft.; Linden: 21,500 ft. Thus, the site met the FAA criteria that a bank is not within 5,000 feet of a runway that serves piston-powered aircraft or 10,000 feet of a runway that serves turbine-powered aircraft.
Salinity Conditions	The site does not have a low salinity that strongly favors invasive species.
Sediment Quality	Sediments are potentially contaminated and may need to be removed or capped.
Geology and Geomorphology	The site was originally all tidal marsh before the landfill was put into place; the site still has some coastal wetlands so the site topography should be conducive to the establishment of a wetland mitigation bank.
Hydrology and hydraulics	The site has an existing water source, reliable hydrological sources, and existing wetlands for continuity with existing wetland resources.
Vulnerability and risk reduction	The site is vulnerable to inundation as it is located in a 100-year floodplain[25] and was inundated during Superstorm Sandy[26]. The site would restore an active functioning floodplain.
Stormwater management	The site would provide significant stormwater storage for flood mitigation.
Cost	The approximate restoration cost per acre, total mitigation cost, and credit cost would be comparable to other sites.

[25] FEMA. Preliminary Flood Hazard Area Maps, New York City. Issued December 2013.
[26] USGS. Sandy 3m Surge Inundation Data. 2013.

2.2.2.3 Oakwood Beach

The Oakwood Beach site is located on the eastern shore of Staten Island in the Oakwood Beach area just south of New Dorp Beach within Community District 3, approximately 0.2 miles south from the corner of Garibaldi Avenue at Cedar Grove Avenue, and would be established within an approximately 50-acre site within Great Kills Park (**Figure 2-7**). The site is comprised of several small lots and 8 major lots including Block 4160, Lots 59, 70 and 100; Block 4130, Lots 1, 70 and 200; Block 4108, Lot 45, and Block 4105, Lot 50. The site is bounded to the north by Ebbitts Street, to the south by Kissam Avenue, and to the west by Roma Avenue, Milton Avenue, and Old Mill Road, as well as by residential lots on these roadways and Pelican Circle. Parkland surrounds the site to the east and north, with vacant land and residential property to the south and west.[27]

The Oakwood Beach site is considered open space and vacant land, comprised mainly of undeveloped freshwater wetlands and dunes in the Staten Island East-Raritan Bay watershed. Stormwater flows are conveyed from the northeast to the southwest and ultimately to the Lower Bay via three stream branches. The East Branch runs through this property, beginning in Great Kills Park east of Kissam Avenue, and flowing south and west to a tide gate that is situated immediately south of the Oakwood Beach Wastewater Treatment Plant. The site is prone to flooding and dominated by *Phragmites* fed by tidal waters passing through this formerly non-functioning tide gate, which was repaired by the U.S. Army Corps of Engineers following a flood control study in 2000.[28]

The site is identified in the *Hudson-Raritan Estuary Comprehensive Restoration Plan* as Site 578, "Oakwood Beach (Cedar Grove Beach)," within the Arthur Kill/ Kill Van Kull Study Area. The freshwater wetland restoration to establish a wetland mitigation bank on this site would require excavation by an average depth of four feet, potential removal/capping of contaminated sediment based on testing, removal of invasive species and debris, replanting and re-grading with native vegetation, restoration of streams, dune structures/vegetation, and upland forested area. The proposed site would also require construction of tide gates and an assessment of the need for sand placement to expand the beach and increase protection from storm damage.

The project site is part of the Staten Island Mid-Island Bluebelt, which aims to preserve natural drainage corridors including streams, ponds, and other wetland areas, to perform their functions of conveying, storing, and filtering stormwater.[29] The NYCDEP is currently expanding the Mid-Island Bluebelt, including Oakwood Beach, New Creek, and South Beach. The Final Scope of Work was completed in 2011, followed by the adoption of a final Generic

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[27] NYC OASIS. Accessed on April 2015 at: http://www.oasisnyc.net/.
[28] Hudson-Raritan Estuary Comprehensive Restoration Plan. Fresh Kills Landfill. CRPID: 704. Accessed on April 2015 at: http://www.oasisnyc.net/crp/crpdetails.aspx?id=578.
[29] NYCDEP. The Staten Island Bluebelt: A Natural Solution to Stormwater Management. Accessed on April 2015 at http://www.nyc.gov/html/dep/html/dep_projects/bluebelt.shtml.

Environmental Impact Statement in 2013. NYCDEP has already acquired 325 acres of wetlands and adjacent areas for the Staten Island Bluebelt, with plans to acquire an additional 195 acres over the next 30 years.[30] In addition, the site is currently (subsequent to the site selection analysis) identified as one of several "Pond Excavation Areas" behind "Buried seawall/Armored levee" and tide gate features of the National Economic Development Plan proposed by the U.S. Army Corps of Engineers in the Draft Main Report for the *Interim Feasibility Study for Fort Wadsworth to Oakwood Beach,* from further consideration as a potential site.

SERVICE AREA

The Oakwood Beach site *partially met* the service area criteria for the following reasons:

Primary Service Area	Without an existing IRT approved primary and secondary Service Area for this location on Raritan Bay, it is not possible to know definitively whether this site would have met the primary and secondary Service Area requirements of the City's pilot mitigation bank. While Oakwood Beach lies within the primary Service Area for Saw Mill Creek, its location on the outer edge of t the primary Service Area leaves a question as to whether a mitigation bank at this location would have a primary Service Area needed to meet the selection criterion of being able to provide compensatory mitigation to Manhattan, Queens, and Brooklyn's East River waterfronts and Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay waterfronts.
Watershed boundaries	The site is located in the Staten Island East-Raritan Bay Watershed (HUC-12), 020301040404.
Distance of bank site from credit demand	The site is located in close proximity to Manhattan, Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay. It is located in the same borough as the following City projects requiring mitigation: Staten Island Bluebelt and St. George Ferry (see Table 2-1).

SITE OWNERSHIP AND CONTROL

The Oakwood Beach site *partially met* the site ownership and control criteria for the following reasons:

Access and control during construction	While NYCDPR would grant access, EDC would also need to arrange access and control of the site during restoration and rehabilitation work from various state and federal entities.
Public ownership	All of the land within the proposed bank is public, but owned by a variety of entities

[30] NYCDEP. Mid-Island Bluebelt Drainage Plans. Accessed on April 2015 at http://www.nyc.gov/html/dep/html/environmental_reviews/midisland_bluebelt_drainage_plan.shtml.

Jurisdictional control	Site is under a mixture of NPS, NYSDEC and NYCDPR jurisdiction.
Long-term stewardship	No long-term steward is identified, as the site has multiple jurisdictions, post-construction access and control do not align with the long-term stewardship requirements required by 40 CFR 230.98.
Threat of wetland degradation	Wetlands on-site are degraded and threatened by *Phragmites* that have spread as a result of a tidal flows from a previously non-functioning tide gate.
Adjacent land uses	The site has a history as tidal wetlands which have degraded over time, therefore it is conducive to the establishment of a wetland mitigation bank. The site is surrounded by open space, residential and vacant land uses, which would support the restored ecosystem. The site is zoned as parkland, with adjacent land zoned as residential and vacant.

ECOLOGICAL SUITABILITY AND SERVICES RESULTANT FROM RESTORATION

Ecological suitability and resulting services of restoration criteria are *met* at Oakwood Beach for the following reasons:

Ecological Criteria and Services

Existing ecosystem functions	The site is a degraded freshwater wetland with some forested/scrub and dunes. Predominant vegetation is *Phragmites*.
Connectivity to a large connected ecosystem	The site contributes to Lower New York Bay ecosystem; however, is bounded on three sides by developed urban area.
Adjacency to surviving or thriving marsh	There is an existing wetland west of the site; however, there is a road that runs in between the two wetland areas.
Likelihood of success	The site has a low likelihood of successfully changing the ecological community into a functioning salt marsh. The tide gate, which was repaired following Superstorm Sandy, limits the tide regime by preventing salt water from moving upstream. Conversion of the freshwater wetland into a tidal wetland would require the construction and maintenance of a salt water channel into the wetland.
Maintenance and Sustainability	This site would have higher maintenance because the site is being converted from freshwater to salt water. The site would most likely require maintenance of the salt water channel into the wetland.
Water Quality	The site would enhance the water quality of the watershed, considering existing watershed, problems with baseline water quality, and water quality standards
Groundwater	The site presently has a positive effect on regional groundwater as freshwater is impounded and percolates through sandy soil. Conversion of the site to salt marsh would remove this effect on regional groundwater.

Buffers	The site has very little buffer to protect the wetland from surrounding human activity.
Maintenance and enhancement of habitat diversity	Site restoration would enhance diversity by eliminating *Phragmites* and supporting healthy salt marsh vegetation communities. Even if all of the *Phragmites* is removed there may be a problem with propagation from neighboring marshes.

HRE Target Ecosystem Characteristics (TECs) - In accordance with HRE CRP (2014), this site was identified as CRP Site 578. The HRE CRP project sheet for Site 578, indicates that the following TECs could be restored at the site.

Coastal Wetlands	The site would support NYCDEP and others to restore freshwater wetlands, remove invasive species, restore streams, and tide gate construction.
Coastal and Maritime Forests	The site would support NYCDEP and NYCDPR to restore dune structure, dune vegetation, and upland forested area and assess need for sand placement to expand beach and increase protection from storm damage.
Sediment contamination	The site would require potential removal/capping of contaminated sediment based on testing.
Public Access	The site would support ongoing efforts to improve recreation opportunities.

TECHNICAL CONSIDERATIONS

The Oakwood Beach site *partially met* the technical requirements for the following reasons.

Size	The 50 acre site is comparably smaller than other sites, but it is large enough to provide contiguous ecological benefits. The size is adequate to have met the credit demand (e.g., to have met the economic threshold).
Permitting Feasibility	Regulatory approvals and permits would be more difficult as compared to other sites, due to regulatory constraints for converting a freshwater marsh to a salt water marsh.
Distance of bank site from airports	Distances from airports are as follows: John F. Kennedy: 91,000 ft.; LaGuardia: 100,500 ft.; Newark: 44,000 ft.; Teterboro: 102,000 ft.; Linden: 43,000 ft. Thus, the site met the FAA criteria that a bank is not within 5,000 feet of a runway that serves piston-powered aircraft or 10,000 feet of a runway that serves turbine-powered aircraft.
Salinity Conditions	The tide gate, which is functioning following its post-Superstorm Sandy repair, limits the tide regime and the expansion of salt marsh upstream. Conversion of the freshwater wetland into a tidal wetland would require the construction and maintenance of a salt water channel into the wetland.
Sediment Quality	Sediments are potentially contaminated and may need to be removed or capped.
Geology and Geomorphology	The site topography is conducive to the establishment of a wetland mitigation bank. However, the site is currently predominantly freshwater wetlands and

	conversion to saline marshes could be problematic.
Hydrology and hydraulics	The site has an existing water source, reliable hydrological sources and existing wetlands for continuity with existing wetland resources.
Vulnerability and risk reduction	The site is vulnerable to inundation as it is located in a 100-year floodplain[31] and was inundated during Superstorm Sandy[32]. The site would provide some coastal protection to mitigate tidal flooding. The restoration of wetland should help alleviate some of the stormwater and flooding problems in the area. Removal of the *Phragmites* and the excavation should allow for additional storm water storage on the site.
Cost	The approximate restoration cost per acre, total mitigation cost, and credit cost would be comparably higher than other sites due to the need for tide gate structures.

2.2.2.4 Alley Creek

The Alley Creek sites are located south of Little Neck Bay in the Douglaston area of Queens within Community District 11, and would be established within two sites, approximately 5.5 and 11.5-acres respectively (17 acres total) along the shoreline of Alley Creek in Alley Pond Park (**Figure 2-8**). The northern site encompasses part of Block 6331, Lot 1 on the western bank of Alley Creek. It is bordered to the north by the MTA Long Island Railroad Port Washington line, to the South by open space adjacent to Northern Boulevard and the Little Neck Bridge over Alley Creek, to the east by Alley Creek, and to the west by the Cross Island Parkway Greenway, which is open space adjacent to an exit ramp for the Cross Island Parkway. The southern site encompasses part of Block 8163, Lot 1 on the eastern bank of Alley Creek. It is bordered to the north by Northern Boulevard and Little Neck Bridge over Alley Creek, to the south by open space in Alley Pond Park, to the east by open space adjacent to parking, transportation / utility, and commercial parcels, and to the west by Alley Creek. Both sites are considered Forever Wild Sites, through an initiative of the New York City Department of Parks and Recreation to protect and preserve the most ecologically valuable lands within the five boroughs.[33]

The Alley Creek sites are considered open space, comprised mainly of undeveloped estuary/marine wetland, intertidal marsh within the Alley Creek-Little Neck Bay watershed. The sites are identified in the *Hudson-Raritan Estuary Comprehensive Restoration Plan* as Sites 20008, "Alley Discharge," and 20013, "Alley Pond Park Salt Marsh" within the Harlem River / East River / Western Long Island Sound Study Area.[34][35] To

[31] FEMA. Preliminary Flood Hazard Area Maps, New York City. Issued December 2013.
[32] USGS. Sandy 3m Surge Inundation Data. 2013.
[33] NYC OASIS. Accessed on April 2015 at: http://www.oasisnyc.net/.
[34] Hudson-Raritan Estuary Comprehensive Restoration Plan. Alley Discharge Mitigation. CRPID: 20008. Accessed on April 2015 at: http://www.oasisnyc.net/crp/crpdetails.aspx?id=20008.

establish a wetland mitigation bank on this site would require excavation by an average depth of five to six feet, removal of invasive species and fill, followed by planting and wetland restoration. In addition, the northern site on the western bank of Alley Creek (11.5 acres) has been restored by NYCDEP and may therefore be removed from further consideration in the site selection analysis.

SERVICE AREA

The Alley Creek site *has not met* the service area criteria for the following reasons:

Primary Service Area	Without an existing IRT approved primary and secondary Service Area for this location along Little Neck Bay, it is not possible to know definitively whether this site would have met the primary and secondary Service Area requirements of the City's pilot mitigation bank. However, Alley Creek's location in what is the agreed upon secondary Service Area for Saw Mill Creek infers that Alley Creek, as a tributary to the Upper East River, would not have met the selection criterion of being able to provide compensatory mitigation to Manhattan, Queens, and Brooklyn's East River waterfront and Manhattan and Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay.
Watershed boundaries	The site is located in the Alley Creek-Little Neck Bay Watershed (HUC-12), 020302010101.
Distance of bank site from credit demand	The site is not located in close proximity to Manhattan, Brooklyn's East River waterfront or Staten Island. However, it is located within Queens, the same borough as one City project requiring mitigation, the North Shore Marine Transfer Station (see Table 2-1).

SITE OWNERSHIP AND CONTROL

The Alley Creek sites *met* the site ownership and control criteria for the following reasons:

Access and control during construction	EDC would have full access and control of the site during restoration and rehabilitation work, as access would be granted by NYCDPR.
Public ownership	All of the land within the proposed bank is owned by the City of New York.
Jurisdictional control	The entire Alley Creek site is under NYCDPR jurisdiction.
Long-term stewardship	Existing oversight puts NYCDPR in an ideal position to serves as Long-term Steward of the property, therefore post-construction access and control align

[35] Hudson-Raritan Estuary Comprehensive Restoration Plan. Alley Pond Park Salt Marsh Restoration South of Northern Boulevard. CRPID: 20013. Accessed on April 2015 at: http://www.oasisnyc.net/crp/crpdetails.aspx?id=20013

	with the long-term stewardship requirements of 40 CFR 230.98.
Threat of wetland degradation	Wetlands on-site are threatened by invasive *Phragmites*.
Adjacent land uses	The site has a history as tidal wetlands which have degraded over time. Therefore, it is conducive to the establishment of a wetland mitigation bank. The site is surrounded by open space, which would support the restored ecosystem. The site is zoned as parkland, with adjacent land zoned as parkland, residential and commercial.

ECOLOGICAL SUITABILITY AND SERVICES RESULTANT FROM RESTORATION

Ecological suitability and services criteria are *partially met* at Alley Creek for the following reasons:

Ecological Criteria and Services

Existing ecosystem functions	The site is a degraded location that still offers some ecological function (e.g. *Phragmites* providing sediment trapping and wave attenuation).
Connectivity to a large connected ecosystem	The site contributes to a connected ecosystem of wetland/upland natural areas.
Adjacency to surviving or thriving marsh	Only remnant marshes remain adjacent to the site; these are equally degraded.
Likelihood of success	Restoration efforts at Alley Creek could address the main factors causing the dominance of invasive species.
Maintenance and Sustainability	Due to pressures from invasive exotic species dominated adjacent areas, a considerable amount of maintenance would be required on site. As such, restoration efforts may not be sustainable without removal of historic fill and restoring tidal elevations.
Water Quality	Restoration of the site would help to improve water quality of the watershed.
Groundwater	Restoration of the site would have minimal effects to regional groundwater.
Buffers	The site has moderate buffers from surrounding developed parcels and seclusion from human activities on some, but not all, sides.
Maintenance and enhancement of habitat diversity	Restoration of the site would enhance habitat diversity, including native plants and animals, essential fish habitat, and significant natural communities.

HRE Target Ecosystem Characteristics (TECs) -

No HRE CRP project sheet is available for this site.

TECHNICAL CONSIDERATIONS

Alley Creek *has not met* the technical requirements for the following reasons:

Size	The 17 acre site is comparably smaller than other sites and may not provide contiguous ecological benefits. The size is not adequate to have met the credit demand (e.g., has not met the economic threshold).
Permitting Feasibility	Regulatory approvals and permitting would be comparable to other sites.
Distance of bank site from airports	Distances from airports are as follows: John F. Kennedy: 37,000 ft.; LaGuardia: 28,000 ft.; Linden: 143,500 ft.; Newark: 113,000 ft.; Teterboro: 86,500 ft. Thus, the site met the FAA criteria that a bank is not within 5,000 feet of a runway that serves piston-powered aircraft or 10,000 feet of a runway that serves turbine-powered aircraft.
Nutrient and Salinity Conditions	Adjacent areas appear to have the appropriate tidal elevation for salt marsh, however, fresh water inputs to the site appear to favor *Phragmites*.
Sediment Quality	Fill material or site contamination is typical of restoration and rehabilitation opportunities citywide.
Geology and Geomorphology	The site topography is conducive to the establishment of a wetland mitigation bank.
Hydrology and hydraulics	The site has existing water source, reliable hydrological sources and existing wetlands for continuity with existing wetland resources. However, due to freshwater inputs the site has not met the goal of salt marsh restoration.
Vulnerability and risk reduction	The site is vulnerable to inundation as the majority of the site is located in a 100-year floodplain[36] and was inundated during Superstorm Sandy[37]. Due to its size and location, the site would not restore active, functioning floodplain and would not significantly improve flood mitigation.
Cost	The approximate restoration cost per acre, total mitigation cost, and credit cost would be comparable to other sites.

2.2.2.5 Sunset Cove

The Sunset Cove site is located in the Broad Channel area of Queens within Community District 14, and would be established within a 9-acre site adjacent to a Jamaica Bay inlet. The site is comprised of portions of 4 lots, including Block 15324, Lot 1; Block 15326, Lot 20; Block 15327, Lot 10; and Block 15350, Lot 700 (**Figure 2-9**). It is bounded to the west by Jamaica Bay, to the east by Shad Creek Road near Cross Bay Boulevard, to the south by open space and to the north by West 19th Road. A large wetland complex at Big Egg Marsh,

[36] FEMA. Preliminary Flood Hazard Area Maps, New York City. Issued December 2013.
[37] USGS. Sandy 3m Surge Inundation Data. 2013.

owned and managed by the National Parks Service, is adjacent to the site. Residential and vacant properties, as well as one commercial and one mixed-use property, are located east of the site between West 19th and West 20th roads. East of Cross Bay Boulevard are several residential and vacant properties with some mixed use and one transportation / utility property.[38]

The Sunset Cove site is considered open space and vacant land, comprised mainly of undeveloped open space with fill and some paved areas, wetland and upland areas within the Jamaica Bay Watershed. A former marina, the site was acquired by the New York City Department of Parks and Recreation in 2009 following multiple violations for illegal dumping and fill.

The site is identified in the *Hudson-Raritan Estuary Comprehensive Restoration Plan* as Site 914, "Sunset Cove Park," within the Jamaica Bay Study Area. To establish a wetland mitigation bank on this site would require excavation by an average depth of five feet, removal of fill and debris as well as existing bulkheads, wetland restoration of low and high marsh, and upland planting of maritime forest vegetation. The site would include the construction of berms in the upland perimeter to provide shoreline protection, and public amenities including trails, canoe/kayak launches, and educational signage.[39] In addition, the site is currently the subject of a planned restoration project by the NYCDPR and the New York State Governor's Office of Storm Recovery, and may therefore be removed from further consideration in the site selection analysis.

SERVICE AREA

The Sunset Cove site *has not met* the service area criteria for the following reasons:

Primary Service Area	Without an existing agreed upon primary and secondary Service Area for Sunset Cove located at the geographic center of Jamaica Bay, it is not possible to know definitively whether this site would have met the primary and secondary Service Area requirements of the City's pilot mitigation bank. However, Sunset Cove's location in what is the agreed upon secondary Service Area for Saw Mill Creek infers that Sunset Cove would not have met the selection criterion of being able to provide compensatory mitigation to Manhattan, Queens, and Brooklyn's East River waterfront and Manhattan and Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay.
Watershed boundaries	The site is located in the Island Channel-Jamaica Bay Watershed (HUC-12), 020302020103.
Distance of bank site	The site is not located in close proximity to Manhattan or Staten Island but is located in relatively close proximity to Brooklyn's East River waterfront, and is

[38] NYC OASIS. Accessed on April 2015 at: http://www.oasisnyc.net/.
[39] Hudson-Raritan Estuary Comprehensive Restoration Plan. Sunset Cove Park. CRPID: 914.

from credit demand	located within Queens, the same borough as one City project requiring mitigation, the North Shore Marine Transfer Station (see Table 2-1).

SITE OWNERSHIP AND CONTROL

Sunset Cove *partially met* the site ownership and control criteria for the following reasons:

Access and control during construction	While NYCDPR would grant access, EDC would also need to arrange access and control of the site during restoration and rehabilitation work from a federal agency.
Public ownership	All of the land within the proposed bank is public, but is owned by a variety of public entities, including NPS and NYCDPR.
Jurisdictional control	Site is under a mixture of NPS and NYCDPR jurisdiction.
Long-term stewardship	No long-term steward is identified, as the site has multiple jurisdictions, post-construction access and control do not align with the long-term stewardship requirements required by 40 CFR 230.98.
Threat of wetland degradation	Wetlands on-site are degraded as the site has a history of illegal dumping and fill.
Adjacent land uses	The site is surrounded by open space, residential and vacant land uses, which would support the restored ecosystem. Unlike most other sites, the majority of this site is zoned as residential with a small portion zoned as parkland. Adjacent land is also zoned as residential and parkland.

ECOLOGICAL SUITABILITY AND SERVICES RESULTANT FROM RESTORATION

Ecological suitability and resulting services of restoration as criteria are *met* at Sunset Cove for the following reasons:

Ecological Criteria and Services

Existing ecosystem functions	The site is generally inaccessible and provides limited ecological function. The predominant cover types include low and high marsh with some *Phragmites*. The site contains shorelines, shallows, coastal wetland and upland habitat.
Connectivity to a large connected ecosystem	The site contributes to Jamaica Bay ecosystem; however, it is bounded on three sides by developed urban area.
Adjacency to surviving or thriving marsh	The site is adjacent to an estuarine marine wetland.
Likelihood of success	The site has a high likelihood of successfully changing the ecological community into a functioning wetland.

Maintenance and Sustainability	Site ecology would require low maintenance after wetland re-establishment.
Water Quality	The site would enhance the water quality of the watershed, considering existing watershed, problems with baseline water quality, and water quality standards.
Groundwater	The site would have little effect on regional groundwater.
Buffers	The site does not have buffers from surrounding developed parcels and is only secluded from human activity on one side.
Maintenance and enhancement of habitat diversity	Site restoration would enhance diversity by eliminating *Phragmites* and supporting healthy salt marsh vegetation communities.

HRE Target Ecosystem Characteristics (TECs)- In accordance with HRE CRP (2014), this site was identified as CRP Site 914. The HRE CRP project sheet for Site 914, indicates that the following TECs could be restored at the site.

Coastal Wetlands	Restoration and preservation of low marsh and high marsh through debris removal and planting of native vegetation. Wetland restoration would involve removal of the existing bulkhead and excavation of existing fill to restore tidal hydrology to the site.
Coastal and Maritime Forests	Upland habitat is available for restoration. This portion of the site would be planted with coastal and maritime woodland species. A vegetated berm could also be placed to provide shoreline protection benefits.
Shorelines and Shallows	The project will restore shoreline and provide shallows in the HRE region.
Habitat for fish, crab and lobsters	The restored marsh will contribute nursery and spawning habitat contiguous with Big Egg Marsh to the west, part of Jamaica Bay Wildlife Refuge.
Sediment contamination	Several feet of fill will be excavated at the site. Soil test pits and borings with comprehensive testing for contaminants will be conducted at a New York State certified lab prior to excavation to determine measures needed for appropriate land-based disposal.
Public Access	At least one accessible pedestrian trail will be provided. As the site was previously a marina, access for human powered boats (canoes, kayaks. etc.) will be incorporated into plan.

TECHNICAL CONSIDERATIONS

The Sunset Cove site *met* the technical requirements for the following reasons:

Size	The 10-acre site is comparably smaller than other sites and may not provide contiguous ecological benefits. The size is not adequate to have met the credit demand (e.g., has not met the economic threshold).
Permitting Feasibility	Regulatory approvals and permitting would be comparable to other sites

Distance of bank site from airports	Distances from airports are as follows: John F. Kennedy: 13,000 ft.; LaGuardia: 63,500 ft.; Newark: 99,000 ft.; Teterboro: 108,000 ft.; Linden: 115,000 ft. Thus, the site has not met the FAA criteria that a bank is not within 5,000 feet of a runway that serves piston-powered aircraft or 10,000 feet of a runway that serves turbine-powered aircraft.
Salinity Conditions	The site does not have low salinity that strongly favors invasive species.
Sediment Quality	High levels of contamination have been found in recent studies. Restoration of the site may include removal of contaminated sediments.
Geology and Geomorphology	The site topography is conducive to the establishment of a wetland mitigation bank.
Hydrology and hydraulics	The site has an existing water source, reliable hydrological sources and existing wetlands for continuity with existing wetland resources.
Vulnerability and risk reduction	The site is vulnerable to inundation as it is located in a 100-year floodplain[40] and was inundated during Superstorm Sandy[41]. The site would provide coastal protection and stormwater storage to mitigate flooding.
Cost	The approximate restoration cost per acre, total mitigation cost, and credit cost would be comparably higher than other sites due to the need for berms.

2.2.2.6 Pennsylvania Avenue Landfill Fringe Wetland

This site is located along the southern and eastern borders of the former Pennsylvania Avenue Landfill in the Starrett City area of Brooklyn within Community District 5. It would be established within an approximately 5 acre site that extends into the North Channel east of Fresh Creek, on a portion of Block 4452, Lot 2 (**Figure 2-10**). It is bounded to the north by the Belt Parkway, to the south by the North Channel (Jamaica Bay), to the east by Fresh Creek, and to the west by the NYCDEP Hendrix Creek upland and wetland restoration project. Immediately north of the Belt Parkway is Spring Creek Park and the Fresh Creek Nature Preserve, while further north is a variety of land uses including residential, vacant, transportation/utility and institutional.

The Pennsylvania Avenue Landfill site is entirely open space, comprised of tidal and degraded marsh within the Jamaica Bay Watershed. Headwaters of Spring Creek flow between the recently remediated and restored Pennsylvania Avenue and Fountain Avenue landfills. Spring Creek North is a tidal creek that has retained its meandering pattern and has several smaller side channels, mud flats are present at low tide. It is listed on the New York State 303(d) TMDL list with pathogens identified as the parameter of concern and CSOs as the primary pollutant or cause.

[40] FEMA. Preliminary Flood Hazard Area Maps, New York City. Issued December 2013.
[41] USGS. Sandy 3m Surge Inundation Data. 2013.

To establish a wetland mitigation bank on this site would require excavation by an average depth of 2 feet, re-contouring to intertidal elevations, removing invasive plant species, and replanting with native plant species.

SERVICE AREA

The Pennsylvania Landfill Fringe Wetland site *has not met* the service area criteria for the following reasons:

Primary Service Area	Without an existing agreed upon primary and secondary Service Area for Pennsylvania Avenue Landfill Fringe Wetland, located on the south Brooklyn shore of Jamaica Bay, it is not possible to definitively know whether this site would have met the primary and secondary Service Area requirements of the City's pilot mitigation bank. However, the Penn Landfill's location in what is the agreed upon secondary Service Area for Saw Mill Creek infers Penn Landfill would not have met the pilot requirement of being able to provide compensatory mitigation to Manhattan, Queens, and Brooklyn's East River waterfront and Manhattan and Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay.
Watershed boundaries	The site is located in the Island Channel-Jamaica Bay Watershed (HUC-12), 020302020103.
Distance of bank site from credit demand	The site is not located in close proximity to Manhattan or Staten Island but is located in relatively close proximity to Brooklyn's East River waterfront, and is located within Brooklyn, the same borough as two City projects requiring mitigation: the Gowanus Tidal Barrier and Brooklyn Bridge Park (see Table 2-1).

SITE OWNERSHIP AND CONTROL

The Penn Landfill Fringe Wetland *partially met* the site ownership and control criteria for the following reasons:

Access and control during construction	EDC would need to arrange access and control of the site during restoration and rehabilitation work from a federal agency.
Public ownership	All of the land within the proposed bank is publicly owned by NPS.
Jurisdictional control	At present, the fringe wetlands surrounding the landfill are mostly under NPS jurisdiction. The landfill itself is currently under NYCDEP management jurisdiction. However, the long-term vision is for the site to be transferred to NPS control.
Long-term stewardship	The restoration of fringe wetlands is not in City jurisdiction, presenting a more complicated Long-term Stewardship agreement; therefore post-construction access and control do not align with the long-term stewardship requirements required by 40 CFR 230.98.
Threat of wetland degradation	Wetlands on-site are degraded.

Adjacent land uses	The site borders the Pennsylvania Avenue Landfill; however, the adjacent former landfill has been closed and functions as open space, which would support the restored ecosystem. The site is zoned as parkland, with adjacent land zoned as residential.

ECOLOGICAL SUITABILITY AND SERVICES RESULTANT FROM RESTORATION

Ecological suitability and resulting services of restoration as criteria are *partially met* at Penn Landfill for the following reasons:

Ecological Criteria and Services

Existing ecosystem functions	The site provides some ecosystem functions, including coastal shoreline protection and wave attenuation.
Connectivity to a large connected ecosystem	The site contributes to a connected ecosystem that is mainly comprised estuarine open water and open space upland. Site and adjacent ecosystems contains very little wetland habitat.
Adjacency to surviving or thriving marsh	Adjacent areas area mainly comprised of capped landfill open space upland. Very little wetland habitat is present.
Likelihood of success	The site has a high likelihood of successfully changing the ecological community into a functioning wetland.
Maintenance and Sustainability	Site ecology would require low-maintenance after wetland re-establishment.
Water Quality	Due to size and location, the site would provide minimal enhancement of existing watershed.
Groundwater	The site would provide minimal improvement for regional groundwater.
Buffers	The site is buffered by capped open space landfill.
Maintenance and enhancement of habitat diversity	The site would maintain and enhance habitat diversity, including native plants and animals, essential fish habitat and significant natural communities.

HRE Target Ecosystem Characteristics (TECs)

No HRE CRP project sheet is available for this site.

TECHNICAL CONSIDERATIONS

The Penn Landfill site *partially met* the technical requirements for the following reasons:

Size	The 5 acre site is comparably smaller than other sites and may not provide contiguous ecological benefits. The size is not adequate to have met the credit demand (e.g., has not met the economic threshold).

Permitting Feasibility	Regulatory approvals and permitting would be comparable to other sites.
Distance of bank site from airports	Distances from airports are as follows: John F. Kennedy: 13,500 ft.; LaGuardia: 46,500 ft.; Linden: 102,500 ft.; Newark: 83,400 ft.; Teterboro: 89,000 ft. Thus, the site met the FAA criteria that a bank is not within 5,000 feet of a runway that serves piston-powered aircraft or 10,000 feet of a runway that serves turbine-powered aircraft.
Salinity Conditions	The site does not have low salinity which would strongly favor invasive species.
Sediment Quality	Fill material or site contamination, due to landfill leachate is a concern.
Geology and Geomorphology	Although site topography is conducive to the establishment/restoration of salt marsh, limited wetland restoration/creation opportunities make this site unappealing for establishment of a wetland mitigation bank.
Hydrology and hydraulics	The site has existing water source, reliable hydrological sources, and existing wetlands for continuity with existing wetland resources.
Vulnerability and risk reduction	The site is vulnerable to inundation as the majority of the site is located in a 100-year floodplain[42] and was inundated during Superstorm Sandy[43]. Restoration of the site would provide moderate costal protection (for a limited area) which would mitigate tidal flooding. Due to size and location, the site would not significantly improve stormwater storage for flood mitigation.
Cost	The approximate restoration cost per acre, total mitigation cost, and credit cost would be comparable to other sites.

Summary Evaluation of Site Selection Criteria for Geographic Alternatives

The rationale for the elimination of the alternate sites from further consideration is summarized in **Table 2-2** according to the four criteria outlined earlier in this document: (1) the site's ability to serve the chosen service area, (2) site ownership and control, (3) the ecological suitability and services that would result from restoration, and (4) technical considerations.

[42] FEMA. Preliminary Flood Hazard Area Maps, New York City. Issued December 2013.
[43] USGS. Sandy 3m Surge Inundation Data. 2013.

Table 2-2: Site Ability to Meet Selection Criteria

Site	Selection Criteria			
	1) Ability to Serve Needed Service Area	*2) Site Ownership and Control*	*3) Ecological Suitability and Services Resultant from Restoration*	*4) Technical Considerations*
Staten Island				
Brookfield 1	Met	Met	Partially Met	Met
Brookfield 2				
Saw Mill Creek*	Met	Met	Met	Met
Fresh Kills/Springville Creek 1	Met	Met	Partially Met	Partially Met
Fresh Kills/Springville Creek 2				
Oakwood Beach	Partially Met	Partially Met	Met	Partially Met
Queens				
Alley Creek 1	Has Not Met	Met	Partially Met	Has Not Met
Alley Creek 2				
Sunset Cove	Has Not Met	Partially Met	Met	Met
Brooklyn				
Pennsylvania Avenue Landfill Fringe Wetland	Has Not Met	Partially Met	Partially Met	Partially Met

2.3 Preferred Site: Saw Mill Creek

Saw Mill Creek has been selected as the preferred site for the establishment of the wetland mitigation bank. Because of alignment with the purpose and need for the City's first mitigation bank and having directly met the four site selection criteria required of a pilot, Saw Mill Creek is the preferred location.

2.3.1 Preferred Site: Site Selection Criteria

EDC worked in collaboration with NYCDPR and NYCDEP. Ultimately, Saw Mill Creek was chosen due to (1) its ability to serve the chosen service area, (2) site ownership and control, (3) the ecological suitability and services that would result from restoration, and (4) technical considerations.

SERVICE AREA

The preferred site, Saw Mill Creek, *met* the service area criteria for the following reasons:

Primary Service Area The agreed upon primary and secondary service area, approved by the IRT, met the service area requirements. The most likely sites requiring compensatory mitigation that line Manhattan, Queens, and Brooklyn's East River waterfront and Staten Island's Upper New York Bay, Arthur Kill and Kill

	van Kull, and Raritan Bay waterfronts are within Saw Mill Creek's primary Service Area.
Watershed boundaries	The site is located in the Staten Island Woodbridge Creek-Arthur Kill Watershed (HUC-12).
Distance of bank site from credit demand	The site is located in close proximity to Manhattan, Staten Island's Upper New York Bay, Arthur Kill and Kill van Kull, and Raritan Bay. It is located in the same borough as the following City projects requiring mitigation: Staten Island Bluebelt and St. George Ferry (see Table 2-1).

SITE OWNERSHIP AND CONTROL

The preferred site, Saw Mill Creek, *met* the site ownership and control criteria for the following reasons:

Access and control during construction	EDC would have full access and control of the site during restoration and rehabilitation work, as access would be granted by NYCDPR.
Public ownership	All of the land within the proposed bank is owned by the City of New York.
Jurisdictional control	The entire Saw Mill Creek site is under NYCDPR jurisdiction; therefore the site met this criterion.
Long-term stewardship	The Citywide initiative to transfer wetland jurisdiction to NYCDPR, as described in the City's Wetland Strategy, places NYCDPR in an ideal position to serves as Long-term Steward. Therefore post-construction access and control align with the long-term stewardship requirements of 40 CFR 230.98.
Threat of wetland degradation	Wetlands on-site are degraded and are threatened with future degradation caused by illegal dumping, debris and invasive species.
Historical and adjacent land uses	The site has a history of dumping and contamination that is characteristic of typical urban fill in New York City, therefore it would benefit from removal of historic fill and debris through wetland restoration. The site is zoned for parkland, with a portion of the site zoned for manufacturing uses.

ECOLOGICAL SUITABILITY AND SERVICES RESULTANT FROM RESTORATION

The preferred site, Saw Mill Creek, *met* the ecological suitability criteria for the following reasons:

Ecological Criteria and Services

Existing ecosystem functions	This site includes disturbed uplands, marsh habitat and fragments of hardwood forest bordering the marsh. The site includes high salt marsh and hummock features that support rare plant species (persimmon trees, Nantucket juneberry, and maritime oaks).
Connectivity to a large connected ecosystem	The site contributes to a connected ecosystem of wetland and upland natural areas as there are neighboring wetland and upland areas.

Adjacency to surviving or thriving marsh	A large portion of the area to west of the site is an estuarine and marine wetland area.
Likelihood of success	The site has a high likelihood of successfully changing the ecological community into a functional wetland.
Maintenance and Sustainability	The site ecology would require low maintenance after wetland re-establishment.
Water Quality	The site would enhance the water quality of the watershed, considering existing watershed problems with baseline water quality, and water quality standards.
Groundwater	Site would have little effect on regional groundwater.
Buffers	There are forested areas that buffer the site from surrounding developed areas and provide general seclusion from human activity.
Maintenance and enhancement of habitat diversity	The site would maintain or enhance habitat diversity, including native plants, animals, essential fish habitat, significant natural communities, unique habitats, endangered, rare, or species of special concern

HRE Target Ecosystem Characteristics (TECs) - In accordance with the HRE CRP (2014), this site was identified as CRP Site 15. The HRE CRP project sheet for Site 15, indicates that the following TECs could be restored at the site.

Coastal Wetlands	Salt marsh restoration may include excavation of *Phragmites* stands, regrading and restoration of tidal hydrodynamics, and fill removal.
Coastal and Maritime Forests	Upland restoration opportunities include preservation/expansion of sandy humic habitat for turtle breeding and reduction of non-point source pollution into Saw Mill Creek at the former car storage property on the east side of Chelsea Road. This can be accomplished by stabilizing and replanting eroded slopes and restoring wetlands. Steep upland slopes can be stabilized by employing appropriate erosion control geotextiles and reestablishing native vegetation.
Sediment contamination	Of the 202 CRP restoration sites, there are different sources of known sediment contamination within the 180 sites located in New York City. Some of the locations are affected by municipal landfills, formal and informal construction and demolition dumps, and contaminants resulting from industrial users. Each type of contamination presents different challenges. In the case of fill and construction and demolition material, soil sampling is able to identify point sources of contamination. This makes such locations preferred for restoration and rehabilitation work in the form of mitigation banks. The area of the Arthur Kill waterbody closest to Saw Mill Creek is in the 50th percentile for contamination levels when compared to other coastal areas of the New York and New Jersey

Estuary[44]. The site would require potential capping or removal of contaminated sediment based on testing.

TECHNICAL CONSIDERATIONS

The preferred site, Saw Mill Creek, *met* the technical requirements for the following reasons:

Size	The 68.94 acre site acre site is comparably larger than other sites, providing contiguous ecological benefits. The size is adequate to have met the credit demand (e.g., to have met the economic threshold).
Permitting Feasibility	Regulatory approvals and permits would be comparable to other sites.
Distance of bank site from airports	Distances from airports are as follows: John F. Kennedy: 101,000 ft.; LaGuardia: 101,500 ft.; Newark: 22,500 ft.; Teterboro: 90,000 ft.; Linden: 15,500 ft. Thus, the site met the FAA criteria that a bank is not within 5,000 feet of a runway that serves piston-powered aircraft or 10,000 feet of a runway that serves turbine-powered aircraft.
Salinity Conditions	The site does not have low salinity that strongly favors invasive species.
Sediment Quality	Contaminated sediments would be removed from the site exposing clean soils. In discrete areas where clean soils are not present at depth, sediments will be over-excavated and covered by 2 feet of clean sand.
Geology and Geomorphology	Site topography is conducive to the establishment of a wetland mitigation bank.
Hydrology and hydraulics	The site has an existing water source, reliable hydrological sources, and existing wetlands for continuity with existing wetland resources.
Vulnerability and risk reduction	The site is vulnerable to inundation as the majority of the site is located in a 100-year floodplain[45] and was inundated during Superstorm Sandy[46]. The site would restore an active functioning floodplain. The site would provide significant stormwater storage for flood mitigation.
Cost	The estimated cost per acre, total mitigation cost, and credit cost would be comparable, or slightly higher than other sites.

A review of primary reports was also undertaken. The reports reviewed included the *Significant Habitat Complex of the New York Bight Watershed* (USFWS, 1997). This report

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[44] *See maps on pages 86 and 88*, *The Hudson – Raritan Estuary Comprehensive Restoration Plan,* USACE, March 2009, available (as of the date hereof) at:http://www.nan.usace.army.mil/Portals/37/docs/harbor/Harbor%20Program%20Images/CRP%20vol1.pdf

[45] FEMA. Preliminary Flood Hazard Area Maps, New York City. Issued December 2013.

[46] USGS. Sandy 3m Surge Inundation Data. 2013.

details the ecological significance and uniqueness of the Arthur Kill complex (**Figure 2-3**). It states "Protection of the heronries, wetland foraging areas, and rare plants and communities of this regionally significant habitat complex should be accorded high priority and sought through a multitude of appropriate land protection mechanisms." *The New York and New Jersey Harbor Deepening Project Habitat Mitigation Report* (USACE, 2004) identifies several potential wetland mitigation sites in the Arthur Kill area that the USACE proposed as mitigation for channel dredging in the area. *The Hudson – Raritan Estuary Comprehensive Restoration Plan* (USACE, 2009 as revised in 2014) identified this site among the preferred restoration sites.

A major driver in the selection of a preferred site for the proposed wetland mitigation bank was extensive consultations with NYCDPR's Natural Resources Group (NRG), which provides recommendations for restoration decision making on City properties under NYCDPR jurisdiction. A top priority for NRG is a consideration of the ultimate long-term benefit of the restoration and rehabilitation actions. Siting decisions are made on the ability of each site to contribute to a large connected ecosystem, support previously identified ecological needs, and adjacencies to surviving or thriving marsh. One of the main reasons for locating the proposed wetland mitigation bank at Saw Mill Creek is its location near other wetland restoration sites. Some, but not all, of these restoration sites are listed below and depicted in **Figure 2-11**:

1. NYCDPR restoration of a portion of Saw Mill Creek tidal marsh with funding from USFWS (1998 to 2001);

2. Bridge Creek Tidal Marsh Restoration (2006);

3. Brooklyn Union Gas (BUG) (now Keyspan) tidal marsh restoration (2007);

4. Port Reading mitigation bank (tidal marsh restoration), Woodbridge, NJ. (2008); and

5. Port Authority Mitigation (tidal marsh restoration) for Goethals Bridge (2009-2013).

2.3.2 Proposed Project: Restoration Design Plan

As part of the design process, technical studies were undertaken to assess topography, tidal elevations, and other features. A New York State licensed land surveyor conducted a survey to develop a surface topographic map that was used as the basis of the design plans. Bio-benchmark surveys of key vegetative communities were performed to aid in determining target wetland planting elevations, which dictate design grades. Hydrologic and hydraulic analyseswere conducted. Final design elevations and optimal habitat ranges were determined through integration of the bio-benchmark and hydrology data and incorporation of project goals and site/constructability constraints.

In designing the proposed project, the following five restoration design alternatives were identified and evaluated:

1. Preferred Restoration Design Plan;
2. Project area East of Chelsea Road;
3. Northern portion of the project area west of Chelsea Road;
4. Southern portion of the project area east of Chelsea Road; and
5. Entire project area.

Four restoration design alternatives were dropped from further consideration, as discussed in Section 2.3.3. The preferred restoration design plan was selected because it met the City's goals of maximizing the area of wetland restoration and enhancement to generate the most potential credits, while staying within the available construction budget of approximately $12 million, as well as maximizing ecological restoration while avoiding indirect impacts to adjacent properties. Based on the restoration design plan and the ecological evaluation, the potential credits that could be generated by the preferred restoration design plan are provided in **Table 2-3**.

Table 2-3: Proposed Project Habitat Restoration and Credits

Proposed Habitat	Acres	Ratio (acres:credit)	Credit
Restoration (Re-establishment)	7.04	1.20:1	5.87
Restoration (Rehabilitation)	16.72	2.14:1	7.81
Wetland Enhancement (Tidal)	33.72	10:1	3.37
Wetland Enhancement (Forest)	1.52	15:1	0.10
Buffer Rehabilitation	9.94	6.69:1	1.49
Total	**68.94**		**18.64**

The proposed project (illustrated in **Figure 2-12**) includes the following improvements:

- Tidal Marsh Wetland Restoration (reestablishment) – Converting uplands, including a defunct parking lot, to tidal marsh and tidal creeks (7.04 acres);
- Tidal Marsh Wetland Restoration (rehabilitation) – Improving degraded wetlands by removing debris, fill and invasive species, restoring tidal flow and circulation, and planting native vegetation (16.72 acres);
- Forested and Tidal Wetland Enhancement – Removing debris and invasive species from functioning wetlands and protecting them from future encroachment (35.23 acres); and

- Upland Buffer Rehabilitation – Improving degraded upland forest buffers by removing debris and invasive species, planting native vegetation, and installing measures to discourage dumping in the area (9.95 acres).

The proposed restoration would be conducted in accordance with the *New York State Salt Marsh Restoration and Monitoring Guidelines*[47] and the *Native Species Planting Guide for New York City and Vicinity*[48]. Restoration of ditched, filled, and/or degraded wetland and upland areas to a high level of function would be accomplished by a combination of practices, including removal of remnant berms and other fill material, regrading to suitable tidal marsh elevations, restoration of tidal creeks, treating non-native invasive species with a USEPA-approved herbicide for use in aquatic habitats, and replanting with native vegetation. Additional tidal creeks would be constructed to convey tidal flows to support native low and high marsh vegetation and to serve as a barrier to *Phragmites* invasion from surrounding areas.

Once constructed, the site would be monitored and maintained to ensure the successful establishment of the proposed habitats. The monitoring program would be developed and implemented by EDC with input from the New York City Parks Department's Natural Resources Group (NRG) in accordance with the detailed monitoring and maintenance requirements of the MBI. The project site would be fenced and signed (e.g., posted for no-trespass) to improve security and inhibit dumping and encroachment. The bank would be protected from future development as it would remain open space that is preserved in perpetuity.

2.3.2.1 Project Site – Western Section

As noted above, illegal dumping is pervasive on the project site and in the surrounding area. The design of the project site would include impediments to dumping to the maximum extent possible. Subsequent to site construction and planting, the site would be fenced and secured and signs posted to describe potential penalties for illegal dumping. Regular site inspections would be conducted by the Parks Department to ensure any dumping conditions are noted and investigated.

***Wetland Restoration (Re-establishment)* –** Much of the central portion of the western section consists of construction/demolition debris and other fill material over former marshlands. This material would be removed and the area graded to low and high marsh elevations, tidal creeks would be excavated to restore tidal flow and circulation, and the marsh plain would be planted with appropriate native salt marsh grasses and shrubs.

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[47] Niedowski, Nancy. 2000. *New York State Salt Marsh Restoration and Monitoring Guidelines*. National Oceanic and Atmospheric Administration, prepared for the New York State Department of State & New York State Department of Environmental Conservation.

[48] Luttenberg, Danielle, Deborah Lev, and Michael Feller. 1993. *Native Species Planting Guide for New York City and Vicinity*. Natural Resources Group, City of New York Parks & Recreation.

Sampling studies were conducted to determine if the fill material in this area is contaminated. Soil and groundwater sampling results indicate that most of the contaminated fill material should be removed from the site.[49] [50] Therefore, the area would be excavated to design grades and then planted with native salt marsh species. Contaminated materials would be removed consistent with all applicable regulatory requirements.

Wetland Restoration (Rehabilitation) – The northeast and southern areas of the western section are dominated by fill and invasive *Phragmites*. Survey data indicate that elevations in this area are too high to support salt marsh species; therefore, this area would be excavated to achieve suitable elevations to support a tidal salt marsh. Debris and fill material would be removed and the area graded to low and high marsh elevations, tidal creeks would be excavated to restore tidal flow and circulation, and the marsh plain would be planted with appropriate native salt marsh grasses and shrubs. Sampling studies recommend that most of the contaminated material be removed from the site[51]. Thus, the area would be excavated to design grades and planted with native salt marsh species. Contaminated materials would be removed consistent with all applicable regulatory requirements.

Wetland Enhancement – Part of the project site consists of low and high marsh, as well as several pannes. Based on conditions within the project site boundary, it is expected that *Phragmites* would continue to be the primary invasive species threatening wetland habitats. To prevent the decline of these aquatic resources, *Phragmites* would be managed during the life of the bank in low and high marsh habitats through spot applications of a USEPA-approved herbicide. In addition, these marshes are threatened by the pervasive dumping in the area. Existing debris in these areas would be removed consistent with all applicable requirements. By including and enhancing these wetlands as part of a mitigation bank, the threat of illegal filling and dumping is minimized.

Buffer Rehabilitation – A relatively small portion of the site would be restored as upland buffer to provide a barrier between the restored wetlands and the existing industrial and commercial land uses to the east.

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[49] For a detailed discussion regarding disposal of contaminated fill, see Section 3.5 Hazardous Materials.

[50] Draft Revised Site Screening Letter Results Report (Western Section), Mitigation and Restoration Strategies for Habitat and Ecological Sustainability Saw Mill Creek Pilot Wetland Mitigation Bank Blocks 1780, 1790, and 1815, Multiple Lots. Letter from Louis Berger & Assoc, PC to Max Taffet, New York City Economic Development Corporation, September 15, 2014.
Draft Revised Site Screening Letter Results Report (Eastern Pilot Wetland Mitigation Bank Blocks 1780, 1790, and 1815, Multiple Lots. Letter from Louis Berger & Assoc, PC to Max Taffet, New York City Economic Development Corporation, September 15, 2014.

[51] For further information regarding sampling studies, see Section 3.5 Hazardous Materials.

2.3.2.2 Project Site – Eastern Section

As with the western portion of the project site, the design of the eastern section would include impediments to dumping to the maximum extent possible. Subsequent to site construction and planting, the site would be fenced and secured and signs posted to describe potential penalties for illegal dumping. Regular site inspections would be conducted by the Parks Department to ensure any dumping conditions are noted and investigated.

***Wetland Restoration (Re-establishment)* –** The design plan for the former junkyard area located south of Saw Mill Creek and east of Chelsea Road (currently an urban vacant lot) consists of removing existing debris (tires, cement, asphalt, etc.) and excavating the fill to a target elevation that would support low and high marsh. Sampling studies were conducted to determine if the fill material in this area is contaminated[52]. Soil and groundwater sampling results indicate that a portion of this location is contaminated with polychlorinated biphenyls (PCBs) due to the presence of a discarded electric transformer. This area of concern would be over-excavated, backfilled with clean sand and then planted with native salt marsh species. Contaminated materials would be removed consistent with all applicable regulatory requirements.[53]

In addition, portions of remnant berms located east of Chelsea Road consist of *Phragmites* and *Ailanthus altissima* (tree of heaven)-dominated uplands. These berms would be removed and the area would be graded to an appropriate marsh plain elevation and planted with native salt marsh species.

***Wetland Restoration (Rehabilitation)* –** This area consists of *Phragmites*-dominated remnant berms and elevations that are too high to support salt marsh species. Restoration of this area would consist of excavating and grading the area to achieve proper tidal marsh elevations and excavating tidal creeks to provide hydrology. Sampling studies were conducted to determine if the fill material in this area is contaminated. Sampling studies recommend that most of the contaminated material be removed from the site; therefore, the area would be excavated to design grades before it is planted with native salt marsh grasses and shrubs. Contaminated materials would be removed in accordance with applicable regulations.

A barren panne located east of an island in the northeast corner of the eastern section only holds water at its western extremity. The design plan includes improvements to the habitat and function of this area by excavating and grading the area to establish appropriate depth for fish species occurring in pannes (i.e., mummichogs) and establishing

[52] For further information regarding sampling studies, see Section 3.5 Hazardous Materials
[53] For further information regarding disposal of contaminated fill, see Section 3.5 Hazardous Materials.

connections with tidal creeks at elevations that would allow flooding of the panne only during spring tides.

Areas dominated by *Phragmites* in the southern portion of the eastern section would be graded to proper salt marsh elevations and natural creeks reestablished, and the marsh plain planted with appropriate native salt marsh grasses and shrubs. This area would be managed for any reinvasion by *Phragmites* through select application of a USEPA-approved herbicide for use in aquatic habitats. The application of the herbicide would be subject to appropriate permits and approvals.

Wetland Enhancement – Much of the project site consists of low and high marsh, as well as several pannes. Based on conditions within the project site boundary, it is expected that *Phragmites* would continue to be the primary invasive species threatening wetland habitats, especially in the eastern section where there are several freshwater inputs. To prevent the decline of these aquatic resources, *Phragmites* would be managed during the life of the bank in low and high marsh habitats by spot applications of a USEPA-approved herbicide. The application of the herbicide would be subject to appropriate permits and approvals. Existing debris would be removed.

A red maple-sweetgum swamp area located within the southern portion of the eastern section contains some storm surge debris that would be removed to enhance habitat quality and function. Additionally, *Phragmites* encroachment into this area would be managed through select application of a USEPA-approved herbicide. Herbicide treatment in this area would be completed by either direct injection or hand wiping (not "spraying" which is a less controlled application method and has the potential to harm non-target plants). Any proposed work in this area would be coordinated with the NRG and would be undertaken in compliance with all applicable federal, state and local requirements and after obtaining any required approvals or permits.

Buffer Rehabilitation – Forested buffers within the eastern section would be enhanced through removal of debris and non-native, invasive species that compromise native diversity and wildlife usage. Target invasive species in areas identified for upland rehabilitation include, but are not limited to, *Polygonum cuspidatum* (Japanese knotweed), *Celastrus orbiculatus* (Oriental bittersweet), and tree-of-heaven. These and other dominant non-native invasive species would be managed by the seeding and/or planting of select native species and if warranted, through the spot application of a USEPA-approved herbicide for use in aquatic habitats. Herbicide treatment in these areas would be completed by either direct injection or hand wiping.

Proposed work in these areas would be limited to debris and invasive vegetation removal, seeding of warm season grasses, and fencing the roadside perimeter. No grading, grubbing, or mulching is proposed in these areas. Construction specifications would state that the contractor shall not disturb existing native vegetation or use heavy equipment in these areas. In addition, any proposed work in the forested Buffer Rehabilitation areas along Chelsea Road, including removal of trash, would need to be approved by NRG.

2.3.3 Alternative Design Modifications Considered

In developing the design for the proposed project, four additional options were identified, evaluated, and dropped from further consideration in 2013. These are summarized below, and illustrated in **Figure 2-13**. Each of these options would develop a wetland mitigation bank on a portion of the project site but were eliminated due to construction cost and wetland restoration considerations. The City's goal was to maximize the area of wetland restoration and enhancement, including removal of fill from wetlands west of Chelsea Road, to generate the most potential credits, while staying within the available construction budget of approximately $12 million (at the time of site selection). At the time of the assessment, the number of credits to be generated by each type of proposed habitat was not known, so a low to high range of credit ratios (acres per credit) was used to evaluate the alternative design options.

2.3.3.1 Project area east of Chelsea Road

This option would develop a wetland mitigation bank on a portion of the project site east of Chelsea Road as tabulated in **Table 2-4**. This alternative wetland mitigation bank would be comprised of approximately 18.42 acres of wetland enhancement, 5.12 acres of wetland restoration (rehabilitation), 12.69 acres of wetland restoration (re-establishment), and 2.55 acres of upland enhancement. This option would total approximately $6.9 million in preliminary projected construction costs, and would provide a 38.78 acre wetland mitigation bank with an estimated 12.84 to 27.53 potential credits. This option was not selected because it would not include removal of fill from wetlands west of Chelsea Road.

Table 2-4: Project Area East of Chelsea Road

Proposed Habitat	Acres	Ratio (acres:credit)	Potential Credits		
Wetland Enhancement	18.42	2:1 to 5:1	9.21	to	3.68
Wetland Restoration (rehabilitation)	5.12	1:1 to 2:1	5.12	to	2.56
Wetland Restoration (re-establishment)	12.69	1:1 to 2:1	12.69	to	6.34
Upland Enhancement	2.55	5:1 to 10:1	0.51	to	0.25
Total	**38.78**		**27.53**	**to**	**12.84**

2.3.3.2 Northern portion of the project area west of Chelsea Road

This option would develop a wetland mitigation bank on the northern portion of the project site west of Chelsea Road as tabulated in **Table 2-5.** This alternative wetland mitigation bank would be comprised of approximately 6.46 acres of wetland enhancement, 4.69 acres of wetland restoration (rehabilitation) and 5.68 acres of wetland restoration (re-establishment), without any upland enhancement. This option would total approximately $9.8 million in preliminary projected construction costs, and would provide a 16.83 acre wetland mitigation bank with an estimated 6.48 to 13.60 potential credits. This option was

not selected because it would not maximize the area of wetland restoration and enhancement to generate the most potential credits.

Table 2-5: Northern Portion of Project Area West of Chelsea Road

Proposed Habitat	Acres	Ratio (acres:credit)	Potential Credits		
Wetland Enhancement	6.46	2:1 to 5:1	3.23	to	1.29
Wetland Restoration (rehabilitation)	4.69	1:1 to 2:1	4.69	to	2.35
Wetland Restoration (re-establishment)	5.68	1:1 to 2:1	5.68	to	2.84
Upland Enhancement	0.00	5:1 to 10:1	0.00	to	0.00
Total	**16.83**		**13.60**	**to**	**6.48**

2.3.3.3 Southern portion of the project area west of Chelsea Road

This option would develop a wetland mitigation bank on the northern portion of the project site west of Chelsea Road as tabulated in **Table 2-6**. This alternative wetland mitigation bank would be comprised of approximately 10.64 acres of wetland enhancement, 0.43 acres of wetland restoration (rehabilitation), 4.76 acres of wetland restoration (re-establishment), and 2.55 acres of upland enhancement. This option would total approximately $8.8 million in preliminary projected construction costs, and would provide a 18.38 acre wetland mitigation bank with an estimated 4.98 to 11.02 potential credits. This option was not selected because it would not maximize the area of wetland restoration and enhancement to generate the most potential credits.

Table 2-6: Southern Portion of Project Area West of Chelsea Road

Proposed Habitat	Acres	Ratio (acres:credit)	Potential Credits		
Wetland Enhancement	10.64	2:1 to 5:1	5.32	To	2.13
Wetland Restoration (rehabilitation)	0.43	1:1 to 2:1	0.43	To	0.22
Wetland Restoration (re-establishment)	4.76	1:1 to 2:1	4.76	To	2.38
Upland Enhancement	2.55	5:1 to 10:1	0.51	To	0.26
Total	**18.38**		**11.02**	**To**	**4.98**

2.3.3.4 Entire project area

This option would develop a wetland mitigation bank encompassing the entire project site as tabulated in **Table 2-7**. This alternative wetland mitigation bank would be comprised of approximately 47.64 acres of wetland enhancement, 16.83 acres of wetland restoration (rehabilitation), 13.29 acres of wetland restoration (re-establishment), and 10.74 acres of upland enhancement. This option would total approximately $28.9 million in preliminary projected construction costs, and would provide a 88.49 acre wetland mitigation bank with

an estimated 25.66 to 56.08 potential credits. This option was not selected because it exceeded the project budget of $12 million.

Table 2-7: Entire Project Area

Proposed Habitat	**Acres**	**Ratio (acres:credit)**	**Potential Credits**		
Wetland Enhancement	47.64	2:1 to 5:1	23.82	to	9.53
Wetland Restoration (rehabilitation)	16.83	1:1 to 2:1	16.83	to	8.41
Wetland Restoration (re-establishment)	13.29	1:1 to 2:1	13.29	to	6.64
Upland Enhancement	10.74	5:1 to 10:1	2.15	to	1.07
Total	**88.49**		**56.08**	**to**	**25.66**

CHAPTER 3: AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL IMPACTS

This chapter presents an evaluation of the potential environmental effects of the proposed project, consistent with National Environmental Policy Act (NEPA) regulations specified at 40 Code of Federal Regulations (CFR) Part 1508.9 and U.S. Department of Housing and Urban Development (HUD) regulations found at 24 CFR Part 58. The New York City Environmental Quality Review (*CEQR) Technical Manual* establishes environmental impact analysis methodologies that have been developed for the specific context of New York City.[54] Because the proposed project is located in the City and involves actions by City and State entities, *CEQR Technical Manual* methodologies have been applied to the environmental screening and to subsequent environmental analyses, where applicable.

The proposed project involves habitat restoration of the project site and the establishment of the wetland mitigation banking instrument as discussed in Chapter 1, Project Description. As discussed in Chapter 2, Project Alternatives, the No Action Alternative does not meet the project purpose and need. However, an assessment of the No Action Alternative has been included in this chapter because it provides a baseline condition for the future analysis year (2016) against which the incremental impacts of the proposed project can be evaluated. Section 3.1 below describes those topics which are either not applicable to the proposed project or where no impacts are expected. Therefore, Section 3.1 demonstrates that further technical analysis for these topics is not required. For topics discussed in Sections 3.2 through 3.7 that have not been dismissed from further analysis, existing conditions are described first, followed by assessments of the potential environmental impacts of the No Action Alterative and the proposed project.

3.1 Environmental Issues Considered and Dismissed

As discussed below and consistent with *2014 CEQR Technical Manual* screening methods, the proposed project would not result in significant adverse impacts with respect to socioeconomic conditions, community facilities, open space, shadows, urban design and visual resources, water and sewer infrastructure, solid waste and sanitation services, energy, transportation, air quality, greenhouse gas emissions and climate change, noise, public health or neighborhood character.

3.1.1 Socioeconomic Conditions

According to the *2014 CEQR Technical Manual*, an assessment of socioeconomic conditions should be conducted if a project may be reasonably expected to create substantial

[54] *City Environmental Quality Review (CEQR) Technical Manual,* New York City Mayor's Office of Environmental Coordination, March 2014.

socioeconomic changes, such as displacements of residences or businesses or impacts to a specific industry. The proposed project would not introduce new residential or commercial development, and would not result in residential or business displacement or substantial changes in a specific industry. The proposed project does not warrant a socioeconomic conditions assessment and would not result in significant adverse impacts to socioeconomic conditions.

Under the proposed project, compensatory mitigation credits would be available for purchase by public agencies and private property owners with permitted wetland impacts. Once constructed, the proposed project would increase the resiliency of the area and help to protect more the more than 200 businesses and over 20,000 residents located in the area.

3.1.2 Community Facilities and Services

The proposed project would not displace or otherwise change any community facilities. The proposed project would not increase residential or employee populations in the area which would place additional demand on community facilities and services such as public schools (educational facilities), public libraries, daycare centers, healthcare facilities, social services, and police and fire services. Therefore, the proposed project does not require further evaluation and would have no effects on community facilities and services.

3.1.3 Open Space

As shown in **Figure 1-3** (in Chapter 1, Project Description), the project site includes land within the jurisdiction of the New York City Parks Department. However, this Parks Department land is not publicly accessible open space. The proposed project would not make the project site publicly accessible, would not result in changes to the overall size of any open space or eliminate an open space, and would not generate residential or employee populations that would increase demand for open space. The operation of the proposed project would not result in increased noise or air pollutant emissions, odors, or shadows that would affect open space. Implementation of the proposed restoration plan would result in the clean-up, enhancement, and restoration of the Saw Mill Creek marsh. In addition, as part of the proposed restoration of the site, the area would be preserved in perpetuity. Therefore, the proposed project does not warrant additional analysis and would not result in significant adverse impacts to open space.

3.1.4 Shadows

The proposed project would not result in any new buildings or other structures; and, therefore, has no potential to create shadows on sunlight sensitive resources. As such, a shadows analysis is not necessary and significant adverse shadow impacts would not result from the proposed project.

3.1.5 Urban Design and Visual Resources

The proposed project involves the restoration of a natural area, within existing site boundaries. The proposed project would remove litter, storm debris and other discarded items (e.g. bulk storage tanks, electrical equipment, 55-gallon drums, etc.) from the marshland and natural environment that serves as the project site. It would not alter the natural features of the project site and would not introduce any built structures. Additionally, a CEQR urban design and visual resources assessment focuses on the pedestrian's experience of public space and how a project may alter that experience. However, the project area is largely void of pedestrians as the project site is not publicly accessible and sidewalks are not provided on all project area streets. Thus, the proposed project does not require further analysis and would not have a significant adverse impact on urban design or visual resources.

3.1.6 Water and Sewer Infrastructure

The project would not generate demand for water and would not adversely affect the City's water or sewer infrastructure. The project site is located in an unsewered portion of Staten Island. The project site is not served by local sanitary and storm sewer utilities. However, the project does not include development and would not generate sanitary flow, nor would the project result in an increase in impervious surface area. Accordingly, the proposed project does not require an infrastructure assessment and would not result in significant adverse impacts to water and sewer infrastructure.

Once constructed, the bank would increase the area's capacity to detain stormwater thereby minimizing upland inundation during storms and flooding events. Thus, the proposed project would have a beneficial impact on stormwater management.

3.1.7 Solid Waste and Sanitation Services

The proposed project would not generate any solid waste nor any demand for sanitation services; and, therefore, has no potential to overburden available waste management capacity. As such, a solid waste assessment is not warranted and significant adverse impacts to solid waste and sanitation services would not result from the proposed project. Section 3.6, Construction Impacts, discusses the potential effects related to the removal of solid waste and excavated material during construction of the proposed project.

3.1.8 Energy

The proposed project involves the restoration of a natural area and would not require an energy supply post-construction. Considerations of energy consumption do not apply to the proposed project. Therefore, the proposed project does not require further analysis and would not have an adverse impact on energy.

3.1.9 Transportation

The proposed project would not result in any new development and would not generate new residents or employees. Substantial pedestrian or automobile traffic would not be generated by the proposed project. A minor amount of traffic would be generated by Parks Department staff, limited to trips necessary to conduct routine inspections and maintenance activities. Therefore, transportation analyses are not required, and significant adverse traffic, parking, transit or pedestrian impacts would not result from operation of the proposed project.

Refer to Section 3.6.3 for a discussion of the potential for temporary traffic impacts during the proposed project's construction period.

3.1.10 Air Quality

Projects with the potential to result in mobile or stationary air quality impacts require air quality analysis. With respect to mobile sources, the proposed project would not increase or result in the redistribution of traffic; create any other mobile sources of pollutants (e.g., diesel trains); or introduce any new development near existing mobile sources. Negligible mobile source emissions would be generated by periodic long-term monitoring and maintenance activities. With respect to stationary sources, the proposed project would not include the use the use of boilers or otherwise result in a new stationary source of pollutants; or introduce new uses or structures near existing emission stacks. As such, the proposed project does not warrant further analysis and would not have a significant adverse impact on air quality.

The potential for temporary effects on air quality during the construction of the proposed project is addressed in Section 3.6.4.

3.1.11 Greenhouse Gas Emissions and Climate Change

A greenhouse gas (GHG) consistency assessment is typically only warranted for larger projects that have the greatest potential to produce GHG emissions which may result in inconsistencies with the City's GHG reduction goal to a degree considered significant. The proposed project comprises the restoration of a natural area and would have no potential to produce greenhouse gas emissions post-construction. Therefore, further analysis of greenhouse gas emissions is not necessary, and the proposed project would not result in significant adverse impacts related to greenhouse gas emissions.

One of the many benefits that coastal wetlands provide is their role in contributing to global carbon cycle (also referred to as coastal blue carbon). [55] Coastal wetlands sequester

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[55] http://thebluecarboninitiative.org/first-greenhouse-gas-methodology-for-tidal-wetland-and-seagrass-restoration/

carbon dioxide from the atmosphere and store it in the form of biomass and soil carbon.[56] The restoration of blue carbon ecosystems, which would be achieved under the proposed project, provides the following potential GHG emission reductions or removals: increasing biomass, increasing soil organic carbon, reducing methane and/or nitrous oxide emissions, and reducing carbon dioxide emissions.[57] In addition, the wetlands restored by the proposed project would play a role in increasing the City's resiliency to sea level rise due to climate change and extreme weather events by providing additional accommodation for flood and stormwaters. The proposed project would likely contribute to GHG mission reductions, and would have a beneficial effect with respect to GHG emissions and climate change.

3.1.12 Noise

Projects that would not generate mobile or stationary sources of noise and are not located in an area with existing high ambient noise levels typically do not have the potential to cause significant adverse noise impacts and therefore do not warrant a quantified noise assessment. The operation of the proposed wetland restoration project would not generate any new mobile or stationary sources of noise, nor is the project site in an area with existing high ambient noise levels. As such the proposed project does not require further analysis and would not cause a significant adverse noise impact.

Refer to Section 3.6.4 for a discussion of the potential for temporary noise impacts during construction of the proposed project.

3.1.13 Public Health

Public health refers to the organized effort of society to protect and improve the health and well-being of the population through monitoring, assessment and surveillance, health promotion, prevention of disease, injury, disorder, disability and premature death, and reducing inequalities in health status. The goal of a public health assessment is to determine whether a project may have adverse effects on public health, and if so, to identify measures to mitigate such impacts. Where no significant unmitigated adverse impact is found in other analysis areas, such as air quality, water quality, hazardous materials, or noise, no public health analysis is warranted.

The proposed project is not expected to result in significant unmitigated adverse impacts with respect to air quality, water quality, hazardous materials or noise. In addition, the proposed project does not have the potential for public health consequences not related to issues already addressed in other technical areas. Under the proposed project, the project

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[56] Coastal wetlands only represent two percent of the world's surface area, yet they sequester 50 percent of the carbon that is transferred to marine soils and sediments.

[57] http://thebluecarboninitiative.org/first-greenhouse-gas-methodology-for-tidal-wetland-and-seagrass-restoration/

site would remain inaccessible to the public. Therefore a public health impact assessment is not warranted, and the proposed project would not result in a significant adverse public health impact.

3.1.14 Neighborhood Character

The following elements collectively contribute to neighborhood character, or the distinctive "personality" of a neighborhood: land use, socioeconomics, historic resources, urban design and visual resources, traffic and/or noise. A neighborhood character assessment is appropriate for projects that have the potential for significant adverse impacts in any of the following areas: land use, zoning and public policy; socioeconomic conditions; open space; historic and cultural resources; urban design and visual resources; shadows; transportation; or noise. Significant adverse impacts have not been identified for the proposed project; therefore a neighborhood character assessment is not warranted. The proposed project would not have a significant adverse effect on neighborhood character.

3.2 Land Use, Zoning and Public Policy

3.2.1 Study Area

The study area for land use, zoning and public policy is the area within 400 feet of the project site boundaries, as consistent with the methodology of the *2014 CEQR Technical Manual*. As indicated in the description of the No Action Alternative included in Chapter 2, Project Alternatives, no planned or approved projects or initiatives that would be completed by the 2016 analysis year have been identified within the land use study area. Aside from typical background growth, no new development or changes in land use are expected in the future with the proposed project in place.

3.2.2 Land Use and Zoning

3.2.2.1 Affected Environment

The proposed project site comprises 68.94 acres located on the western shore of Staten Island, in Community District 2. As shown in **Figure 1-2** Land Use, predominant land uses in the area surrounding the project site include open space, vacant land, and industrial land uses.

The site is bisected by Chelsea Road (oriented north to south) into a western section and an eastern section. The approximately 15.0-acre western section of the project site is generally bounded by railroad tracks to the west, a Williams-Transco underground natural gas pipeline valve house access road to the north, Chelsea Road and privately-owned parcels to the east and by Saw Mill Creek to the south. The railroad tracks running along the western edge of the project site include overhead electrical lines and buried high voltage cables. Beyond the railroad is additional tidal marsh, followed by Pralls Creek and the Arthur Kill waterway. Beyond River Road to the north of the site is vacant land that was

formerly the GATX facility, a high-capacity petroleum storage tank field and transfer station that handled petroleum products for decades. A Con Edison electrical substation (100 River Road) is located approximately 0.18 miles to the northwest of the project site, at the terminus of River Road on the Arthur Kill. Tidal marsh adjacent to Saw Mill Creek forms the southern boundary of the western section of the project site, beyond which is open tidal marsh.

There are a number of privately-owned commercial and industrial parcels along Chelsea Road immediately adjacent to the western section of project site. The property at 365 Chelsea Road is used for school bus parking by Cheryl & Sons, Inc., a school bus dealer located at 337 Chelsea Road. The property at 335 Chelsea Road is utilized as a parking lot for temporary staging of new cars. A large garage-type building is located on this property. Master Mix, LLC, a concrete production plant, is located at 333 Chelsea Road. North of 333 Chelsea Road are vehicle storage yards and metal buildings with no identifiable address. Based on a review of the New York City Department of Finance (NYCDOF) online records, the tax lots are identified as 291-295 Chelsea Road. A large fence along Chelsea Road obscures the view of these properties. Additionally, view of these properties from the project site is limited due to vegetative overgrowth along an approximate 10-foot high berm.

Two existing businesses located on the western side of Chelsea Road (Block 1815, Lots 160 and 260; see **Figure 1-3**) have a history of encroachment on the eastern section of Block 1815, Lot 300, one of the project site parcels owned by the Parks Department). As visible in **Figure 1-1**, vehicle storage areas associated with businesses located at 335 Chelsea Road and 291-295 Chelsea Road have infringed upon Lot 300. The Parks Department's Parklands Division has taken enforcement measures to remove the encroachment.

The approximately 53.94-acre eastern section of the project site is generally bounded by Chelsea Road and privately-owned parcels to the west, Edward Curry Avenue and associated right-of-way to the north, tidal marsh followed by Route 440 to the east, and Chelsea Road and an off-ramp from Route 440 to the south. Beyond Chelsea Road is a self-storage facility and beyond the off-ramp is wooded land. The northern boundary comprises Edward Curry Avenue and its right-of-way, beyond which is Flagstone Landscape and Garden Supply, Faztec Industries (a recycling and materials business), a sportsmen's club, and an office building. Chelsea Road and Chelsea Playground (400 Chelsea Road), Island Charter (380 Chelsea Road) (a bus rental company), private parking lots and Cambridge Paving Stones storage comprise the western boundary (of the eastern section of the project site).

The surrounding land uses – a mix of industrial, institutional, commercial transportation/ utility, vacant land and open space – buffer the project site from proximate residential uses. Residential areas closest to the project site are found approximately 3,500 to the south in the Chelsea area and approximately 4,000 feet to the northeast in the Bulls Head neighborhood. The Chelsea residential area is located south of Meredith Avenue and east of Route 400 in the vicinity of Cannon Avenue and Victory Boulevard, while residences in Bulls Heads are located in the vicinity of Signs Road and Victory Boulevard. Residential

uses in these areas are predominantly single-family homes, with some two-family homes and a limited number of apartment buildings.

The project site is largely mapped within the jurisdiction of the Parks Department (see **Figure 1-3** for the jurisdiction of each parcel). As shown in **Figure 3-1** Zoning, the portions of the project site that are not under Parks jurisdiction are zoned for manufacturing uses; specifically zoning districts M3-1 and M2-1. Additional zoning districts within the project area include M1-1 and C4-3.

M1 zoning districts typically include light industrial uses, such as repair shops and wholesale service and storage facilities, and are often buffers between M2 or M3 districts and adjoining residential or commercial areas. Most types of industrial use are permitted in M1 districts if they conform to the stringent performance standards (e.g., minimum requirements or maximum allowable limit on noise, vibration, smoke, order or other nuisance effects). M3 zoning districts are designated for areas with heavy industries that generate noise, traffic or pollutants. In M3 districts, uses with potential nuisance effects are required to comply with minimum performance standards. M2 zoning districts are the middle ground between light and heavy industrial uses, with performance standards that that are less stringent than M1 districts. M2 districts are generally mapped in the City's older waterfront industrial areas. C4 commercial districts are generally mapped in commercial centers located outside of central business districts. Commercial and office uses that serve a larger region and generate more traffic than neighborhood shopping areas are permitted in C4 districts.

3.2.2.2 Potential Environment Impacts

3.2.2.1.1 No Action Alternative

No changes in land uses on or near the project site are anticipated in the No Action Alternative. Typical background growth would occur, but substantial new development is not expected to be constructed in the vicinity of the project site. A continuation of existing land use patterns and trends is expected in the future without the proposed project.

In the No Action Alternative, continued and increased encroachment by adjacent land uses onto the property may be expected. The project site is currently subject to pervasive illegal dumping; this condition would also be expected to continue and increase. Given the continued encroachment and illegal disposal of waste, the No Action Alternative has the potential for an adverse effect on land use.

Similar to the proposed project, the No Action Alternative would be consistent with existing zoning.

3.2.2.1.2 Proposed Project

The existing light industrial and commercial land uses identified on the east and west sides of Chelsea Road (i.e., located between the two portions of the project site) would remain in

the future with the proposed project. The current encroachment of adjacent industrial uses and illegal dumping conditions would be improved through security fencing, improved signage, increased presence at the project site during post-construction monitoring periods, and Parks Department routine inspections.

The proposed project would not require any zoning actions or relief from zoning regulations, and would be consistent with the existing land use pattern which is expected to largely remain unchanged in the 2016 analysis year. The proposed project would improve the City's control over the project site through monitoring encroachment by nearby businesses and illegal dumping. Thus the proposed project would not result in a significant adverse effect with respect to land use or zoning.

3.2.3 Public Policy

3.2.3.1 Affected Environment

PlaNYC is the City's long-term sustainability and resiliency plan that was adopted in 2007 to work toward a greener, greater New York. The Plan establishes a wide range of sustainability polices that apply to the City's land use, open space, brownfields, energy use and infrastructure, transportation systems, water quality and infrastructure, and air quality. Recognizing the challenges to the City's success and quality of life that are posed by the changing climate, a growing population and aging infrastructure, the Plan includes actions to mitigate climate change and improve the City's resiliency to projected climate change effects.

In May 2012, the City released its Wetlands Strategy as part of the PlaNYC 2030 initiative. The strategy builds upon past planning efforts to address challenges facing the City's remaining wetland areas, and provides a framework for strengthening these critical areas in New York City. The strategy establishes a goal of no net loss of wetlands, but also recognizes the insufficiency of solely focusing on the quantity of wetlands. Thus the strategy also incorporates objectives to improve the quality of the remaining wetland areas and maximize their ecological functions. Initiatives to achieve these goals are addressed in four key areas:

1. Protection: To enhance wetlands protection, strengthen protection of vulnerable wetland parcels, increase wetlands acquisition efforts, and update the Waterfront Revitalization Plan.
2. Mitigation: Work with State and Federal partners to revise wetlands mitigation guidance, and create a wetlands mitigation banking instrument or in-lieu fee mechanism for public projects.
3. Restoration: Complete City-funded restoration projects, create a natural areas conservancy, and work with State and Federal partners to complete and

implement the Comprehensive Restoration Plan[58] developed to provide the blueprint for restoration for the entire New York-New Jersey Harbor Estuary.

4. Assessment: Improve wetlands mapping in New York City; monitor tidal wetlands and analyze the potential impacts of sea level rise; assess the conditions and functions of New York City wetlands; and develop a research agenda to address wetlands challenges.

In April 2015, the City released OneNYC, building on the prior long-term sustainability plans of PlaNYC. The City seeks to improve wetlands protection, restore the functions of important wetlands, and improve the mitigation process via implementation of its Wetlands Strategy. OneNYC's water quality goals follow those outlined in PlaNYC and include improving the quality of waterways and restoration of coastal ecosystems. Approaches to improve water quality include increasing the use of sustainable stormwater best management practices (BMPs) and the protection of wetlands. Other objectives of the Plan that are relevant to the proposed project include protecting and promoting nature in the City's open spaces, conserving natural areas and preserving wildlife and nature, protecting and enhancing natural resources, and improving waterways.

Building on the PlaNYC foundation, in June 2013 the Special Initiative for Rebuilding and Resiliency (SIRR) released a report titled *A Stronger, More Resilient New York.* The SIRR report outlines recommendations to protect neighborhoods and infrastructure from future climate events, and specifically identified Saw Mill Creek as a wetland complex capable of serving a protective buffer on the coast of western Staten Island, shielding developed inland areas from the effects of wave action and flooding. [59] In October 2014, Mayor Bill de Blasio announced the availability of Community Development Block Grant – Disaster Recovery (CDBG-DR) funding for SIRR-related targeted resiliency and infrastructure investments. The proposed project is specifically identified in the CDBG-DR Action Plan as an important component to protect businesses and residents on the West Shore of Staten Island.

With respect to public policy specific to the project area, in 2011 the New York City Department of City Planning (NYCDCP) and EDC released *The Working West Shore 2030*, a report that lays the framework for future investment in development and land use decisions on the West Shore of Staten Island.[60] The report identifies strategies that will help create jobs, upgrade infrastructure, preserve open space and manage growth over the

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[58] *The Comprehensive Restoration Plan*, developed by the New York-New Jersey Harbor & Estuary Program, The Port Authority of New York & New Jersey and the U.S. Army Corps of Engineers - New York District, was developed to provide the blueprint for restoration for the entire New York-New Jersey Harbor Estuary.

[59] *A Stronger and More Resilient New York*, page 65. The New York City Special Initiative for Rebuilding and Resiliency. June 11, 2013.

[60] The New York City Economic Development Corporation and the New York City Department of City Planning, *Working West Shore 2030, Creating Jobs, Improving Infrastructure and Managing Growth*. June 2011.

next twenty years. The four main objectives of the 2030 strategy are to create quality local jobs for Staten Islanders, reducing the need for off-island commutes; improve connections between West Shore job centers and neighborhoods and the rest of the borough and the region through upgraded road and transit networks; preserve and link open spaces, expand public waterfront access, and strengthen connections between parks and neighborhoods; and improve community services and choices for the West Shore area and expand housing and transit options to attract and retain young adults and meet the needs of a growing senior population.

The vision for the goal of preserving and linking open spaces goal comprises a number of tactics, including: preserve natural lands; recover and utilize brownfield areas; expand the Bluebelt system; encourage development that provides open space and remediation; develop and implement stormwater management guidelines to facilitate future industrial and commercial development while preserving and improving extensive natural areas; utilize Staten Island Bluebelt concepts to design future stormwater drainage and protect streams and wetlands; and provide waterfront access and shoreline amenities with views of Prall's Island and Saw Mill Creek Marsh.

Finally, the proposed project site falls within the boundaries of the City's Waterfront Revitalization Program (WRP) and must be evaluated for consistency with the WRP policies. The WRP establishes a broad range of public policies for its coastal areas and is the City's main coastal zone management tool. The WRP establishes 10 categories of policies that are used to assess the consistency of a proposed project within the coastal zone with the WRP: (1) residential and commercial redevelopment; (2) maritime and industrial development; (3) use of the waterways; (4) ecological resources; (5) water quality; (6) flooding and erosion; (7) hazardous materials; (8) public access; (9) scenic resources; and (10) historical and cultural resources.

The New York Department of State (NYSDOS) is the agency responsible for certification that a proposed project within the coastal zone is consistent with the State's coastal zone management policies. Because the City has adopted its own WRP, the NYSDOS bases its consistency determination on consultation with the NYCDCP Waterfront and Open Space Division.

3.2.3.2 Potential Environment Impacts

3.2.3.2.1 No Action Alternative

In the No Action Alternative, the comprehensive plan to restore and enhance the existing marshlands and forests that comprise the proposed project would not be implemented. Thus the No Action Alternative would not conflict with public policy, but it would not be directly supportive of PlaNYC's wetland strategy; of the vision outlined in *The Working West Shore 2030* report; or of the recommendations included in the SIRR report, *A Stronger, More Resilient New York.* Although the No Action Alternative would not be inconsistent with the WRP policies, it would not provide direct support for many of the policies established in the WRP, including Policy 4: Protect and restore the quality and function of ecological

systems within the New York City coastal area; and Policy 5: Protect and improve water quality in the New York City coastal area; and Policy 9: Protect scenic resources that contribute to the visual quality of the New York City coastal area.

3.2.3.2.2 Proposed Project

The proposed project is publicly-sponsored and is consistent with and supportive of the City's sustainability policies and goals, as encouraged through PlaNYC and the subsequent OneNYC. Since the proposed project entails the development of a pilot wetland mitigation bank, it directly supports the wetlands strategy and PlaNYC/OneNYC objectives related to wetlands.

The proposed project includes wetland restoration, enhancement and rehabilitation; and upland buffer rehabilitation. As such, it is consistent with PlaNYC/OneNYC's overall water quality goal of improving the quality of New York City's waterways to increase opportunities for recreation and restore coastal ecosystems; with PlaNYC/OneNYC's natural resources objective of protecting and enhancing natural resources; and with PlaNYC/OneNYC's open space goal of protecting and promoting nature.

The proposed project is included in the CDBG-DR Action Plan as an important action that would protect West Shore businesses and residents, and Saw Mill Creek is identified in the SIRR's *A Stronger and More Resilient New York* report as wetland complex that would improve the resiliency of Staten Island's West Shore. Implementation of the proposed project would be directly consistent with the implementation of the SIRR report recommendations and in line with the intent of CDBG-DR funding to provide recovery from Superstorm Sandy and to provide resiliency from future storm events.

The proposed project would be consistent with *The Working West Shore 2030* framework's goal of preserving and linking open space as it would restore (and preserve) the Saw Mill Creek wetland complex thereby improving the extensive Saw Mill Creek natural area. The proposed restoration of the tidal wetlands complex would substantially improve stormwater management in the project area, facilitating future industrial and commercial development. The proposed project would also support the "recover and utilize brownfield" strategy, as it would remove existing contaminated fill material on portions of the project site (as detailed in Section 3.5 Hazardous Materials).

A WRP Consistency Assessment was prepared for the proposed project as part of the CEQR review process and also as part of the wetland permitting process. On January 8, 2014 the NYCDCP Waterfront and Open Space Division determined that the proposed project is consistent with WRP policies. The NYSDOS also determined that the proposed project meets their general consistency concurrence criteria in a letter dated March 10, 2014. A copy of WRP Consistency Assessment and the City and State consistency determinations are provided in **Appendix A.**

The proposed project is consistent with and would support relevant public policies such as PlaNYC/OneNYC, the SIRR's *A Stronger, More Resilient New York*, the CDBG-DR Action Plan,

The Working West Shore 2030, and the City's WRP. The proposed project would not have a significant adverse effect with respect to public policy.

3.3 Historic and Cultural Resources

A cultural resources assessment was conducted in conformance with Section 106 of the National Historic Preservation Act (NHPA) of 1966. Areas of Potential Effect (APEs) for archaeological and architectural resources were defined in accordance with applicable regulations and 2014 *CEQR Technical Manual* methodology. The entirety project site is the archaeological APE for the proposed project as it is the area what would be disturbed during construction. To account for the potential visual and/or contextual effects, the historic architectural APE includes the project site and area within 400 feet of the project site boundary.

3.3.1 Architectural Resources

3.3.1.1 Affected Environment

Historic architectural properties include properties or districts listed on the State or National Registers of Historic Places or determined eligible for such listing; National Historic Landmarks, New York City Landmarks, and New York City Historic Districts; and properties that have been found by New York City Landmarks Preservation Commission (LPC) to appear eligible for landmark designation, considered for designation by LPC at a public hearing, or calendared for consideration at such a hearing (these are pending New York City Landmarks).

Based on a review of relevant databases[61], no historic resources were found on or within 400 feet of the project site parcels. A letter was sent to LPC on 6/10/2013 requesting the identification of any historic architectural resources within the general project area plus a 400-foot radius from the area boundaries (i.e., the APE).[62] In a letter dated 7/17/2013, LPC stated that there are no properties of architectural significance within the general project area that have the potential to be affected by the proposed project (see **Appendix D**).

[61] http://nysparks.com/shpo/online-tools/

[62] At the time that the letter was sent, the general project area was larger and encompassed the following 19 parcels: Block 1780, Lots 1, 69, 210, 260, 275, 300; Block 1790, Lot 100; and Block 1815, Lots 75, 85, 125, 135, 150, 204, 220, 235, 251, 300, 325 and 375.

3.3.1.2 Potential Environment Impacts

3.3.1.2.1 No Action Alternative

Under the No Action Alternative the proposed project would not be implemented. No effects to historic architectural resources on the project site are anticipated under the No Action Alternative

3.3.1.2.2 Proposed Project

The proposed project would not result in significant adverse impacts to architectural resources as the APE does not contain such resources.

3.3.2 Archaeological Resources

3.3.2.1 Affected Environment

A written description of the proposed project was submitted to LPC on 6/10/2013 and to the New York State Office of Parks, Recreation and Historic Preservation's State Historic Preservation Office (SHPO) on 2/19/14. LPC completed an initial environmental review of the project site and indicated that the site possesses archaeological significance. Since there is the potential for the recovery of archaeological deposits from the 19th century and Native American occupation and human burials on the project site, LPC required the completion of an archaeological documentary study.

In October of 2013, a Phase IA Archaeological Documentary Study (see Attachment 2 of **Appendix B**) was completed for the project site in order to determine whether intact archaeological resources might exist on the project site.[63] The Phase IA indicated that large portions of the site have been disturbed through earthmoving and grading. The Phase IA findings did indicate areas of pre-contact archaeological sensitivity within upland areas of the project site, and recommended that Phase IB archaeological testing be undertaken. LPC concurred with the Phase IA findings and requested that a scope of work be developed for the archaeological fieldwork (see letter from LPC dated 11/15/13 included in **Appendix D**).

[63] *Phase IA Archaeological Documentary Study Saw Mill Creek Wetland Mitigation Bank, Block 1780, Lots 1, 69, 210, 260, 275, and 300; Block 1790, Lot 100 Block 1815, Lots 74, 75, 85, 125, 135, 150, 204, 220, 235, 251, 300, 325, and 375, Staten Island, Richmond County, New York.* Prepared for the New York City Economic Development Corporation by Historical Perspectives Inc., October 2013.

3.3.2.2 Potential Environment Impacts

3.3.2.2.1 No Action Alternative

Under the No Action Alternative it is assumed that no ground disturbance would occur on the project site. Therefore this alternative would have no effect on archaeological resources.

3.3.2.2.2 Proposed Project

As discussed above, documentary studies to evaluate the potential for archaeological resources on the project site recommended the preparation of a Phase IB archaeological testing to confirm the presence of archaeological resources. The Phase IB fieldwork/ testing is proposed to be undertaken during (and in coordination with) construction. The archaeological fieldwork protocol includes an unanticipated discoveries plan which relies on the presence of archaeological monitors during construction of the project to ensure that any potential archaeological resources that may be present on the project site are appropriately treated.

LPC reviewed and accepted the archaeological monitoring protocol on February 10, 2014. The archaeological protocol was subsequently revised and a final revised version was completed July 18, 2014. SHPO accepted the revised archaeological fieldwork protocol on August 13, 2014 and LPC accepted the final revised protocol on September 5, 2014 (see **Appendix D**).

In order to ensure that the required archaeological monitoring obligations are met during construction and are carried out in accordance with applicable standards, a Programmatic Agreement (PA) has been developed among the U.S. Army Corps of Engineers (USACE), the SHPO, EDC, and LPC. The PA designates EDC, as the project sponsor, as the responsible entity for carrying out the Phase IB testing; sets out professional standards for those performing the archaeological resource monitoring; provides a protocol for addressing any resources found intact, including any unanticipated discoveries; designates the responsibilities of the PA signatories; and includes standard provisions for reporting results, resolving disputes, and amending and terminating the PA. The draft PA is provided as **Appendix B**.

The implementation of the PA will ensure that if archaeological resources are encountered during the construction of the project, mitigation measures (such as further testing, data recovery, curation, etc.) would be developed in coordination with the regulatory agencies. Therefore the proposed project would not have a significant adverse impact on archaeological resources.

3.4 Natural Resources

The project site contains the following types of natural resources: surface water hydrology, vegetation, wetland and open water areas, wildlife and special status species, significant

natural communities, floodplains and soils. The regulatory context is described first, followed by descriptions of the affected environment and potential environmental impacts for each resource type. The project site is not within a sole source aquifer system identified by the USEPA under the Safe Drinking Water Act.

3.4.1 Regulatory Context

3.4.1.1 Federal

National Flood Insurance Act of 1968 (44 CFR § 59) and Floodplain Management Executive Order 11988 (42 FR 26951). The Floodplain Management Executive Order (EO) 11988 and National Flood Insurance Act of 1968 (44 CFR § 59) regulate development in floodplains defined by Federal Emergency Management Agency (FEMA) mapping. As per EO 11988, federal agencies are required to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

The project site is largely located within the 100-year floodplain. According to FEMA's Preliminary Firm Data (December 5, 2013), the majority of the project site is within an AE zone which represents areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. According to 24 CFR Part 55.12(c)(3), a project may be excluded from floodplains and wetlands review if the project *restores and preserves the natural and beneficial functions of floodplains and wetlands*. As the central intent of the proposed project is wetland restoration, the proposed project qualifies as an exception as per 24 CFR Part 55.12(c)(3), and therefore is not required to follow the 8-step process for activities in a floodplain.

Executive Order 11990, Protection of Wetlands. EO 11990 states that federal agencies can undertake or provide assistance for new construction in wetlands only if there is no practical alternative to such construction and the proposed action includes all practicable measures to minimize harm to the wetland.

The project site contains wetlands and the proposed project entails wetland restoration, re-establishment, etc. However, as discussed above, the proposed project qualifies as an exception as per 24 CFR Part 55.12(c)(3) and is not required to complete the floodplain or wetlands review processes.

Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The USACE protects wetlands considered "Waters of the U.S." under Section 404 of the Clean Water Act. The USACE also regulates activities below ordinary high water elevations of navigable waters of the U.S. and adjacent wetlands.

Saw Mill Creek within the project site is a tributary of the Arthur Kill, a navigable water; thus the creek is classified by the USACE as a navigable water. Wetland restoration and other activities included in the proposed project would require a Section 10 permit.

Pursuant to its responsibilities under Sections 10 and 404, the USACE has a responsibility to review permit requests. The USACE review considers the purpose and need of a project from a public interest perspective. This EA provides the basis for this public interest review, as outlined in Title 33 CFR Part 320.4. The public interest determination involves more than an evaluation of impacts to the aquatic environment; a project must also be evaluated to ensure that it is not contrary to the public interest. Public interest review factors include: Conservation, Economics, Aesthetics, General Environment, Wetlands, Cultural Values, Fish & Wildlife Values, Land Use, Flood Hazards, Property Ownership, Flood Plain Values, Navigation, Recreation, Shore Erosion & Accretion, Water Supply/ Water Quality, Energy Needs, Safety, Mineral Needs, Food & Fiber production, and Needs & Welfare of People. A project may have an adverse effect, a beneficial effect, a negligible effect, or no effect on any or all of these factors. The USACE must evaluate the proposed project in light of these factors and other relevant public interest factors, to determine the overall balance of the proposed project with respect to the public interest. The public interest review is a balancing test by the USACE of the foreseeable benefits and detriments of proposed projects on an individual and cumulative basis.

In addition, the USEPA Guidelines prohibit the issuance of a permit if the discharge is not the least environmentally damaging practicable alternative, or would cause or contribute to significant degradation of waters of the United States (40 CFR 230.10(a)(4).[64]

Section 401 of the Clean Water Act (Water Quality Certification). Applicants for a federal license or permit to conduct an activity that may result in a discharge of a pollutant into waters of the U.S., are required by Section 401 of the Clean Water Act to obtain a certification (from the State in which the discharge originates) that the discharge complies the applicable water quality standards. The New York State Department of Environmental Conservation (NYSDEC) oversees this permit certification.

A Section 401 application is required for the proposed project to demonstrate that it would not release contaminants into state and federal waters.

Endangered Species Act of 1973 (16 USC §§ 1531 to 1544). The Endangered Species Act of 1973 (ESA) provides for the protection of critical habitats on which endangered or threatened species depend for survival; and also prohibits the importation, exportation, taking, possession, and other activities involving illegally taken species covered under the Act.

According to correspondence with the NYSDEC Natural Heritage Program (NYSDEC NHP) and the United States Fish and Wildlife Service (USFWS) (see **Appendix D**), the project

[64] The USEPA has developed criteria to be used in the evaluation of discharges of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act. The *Guidelines for Specification of Disposal Sites for Dredged or Fill Material* (40 CFR Part 230, December 24, 1980) are commonly known as the Section 404(b)(1) guidelines.

area contains habitat that may support federal and/or state threatened, endangered, proposed or candidate species. Therefore the ESA is relevant to the proposed project.

Migratory Bird Treaty Act [50 CFR 10, 20, 21, Executive Order 13186]. The Migratory Bird Treaty Act makes it unlawful to pursue, hunt, take, capture, kill or sell birds listed therein. The statute applies to both live and dead birds, and includes any bird parts (i.e. feathers, eggs, and nests). Currently more than 800 species are protected by the Act.

This Act is applicable to the proposed project as several avian species have been observed on the project site and in the project area.[65]

Magnuson-Stevens Fishery Conservation and Management Act [16 USC 1801 et seq]. The Magnuson-Stevens Act, the primary law governing marine fisheries management in U.S. federal waters, includes national standards for management and mandates the contents of fishery management plans. It was eenacted to promote the U.S. fishing industry's optimal exploitation of coastal fisheries by "consolidating control over territorial waters" and establishing eight regional councils to manage fish stocks. Section 305(b)(2)-(4) of the Act outlines the process for the National Marine Fisheries Service (NMFS) and the regional councils to comment on activities proposed by federal agencies that may adversely impact areas designated as Essential Fish Habitat (EFH).

Based on correspondence with the NMFS (see **Appendix D**), the project area includes areas designated as EFH; thus this Act is relevant to the proposed project.

Essential Fish Habitat (EFH). [16 USC 1802(10)] EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Adverse impacts include any effects that reduce the quality and/or quantity of EFH. EFH portions of the New York Harbor waterways are listed by the NMFS as essential for one or more life stages of commercially and/or recreationally important fishes. The types and timing of in-water work may be limited by such a designation (typically via the permitting process).

EFH for 17 federally-managed fish species has been designated in the area, therefore an EFH assessment was prepared for the proposed project.

Fish and Wildlife Coordination Act (PL 85-624; 16 USC 661-667e). Under this Act, the Secretary of the Interior is responsible for providing assistance to, and cooperating with, federal, state, and public or private agencies and organizations, to ensure that wildlife conservation receives equal consideration with other water-resource development programs. These programs can include the control (such as a diversion), modification (such as channel deepening), or impoundment (through the construction of a dam) of a body of water.

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[65] dedicated avian survey was also conducted by biologists at the project site on July 23, 201

This Act is relevant to the proposed project given the nature of the project (work in/adjacent to wetlands including tidal creek construction) and presence of wildlife on the project site.

3.4.1.2 State

Protection of Waters/Stream Disturbance, Article 15, Title 5, Environmental Conservation Law (ECL), Implementing Regulations 6 NYCRR Part 608. New York State policy is to preserve and protect the state's water resources from adverse effects and potential impairment due to human activities. The NYSDEC created the protection of waters regulatory program to implement this policy and prevent undesirable activities on water bodies. The Program establishes and enforces regulations that are compatible with the preservation, protection and enhancement of present and potential values of the water resources; protect the public health and welfare; and are consistent with the reasonable economic and social development of the state.

The proposed project requires a Protection of Waters permit to demonstrate that it would not result in adverse effect to the water resources and would comply with the protection of waters regulatory program.

Freshwater Wetland Act, Article 24, ECL, Implementing Regulations- 6 NYCRR Part 663, Part 664, and Part 665. The Freshwater Wetlands Act was passed in 1975 with the intention of preserving, protecting and conserving freshwater wetlands and their benefits, consistent with the general welfare and beneficial economic, social and agricultural development of the state. A wetland must be 12.4 acres (5 hectares or larger) to be protected under this Act; an 'adjacent area' of 100 feet around every wetland is also regulated to provide protection for the wetland. The NYSDEC administers this policy through its freshwater wetlands regulatory program and the mapping of the state's freshwater wetlands. A permit is required to conduct any regulated activity in a protected wetland or its adjacent area. Permit standards require that impacts to wetlands be avoided and minimized.

The proposed project contains freshwater wetlands and requires a freshwater wetland permit to demonstrate that it would not result in an adverse effect to the water resources and would comply with the freshwater wetlands regulatory program.

Tidal Wetlands Act, Article25, ECL, Implementing Regulations 6 NYCRR Part 661. Tidal wetlands regulations apply anywhere tidal inundation occurs on a daily, monthly or intermittent basis. The NYSDEC administers the tidal wetlands regulatory program and the mapping of the state's tidal wetlands. A permit is required for almost any activity that would alter wetlands or the adjacent areas (up to 300 feet inland from wetland boundary or up to150 feet inland within New York City). NYSDEC-regulated wetlands exist along the shoreline within the project site.

Tidal wetlands occur on the project site. A tidal wetland permit is necessary for the proposed project to demonstrate that it would not adversely affect water resources and would comply with the tidal wetlands regulatory program.

Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern (ECL, Sections 11-0535[1]-[2], 11-0536[2], [4], Implementing Regulations 6 NYCRR Part 182). The Endangered and Threatened Species of Fish and Wildlife, Species of Special Concern Regulations forbid the taking, import, transport, possession, or selling of any endangered or threatened species of fish or wildlife; including any hide, or other part of these species as listed in 6 NYCRR §182.6. These regulations also prohibit the adverse modification of occupied habitat of endangered or threatened species without prior authorization from NYSDEC.

These regulations apply to the proposed project because correspondence with the NYSDEC NHP and USFWS (see **Appendix D**) indicate that the project area contains habitat that may support federal and/or state threatened, endangered, proposed or candidate species.

Removal of Trees and Protected Plants (ECL, Section 9-1503). As per Section 9-1503 of the ECL, "[n]o person shall, in any area designated by such list or lists, knowingly pick, pluck, sever, remove, damage by the application of herbicides or defoliants, or carry away without the consent of the owner thereof, any protected plant."

The project site may contain protected trees and plants, thus this regulation is applicable to the proposed project.

3.4.2 Study Area

The study area for surface water hydrology, wetland and open water areas, and floodplains generally coincides with the boundaries of the project site. The study area for vegetation, wildlife and special status species and significant natural communities includes the project site and the surrounding area within approximately 0.5 mile of the site boundaries.

3.4.3 Surface Water Hydrology

3.4.3.1 Affected Environment

Saw Mill Creek, a tidally influenced tributary of Pralls Creek, and several tributaries and drainage ditches are located within the project site. Average annual rainfall/snowfall is 48.6 inches. The confluence of Saw Mill Creek and Pralls Creek is located approximately 600 feet west of the project site. Pralls Creek is a tributary of the Arthur Kill. The proposed project is 0.8 aerial miles from the Arthur Kill (closest Traditional Navigable Water [TNW]) to the Chelsea Road Bridge over Saw Mill Creek in the center of the project site. The project site is connected to the Arthur Kill through a series of smaller tidal channels. Part of the site experiences twice daily tidal inundation. Groundwater within the project site is expected to be present within the glacial and overlying organic material at depths influenced by the tide. At high tide, the low-lying marsh is saturated and inundated in the

lower lying areas. At low tide, groundwater is estimated to be present at less than 6 feet below ground surface (bgs). Groundwater flow is anticipated to be to the west towards Pralls Creek. Saw Mill Creek and its tributaries can be classified as Relatively Permanent Waters (RPW) as they flood twice daily with the tide cycle. According to the environmental database report,[66] the project site is located within the Federal Emergency Management Agency (FEMA) 100-year flood zone, but outside of the 500-year flood zone.

In May 2013, EDC consultants installed four levelloggers and one barologger on-site to measure site specific tidal fluctuations and atmospheric pressure within the project site. In addition to the tide data monitoring, EDC consultants obtained the surveyed tide gauge elevations and transformed the tide stages measured by the levelloggers into vertical elevation datum. This allows for a direct comparison of the monitored tide elevation to the site topography that has been surveyed and referenced to NAVD88 in feet.[67]

3.4.3.2 Potential Environmental Impacts

3.4.3.2.1 No Action Alternative

In the No Action Alternative, a comprehensive program to restore and enhance project site wetlands would not be implemented. New channels that connect to Saw Mill Creek would not be constructed and the targeted tidal hydrology would not be restored or maintained. Tidal water would continue to be separated from portions of the project site and existing remnant berms and other fill material would remain on site.

In the No Action Alternative, there would be no effect on surface water hydrology. Without implementation of the proposed project, historic berms and fill would not be removed from within the project site, and new tidal creeks that connect to Saw Mill Creek to convey tidal flows within the site would not be constructed. Tidal water would continue to be separated from portions of the project site and existing remnant berms and other fill material would remain on site.

3.4.3.2.2 Proposed Project

One of the primary objectives of the proposed project is to restore and maintain targeted tidal hydrology by restoring tidal flow with new tidal creeks. Proposed restoration work includes the removal of historic berms and fill within the project site, and the creation of new tidal creeks that connect to Saw Mill Creek. These tidal creeks would be constructed to convey tidal flows within the site to support tidal marsh habitat. Once constructed, the site would be monitored to assess any potential marsh loss at the marsh edges.

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[66] Environmental Data Resources, Inc. Radius Map Report with Geocheck, Saw Mill Creek Marsh, River Road, Staten Island, NY 10314, April 26, 2013.

[67] *Draft Feasibility Study*, MARSHES Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island, New York, May 2013; prepared for EDC by Louis Berger & Assoc, PC.

Proposed restoration activities at the project site also include providing the correct site topography/elevation*s* to support the desired tidal marsh vegetation and features. Based on extensive hydrologic data and vegetative biobenchmark data collected in the adjacent marsh, the desirable elevations for *Spartina alterniflora* low marsh in the surrounding tidal marsh is between 1.64 and 2.7 feet NAVD88. (The biobenchmark studies involved establishing precise vertical elevations within nearby reference wetlands and coupling these elevations with observations of key vegetative, soil and hydrological characteristics).[68]

Excavation would be necessary to remove fill/ regrade areas to appropriate elevations and to construct new tidal creeks. Based on the project draft design documents, approximately 64,800 cubic yards (cy) of existing fill material/soils would be excavated from the project site.[69] Material excavated for creation of intertidal channels, mudflat, and emergent marsh, and from removal of the existing fill and remnant berms, would be removed from the site and disposed of at a licensed upland facility in accordance with all applicable local, state and federal regulations (see Section 3.5 Hazardous Materials).

Tidal flow is the most critical factor contributing to the biological productivity of an estuary. Construction of new tidal creeks and excavation to suitable tidal marsh elevations would result in the restoration of tidal hydrology to previously filled, hydrologically impaired areas of the project site, and would facilitate the establishment of native plant species in areas currently dominated by invasive species. The proposed project would reintroduce complete tidal flushing to areas historically subject to tidal inundation, resulting in long-term, major benefits to wetland function and structure. Increased tidal fluctuation would improve water quality, tidal flood storage and conveyance capability, and improve fish and benthic habitat. As the proposed project would alter the existing surface water hydrology in order to accommodate the restoration objectives of the proposed project, the impact is considered beneficial.

3.4.4 Vegetation

3.4.4.1 Affected Environment

Over the last 200 years, the vegetation in the vicinity of the project site has been altered by human activities, including upland clearing, wetland ditching and filling, residential and industrial development, introduction and spread of invasive species (e.g. common reed, poison ivy, and Japanese knotweed) and obstructions of surface water movement. Industrial development has increased the potential for spills of industrial fuels and

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[68] *Draft Feasibility Study*, MARSHES Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island, New York, May 2013; prepared for EDC by Louis Berger & Assoc, PC.

[69] Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island New York, Draft 60% Design Submission (Not for Construction), prepared by Louis Berger & Assoc., P.C., for the New York City Economic Development Corporation, October 2013.

chemicals and illegal dumping, which can damage the environment by causing destruction of habitat and loss of species. These actions have directly or indirectly changed and shaped the historical ecological communities to their present state. However, the defined community types present on the project site, although influenced by human development and/or invasion by non-native plant species, support a variety of plant species and provide habitat for area wildlife.

Table 3-1 provides the approximate acreages of existing habitat cover type within the project site, as illustrated in **Figure 3-2** Wetland Delineation and Habitat Cover Types. Vegetation observed on the project site is listed in **Table 3-2**.

Table 3-1: Habitat Type – Existing Conditions and Future Conditions under the Proposed Project

Existing Habitat Type	Proposed Habitat (Future Conditions under the Proposed Project)	Acreage		
		Western Section of Project Site	Eastern Section of Project Site	Total
Degraded *Phragmites* Marsh	Restored Tidal Wetland	1.02	15.70	16.72
Urban Vacant Lot	Restored Tidal Wetland	5.17	1.87	7.04
Tidal Wetland	Enhanced Tidal Wetland	7.69	26.03	33.72
Red Maple-Sweetgum Swamp	Enhanced Red Maple-Sweetgum Swamp/ Enhanced Forested Wetland	0.00	1.52	1.52
Urban Vacant Lot	Rehabilitated Upland Buffer - Slope	1.12	0.33	1.45
Successional Southern Hardwood	Rehabilitated Upland Buffer -Forest	0.00	8.49	8.49
Total		**15.00**	**53.94**	**68.94**

Table 3-2: Vegetation Observed on the Project Site

Scientific Name	Common Name	Indicator Status
Trees		
*Acer platanoides**	Norway maple	UPL
Acer rubrum	red maple	FAC
Ailanthus altissima	tree-of-heaven	UPL
Betula populifolia	gray birch	FAC
Carya sp.	Hickory	--
Liquidambar styraciflua	Sweetgum	FAC
Morus alba	white mulberry	FACU
Nyssa sylvatica	black gum	FAC
Prunus serotina	black cherry	FACU
Quercus alba	white oak	FACU
Quercus bicolor	swamp white oak	FACW
Quercus michauxii	swamp chestnut oak	FACW
Quercus palustris	pin oak	FACW
Quercus prinus	chestnut oak	UPL

Scientific Name	Common Name	Indicator Status
Quercus rubra	red oak	FACU
Rhus copallinum	winged sumac	UPL
*Robinia pseudoacacia**	black locust	FACU
Salix sp.	Willow	--
Sassafras albidum	Sassafras	FACU
Ulmus rubra	slippery elm	FAC
Shrubs/Vines		
*Ampelopsis brevipedunculata**	Porcelainberry	UPL
Baccharis halimifolia	sea myrtle	FACW
*Berberis thunbergii**	Japanese barberry	FACU
*Celastrus orbiculatus**	Oriental bittersweet	UPL
Clethra alnifolia	sweet pepperbush	FAC
Lonicera sp.	bush honeysuckle	--
Elaeagnus angustifolium	Russian olive	FACU
Iva frutescens	high tide bush	FACW
*Lonicera japonica**	Japanese honeysuckle	FAC
Myrica pensylvanica	northern bayberry	FAC
Parthenocissus quinquefolia	Virginia creeper	FACU
Rhus typhina	staghorn sumac	UPL
*Rosa multiflora**	multi-flora rose	FACU
Sambucus canadensis	Elderberry	FACW
Smilax rotundifolia	Greenbriar	FAC
Toxicodendron radicans	poison ivy	FAC
Vaccinium angustifolium	lowbush blueberry	FACU
Vaccinium corymbosum	highbush blueberry	FACW
Viburnum dentatum	northern arrowwood	FACW
Herbaceous		
*Alliaria petiolata**	garlic mustard	FACU
Allium vineale	field garlic	FACU
Schizachyrium scoparium	little bluestem	FACU
Andropogon virginicus	Broomsedge	FACU
Apocynum cannabinum	Dogbane	FACU
*Artemisia vulgaris**	Mugwort	NI
Aster sp.	Aster	--
Atriplex patula	common orach	FACW
Carex sp.	Sedge	--
Chenopodium album	Lambsquarters	FACU
Coronilla varia	crown vetch	UPL
Dactylic glomerata	orchard grass	FACU
Danthonia spicata	poverty grass	NI
Digitaria sp.	Crabgrass	--
Distichlis spicata	spike grass	FACW
Echinochloa crus-galli	barnyard grass	FAC
Erechtites hieraciifolia	American burnweed	FACU
Impatiens capsensis	Jewelweed	FACW
Juncus gerardii	black grass	FACW
Juncus tenuis lesser	poverty grass	FAC
Lotus corniculatus	birdsfoot trefoil	FACU
Matteuccia struthiopteris	ostrich fern	FAC

Scientific Name	Common Name	Indicator Status
Osmunda cinnamomea	cinnamon fern	FACW
Panicum virgatum	Switchgrass	FAC
Parathelypteris noveboracensis	New York fern	FAC
*Phragmites australis**	common reed	FACW
Phytolacca americana	Pokeweed	FACU
Pluchea odorata	saltmarsh fleabane	OBL
Phleum pretense	Timothy	FACU
*Polygonum cuspidatum**	Japanese knotweed	FACU
Rhododendron arborescens	Smooth azalea	FAC
Rumex cripus	curly dock	FAC
Salicornia sp.	Glasswort	OBL
Solidago sempervirens	seaside goldenrod	FACW
Solidago sp.	Goldenrod	--
Spartina alterniflora	smooth cordgrass	OBL
Spartina patens	saltmeadow cordgrass	OBL
Symplocarpus foetidus	skunk cabbage	OBL
Taraxacum officinale	Dandelion	FACU
Verbascum Thapsus	common mullein	UPL
Vicia sativa	crown vetch	FACU
Xanthium pensylvanicum	Cocklebur	FAC

* Invasive Species. Source: New York State Prohibited and Regulated Invasive Plants, September 10, 2014.
http://www.dec.ny.gov/docs/lands_forests_pdf/isprohibitedplants2.pdf

Key to indicator categories

OBL: Obligate Wetland, occur almost always (estimated probability >99%) under natural conditions in wetlands.

FACW: Facultative Wetland, usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.

FAC: Facultative, equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).

FACU: Facultative Upland, usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).

NI: No Indicator, on national listings of plants occurring in wetlands.

NA: Not Applicable, only vascular plants are assigned indicator statuses.

Sources: 2012 National Wetlands Plant List: Northcentral-Northeast, U.S. Army Corps of Engineers. Louis Berger & Assoc, P.C. 2013.

The majority of the project site and the adjacent area west of the railroad tracks consist of estuarine tidal wetland associated with Saw Mill Creek and its tributaries. The project site tidal wetlands consist primarily of a mixture of intertidal creeks and marsh. Portions of Saw Mill Creek are subtidal. The majority of the intertidal marsh is irregularly flooded high marsh habitat. Smaller areas of low marsh, intertidal scrub-shrub, and salt panne habitat are present within the Site. Vegetation in the high marsh community includes spike grass (*Distichlis spicata*), saltmeadow cordgrass (*Spartina patens*), smooth cordgrass (*Spartina alterniflora*), and to a much lesser extent black grass (*Juncus gerardii*) and common reed (*Phragmites australis*). The low marsh community is dominated by smooth cordgrass located along creek edges, in shallow ditches, and where sufficiently low elevations allow

regular tidal flooding. Intertidal scrub-shrub habitat, consisting primarily of high tide bush (*Iva frutescens*), is scattered throughout the high marsh on both sides of Chelsea Road. Salt pannes are also present in depressions located within the high marsh. Vegetation associated with pannes includes the short form of smooth cordgrass and glasswort (*Salicornia europa*).

Freshwater wetlands exist as fringes and upper reaches above the tidal wetlands. A 1.52-acre palustrine forested freshwater wetland is present between the upper tidal limits and upland area along the exit ramp of Route 440/West Shore Expressway in the southern section of the project site east of Chelsea Road. This wetland is dominated by pin oak (*Quercus palustris*) and red maple (*Acer rubrum*). Other species observed include sweetgum (*Liquidambar styraciflua)*, sweet pepperbush (*Clethra alnifolia*), poison ivy (*Toxicodendron radicans)*, northern arrowwood (*Viburnum recognitum*), skunk cabbage (*Symplocarpus foetidus*) and common reed.

Common reed, high tide bush, and sea myrtle (*Baccharis halimifolia*) are common within transition areas between wetlands and uplands. Common reed is dominant in the upper reaches of the marsh adjacent to roadways, uplands, and freshwater wetlands, and in some areas forms a dense monoculture.

Successional upland forest habitat is present at the project site along roadway embankments and previously filled areas that were not developed. Vegetation in these uplands consists largely of early successional non-native, disturbed plant communities. Dominant species include tree of heaven *(Ailanthus altissima*), white mulberry (*Morus alba*), red maple, black cherry (*Prunus serotina*), sassafrass (*Sassafras albidum*), poison ivy, oriental bittersweet (*Celastrus orbiculatus*), Japanese honeysuckle (*Lonicera japonica*), mugwort (*Artemisia vulgaris*) and Japanese knotweed (*Polygonum cuspidatum*). Upland/wetland edges are dominated by common reed.

A disturbed hardwood forest is located immediately adjacent to Edward Curry Avenue. This upland forested area is primarily dominated by invasive species, including Japanese knotweed, tree-of-heaven, black locust (*Robinia pseudoacacia*), white mulberry, and oriental bittersweet. Black cherry, poison ivy, and grape (*Vitis* sp.) are also present. Another upland hardwood forest area is located along Chelsea Road and the Route 440 exit ramp in the extreme southern part of the project site and is predominantly a white oak (*Quercus alba)*, chestnut oak (*Quercus prinus*), and red oak (*Quercus rubrum*) forest with some Japanese knotweed. A portion of the forested upland in this area, essentially a narrow peninsula projecting out into the marsh, is reportedly the site of a previous restoration planting that took place in the 1990s. This area is a predominantly oak forest with some lowbush blueberry (*Vaccinium angustifolium*).

Three "island" areas are located along the eastern margin of the eastern side of the project site. Historic maps and imagery indicate that these upland areas are filled wetlands. These areas are dominated by grey birch (*Betula populifolia*), with some black cherry, tree-of-heaven and pin oaks. Highbush blueberry (*Vaccinium corymbosum*), northern bayberry (*Myrica pensylvanica*), sea myrtle, common reed, and Japanese knotweed are present along

the edges of these areas. These upland areas are encircled by a remnant berm, apparently as part of an abandoned effort to fill large portions of the eastern side of the project site. Portions of the berms are uplands dominated by common reed, with some live and dead tree-of-heaven, pokeweed (*Phytolacca americana*), Virginia creeper *(Parthenocissus quinquefolia*), and poison ivy.

3.4.4.2 Potential Environmental Impacts

3.4.4.2.1 No Action Alternative

In the future without construction of the proposed project, project site vegetative communities would be similar to current conditions described above. A comprehensive site restoration plan to modify and improve the existing upland and wetland/open water area vegetation would not be undertaken, invasive plant species would not be removed, and reestablishment of native marsh vegetation would not occur. Historic illegal dumping would likely continue, as would the potential for upland clearing, wetland ditching and filling, and contamination of the project site from illegal dumping; all of which could further damage the environment and negatively affect vegetative communities.

3.4.4.2.2 Proposed Project

Construction of the bank would have beneficial effects on vegetative communities. Debris and non-native, invasive species that compromise native diversity and wildlife usage would be removed from the existing forest buffer and upland areas, thereby enhancing these areas. Native vegetation would be replanted and additional tidal creeks to convey tidal flows would be constructed, which would support native low and high marsh vegetation. Upland areas would be monitored and maintained to prevent re-establishment of invasive species, including *P. australis, Fallopia japonica* and *Ailanthus altissima*. These areas would also be monitored yearly for recruitment of new species and survival of planted species.

As discussed earlier, any herbicide spraying would be coordinated with the NRG.[70] In addition, any work in forested wetland areas would be subject to review by the NRG, and

[70] The bank is designed to be a low-maintenance, self-sustaining system. The elevation range established for the emergent marsh would not be conducive to *Phragmites* establishment, shoreline slopes would be planted with native vegetation to minimize *Phragmites* invasion, and tidal creeks would be constructed to convey tidal flows to support native marsh vegetation and to serve as a barrier to *Phragmites* invasion from surrounding areas. It is anticipated that it would function effectively and achieve the desired long-term goals with no or minimal management with herbicides. Mowing and/or limited herbicide spot treatment applications of *Phragmites* plants within affected areas of the bank would be conducted only if deemed necessary by monitoring data. In the forested wetland, cutting/mowing and/or spot applications of herbicide would be used to control invasive plant species during the maintenance period until tree and shrub growth is sufficient to out-compete and provide shade control of invasive plants. All herbicide spraying activity would be coordinated with the Parks Department's Natural Resources Group (NRG) and applied in accordance with all required permits and approvals.

herbicide treatment in these areas would be completed by either direct injection or hand wiping. With respect to the creation of new tidal creeks, the constructed site would be monitored to assess any potential loss of vegetative cover at the marsh edges.

The proposed habitat areas that are expected to be restored/enhanced/rehabilitated as a result of the proposed project are identified above in **Table 3-1** and illustrated in **Figure 2-12**. The design of the bank would comply with federal, state and city guidelines regarding salt marsh restoration and native species planting. Refer to **Table 3-3** for the proposed planting zones and anticipated species.

Table 3-3: Proposed Planting Zones and Anticipated Species

Planting Zone	Size (acres)	Scientific Name (Common Name)
Open water/ Mudflat	3.1	N/A
Low Marsh	5.79	*Spartina alterniflora* (smooth cordgrass)
High Marsh	11.36	*Distichlis spicata* (spike grass)
		Spartina patens (saltmeadow cordgrass)
		Spartina alterniflora (smooth cordgrass)
		Juncus gerardii (black grass)
Scrub-Shrub Wetland	3.56	*Baccharis halimifolia* (groundsel tree)
		Iva frutescens (high tide bush)
Upland Slope	1.45	*Baccharis halimifolia* (groundsel tree)
		Myrica pensylvanica (bayberry)
		Hibiscus moscheutos (swamp rose-mallow)
		Rhus copallinum (shining sumac)
		Prunus maritime (beach plum)
		Sambucus candensis (common elderberry)

The primary wetland system within the tidally influenced emergent marsh habitats (elevations 1.5 to 2.5 feet NAVD88) would be comprised of *Spartina alterniflora* dominated low marsh plant communities. High marsh areas (2.5 to 3.5 feet NAVD88) would be planted primarily with salt meadow hay *(Spartina patens),* spike grass (*Distichlis spicata*), big cordgrass (S*partina cynosuroides*), and saltmeadow rush (*Juncus gerardii*) on 2 foot centers.[71] Additionally, target vegetative species include native volunteers that are anticipated to colonize the emergent marsh, such as salt marsh fleabane (*Pluchea purpurascens*), dwarf spike rush (*Eleocharis parvula*), water hemp (*Amaranthus cannabinus*), and marsh orach (*Atriplex patula*). It is also anticipated that dwarf spike rush would colonize portions of the mudflat community. Scrub-shrub areas (3.5 to 5.0 feet

[71] Increasing the planting density increases project construction costs. An 18-inch on center planting spacing would be investigated as part of the construction contractor bidding process. Assuming the cost difference is not problem for project implementation, 18 inches will be implemented, as per NRG design standards.

NAVD88) would be planted with groundsel tree and marsh elder (*Iva frutescens*) on 5 foot centers.

As discussed above in Section 2.3.2, Proposed Project: Restoration Design Plan, the project site has a history of illegal dumping activity. Thus impediments to deter dumping would be incorporated into the design of the bank to ensure that vegetation planted as part of the proposed project would be protected. The site would be fenced and posted and regular site inspections would be conducted. In addition to discouraging dumping, the fencing would also serve to protect new plantings from consumption by local wildlife. The chain link fencing and gates proposed to be installed along portions of the property and project site boundaries would help limit the ability of white-tailed deer to access and browse on the upland buffer plants.

The existing vegetative communities would be altered to accommodate the restoration objectives of the proposed project, including replanting of native vegetation and control of invasive species. The construction of additional tidal creeks to convey tidal flows would support native low and high marsh vegetation and serve as a barrier to *Phragmites* invasion from surrounding areas. Increased plant diversity is expected as a result of the proposed project. Therefore, the proposed project's effects on vegetative communities are considered beneficial. In addition, the proposed project would comply with the Endangered Species Act[72] and New York State's Removal of Trees and Protected Plants regulations.

3.4.5 Wetlands and Open Water Areas

3.4.5.1 Affected Environment

A National Wetlands Inventory (NWI) map for the project site is included as **Figure 3-3**. Ten different classes of wetlands/watercourses were identified within the project site, based upon *The Classification of Wetlands and Deepwater Habitats of the United State*s.[73] These classes are listed below for the two wetland areas that have been delineated.

Wetland A (West side of Chelsea Road):

- Estuarine, Subtidal, Unconsolidated Bottom, Subtidal water regime (E1UBL) – Saw Mill Creek
- Estuarine, Intertidal, Emergent, Persistent, Regularly Flooded (E2EM1N)
- Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded, partially drained/ditched (E2EM1Pd)

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[72] In a letter addressed to the USACE Regulatory Branch, New York District dated 2/9/15, the USFWS stated their concurrence with the USACE's "determination that the proposed project will result in 'no effect' to federally listed threatened or endangered species under Service jurisdiction or their critical habitats."

[73] Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *The Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Fish and Wildlife Service, Washington, D.C. FWS/OBS-79/31.

- Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded (E2EM1P)
- Estuarine, Intertidal, Emergent, Narrow-leaved Persistent (E2EM5P)
- Estuarine, Intertidal, Scrub-Shrub, Broad Leaved Deciduous, Irregularly Flooded (E2SS1P)
- Estuarine, Intertidal, Unconsolidated Shore, Mud, Irregularly Flooded, Hyperhaline (E2US3P1)

Wetland B (East side of Chelsea Road):

- Estuarine, Subtidal, Unconsolidated Bottom, Subtidal water regime (E1UBL) – Saw Mill Creek
- Estuarine, Intertidal, Emergent, Persistent, Regularly Flooded (E2EM1N)
- Estuarine, Intertidal, Emergent, Narrow-leaved Persistent (E2EM5P);
- Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded, partially drained/ditched (E2EM1Pd)
- Estuarine, Intertidal, Emergent, Persistent, Irregular Flooded (E2EM1P)
- Estuarine, Intertidal, Emergent, Narrow-leaved Persistent, Partially Drained/Ditched (E2EM5Pd)
- Estuarine, Intertidal, Scrub-Shrub, Broad Leaved Deciduous, Irregular Flooded (E2SS1P),
- Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded (PFO1C)
- Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded/Saturated (PFO1E)

Freshwater Wetlands **–** Freshwater wetlands exist as fringes and upper reaches beyond the tidal wetlands. NYSDEC freshwater wetlands AR-49 is mapped within the project site as exhibited in **Figure 3-4**. A NWI mapped palustrine forested freshwater wetland (PFO1C) is present between the upper tidal limits and upland area along the exit ramp of Route 440/West Shore Expressway in the southern section of the project site. This wetland is dominated by pin oak *(Quercus palustris*) and red maple (*Acer rubrum*). Other species observed include sweetgum (*Liquidambar styraciflua)*, skunk cabbage (*Symplocarpus foetidus)*, sweet pepperbush (*Clethra alnifolia*), poison ivy (*Toxicodendron radicans)*, northern arrowwood (*Viburnum recognitum*), and common reed.

Tidal Wetlands **–** As shown in **Figure 3-5**, NYSDEC tidal wetlands are mapped within the project site and surrounding area. Tidal wetlands occur within the project site in association with Saw Mill Creek and its tributaries, and consist primarily of a mixture of subtidal creeks and intertidal marsh. Industrial/commercial developments and transportation structures (railroad to the west, Route 440/West Shore Expressway to the east and south, and Edward Curry Avenue to the north) surround the tidal wetlands, with Chelsea Road bisecting the project site.

Saw Mill Creek is a steep-banked tidal creek that enters the study area from west of the rail line at the western project site boundary, flows east under the Chelsea Road bridge, and meanders through the eastern portion of the project site towards Route 440. As per NWI mapping, Saw Mill Creek is classified as Estuarine, Subtidal, Unconsolidated Bottom,

Subtidal water regime (E1UBL). Portions of the tidal marsh have been filled in the past for roadways and commercial properties, and the remaining tidal marsh habitat contains linear ditches and remnants of filled areas and related berms. The majority of the ditches are completely exposed at low tide, while the bed of Saw Mill Creek remains inundated. Remnants of former berms were located east of Chelsea Road. Portions of the remnant berms remain high enough in elevation that they have been delineated as upland. However, much of the remnant berms have reverted to disturbed wetlands.

Intertidal marsh constitutes most of the tidal wetlands located on the project site. The majority of the intertidal marsh is irregularly flooded high marsh habitat. Vegetation in the high marsh community includes spike grass *(Distichlis spicata*), saltmeadow cordgrass *(Spartina patens)*, smooth cordgrass *(Spartina alterniflora*), black grass (*Juncus gerardii*), and common reed. The low marsh community is dominated by smooth cordgrass along creek edges, in shallow ditches, and where lower elevations allow regular tidal flooding. Intertidal scrub-shrub habitat, consisting primarily of high tide bush (*Iva frutescens*), is scattered throughout the high marsh on both sides of Chelsea Road. Salt pannes are also present in depressions and pools of the high marsh surface. Vegetation associated with the pannes includes the short form of smooth cordgrass and glassworts (*Salicornia* spp.).

Common reed, high tide bush, and groundsel tree (*Baccharis halimifolia*) are common within transition areas between wetlands and uplands. Common reed is dominant in the upper reaches of the marsh adjacent to roadways, uplands, and freshwater wetlands, and in some areas forms a dense monoculture.

A wetland delineation was performed to determine the jurisdictional boundaries of all wetlands and open waters within the project site. Wetlands were delineated in May 2013 in accordance with the procedures outlined in relevant USACE wetland delineation manuals.[74, 75] The two wetland areas delineated are composed of ten wetland classifications types. These wetlands are summarized below in **Table 3-4** and depicted in **Figure 3-2.**

[74] Environmental Laboratory. 1987. *U.S. Corps of Engineers Wetland Delineation Manua*l. Tech. Rpt. Y-87-1, U.S. Army Corps of Engineer Waterways Experiment Station, Vicksburg, MS.
[75] U.S. Army Corps of Engineers . *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region.*

Table 3-4: Summary of Delineated Wetlands

Wetland Line	Size (Acres)	Wetland Cover Type(1)	Comments
A	22.10	E1UBL, E2EM1N, E2EM5P, E2EM1Pd, E2EM1P, E2SS1P, E2US3P1	West of Chelsea Road
B	43.30	E1UBL, E2EM1N, E2EM5P, E2EM1Pd, E2EM1P, E2EM5Pd, E2SS1P, PFO1C, PFO1E	East of Chelsea Road

(1) Classification of wetlands based on field examination.
Classification under Cowardin 1979:

E1UBL	Estuarine, Subtidal, Unconsolidated Bottom, Subtidal
E2EM1N	Estuarine, Intertidal, Emergent, Persistent, Regularly flooded
E2EM1Pd	Estuarine, Intertidal, Emergent, Persistent, Irregularly flooded, partially drained/ditched
E2EM1P	Estuarine, Intertidal, Emergent, Persistent, Irregularly flooded
E2EM5P	Estuarine, Intertidal, Emergent, Narrow-leaved Persistent
E2SS1P	Estuarine, Intertidal, Scrub-Shrub, Broad Leaved Deciduous, Irregularly Flooded
E2US3P1	Estuarine, Intertidal, Unconsolidated Shore, Mud, Irregularly Flooded, Hyperhaline
E2EM5Pd	Estuarine, Intertidal, Emergent, Narrow-leaved Persistent, Partially Drained/Ditched
PFO1C	Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded
PFO1E	Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded/Saturated

3.4.5.2 Potential Environment Impacts

3.4.5.2.1 No Action Alternative

In the No Action Alterative, it is expected that wetland and open water conditions would be similar to existing conditions. Extensive wetland restoration and enhancement activities would not be undertaken in a coordinated manner; conditions of the existing degraded, *Phragmites*-dominated wetland complex would be expected to continue to decline and existing high-quality marsh and pannes may decline due to existing debris and invasive species. New tidal creeks that connect to Saw Mill Creek and enable restoration of tidal flow and circulation to filled uplands would not be constructed. The threat of illegal filling and dumping would remain unchecked and potential contamination would not be remediated. Thus, the No Action Alternative could lead to the accelerated deterioration of existing wetland and open water areas.

3.4.5.2.2 Proposed Project

One of the key objectives of the proposed project is wetland restoration. Wetland restoration activities that would occur as part of the proposed project include re-establishment and rehabilitation of wetland areas, as well as wetland enhancement. Wetland re-establishment in the western portion of the project site (west of Chelsea Road) would include removal of debris and other fill material over former marshlands, regrading of the area to low and high marsh elevations, excavation of tidal creeks, and replanting of the marsh plain with appropriate native salt marsh grasses and shrubs. Proposed wetland

enhancement work in this area includes removal of existing debris and management of invasive species (i.e., *Phragmites*) through the use of spot applications of a USEPA-approved herbicide in order to prevent decline of existing, high-quality low and high marsh and pannes areas.

East of Chelsea Road, proposed wetland re-establishment work includes removal of existing debris, excavation of fill to an elevation suitable for low and high marsh, removal of portions of remnant berms, regrading of the area to a suitable marsh plain elevation, and the planting of native salt marsh species. Proposed wetland rehabilitation activity involves excavating tidal creeks to restore tidal hydrology, and excavating and grading the *Phragmites*-dominated remnant berm area to appropriate tidal marsh elevations, followed by planting of native salt marsh species. The area would be managed for any reinvasion by *Phragmites* through select application of a USEPA-approved herbicide for use in aquatic habitats. Additionally, an existing barren panne area would be excavated and graded to an appropriate depth necessary to support fish species occurring in pannes (e.g., mummichogs) and to establish connections with tidal creeks at elevations that would allow flooding of the panne only during spring tides.

Implementation of the proposed project would involve the removal of construction/ demolition debris and other fill material over former marshlands. This material would be removed and the area graded to tidal marsh elevations, resulting in approximately 24.27 acres of restored wetlands.[76] **Table 3-5** presents the acreage of habitat type that is expected to occupy the project site in the future analysis year (2016) due to construction of the proposed project. The proposed project would result in improvements to a combined total of almost 70 acres of land, as noted in the table.

Marsh restoration at the project site would have several long-term beneficial effects on water quality in the Arthur Kill systems. Increased tidal flushing would reduce the retention times of organic, oxygen-demanding substances and increase the flow of well-oxygenated water, thereby improving dissolved oxygen concentrations in the marsh. Increased flushing would also increase the abilities of the marsh to function in trapping nutrients, which could improve water quality in the Arthur Kill system, and in exporting detritus, which would increase food supply to organisms in the system.

The proposed project would improve fish and wildlife habitat by removing existing soils containing metals and other harmful substances, exposing cleaner soils. As noted in Section 3.5, Hazardous Materials, portions of the site which have been found to contain levels of contamination above appropriate ecological effect thresholds would be over-excavated and covered with sand; this remediation method has been found to be effective on other

[76] *Draft Essential Fish Habitat Assessment, MARSHES Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island*, prepared by the Louis Berger Group, Inc. on behalf of the New York City Economic Development Corporation, for U.S. Army Corps of Engineers, New York District, October 2013.

projects to control the re-introduction of contaminants to the aquatic environment.[77] As such, there is no reason to believe that the remaining soils and sediments would adversely affect benthic organisms and the upper trophic-level life for which they serve as a food base. Annual post-construction monitoring would be performed for a minimum of five consecutive years, according to standards set by the USACE and NYSDEC, in consultation with the IRT. Monitoring would be conducted for vegetation cover, variety, and health; soil properties; the presence of benthic invertebrates and macrofauna; etc. In addition, EDC has committed to an annual sediment and biotic sampling and analysis for the presence of metals throughout the project site.

In terms of interaction with the nearby impaired Arthur Kill, the site would continue to be subject to tidal exchange with the Arthur Kill. Site sampling conducted on the site as part of the wetland restoration design process[78] did not show that current sediment quality is indicative of contamination from outside the site, in that the contaminants of concern found in the sediments are, for the most part, the same metals that are of concern in the uplands. The relative uniformity of the contamination in upland soils and sediments in the tidal area suggests that the contamination of the site is a product of conditions on the site itself and surrounding land uses, not the Arthur Kill. Similarly, while there is a small risk that metals and other substances from the Arthur Kill may re-enter the restored wetland, it would likely to be much lower concentrations than currently exist on the site. There is no long-term, sustainable design solution for eliminating this risk, aside from undertaking the cleanup of the Arthur Kill itself. As noted above, EDC has committed to an annual post-construction sediment sampling and analysis for the presence of metals throughout the project site. Such a sampling plan would allow the Bank to determine whether sediment contaminant concentrations are increasing post-construction. Finally, while restoration of the site would not in and of itself address regional water quality issues associated with the Arthur Kill, it would contribute to regional improvements in water quality.

As discussed above, the proposed project would have a positive effect on wetlands and open waters and would not result in significant adverse impacts to these resources. In

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[77] Example regional tidal wetland restoration projects that involved the placement of a clean sand substrate include the Lincoln Park Wetland Restoration Site in Jersey City, NJ (constructed 2010); the Randall's Island Wetland Restoration Site in New York, NY (constructed 2008); and Jamaica Bay Marsh Islands Restoration Projects, Brooklyn, NY (ongoing). The Lincoln Park Wetland Restoration Project received a 2011 Coastal America Partnership Award for outstanding efforts to restore and protect the coastal environment.

[78] Draft Revised Site Screening Letter Results Report (Western Section), Mitigation and Restoration Strategies for Habitat and Ecological Sustainability Saw Mill Creek Pilot Wetland Mitigation Bank Blocks 1780, 1790, and 1815, Multiple Lots. Letter from Louis Berger & Assoc, PC to Max Taffet, New York City Economic Development Corporation, September 15, 2014.
Draft Revised Site Screening Letter Results Report (Eastern Pilot Wetland Mitigation Bank Blocks 1780, 1790, and 1815, Multiple Lots. Letter from Louis Berger & Assoc, PC to Max Taffet, New York City Economic Development Corporation, September 15, 2014.

addition, the proposed project includes all practicable measures to minimize harm to the wetland and would comply with EO 11990.[79]

Table 3-5: Habitat Type – Existing Conditions and Future Conditions under the Proposed Project

Existing Habitat Type	Proposed Habitat (Future Conditions under the Proposed Project)	Acreage		
		Western Section of Project Site	Eastern Section of Project Site	Total
Degraded *Phragmites* Marsh	Tidal Wetland Restoration (Rehabilitation)	1.02	15.70	16.72
Urban Vacant Lot	Tidal Wetland Restoration (Re-establishment)	5.17	1.87	7.04
Tidal Wetland	Tidal Wetland Enhancement	7.69	26.03	33.72
Red Maple-Sweetgum Swamp	Forested Wetland Enhancement	0.00	1.52	1.52
Urban Vacant Lot	Upland Buffer Rehabilitation - Slope	1.12	0.33	1.45
Successional Southern Hardwood	Upland Buffer Rehabilitation - Forest	0.00	8.49	8.49
Total		**15.00**	**53.94**	**68.94**

Source: Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island New York, Draft 90% Design Submission (Not for Construction), prepared by Louis Berger & Assoc., P.C., for the New York City Economic Development Corporation, October 2013.

3.4.6 Wildlife and Special Status Species

3.4.6.1 Affected Environment

As presented in **Table 3-1** and **Figure 3-2**, the majority of the project site is tidal wetland containing a mixture of intertidal creeks and marsh. The existing intertidal marsh is predominantly irregularly flooded high marsh habitat. Smaller areas of low marsh, intertidal scrub-shrub, and salt panne habitat are present within the project site, and a small palustrine forested freshwater wetland is also present in the southern section of the project site. Upland forest habitat is also present along roadway embankments and previously filled areas that were not developed.

As described in the Biological Resources Survey Report that was prepared for the proposed project,[80] the primary habitat available to fish and wildlife within the project site consists of estuarine tidal wetland habitat associated with Saw Mill Creek and its tributaries.

[79] As noted in Section 3.41., the proposed project qualifies as an exception as per 24 CFR Part 55.12(c)(3) and is not required to complete the wetlands review process.

[80] *Draft Biological Resources Survey Report*, MARSHES Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island, New York, August 2013; prepared for the New York City Economic Development Corporation.

Species expected to utilize the estuarine tidal wetland habitats present within the project site are listed in **Table 3-6**.

Table 3-6: Anticipated Wildlife Utilization in Tidal Wetland Communities

Tidal Wetland Community	Common Name	Scientific Name	Observed at Project Site*
High marsh	salt marsh mosquitoes	*Aedes* spp.	X
	greenhead flies	*Tabanidae*	
	Grasshoppers	Suborder Caelifera	
	Spiders	Order Araneae	X
	salt marsh snail	*Melampus bidentatus*	X
	clapper rail	*Rallus longirostris*	
	sharp-tailed sparrow	*Ammodramus caudacutus*	
	marsh wren	*Cistothorus palustris*	X
	eastern meadowlark	*Sturnella magna*	
	American black duck	*Anas rubripes*	
	northern harrier	*Circus cyaneus*	
	Raccoon	*Procyon lotor*	
	meadow vole	*Microtus pennsylvanicus*	
	Muskrat	*Ondatra zibethicus*	
Low marsh	clapper rail	*Rallus longirostris*	
	alewife (juvenile and larvae)	*Alosa pseudoharengus*	
	Willet	*Catoptrophorus semipalmatus*	
	marsh wren	*Cistothorus palustris*	
	seaside sparrow	*Ammodramus maritimus*	
	wading birds (egrets, herons)	Family Ardeidae	X
	fiddler crabs	*Uca* spp.	X
	blue crab	*Callinectis sapidus*	X
	ribbed mussel	*Geukensia demissa*	X
	Mummichog	*Fundulus heteroclitus*	X
	sheepshead minnow	*Cyprinodon variegatus*	
	Atlantic silverside	*Menidia menidia*	
	Winter flounder (juvenile and larvae)	*Pleuronectes americanus*	
	Bluefish (juvenile and larvae)	*Pomatomus saltatrix*	

Table 3-6: Anticipated Wildlife Utilization in Tidal Wetland Communities

Tidal Wetland Community	Common Name	Scientific Name	Observed at Project Site*
Intertidal flats/creeks	microinvertebrate infauna		
	salt marsh snail	*Melampus bidentatus*	X
	mud snail	*Nassarius obsoletus*	X
	fiddler crabs	*Uca* spp.	X
	mud crabs	*Panopeus* spp.	
	blue crab	*Callinectes sapidus*	X
	Bluefish	*Pomatomus saltatrix*	
	striped bass	*Morone saxatilis*	
	Atlantic menhaden	*Brevoortia tyrannus*	
	bay anchovy	*Anchoa mitchilli*	
	Atlantic silverside	*Menidia menidia*	
	alewife	*Alosa pseudoharengus*	
	winter flounder	*Pleuronectes americanus*	
	bluefish	*Pomatomus saltatrix*	
	great egret	*Casmerodius albus*	X
	snowy egret	*Egretta thula*	X
	cattle egret	*Bubulcus ibis*	
	tricolor heron	*Egretta tricolor*	
	little blue heron	*Egretta caerulea*	
	green heron	*Butorides striatus*	
	Willet	*Catoptrophorus semipalmatus*	
	greater yellowlegs	Tringa melanoleuca	
Salt shrub	marsh wren	*Cistothorus palustris*	X
Salt panne	Mummichog	*Fundulus heteroclitus*	X
	sheepshead minnow	*Cyprinodon variegatus*	
	Wading birds (egrets, herons)	Family Ardeidae	X

* Observed by Louis Berger & Assoc., P.C. during 2013 field studies
Source: Edinger, et al., 2002;[81] Niedowski 2000;[82] NMFS letter dated August 7, 2013; Louis Berger & Assoc., P.C., 2013.

[81] Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2002. *Ecological Communities of New York State*. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. (Draft for review). New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

[82] Niedowski, Nancy. 2000. *New York State Salt Marsh Restoration and Monitoring Guidelines*. National Oceanic and Atmospheric Administration, prepared for the New York State Department of State & New York State Department of Environmental Conservation.

Common waterbirds that use salt marshes for feeding and roosting include great blue herons (*Ardea herodias*), great egrets (*Ardea alba*), belted kingfishers (*Ceryle alcyon*), and Canada geese (*Branta canadensis*).[83] The salt marsh and tidal creek habitats at the project site provide critical foraging habitat for long-legged wading bird species (herons, egrets, ibises) that make up the population known as the New York City Harbor Herons. Within the Arthur Kill/Staten Island wetland complex, Prall's Island, Shooter's Island, and the Isle of Meadows had previously been popular breeding areas for wading bird species.[84] No wader-nesting activity has been observed on these islands since the late 1990s, but they are still used by a wide variety of bird guilds including waterfowl, birds of prey, songbirds, crows and blackbirds.[85, 86]

Resident birds that nest in the salt marsh include saltmarsh sparrows (*Ammodramus caudacutus*), seaside sparrows (*Ammodramus maritimus*), clapper rails (*Rallus longirostris*), and willets (*Tringa semipalmata*). Saltmarsh sparrows are limited to breeding in the high tidal salt marsh where they nest in the upper reaches of the low marsh. Seaside sparrow nests are found in expanses of medium-sized smooth cordgrass with a mixture of salt meadow cordgrass, spike grass, and black grass. The nests ideally are located near creek edges or pools in which the birds can forage. [87] Clapper rails are found almost exclusively in coastal salt marshes and prefer to run through thick marsh grass rather than fly.[88] Clapper rails prefer to feed in the low salt marsh but build their nests on the high salt marsh.[89] Willets nest on the ground, preferably within high marsh vegetation and forage in tidal ponds, creeks, and flats.

Meadow voles (*Microtus pennsylvanicus*) and muskrats (*Ondatra zibethicus*) may occur in high salt marsh habitats. Muskrats occur in marshes where salinity is not too high.[90] Meadow voles are voracious herbivores that feed in the high marsh.

Fiddler crabs (*Uca* spp.) and ribbed mussels (*Geukensia demissa*) are typically present in low marsh habitats. Fiddler crabs prefer the structural habitat in low marshes provided by

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[83] Kiviat, E. and E.A. Johnson. 2013. *Biodiversity assessment handbook for New York City.* American Museum of Natural History, Center for Biodiversity and Conservation, New York, NY, and Hudsonia Ltd., Annandale, NY.
[84] Craig, E. 2010. *New York City Audubon's Harbor Herons Project: 2010 Nesting Survey – 25th Annual Report.* New York City Audubon, New York, NY.
[85] *Ibid.*
[86] Harbor Herons Subcommittee. 2010. H*arbor Herons Conservation Plan- NY/NJ Harbor Region*. S.B. Elbin and N.K. Tsipoura (Editors). NY-NJ Harbor Estuary Program.
[87] Kiviat, E. and E.A. Johnson. 2013. *Biodiversity assessment handbook for New York City.* American Museum of Natural History, Center for Biodiversity and Conservation, New York, NY, and Hudsonia Ltd., Annandale, NY.
[88] North Carolina Wildlife Resources Commission. 2011. *Clapper Rail Wildlife Profile.* http://www.ncwildlife.org/portals/0/learning/documents/profiles/clapperrail091411.pdf.
[89] Luttenberg, Danielle, Deborah Lev, and Michael Feller. 1993. *Native Species Planting Guide for New York City and Vicinity*. Natural Resources Group, City of New York Parks & Recreation.
[90] Kiviat, E. and E.A. Johnson. 2013. *Biodiversity assessment handbook for New York City.* American Museum of Natural History, Center for Biodiversity and Conservation, New York, NY, and Hudsonia Ltd., Annandale, NY.

smooth cordgrass roots. Fiddler crab burrows aerate the low marsh peat which facilitates nutrient absorption by smooth cordgrass roots. Ribbed mussels anchor to smooth cordgrass roots in the low marsh peat. The mussel is a filter feeder that derives nourishment from detritus and plankton. The mussels' waste is excreted in the form of packets of nitrogen which fertilize the smooth cordgrass. [91]

According to correspondence from NMFS (see **Appendix D**), the project site provides habitat for a variety of resident, migratory, and forage species such as bluefish (*Pomatomus saltatrix*), striped bass (*Morone saxatalis*), menhaden (*Brevoortia tyrannus),* killifish (*Fundulus* spp.), bay anchovies (*Anchoa mitchilli*), and blue crabs (*Callinectes sapidus*).

Successional shrubland is present on both sides of the project site. Wildlife that typically utilize this habitat type include willow flycatcher (*Empidonax traillii*), yellow warbler (*Setophaga petechia*), common yellowthroat (*Geothlypis trichas*), brown thrasher (*Toxostoma rufum*), rufous-sided towhee (*Pipilo erythrophthalmus)*, song sparrow (*Melospiza melodia*) and eastern cottontail (*Sylvilagus floridanus*). [92]

Species expected to use the upland forested habitat found in the project site include invertebrates found in or on the leaf litter such as spiders, mites, worms, and beetles. Vertebrates include the eastern red-backed salamander (*Plethodon cinereus*), eastern chipmunk (*Tamias striatus*), northern short-tailed shrew (*Blarina brevicauda*), white-footed mouse (*Peromyscus leucopus*), and eastern cottontail. The northern cardinal (*Cardinalis cardinalis*), gray catbird (*Dumetella carolinensis*), and wood thrush (*Hylocichla mustelina*) may inhabit the shrub layer. Cavities in larger, older canopy trees serve as nest sites for the raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), eastern gray squirrel (*Sciurus carolinensis*), and great horned owl (*Bubo virginianus*) Birds found on upper tree trunks and limbs include northern flicker (*Colaptes auratus*), red-bellied woodpecker (*Melanerpes carolinus*), downy woodpecker (*Picoides pubescens*), black-capped chickadee (*Poecile atricapillus*), and tufted titmouse (*Baeolophus bicolor*). Birds high in the canopy include the eastern wood-pewee (*Contopus virens*), red-eyed vireo (*Vireo olivaceus*).[93]

Forested wetland habitat, such as is located in the southern portion of the Project Site, provides habitat from bird species such as common yellowthroat (*Geothlypis trichas*), yellow warbler (*Setophaga* [*Dendroica*] *petechia*), swamp sparrow (*Melospiza georgiana*), blue-winged warbler (*Vermivora cyanoptera*), Baltimore oriole (*Icterus galbula*), and American woodcock (*Scolopax minor*). Small pools are found occasionally within forested

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[91] Luttenberg, Danielle, Deborah Lev, and Michael Feller. 1993. *Native Species Planting Guide for New York City and Vicinity*. Natural Resources Group, City of New York Parks & Recreation.
[92] *Ibid.*
[93] Kiviat, E. and E.A. Johnson. 2013. *Biodiversity assessment handbook for New York City.* American Museum of Natural History, Center for Biodiversity and Conservation, New York, NY, and Hudsonia Ltd., Annandale, NY.

wetlands and serve as vital breeding grounds for woodland amphibians such as the spotted salamander (*Ambystoma maculatum*) and spring peeper (*Pseudacris crucifer*).[94]

Common reed dominated wetland habitats like those found within the Project Site are usually considered to have low wildlife and waterfowl value because they can form dense, impenetrable monocultures. These areas contain minimal or no surface water for aquatic species. Utilization of these areas by waterfowl and wading birds is limited due to the dense stands of common reed that cannot be traversed by these groups of birds.

Wildlife species observed at the project site during field investigations are noted in **Table 3-6** and include fish, most likely mummichog (*Fundulus heteroclitus*), marsh snail (*Melampus bidentatus*), mud snail (*Ilyanassa obsoletus*), ribbed mussel (*Geukensia demissa),* fiddler crabs (*Uca minax* and *Uca pugnax*), and diamondback terrapin (*Malaclemys terrapin*) within the tidal marsh habitat. Feral cats (*Felis catus*) were observed within the high marsh and the upland areas of the project site; white-tailed deer (*Odocoileus virginianus*) were observed within upland and wetland areas. Dragonflies (Order Odonata) and mosquitoes, including the tiger mosquito (*Aedes albopictus*), were present at the project site. Spicebush swallowtail butterflies were observed in upland areas of the project site.

Bird species observed during field investigation within the project site included great egret (*Ardea alba*), marsh wren (*Cistothorus palustris*), swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), red-tailed hawk (*Buteo jamaicensis*), Canada goose (*Branta canadensis*), osprey (*Pandion haliaetus),* yellow crowned night heron (*Nyctanassa violacea*), mallard (*Anas platyrhynchos*), and turkey vulture (*Cathartes aura).*

A dedicated avian survey was also conducted by biologists at the project site (and reference site) on July 23, 2013.[95] The sites were traversed and all visual and audial bird observations recorded. A total of 39 bird species were observed between all surveyed areas, as presented in **Table 3-7**.

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[94] *Ibid.*

[95] A Biological Resources Survey of the project site and a nearby reference site was conducted (*Draft Biological Resources Survey Report*, MARSHES Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island, New York, August 2013; prepared for EDC). The approximately 7-acre reference site is located north of the project site, bounded by the Williams-Transco underground natural gas pipeline to the south, railroad tracks to the west, and River Road to the north and east. The reference site was selected because it is near the project site as well as hydrologically and ecologically similar; however, it is functionally superior to the project site as it generally lacks historic fill and non-native vegetation.

Table 3-7: Bird Species Observed During July 2013 Avian Survey

Scientific Name	Common Name	Project Site - East	Project Site - West
Agelaius phoeniceus	red-winged blackbird	X	X
Anas platyrhynchos	mallard		X
Ardea alba	great egret	X	X
Branta canadensis	Canada goose	X	
Buteo jamaicensis	red-tailed hawk		X
Cardinalis cardinalis	northern cardinal		X
Carduelis tristis	American goldfinch	X	X
Cathartes aura	turkey vulture		X
Ceryle alcyon	belted kingfisher	X	
Charadrius vociferus	killdeer		X
Cistothorus palustris	marsh wren	X	X
Cyanocitta cristata	blue jay	X	X
Dendroica petechia	yellow warbler	X	
Dumetella carolinensis	gray catbird	X	X
Egretta thula	snowy egret		X
Empidonax minimus	least flycatcher	X	
Empidonax traillii	willow flycatcher	X	
Geothlypis trichas	common yellowthroat	X	X
Hirundo rustica	barn swallow	X	X
Larus argentatus	herring gull	X	X
Larus marinus	great black-backed gull		X
Melospiza georgiana	swamp sparrow	X	X
Melospiza melodia	song sparrow	X	X
Mimus polyglottos	northern mockingbird		X
Molothrus ater	brown-headed cowbird	X	
Pandion haliaetus	osprey		x
Picoides pubescens	downy woodpecker	X	X
Plegadis falcinellus	glossy ibis	X	
Poecile atricapilla	black-capped chickadee	X	
Quiscalus quiscula	common grackle		
Sayornis phoebe	eastern phoebe		X
Sphyrapicus varius	yellow-bellied sapsucker	X	
Sturnus vulgaris	European starling	X	X
Troglodytes aedon	house wren	X	X
Turdus migratorius	American robin	X	

Table 3-7: Bird Species Observed During July 2013 Avian Survey

Scientific Name	Common Name	Project Site - East	Project Site - West
Tyrannus tyrannus	eastern kingbird		X
Thryothorus ludovicianus	Carolina wren		
Vireo gilvus	warbling vireo	X	
Zenaida macroura	mourning dove		

Source: Louis Berger & Assoc., P.C. 2013.

Common salt marsh species including marsh wren (*Cistothorus palustris*), swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), and great egret (*Ardea alba*) were observed at the project site. A flock of glossy ibis (12 individuals) was observed flying over the eastern section of the project site. An osprey was heard adjacent to the eastern section of the project site and observed using a nest platform outside of the project site property.

Late 20th century bird surveys within Saw Mill Creek Marsh, including the project site, observed small, but stable numbers of saltmarsh sharp-tailed sparrow (*Ammodramus caudacutus*) and seaside sparrow (*Ammodramus maritimus*). Although these species were not observed during the July 2013 survey, the high and low marsh habitats for these species are prevalent at the project site. Twelve species of breeding birds were observed during the 1993 survey within the general study area including mallard, marsh wren, swamp sparrow, seaside sparrow, saltmarsh sharp-tailed sparrow, song sparrow, clapper rail, red-winged blackbird, American black duck (*Anas rubripes*), fish crow (*Corvus ossifragus*), common yellowthroat, and American goldfinch.[96] During the winter months, various species have been observed using the project site for foraging, including waterfowl species, such as snow goose (*Chen caerulescens*) and common merganser (*Mergus merganser*) and birds of prey, such as rough-legged hawk (*Buteo lagopus*), and northern harrier (*Circus cyaneus*).[97]

3.4.6.1.1 Special Status Species

A literature review and Natural Heritage Program database records search was completed in order to identify the existence or potential occurrence of special status species and significant communities on or in the vicinity of the project site. Information was requested

[96] Aquila, C.D. *Results of the Breeding Bird Census' at Saw Mill Creek Marsh and Old Place Creek Mars*h. New York City Department of Parks and Recreation, Salt Marsh Restoration Team. 1994; *Results of the Breeding Bird Census' at Saw Mill Creek Marsh and Old Place Creek Marsh*. New York City Department of Parks and Recreation, Salt Marsh Restoration Team, 1995.

[97] Aquila, C.D. *Winter Bird Inventory at Saw Mill Creek, and Old Place Creek Marsh*. New York City Department of Parks and Recreation, Salt Marsh Restoration Team, 1994.

from the NYSDEC NHP, the USFWS, and the NMFS regarding the potential presence of any federal and/or state threatened, endangered, proposed or candidate species in the vicinity of the project site, as well as any other species or habitats of special concern. Species information received from NYSDEC NHP and USFWS is summarized in **Table 3-8** and agency correspondence is included as **Appendix D**. (NMFS reported that no threatened or endangered species under their jurisdiction are known to occur within the study area.)

Biological field surveys were conducted July 23 and 24, 2013 to determine the presence of any special status species and habitat suitability assessments were conducted to determine the potential for special status flora and fauna to occur within the project site as well as the reference site. Special attention was focused on special status flora and fauna identified through the literature review conducted prior to the field surveys.

The USFWS list indicates that the following threatened and endangered species may occur within the project site vicinity: piping plover (*Charadrius melodus* – threatened) and roseate tern (*Sterna dougallii dougallii* – endangered).

Piping plover - The piping plover is a small shorebird weighing 1.5 to 2.25 ounces and is 5.5 inches long. The piping plover is light beige with orange legs. In spring and summer, it has a single black neckband and a narrow black band across its forehead. The rump is white and the bill is yellowish with a black tip. Piping plover forage on beaches, dunes and in tidal wrack. Piping plovers breed on dry sandy beaches or in areas that have been filled with dredged sand, often near dunes in areas with little or no beach grass. They occur along the Atlantic Coast from southwestern Newfoundland and southeastern Quebec south to North Carolina. In New York, this species breeds on Long Island's sandy beaches, from Queens to the Hamptons, in the eastern bays and in the harbors of northern Suffolk County. Habitat is only found at the shoreline, on barrier islands, sandy beaches and dredged material disposal islands. Potential suitable habitat for piping plover was not observed within the project site.

Roseate tern - The roseate tern is 14 to 17 inches long, with a wingspan of about 30 inches. Its back and upper wings are a light pearly-grey, while its underparts are white. The tip of the white tail extends well beyond its wing tips when at rest. In the summer, it has a black cap, nape and bill. Roseate terns feed primarily on American sand lance, a small marine fish. In New York, roseate terns are found nesting with common terns. The nest may be only a depression in sand, shell or gravel, and may be lined with bits of grass and other debris. The roseate tern breeds along the coasts of the Atlantic, Pacific and Indian Oceans on salt marsh islands and beaches with sparse vegetation. In eastern North America, it breeds from the Canadian Maritime Provinces south to Long Island. In New York, this species breeds only at a few Long Island colonies. Potential suitable habitat for roseate tern was not observed within the project site.

NYSDEC NHP indicates that the following threatened species have been documented at or near the project site, generally within 0.5 miles: Least Bittern (*Ixobrychus exilis* – state threatened) and Pied-billed grebe (*Podilymbus podiceps* –state threatened).

Table 3-8: Summary of State and Federal Special Status Species

	Common Name	Scientific Name	NY State Listing	Heritage Conservation Status	Type of Use
USFWS					
Species may occur within the project boundary and/or may be affected by project	Piping plover	*Charadrius melodus*	Threatened		
	Roseate tern	*Sterna dougallii dougalli*	Endangered		
NYSDEC NHP					
Threatened and Endangered Species documented at or near the site, generally within 0.5 mile	Least bittern	*Ixobrychus exilis*	Threatened		
	Pied-billed grebe	*Podilymbus podiceps*	Threatened		
Rare animals documented at or in vicinity of site	Cattle egret	*Bubulcus ibis*	Protected bird	Imperiled in NYS	Breeding
	Glossy ibis	*Plegadis falcinellus*	Protected bird	Imperiled in NYS	Breeding
	Little blue heron	*Egretta caerulea*	Protected bird	Imperiled in NYS	Breeding
	Snowy egret	*Egretta thula*	Protected bird	Imperiled in NYS	Breeding
	Yellow-crowned night-heron	*Nyctanassa violacea*	Protected bird	Imperiled in NYS	Breeding
	Southern leopard frog	*Lithobates sphenocephalus*	Special concern	Critically imperiled in NYS	Breeding
Plants listed as Endangered or Threatened	Nantucket juneberry	*Amelanchier nantucketensis*	Endangered	Critically imperiled in NYS	
	Featherfoil	*Hottonia inflata*	Threatened	Imperiled in NYS	
	Persimmon	*Diospyros virginiana*	Threatened	Imperiled in NYS	
	Rose pink	*Sabatia angularis*	Endangered	Critically imperiled in NYS	
	Sweetbay magnolia	*Magnolia virginiana*	Endangered	Critically imperiled in NYS	
Rare species with historical records at the site or in the vicinity.	Eastern mud turtle	*Kinosternum subrubrum*	Endangered	Critically imperiled in NYS	
	Log fern	*Dryopteris celsa*	Endangered	Critically imperiled in NYS	
	Orange fringed orchid	*Platanthera ciliaris*	Endangered	Critically imperiled in NYS	

Source: NYSDEC Natural Heritage Program, letter dated May 13, 2015; USFWS Long Island Ecological Services Office, letter dated May 27, 2013.

Least Bittern - The least bittern is the smallest member of the *Ardeidae* (heron) family in North America at just 13 inches in length, a wingspan of 17 inches, and an average weight of just three ounces. It has yellow eyes and a thin yellow bill placed atop a long, chestnut

and buff-striped throat. The slightly-crested crown, nape, back, and tail are blackish-green and the neck, sides, and undersides are chestnut and white. The wings are black, chestnut, and buff which when folded against the body appear as light-colored streaks along the back. They are extremely secretive birds. Least bitterns initiate nesting in New York in late May to early June. In prime marsh habitat, least bitterns may nest in small groups of up to 15 pairs per hectare (approximately 2.5 acres). Least bitterns feed primarily on small fish, such as minnows, sunfish and perch. Additionally, they rely upon insects (such as dragonflies and beetles), snakes, frogs, tadpoles, salamanders, crayfish and some small mammals. Least bitterns occur in freshwater and brackish marshes with tall, dense emergent vegetation such as cattails, sedges, and rushes that are interspersed with clumps of woody shrubs and open water. In New York, least bitterns thrive in the large, expansive cattail marshes associated with the Great Lakes, the Finger Lakes, Lake Champlain, and the St. Lawrence and Hudson River Valleys. There is potential habitat for the least bittern in the study area.

Pied-Billed Grebe - The pied-billed grebe is a small waterbird measuring approximately 11 to 15 inches in total length, with a 20 to 22.5 inch wingspan and average weight of just 0.75 to 1.0 pound. Their name comes from their most distinguishing characteristic: the pied, or two-colored, bill which is bluish-white with a distinct black vertical bar on either side. The bill is short, laterally compressed, and slightly hooked downward. They return to New York between late March and mid-April. In New York, pied-billed grebe breeding records are scattered across the state but are most abundant in marshes associated with the St. Lawrence River Valley and Lake Ontario. Pied-billed grebes nest in freshwater marshes associated with ponds, bogs, lakes, reservoirs, or slow-moving rivers. Breeding sites typically contain fairly deep open water at depths 0.8 – 6.6 feet interspersed with submerged or floating aquatic vegetation and dense emergent vegetation. Pied-billed grebes occupy a greater diversity of habitats during the non-breeding season including freshwater ponds, impoundments, lakes, rivers, brackish marshes, estuaries, inlets and coastal bays. There is potential non-breeding habitat for the pied billed grebe in the study area, but breeding habitat is not found in the study area.

The NYSDEC NHP also reported that the following animals, while not listed by New York State as Endangered or Threatened, are of conservation concern to the state, and are considered rare by NYSDEC NHP: cattle egret (*Bubulcus ibis*), glossy ibis (*Plegadis falcinellus*), little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), yellow-crowned night-heron (*Nyctanassa violacea*), and southern leopard frog (*Lithobates sphenocephalus).* Three of the birds species were observed during the July 2013 field surveys: glossy ibis, snowy egret, and yellow-crowned night-heron. Neither cattle egret nor southern leopard frog were observed during field surveys.

The following plants are listed as Endangered or Threatened by New York State, and/or are considered rare by NYSDEC NHP: Nantucket juneberry (*Amelanchier nantucketensis*), rose-pink (*Sabatia angularis*), and sweetbay magnolia (*Magnolia virginiana*) are listed as Endangered; and featherfoil (*Hottonia inflata*) and persimmon (*Diospyros virginiana*) are listed as Threatened. According to NYSDEC NHP, persimmon was documented in 1997

within the southwestern portion of the project site in the red maple swamp along Chelsea Road. However, none of these species, including persimmon, were identified in the project site in field surveys.

NYSDEC NHP reports that the eastern mud turtle (*Kinosternon subrubrum*), and two vascular plants, log fern (*Dryopteris celsa*) and orange fringed orchid (*Platanthera ciliaris*), all listed as Endangered in New York State, have been documented in the vicinity of the project site at one time, but have not been documented since 1979 or earlier, and/or there is uncertainty regarding their continued presence. None of these species were identified on the project site in field surveys.

According to NYSDEC Environmental Resource Mapper (see **Appendix D**), old or potential records exist of rare plants and animals within 0.5 mile of the project site. Rare plant species recorded include orange fringed orchid (*Platanthera ciliaris*), Hyssop-skullcap (*Scutellaria integrifolia*), slender crabgrass (*Digitaria filiformis*), wild comfrey (*Cynoglossum virginianum var. virginianum*), Collin's sedge (*Carex collinsii*), and log fern (*Dryopteris celsa*). Rare animal species recorded include the eastern mud turtle (*Kinosternon subrubrum*), northern cricket frog (*Acris crepitans*), the American burying beetle (*Nicrophorus americanus*), and the three following species of dragonfly: the mocha emerald (*Somatochlora linearis*); the Rambur's forktail (*Ischnura ramburii*); and the Needham's skimmer (*Libellula needhami*). The records listed are only potential areas for rare animals or rare plants. For these historical records, it is not known whether the rare plant or animal still exists at these locations. However, the rare plant or animal listed in the record may still occur in the area if habitat and site conditions are favorable.

As noted previously, NMFS reported that no threatened or endangered species under their jurisdiction are known to occur within the project site. However, NMFS correspondence indicates that Essential Fish Habitat (EFH) for 17 federally-managed fish species have been designated in the area. Thus, a draft EFH assessment has been completed for the project.[98] EFH is defined as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Based on water quality parameters, sediment types, and habitats present on the project site under existing conditions, three EFH-designated species have potential to occur on the project site: winter flounder, windowpane flounder, and bluefish. The study area also supports prey items for EFH-designated species.

Winter Flounder - The winter flounder, a small-mouthed, right-eyed flounder, is a valuable commercial and recreational species. This fish can be found from Labrador to North Carolina, but most commonly in estuaries from the Gulf of St. Lawrence to the Chesapeake Bay. Except for the Georges Bank population, adult winter flounder migrate inshore in the

[98] *Draft Essential Fish Habitat Assessment, MARSHES Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island*, prepared by the Louis Berger Group, Inc. on behalf of the New York City Economic Development Corporation, for U.S. Army Corps of Engineers, New York District, October 2013.

autumn and early winter, and spawn in late winter and early spring throughout most of their range. Winter flounder spawn at night, in shallow inshore waters. The Arthur Kill is designated as EFH for eggs, larvae, juvenile, adult and spawning adult winter flounder.

The eggs of winter flounder are demersal, adhesive, and stick together in clusters. Winter flounder eggs are generally present in very shallow waters, less than about 5 meters (16 feet), at water temperatures of 10°C (50°F) or less, and salinities ranging from 10 to 30 parts per trillion (ppt).[99] These shallow, nearshore habitats are of critical importance, because they are most likely to be impacted by human activities. The type of substrate where eggs are found varies, having been reported as sand, muddy sand, mud and gravel, although sand seems to be the most common.

Larvae are initially planktonic, but become increasingly bottom-oriented as metamorphosis approaches. Spawning areas and nursery areas are believed to be close together, and for the first summer, young-of-the-year winter flounder remain in shallow waters of bays and estuaries where they were spawned. Larvae are most abundant at temperatures of 2 to 15°C (36 to 64°F) and at salinities of 3.2 to 30 ppt.[100] Preferred larval habitat consists of fine sand or gravel bottoms in inshore waters shallower than 5 meters (16 feet). As winter flounder grow, they appear to prefer cooler, more saline waters. Winter flounder young-of-the-year are generally found in water temperatures below 28°C (82.4°F), depths from 0.1 to 10 meters (0.3 to 33 feet), and salinities between 5 and 33 ppt. Young-of-the-year have been captured in pile field areas and in open water in the Lower Hudson River.[101] Juvenile winter flounder are generally found in conditions that include water temperatures below 25°C (77°F), depths from 1 to 50 meters (3 to 164 feet), and salinities between 10 and 30 ppt.

Winter flounder adults are generally found in conditions consisting of water temperatures below 25°C (77°F), depths from 1 to 100 meters (3 to 328 feet), and salinities between 15 and 33 ppt. Adult winter flounder migrate inshore in the autumn and early winter, and spawn in shallow coastal bays and estuaries in late winter and early spring. In the Hudson Raritan Estuary, most adults were captured at water temperatures of 4 to 12°C (39 to 54°F).[102] Adult winter flounder are common on muddy or clean sand, pebbly, or gravelly bottom. Since adults prefer to live in cooler waters than juveniles, they do not often encounter low-oxygen events.

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[99] Pereira, J.J., R. Goldberg, and J.J. Ziskowski. 1998. Essential Fish Habitat Source Document: Winter Flounder, *Pseudopleuronectes americanus* (Walbaum), Life History and Habitat Characteristics. National Marine Fisheries Service, Milford, CT. 39 pp.

[100] *Ibid.*

[101] Able, K.W., J.P. Manderson, and A.L. Studholme. 1999. Habitat quality for shallow water fishes in an urban estuary: the effects of man-made structures on growth. Marine Ecology Progress Series 187:227-235.

[102] Pereira, J.J., R. Goldberg, and J.J. Ziskowski. 1998. Essential Fish Habitat Source Document: Winter Flounder, *Pseudopleuronectes americanus* (Walbaum), Life History and Habitat Characteristics. National Marine Fisheries Service, Milford, CT. 39 pp.

Winter flounder are sight feeders, using their dorsal fins to raise their heads off the bottom with eye turrets extended for a better view. Prey is then taken in a 10 to 15 centimeter (0.3 to 0.5 feet) lunge. The importance of adequate light for feeding in flounder has been demonstrated in recent studies, where growth rates for young-of-the-year flounder held in cages underneath piers in the Lower Hudson River were significantly lower than that of fish caged in pile fields and open water areas.[103] The USACE has mandated work windows for some dredging projects in the New York District during the winter and spring months, to avoid disturbance to spawning winter flounder.

Windowpane Flounder **-** The windowpane flounder is a thin-bodied flatfish inhabiting estuaries, near-shore waters, and the continental shelf from the Gulf of St. Lawrence to South Carolina. This species is most abundant from Georges Bank to the Chesapeake Bay area, with maximum abundance in the New York Bight. Windowpane flounder are generally found on sandy bottoms in waters less than 80 meters (262 feet) deep. They aggregate in warm shoal waters in the summer and early autumn, and move offshore during the winter and early spring when temperatures decrease. The Arthur Kill is designated as EFH for eggs, larvae, juvenile, adult and spawning adult windowpane flounder.

Windowpane flounder generally spawn in the Middle Atlantic Bight from spring to autumn in inshore waters at temperatures ranging from 8.5 to 13.5°C (47 to 56°F).[104] Windowpane flounder spawning peaks occur in May and September off of New Jersey and New York. Windowpane eggs are buoyant, and typically occur in surface waters less than 20°C (68°F) and water depths less than 70 meters (230 feet). Eggs hatch in about eight days, so the pelagic larvae are found in the same water conditions and within the same time period. Settlement of spring-spawned individuals occurs in estuaries and on the shelf, while settlement of autumn-spawned individuals occurs primarily on the shelf.

Juvenile and adult habitat generally consists of bottom habitats, with a substrate of mud or fine-grained sand. In the Hudson Raritan Estuary, juveniles were found to be fairly evenly distributed throughout the estuary, but juveniles were found to be most abundant in the deeper channels in winter and summer. Juvenile windowpane were most abundant at bottom water temperatures of 5 to 23°C (41 to 73°F), at depths of 7 to 17 meters (23 to 56 feet), at salinities of 22 to 30 ppt, and dissolved oxygen (DO) levels of 7 to 11 mg/l.[105] Adults were also fairly evenly distributed throughout the estuary, but were more abundant in deeper channels in the summer. For the seasons combined, adults were collected at

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[103] Able, K.W., J.P. Manderson, and A.L. Studholme. 1999. Habitat quality for shallow water fishes in an urban estuary: the effects of man-made structures on growth. Marine Ecology Progress Series 187:227-235.
[104] Chang, S., P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999. Essential Fish Habitat Source Document: Windowpane flounder, *Scophthalmus aquosus*, Life History and Habitat Characteristics. National Marine Fisheries Service. NOAA Technical Memorandum NMFS-NE 137.
[105] *Ibid.*

bottom temperatures of 0 to 24°C (32 to 75°F), at depths less than 25 meters (83 feet), at salinities of 15 to 33 ppt, and DO levels of 2 to 13 mg/l.

Bluefish - Bluefish are carnivorous pelagic fish that occur in temperate and tropical waters of the continental shelf and estuarine habitats around the world. In North America, bluefish live along most of the Atlantic coastal waters from Nova Scotia south, around the tip of Florida, and along the Gulf Coast to Mexico. Bluefish travel in schools of like-sized individuals, and complete seasonal migrations, generally moving north in spring-summer to centers of abundance in the New York Bight and southern New England, and south in autumn-winter to waters as far as southeastern Florida. The Arthur Kill is designated as EFH for juvenile and adult bluefish.

Bluefish spawn over the outer portion of the continental shelf, and eggs and larvae occur in oceanic waters. Juveniles in the Middle Atlantic Bight inhabit inshore waters and estuaries from May to October, preferring temperatures between 15 and 30°C (59 and 86°F) and salinities between 23 to 33 ppt, but can ascend well into estuaries to salinities as low as 3 ppt.[106] Juveniles use estuaries as nursery areas, and can be found in sand, mud, silt, or clay substrates, as well as vegetation including rockweed, sea lettuce, eelgrass, and Spartina. Most bluefish collected in NEFSC Hudson Raritan Estuary trawl surveys were found to be juveniles.

Adult bluefish occur in the open ocean, large embayments, and most estuarine systems within their range. They are highly migratory, with a seasonal occurrence in Mid-Atlantic estuaries from April to October. They prefer salinities greater than 25 ppt and warm temperatures, and are not found in the Middle Atlantic Bight when temperatures drop below 14 to16°C (57 to 61°F).[107]

3.4.6.2 Potential Environment Impacts

3.4.6.2.1 No Action Alternative

In the No Action Alternative, habitat for wildlife and special status species would be similar to existing conditions. The proposed project would not be constructed and substantial improvements to fish and wildlife habitat (including EFH and avian habitat) would not occur. Increased heterogeneity of habitats, wildlife diversity and wildlife abundance within the project site would not be expected in the No Action Alternative. Further, the No Action Alternative would be unlikely to lead to improved regional habitat connectivity or to facilitate species conservation.

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[106] Fahay, M.P., P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999. Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix*, Life History and Habitat Characteristics. National Marine Fisheries Service. NOAA Technical Memorandum NMFS-NE 144.
[107] *Ibid.*

3.4.6.2.2 Proposed Project

As noted previously, historical fill, ditching, dumping, and invasion by nuisance plant species has degraded existing habitat quality within the project site, limiting habitat diversity and, therefore, decreasing wildlife species diversity. One of the objectives of the proposed project is to maximize the wetlands functions and services within the project site, particularly for wildlife habitat and water quality improvement. The project site location designates it as an oasis for wildlife in a predominantly urban landscape, offering natural habitat in an area limited with such resources. Construction of the proposed project includes rehabilitation of upland buffer areas. Superstorm Sandy storm surge-driven debris and debris from illegal dumping activity would be removed from the forested buffer areas in the eastern and western sections of the project site. The dominant invasive species that occur in these areas (e.g., Japanese knotweed, Oriental bittersweet, tree-of-heaven) compromise native diversity and wildlife usage, and would be managed through the application of a USEPA-approved herbicide for use in aquatic habitats and by the seeding and/or planting of select native species.

The project site serves as part of the Atlantic Flyway, providing a crucial stopover site for birds during their southbound migration in late summer and fall. The proposed project would restore tidal hydrology to previously filled, hydrologically impaired, and *Phragmites*-dominated areas of the project site. In portions of the project site *Phragmites* has replaced native marsh plants species and its dense cover has adversely affected hydrology and, therefore, the use of open water and marsh surface by aquatic species. The implementation of the proposed project would increase the heterogeneity of habitats, thereby allowing wildlife species diversity the opportunity to increase. Avian species, in particular, are found to be attracted to a variety of habitats in comparison to a single habitat type. The combination of mud flat, open water, low marsh, high marsh, and scrub-shrub proposed for the project site would provide the diversity of habitat types needed to support a variety of wildlife species, whether on a migratory stopover or as a resident. Restoring the tidal flow to previously filled or degraded areas would allow fish, shellfish, and aquatic invertebrate species to use the tidal channels and provide valuable foraging opportunities for bird species along mudflats during low tide.

The proposed project would have beneficial effects on wildlife diversity and abundance. Biological field surveys were conducted to determine the presence of any special status species and habitat suitability assessments were conducted to determine the potential for special status flora and fauna to occur within the project site. Three birds species designated as rare by the NYSDEC were observed during the field survey. With the exception of the three rare bird species, no special status flora and or fauna were encountered or detected by sign within the project site; therefore, no significant adverse impacts to such species are anticipated. Suitable habitat for federally listed species is not present on the project site.

The proposed project would have positive effects on the habitat for state-listed rare birds such as the least bittern, glossy ibis, snowy egret, and yellow-crowned night-heron by creating habitat more attractive to these species than under current conditions or the No

Action Alternative. Specifically, the increase in available open water habitat and increased interspersion of emergent vegetation and open water would improve habitat for these species as well as other waterfowl and water-dependent birds. Least bitterns favor marshes with tall, dense emergent vegetation that are interspersed with clumps of woody shrubs and open water; conditions which are expected to occur under the proposed project as a result of the restoration plan. Glossy ibis breed in saltwater marshes and forage in shallow waters, mudflats, creeks and pools; conditions which are expected to occur under the proposed project as a result of the restoration plan. Snowy Egrets and yellow-crowned night herons forage in salt marshes and salt pannes. The proposed project would support fish populations adequate to provide foraging for osprey. Increased open water may also make the site more attractive for pied-billed grebes to utilize during the nonbreeding season.

The increase in diversity of habitats would lead to an increase in the availability of food resources and variation in prey, providing foraging habitat for more species than currently utilize the site. As the site would be protected from future disturbance and development under the proposed project, it would play an important role in regional habitat connectivity and species conservation due to its geographic location and on-site biological resources.

According to the EFH assessment, restoration of salt marsh habitat at the project site would have long-term, major beneficial effects on fish communities and fish habitat in the Arthur Kill system. The increase in marsh areas and the creation of tidal channels would physically allow more fish movement in and out of the marshes. The increased volume of water and improved water quality in the marshes would increase the availability and quality of habitat for all trophic levels of aquatic organisms. In particular, these improvements would benefit forage fish for EFH-designated species, as many of these forage fish spend most or all of their life in salt marshes. Larger numbers of small, resident forage fish in the marshes would provide an increased food source for larger predatory EFH-designated species that would also be able to move more easily into and out of the marshes because of the presence of tidal channels and removal of tidal restrictions. Improved water and sediment quality would result in more expansive benthic habitat required for demersal fish species, including EFH-designated species. The proposed project is not expected to significantly impact EFH for any life stage of winter flounder, windowpane flounder, or bluefish, as discussed below.

Winter Flounder **-** Water quality and substrate characteristics of the Arthur Kill area are typical for each life stage of winter flounder. Temporary increases in suspended sediment could adversely affect the ability of winter flounder to feed because of its dependence on sight and light. Eggs, post-settled larvae, juveniles, and adults are demersal, and could be subjected to increased turbidity. However, this demersal species occurs in the often turbid conditions of estuaries and can avoid temporary increases in suspended sediments. Thus, the proposed project is not expected to significantly impact EFH for any life stage of winter flounder.

Windowpane Flounder - Water quality and substrate characteristics of the Arthur Kill area are typical for each life stage of windowpane flounder. Temporary increases in suspended

sediment could adversely affect the ability of windowpane flounder to feed because of its dependence on sight and light. Since the eggs of this species are buoyant, they would not be exposed to appreciable sedimentation. Post-settled larvae, juveniles, and adults are demersal, and could be subjected to increased turbidity. However, this demersal species occurs in the often turbid conditions of estuaries and can avoid temporary increases in suspended sediments. Therefore, the proposed project is not expected to significantly impact EFH for any life stage of windowpane flounder.

Bluefish - Juvenile and adult bluefish may be seasonally present within the Arthur Kill system and the project site from late spring through the fall. Since bluefish are pelagic and highly migratory, their presence in any particular area is seasonal and short-lived. In addition, bluefish are fast moving and feed high in the water column, so they would not be affected by increased sedimentation. Therefore, the proposed project is not expected to impact EFH for any life stage of bluefish.

As discussed above, the proposed project would improve the condition of the onsite habitat for wildlife and special status species, and would not result in significant adverse impacts. Furthermore, the proposed project would comply with the federal Endangered Species Act,[108] New York State's Endangered and Threatened Species of Fish and Wildlife Act, the Fish and Wildlife Coordination Act, the Migratory Bird Treaty Act, and the Magnuson-Stevens Fishery Conservation and Management Act.

3.4.7 Significant Natural Communities

3.4.7.1 Affected Environment

The NYSDEC NHP tracks locations of significant natural communities because they serve as habitat for a wide range of plants and animals, both rare and common, and because community occurrences in good condition support intact ecological processes and provide ecological value and services. Significant natural communities include rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats, ecosystems, and natural areas. Two significant natural communities within the vicinity of the project site are recorded in the NHP's Biodiversity Database. A red maple-sweetgum swamp is located approximately 0.25 mile east of the project site and a maritime post oak forest is located approximately 0.5 mile north east of the project site.

The red maple-sweetgum swamp's NHP conservation status is "High Quality Occurrence of Rare Community Type" and is described as moderate size, mature, with a minimally disturbed core and less than one percent cover of exotic plants. It is considered vulnerable in its urban setting and has little connectivity to natural landscape.

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[108] In a letter addressed to the USACE Regulatory Branch, New York District dated 2/9/15, the USFWS stated their concurrence with the USACE's determination that the proposed project will result in "no effect" to federally-listed threatened or endangered species under USFWS jurisdiction or their critical habitats.

The maritime post oak forest's NHP conservation status is "Rare Community Type" and is described as a small, but unusual mature occurrence with a minimally disturbed core. It is considered vulnerable in its urban setting with connectivity to only small forested landscape.

Although not noted in the database, 1.52 acres of red maple sweetgum swamp habitat are located in the southern portion of the eastern section of the project site (see **Table 3-1** and **Figure 3-2**)

3.4.7.2 Potential Environmental Impacts

3.4.7.2.1 No Action Alternative

In the No Action Alternative, the conditions of significant natural communities on and within the vicinity of the project site would be similar to the current conditions. Without implementation of the proposed project, the quality and function of the red maple sweetgum swamp habitat would not be improved and would continue to be threatened by dumping practices.

3.4.7.2.2 Proposed Project

The proposed project would have no direct effect on the significant natural communities at the locations identified in the NYSDEC NHP biodiversity database, and would improve the red maple sweetgum swamp habitat present on the project site. The proposed project includes the removal of Superstorm Sandy storm surge debris from this swamp area, as well as invasive species management, which would enhance habitat quality and function of this significant natural community.[109] The project site's red maple sweetgum swamp is also threatened by pervasive dumping practices. The proposed project would incorporate impediments to dumping, including project site posting and frequent inspections, which would further improve this swamp. Thus, the proposed project would not directly affect the significant natural community locations listed in the NYSDEC NHP database and would have beneficial effects to the red maple sweetgum swamp found within the project site. Additionally, the proposed project would comply with the New York State's Removal of Trees and Protected Plants regulations.

[109] As previously discussed, any work in the red maple-sweetgum swamp area would be subject to review by NRG, and herbicide treatment in these areas will be completed by either direct injection or hand wiping (rather than "spraying" which is less controlled application method and has the potential to harm non-target plants).

3.4.8 Floodplains

3.4.8.1 Affected Environment

The project site is located within a special flood hazard area and was inundated during Superstorm Sandy. According to FEMA's Preliminary Flood Insurance Rate Map (FIRM) Panels 360497 0302G and 360497 0306G (December 5, 2013), the majority of the project site is located within an AE zone, which represents areas subject to inundation by the 1-percent-annual-chance flood event (100-year flood) determined by detailed methods. The remainder of the site is located within the moderate flood hazard area, zone X (shaded), which represents areas between the limits of the base flood and the 0.2-percent-annual-chance flood event (500-year flood). **Figure 3-6** illustrates the site's flood hazard. The adjacent properties, and much of the surrounding neighborhood on Staten Island's northwest shore are also located in a special flood hazard area.

3.4.8.2 Potential Environmental Impacts

3.4.8.2.1 No Action Alternative

In the No Action Alternative a buffer of functioning wetlands would not be created between Arthur Kill and developed areas surrounding the project site. The existing fill would remain on-site and the previously degraded wetland ecosystem would not be reestablished. No additional water retention or mitigation against impacts of flood events are anticipated in the No Action Alternative.

3.4.8.2.2 Proposed Project

The proposed project would have direct beneficial impacts on floodplain conditions on the project site. The project would restore wetlands on the western section of the site by removing existing remnant berms, construction/demolition debris and other fill material and excavating the fill to a target elevation that would support low and high marsh. The site would be regraded, tidal creeks would be excavated to restore tidal flow and circulation, and the marsh plain would be planted with appropriate native salt marsh grasses and shrubs. The excavation of fill and wetlands restoration would provide additional room for storage of flood waters during tidal inundation and rain events. Reestablishing a previously degraded and destroyed wetland ecosystem with functioning site hydrology would improve flood attenuation and allow for more effective absorption of tidal inundation. In addition, the proposed project would comply with the National Flood Insurance Act of 1968 and Floodplain Management Executive Order 11988.[110]

[110] As noted in Section 3.41., the proposed project qualifies as an exception as per 24 CFR Part 55.12(c)(3) and is not required to complete the floodplain review process.

3.4.9 Soils

3.4.9.1 Affected Environment

The U.S Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), New York City Reconnaissance Soil Survey (2005) indicates that soils within the project area consist of four soil mapping units: Ipswich-Pawcatuck-Matunuck mucky peats (mapping unit 6); Laguardia-Ebbets-Pavement & Buildings, wet substratum complex, 0 to 8 percent slopes (mapping unit 7); Pavement & Buildings, wet substratum-Laguardia-Ebbets complex, 0 to 8 percent slopes (mapping unit 101); and Windsor-Windsor, loamy substratum-Deerfield loamy sands, 0 to 8 percent slopes (mapping 238). Soil mapping units are described below and shown on **Figure 3-7**.

Ipswich-Pawcatuck-Matunuck mucky peats (6): The majority of surficial soils throughout the project area consist of Ipswich-Pawcatuck-Matunuck mucky peat. These soils form in low-lying areas of tidal marsh that are inundated by salt water twice each day at high tide. These soils are a mixture of very poorly drained soils which vary in thickness of organic material over sand.

Laguardia-Ebbets-Pavement & buildings, wet substratum complex, 0 to 8 percent slopes (7): Surficial soils within the northern portion of the eastern project area consist of the Laguardia-Ebbets-Pavement & buildings, wet substratum complex. These soils form on nearly level to gently sloping areas filled with a mixture of natural soil materials and construction debris over swamp, tidal marsh, or water. This unit contains a mixture of anthropogenic soils which vary in coarse fragment content. At least 15 percent of the land surface is covered by impervious pavement and buildings.

Pavement & buildings, wet substratum-Laguardia-Ebbets complex, 0 to 8 percent slopes (101): Surficial soils within the eastern-central portion of the western project area consist of the Pavement & buildings, wet substratum-Laguardia-Ebbets complex. These soils are formed in nearly level to gently sloping urbanized areas filled with a mixture of natural soil materials and construction debris over swamp, tidal marsh, or water. This unit contains a mixture of anthropogenic soils which vary in coarse fragment content. Up to 80 percent of the land surface is covered by impervious pavement and buildings.

Windsor-Windsor, loamy substratum-Deerfield loamy sands, 0 to 8 percent slopes (238): Surficial soils in the southern-most portion of the eastern project area consist of Windsor-Windsor, loamy substratum-Deerfield loamy sands. These soils are formed in nearly level to gently sloping areas of sandy outwash plains and dunes that are relatively undisturbed and mostly wooded. This unit contains a mixture of excessively drained and moderately well drained sandy outwash soils.

Each of the above mapping unit components include soil series and miscellaneous areas. In general, soils in a series have the same parent material, drainage class, and sequence of major horizons. Characteristics of each soil series found within the project site mapping are included in the USDA NRCS Custom Soil Report for Richmond County, New York, Saw Mill

Creek Wetland Mitigation Bank included as **Appendix E.** The project site does not contain agricultural lands or soils classified as Prime per the USDA soil classifications.[111]

3.4.9.2 Potential Environmental Impacts

3.4.9.2.1 No Action Alternative

Under the No Action Alternative, no excavation would occur and the existing contaminated fill material and soils would not be removed from the project site.

3.4.9.2.2 Proposed Project

Restoration activities that would occur under the proposed project require the excavation of onsite soils. As above noted in Section 3.4.3 Surface Water Hydrology, the proposed construction of intertidal channels, mudflat, and emergent marsh, and removal of the existing fill and remnant berms, would require the excavation of approximately 64,800 cy of existing fill material/soils. As discussed below in Section 3.5 Hazardous Materials, results of site characterization indicate that fill material in various areas of the site is contaminated. All excavated soil and fill material would be removed from the site and disposed of at a licensed upland facility in accordance with all applicable local, state and federal regulations. During construction of the proposed project, contaminated areas would be excavated and planted with native salt marsh species. Areas where clean soil horizons have not been discovered through sampling would be over-excavated in accordance with the approved restoration design plan and provided with two feet of clean material.

The soils that would be excavated on the western section of the project site are primarily the Pavement & buildings, wet substratum-Laguardia-Ebbets complex, 0 to 8 percent slopes; and Laguardia-Ebbets-Pavement & buildings, wet substratum complex, 0 to 8 percent slopes on the eastern section of the site. No soils considered Prime by USDA classifications and no agricultural lands are present on the project site. The removal of project site soils would not result in significant adverse soil impacts.

3.5 Hazardous Materials

3.5.1 Affected Environment

A Phase I Environmental Site Assessment (ESA) was conducted for the proposed project in May of 2013.[112] The purpose of the Phase I ESA was to identify potential Recognized

[111] United State Department of Agriculture Natural Resources Conservation Service. Custom Soil Report for Richmond County, New York, Saw Mill Creek Wetland Mitigation Bank. Accessed April 2015 at: http://websoilsurvey.sc.egov.usda.gov/WssProduct/3341s0emqkczxjdbvzoruawx/DL_00000/20150411_14302802223_12_Soil_Report.pdf.

Environmental Conditions (RECs) on and surrounding the project site and the implications of those RECs for the proposed restoration and/or conservation of saltwater marsh at the project site.

Based on the data obtained during the Phase I ESA— which included a project site inspection, interviews, historical resources review and regulatory agency records review— several RECs were identified within the project site:

- Nonindigenous Fill Material - the site and adjacent areas contain nonindigenous fill material placed over the last 80 years to create upland areas.
- Widespread dumping was observed on the project site, some of which consisted of:
    - General Dumping
    - Bulk Storage Tank
    - Suspected Bulk Storage Tank
    - Discarded Electrical Equipment
    - Discarded Vehicle Battery Casings
    - 55-gallon Drum Dump Area
    - Discarded 55-gallon Drum and Approximate 30-gallon Drum (Eastern Section)
    - Discarded 55-gallon Drum and Approximate 30-gallon Drum (Western Section)
    - Discarded 55-gallon Drums in Fill Berm (Western Section)
    - Discarded 55-gallon Drum in Fill Area (Western Section)
    - Discarded 1-gallon Pails of Petroleum Product (Western Section)
- Other RECs that were noted at the project site which would require action and/or further investigation:
    - Potential off-site impacts -
        - The environmental database report identified two adjacent New York Solid Waste/Landfill facilities, Domenico Fontano Sons, Inc. (291-295 Chelsea Road) and Sarnelli Brothers (333 Chelsea Road, aka 331 Chelsea Road), as well as a New York Solid Waste Landfill facility at 200 Bloomfield Avenue. Given their proximity and assumed groundwater flow direction, any release at one of these facilities could migrate to the project area.
        - The environmental database report identified three closed spill cases at Francisco Auto Wrecking (422 Chelsea Road). While all cases are

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[112] *Draft Phase I Environmental Site Assessment Report for The Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES) Initiative Saw Mill Creek Pilot Wetland Mitigation Bank Blocks 1780, 1790, and 1815, Multiple Lots Staten Island, NY*, prepared for the New York City Economic Development Corporation by Louis Berger & Assoc., P.C., May 2013.

closed, any residual contamination or newly discovered release at this address has the potential to migrate to the project area.

- The former Gulf Oil fuel storage facility (aka the GATX facility), formerly located north of the project site, across River Road, housed 82 bulk storage tanks totaling approximately 215 million gallons and historically stored products including gasoline, aviation fuel, fuel oils, jet fuels, lubricating oils, naphtha distillates and crude oil. Petroleum-related soil and groundwater contamination, as well as free product at this facility, have been documented. Dredge material used as fill at this facility typically contains contaminants such as metals, polycyclic aromatic hydrocarbon (PAH), PCBs and dioxins. Based on the proximity of the former GATX facility, any residual and/or unidentified sources of contamination at this facility has the potential to migrate to the project area.
- During Superstorm Sandy in October 2012, three significant releases to the Arthur Kill occurred as a result of storm surge, flooding and wind impacts. Motiva Enterprises (Woodbridge NJ), Phillips 66 Refinery (Linden, NJ) and Kinder Morgan Carteret Terminal (Carteret NJ) reported spills which had the potential to degrade the environmental quality of the Arthur Kill watershed, including the project area.

- Suspected pesticide application - In the areas to the north at the former GATX facility (historic high-capacity petroleum storage tank field and transfer station situated north of the western portion of the project site, north of River Road and west of Bloomfield Road), pesticides have been detected in the ground water.[113]
- Rail line along western project site boundary – An active railroad that was built on fill material is situated along the western boundary of the western section of the project site. It is possible that PAH, PCB, petroleum hydrocarbon, herbicide and/or metal contamination may result from long-term railroad operations.

In accordance with the Phase I ESA findings and recommendations, a Phase II Site Investigation Work Plan (Phase II) and a Health and Safety Plan (HASP) were prepared and submitted to the New York City Department of Environmental Protection (NYCDEP) for review in June 2013. Under the scope of work outlined in that plan, soil, sediment and groundwater sampling was performed at areas of historic fill and widespread dumping, as identified in the Phase I ESA Report, as well as in areas of undisturbed sediments which

[113] Application for Department of the Army Jurisdictional Determination (Application No. NAN-2013-02059-FHA), MARSHES Initiatives, Saw Mill Creek Pilot Wetland Mitigation Bank, Staten Island, Richmond County, New York. August 2013.

may have been impacted from nearby filling and dumping. The purpose of the preliminary site screening was to investigate and identify the extent, depth and physical characteristics of the historic fill material and the RECs associated with the project site per the Phase I ESA. Each of the RECs was assigned an Area of Concern (AOC) designation; the AOCs investigated are as follows: AOC 1 – General Dumping; AOC 2 – Bulk Storage Tank; AOC 3 – Suspected Bulk Storage Tank; AOC 4 – Discarded Electrical Equipment; AOC 7 – Discarded 55-Gallon Drum and Approximate 30-Gallon Drum (eastern section). One soil boring was advanced adjacent to each of the above listed AOCs.

Following the completion of the September 2013 field work and laboratory sampling and analyses, a Phase II Report (Preliminary Site Screening Letter Results Report) was prepared and submitted to NYCDEP on December 13, 2013. Following this initial submission, the evolution of the proposed project's restoration design plan necessitated a change to proposed final elevation depths. This change in the design plan— as well as NYSDEC comments on the project's Joint Permit Application, which was submitted at this time— required that select soil borings and one sediment boring would need to be reoccupied and resampled to reflect the new design elevations. This additional sampling was proposed to both NYSDEC and NYCDEP in a January 2014 Addendum to the Phase II Work Plan; a HASP was also submitted with the work plan. Following a review of this proposed addendum, the NYSDEC requested further additional sampling.

Following subsequent meetings with NYCDEP, NYSDEC, USEPA, USWFS and members of the IRT, and multiple revisions of the revised sampling plan, the final revised Addendum Site Screening Work Plan Revision 4, was submitted to and approved by both NYSDEC and NYCDEP in May 2014. This revised work plan included the comparison of results to NYSDEC Regulations 6 NYCRR Part 375 Remedial Program Soil Cleanup Objectives, the Protection of Health Residential (Track 2) Soil Cleanup Objectives (SCOs), the Protection of Ecological Resources, (Track 2) SCOs, and the Protection of Groundwater (Track 2) SCOs. Six soil borings on the western section and two soil borings on the eastern section were added as part of the revised workplan. Additional proposed soil sampling also included the reoccupation of select soil borings on the western section and eastern sections to collect samples from revised depths, or for additional analytical parameters. Finally, six additional sediment borings were added to the eastern section, and it was proposed that one sediment boring be reoccupied based on the final design elevation depth. No additional water samples were proposed. Upon approval of the revised scope of work and HASP by both agencies, the additional site characterization work commenced in June 2014.

Based on the results of analytical sampling at the eastern section of the project site, on-site sediments were found to comprise silt, clayey silt, and organic clay with sand. Sand layers were found below the silt and clay at some of the borehole locations. Fill material (consisting of brick, concrete, glass, metal, porcelain, fabric, coal, and wood) was placed in wetlands and uplands throughout many areas of the project site, mostly adjacent to privately held parcels of land. Water was found to be within a foot of the ground surface in undisturbed natural areas and within 5 feet of the ground surface in areas that have been filled.

Contaminants identified with the fill material include various metals, polychlorinated biphenyls (PCBs), pesticides, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). With the exception of the PCBs, the contaminants detected are typically associated with fill material. In most cases, contaminant concentrations are found to decrease with depth with two exceptions which showed an increasing concentration of metals with depth. As described below in Section 3.5.2.2, these two areas of the project site would be over-excavated during the project's construction and covered with 2 feet of clean material.

In addition, due to the presence of PCBs in soil greater than 50 parts per million (ppm) at one location, requirements of the Toxic Substances Control Act (TSCA) are triggered. This exceedance of the PCB concentration threshold is likely attributable to the discarded electrical transformer found at the location and is a localized issue that would be remediated during construction. This area will be over-excavated during the project's construction to remove the PCBs and covered with clean material. Disposal of soils with PCB concentrations greater than 50 ppm would be performed in accordance with applicable TSCA regulations (see Section 3.5.2.2).

Similar to the eastern section of the project site, fill material was placed in wetlands and uplands on this portion of the project site. This fill material consists of brick, wood, concrete, fiberglass, floor tile, stone (schist block fragments), metal and plywood. The depth to groundwater on the western portion of the project site varies between 1 and 7.5 feet below ground surface.

Contaminants identified with the fill material include various metals, PCBs, VOCs and SVOCs, and PAHs. In most cases, contaminant concentrations are found to decrease with depth, with two exceptions which showed an increasing concentration of metals with depth. As described below these two areas of the project site would be over-excavated during the project's construction and covered with 2 feet of clean material.

3.5.2 Potential Environmental Impacts

3.5.2.1 No Action Alternative

In the No Action Alternative, project site conditions related to hazardous materials would be similar to the current conditions. The RECs would likely remain and continue to contribute to the degradation of the site's environmental condition.

3.5.2.2 Proposed Project

Soil, sediment, and groundwater sampling completed as part of the site characterization indicate that fill material in various areas of the site is contaminated. Based on the findings of the Phase II site investigation, the restoration design plan and construction specifications— which together govern the design and construction of the proposed project— also define the remedial action measures to be undertaken during the construction of the proposed project, including but not limited to, the excavation and

removal of soils, dewatering operations, and removal and disposal of hazardous materials. The restoration design plan and construction specifications were submitted to NYCDEP for review and approval in December 2014. A Construction Health and Safety Plan (CHASP), outlining the measures that would be employed to protect construction personnel from potential exposures to contaminated materials, was also submitted. In a letter January 14, 2015, NYCDEP approved the submitted materials.

EDC, as the project sponsor, would ensure that the chosen contractor appropriately implements the following measures during the construction of the proposed project:

- As outlined in the restoration design plan, contaminated areas would be excavated and planted with native salt marsh species. Areas where clean soil horizons have not been discovered through sampling would be over-excavated in accordance with the approved design plan and provided with two feet of clean material.
- All excavated soil and material would be taken from the site to a licensed disposal facility in accordance with all federal, state, and city laws and regulations governing the transportation and disposal of excavated soils and materials. Certified load tickets from the disposal facility for the material transported to it would be provided.
- All excavated soils deemed contaminated would be segregated and stored separately from non-contaminated soil areas. Sampling and testing of the segregated excavated soils for Hazardous Waste Toxic Substances Control Act (TSCA) Toxicity Characteristics Leaching Procedure (TCLP) constituents would be implemented. Proper transportation and disposal of all contaminated soils with TCLP sampling results classifying soil as a TSCA regulated hazardous waste would be implemented. All other excavated soils would be handled and disposed of in accordance with 6 NYCRR Part 375 Environmental Remediation Programs.
- Excavated material would be dewatered on site, stockpiled and allowed to dry before hauling to disposal site. Any wet material would be carted from site in trucks with watertight dump bodies that include tailgates with gaskets. A plan would be developed by the chosen contractor for handling of all excavated materials in wet areas during the time of excavation as portions of the site will be inundated twice daily with the tide cycles. Dewatering operations would be performed in accordance with applicable Federal and State laws, rules and regulations, the Specifications, and the direction of the contractor's project engineer.
- Appropriate dust control measures would be employed by the chosen contractor, including covering contaminated soil stockpiles with a minimum of 10-millimeter (or 2 layers of 6-millimeter) polyethylene sheeting, or an equivalent material.
- As part of the project's construction, discarded and dumped items and project site-wide debris would be removed from the project site and properly disposed of at an off-site location, in accordance with all applicable city, state, and federal laws and regulations.

- The approved CHASP would be implemented during the construction of the proposed project. Prior to the start of construction, after EDC choses a contractor through a competitive bidding process, the CHASP would be updated to include the names and contact information of the EDC construction manager, the Site Supervisor, the Site Health and Safety Officer, an alternate Site Health and Safety Officer, and the Emergency Response Coordinator. The CHASP would also include any additional/incremental hazards if other general hazards, or a hazard specifically associated with a Principal Task are identified after a detailed construction sequence is determined. An exposure monitoring program would be included, as well as any Standard Operating Procedures implemented by the chosen contractor. A map of the project site— showing site boundaries, designated work zones, and points of entry and exit— would be included once construction drawings are finalized.
- The design of the project site would include impediments to dumping to the maximum extent possible. Subsequent to site construction and planting, the site would be fenced and secured and signs would be posted to describe potential penalties for illegal dumping.

EDC would require that these and other conditions outlined in the Wetland Restoration Plan, construction specifications, and CHASP are undertaken by the contractor chosen to implement the proposed project through a competitive bidding process. EDC's construction manager would be responsible for ensuring that the contractor adheres to these and other provisions; EDC would enforce any infractions through a legally binding contract. Once construction is complete, a Professional Engineer (P.E.) would prepare and certify a Closure Report indicating that all requirements have been properly implemented. The PE-certified Closure Report would be submitted to NYCDEP for review and approval.

Overall, the proposed project would have a beneficial effect with respect to contaminated materials as it would remove nonindigenous fill material and address the additional identified RECs. With the implementation of the aforementioned measures, the proposed project would not result in adverse effects related to hazardous materials.

3.6 Construction Impacts

A construction impact analysis was completed due to the indicated presence of contaminated materials on the project site, the pre-contact archaeological sensitivity and the presence of natural resources on the project site, the need for construction impact assessments in these areas is evaluated below. In addition, due to the amount of excavated material that would be removed and disposed of during construction, transportation, air and noise construction impact assessments are also provided.

3.6.1 Regulatory Context

Responsibilities for construction oversight in New York City lie primarily with New York City agencies, although state and federal agencies are sometimes involved. The responsibilities of each agency are summarized in **Table 3-9**.

Table 3-9: Construction Oversight in New York City

Agency	Areas of Responsibility
New York City	
New York City Department of Buildings	Primary oversight for Building Code and site safety
New York City Department of Environmental Protection	Noise, hazardous materials, dewatering
New York City Fire Department	Compliance with Fire Code, tank operation
New York City Department of Transportation	Traffic lane and sidewalk closures
New York City Transit	Bus stop relocation; any subsurface construction within 200 feet of a subway
Landmarks Preservation Commission	Archaeological and historic architectural
New York State	
Department of Labor	Asbestos workers
Department of Environmental Conservation	Dewatering, hazardous materials, tanks, Stormwater Pollution Prevention
New York State Department of Transportation	Traffic effects on state routes and highways
Federal	
Environmental Protection Agency	Air emissions, noise, hazardous materials, toxic substances
Occupational Safety and Health Administration	Worker safety

The NYCDEP, which enforces the Noise Code, approves remedial action plans (RAPs) and CHASPs, and regulates water disposal into the sewer system, would play a regulatory role during project construction. The New York City Department of Transportation (NYCDOT), which reviews and approves any traffic lane and sidewalk closures, may also be involved if the final construction means and methods require temporary roadway closures to mobilize equipment, etc. The New York State Department of Transportation (NYSDOT) may plan a similar role if construction temporarily affects the ramp from Route 440, which comprises the eastern portion of the project site. As previously noted, during the construction of the project LPC and SHPO would monitor the implementation of archaeological monitoring.

In accordance with Title 15, Chapter 28 of the Rules of the City of New York, construction activities in New York City are permitted Monday through Friday, between 7 AM and 6 PM; however the workday can be extended beyond 6 pm under special circumstances. Weekend and after hours work requires a permit from the Department of Buildings (NYCDOB), as discussed further in Section 3.6.4.

Construction of the proposed project would involve soil disturbance of one or more acres; therefore, it must obtain coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity. The SPDES permit application includes an Erosion and Sediment Control Plan and Stormwater Pollution Prevention Plan (SWPPP). On April 24, 2014, NYSDEC issued an acknowledgment of coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity for the proposed project (a copy of the NYSDEC letter is provided in **Appendix D**).

3.6.2 Construction Sequence and Schedule

The eight-month construction period is expected to commence in Fall 2015 with completion in Spring/Summer 2016. Construction would be undertaken with the following sequence:

- Clearing of upland areas that are designated as Wetland Restoration (reestablishment) on the restoration design plan.
- Installation of a temporary turbidity curtain, used in the existing channels adjacent to proposed channels.
- Installation of a temporary silt fence around the project site boundary.
- Establishment of temporary construction entrances.
- Installation of chain link fencing and gates along the project site boundaries.
- Excavation and disposal of soils. As described in Chapter 3, Affected Environment and Potential Environmental Impacts, contaminated soil would be removed in accordance with all applicable legal requirements and properly stockpiled until it could be removed off-site for proper disposal by a licensed carter.
- Removal, transportation and disposal of human-made debris from the bank mitigation property, including items seen on the surface and debris encountered during excavation.
- Furnishing, installing, inspecting, and maintaining a depth of 2 feet of Sand Backfill in areas marked for over excavation on the Construction Plans.
- Temporary seeding and use of mulch for the upland grass areas.
- Installation of herbivory fencing on areas designated as wetland restoration. This fencing would be maintained for a minimum of two years to allow time for the vegetation to become established.
- Herbaceous Planting: *Spartina alterniflora* (Smooth Cordgrass) *Distichlis spicata* (Spike Grass) *Spartina patens* (Saltmeadow Hay) *Juncus gerardii* (Saltmeadow Rush) are proposed to be planted on 2-foot centers in the wetland restoration areas.[114]
- Shrub planting: *Baccharis halimifolia* (Groundsel Tree) *Iva frutescens* (Marsh Elder) are proposed to be planted on 5-foot centers in the wetland restoration areas.

[114] Increasing the planting density increases project construction costs. An 18-inch on center planting spacing would be investigated as part of the construction contractor bidding process. Assuming the cost difference is not problem for project implementation, 18 inches will be implemented, as per NRG design standards.

- Herbaceous seed mix comprised of *Echinochloa walteri* (Coast Cockspur Grass), *Andropogon gerardii* (Big Bluestem), *Hordeum jubatum* (Foxtail Barley), *Lolium multiflorum* (Ryegrass) and *Panicum vigatum* (Switchgrass), would be spread in the area designated as buffer rehabilitation.
- Installation of permanent fencing along project site boundaries.

A detailed construction schedule for the proposed project is not yet available, as it would be developed by the construction contractor to be chosen by a competitive bidding process. The anticipated construction timeline is outlined below.

Month 1

- Construction Entrance - Temporary
- Turbidity Curtain – Temporary
- Silt Fence – Temporary
- Clearing
- Chain Link Fencing and Gates
- Invasive Species Control

Month 2 – Month 5

- Excavation & Disposal
- Wetland Restoration (reestablishment)
- Wetland Restoration (Rehabilitation)
- Tidal Channels

Month 6 - Month 8

- Herbivory Fencing
- Planting
- Herbaceous Seed Mix

3.6.3 Transportation

As noted previously, the construction of the proposed project would remove an estimated 64,800 cy of material from the project site. Assuming an average haul truck capacity of 15 cy, the proposed project would require a total of approximately 4,320 truck trips to remove soils from the site. Given that earthwork is expected to last seven months or 140 weekdays,[115] this equates to 30.9 truck trips per day on average. During the peak construction period the number of truck trips would be higher than the average, with

[115] It was conservatively assumed that earthwork would occur during the majority of the proposed project's approximate eight-month construction period.

approximately 40 to 50 truck trips per day. Truck trips would be spread throughout the day and would not be concentrated in peak hour periods when impacts on congestion would be most likely. As a worst case assumption, up to 10 trucks could travel to/from the project area during the AM and PM peak hours. Trucks would be able to directly reach NYS Route 440 via the interchange with South Avenue/Chelsea Road. Route 440 is a four-lane limited access roadway that is also a designated New York City through truck route.[116] Local roads that would be used by trucks such as Chelsea Road, South Avenue, and Edward Curry Avenue are all designated local truck routes. Annual average daily traffic (AADT) on the project area roadways are as follows based on data available from NYSDOT:[117]

- NYS Route 440: 92,038 (2012, between South Avenue and I-287)
- South Avenue: 13,566 (2012, between Chelsea Road and Travis Avenue)
- Chelsea Road 1,783 (2012, between South Avenue and Bloomfield Avenue)

Based on the truck route designations and existing traffic conditions, the proposed project is not expected to cause substantial congestion in the project area.

3.6.4 Air Quality and Noise

The proposed project would result in air emissions and noise generation temporarily as a result of construction vehicles and delivery vehicles traveling to and from a site, as well as by stationary equipment used for on-site construction activities. However, adverse impacts are not anticipated due to the lack of residential or community facility receptors sensitive to noise in the immediate project area. Facilities used by the Staten Island Boys Football League (1475 South Avenue) are located over 900 feet from project site. The John Lavelle Preparatory Charter School is located 1,000 feet east of the project site (1 Teleport Drive). The nearest residential areas are over 3,000 feet from the project site (east of Victory Boulevard, north of Signs Road; south of Meredith Avenue, east of Route 440). Construction of the proposed project would not include pile driving, blasting or demolition – construction activities that typically generate relatively higher noise levels.

Construction of the proposed project would comply with USEPA noise emission standards for construction equipment and with the New York City Noise Control Code (Local Law 113 of 2005) which include specific noise emissions standard requirements for certain classifications of construction equipment and vehicles. To comply with local and federal noise regulations, the contractor selected to construct the proposed project would implement measures to minimize noise. As required by the local noise code, the contractor would develop a Construction Noise Mitigation Plan that would include source controls, path controls and receptor controls. These federal and local regulations also mandate that construction material be handled and transported so as not to create unnecessary noise,

[116] http://home2.nyc.gov/html/dot/downloads/pdf/2011_truck_route_map.pdf
[117] http://gis.dot.ny.gov/tdv/

and limit construction activities to weekdays between the hours of 7 AM and 6 PM, except for special circumstances. After hour and weekend work requires a permit from the DOB and in certain instances, also requires that an Alternative Noise Mitigation Plan be filed with the DEP (in addition to the noise mitigation plan for normal weekday hours).

Potential air quality impacts would be minimized by the incorporation of construction best management practices (BMPs), and compliance with the New York City Air Pollution Control Code which regulates fugitive dust. The contractor would implement construction BMPs to minimize emissions, such as covering haul trucks/soil piles, watering exposed soil during dry weather and limiting idling on-site to five minutes or less in accordance with state law.[118] Equipment over 50 horsepower would be required to comply with New York City's requirements for emissions control equipment (diesel particulate filters on older equipment or using newer Tier 4-compliant equipment) and use ultra-low sulfur diesel.[119]

3.6.4.1 General Conformity

Richmond County is designated by USEPA as a nonattainment area for ozone and a maintenance area (former nonattainment area) for fine particulates ($PM_{2.5}$) and carbon monoxide (CO).[120] General conformity regulations (40 C.F.R. Part 93 Subpart B) implementing the Clean Air Act (CAA; 42 U.S.C. § 7506(c)) apply to a federal action (in this case HUD's funding action) in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the federal action equal or exceed certain *de minimis* rates. If the action will cause emissions above the *de minimis* rates and the action is not otherwise exempt, "presumed to conform," or included in the existing emissions budget of the State Implementation Plan (SIP), the federal agency must conduct a conformity determination before it takes the action.[121] The General Conformity *de minimis* thresholds applicable to Staten Island are as follows:

- Nitrogen oxides (NO_x) – 100 tons/year (ozone precursor and $PM_{2.5}$ precursor)
- Volatile organic compounds (VOCs) – 50 tons/year (ozone precursor)
- $PM_{2.5}$ direct – 100 tons/year
- Sulfur oxides (SO_2) – 100 tons/year ($PM_{2.5}$ precursor)

[118] http://www.dec.ny.g
http://www.nyc.gov/html/dep/pdf/ll77.pdfov/regs/4256.html
[119] http://www.nyc.gov/html/dep/pdf/ll77.pdf
http://www.nyc.gov/html/dep/pdf/air/ll77-amendment-2011.pdf
[120] http://www.epa.gov/airquality/greenbook/
[121] Pursuant to the Clean Air Act, the USEPA develops National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ozone, particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide and lead. State Implementation Plans (SIPs) are developed for nonattainment areas (areas where pollutant levels exceed the NAAQS) to demonstrate that the state has appropriate program components in place, and to identify emission control programs that the state will use to meet and maintain the NAAQS.

Diesel vehicles do not result in notable VOC or SO_2 emissions, therefore the focus of General Conformity applicability assessment is emissions of NO_x (from off-road equipment and haul trucks) and $PM_{2.5}$ (from equipment, trucks and fugitive dust).

Haul truck emissions were estimated assuming a worst-case travel distance of 15 miles to the disposal site or 30 miles roundtrip, and the total number of trips 4,320 (see the transportation section above). This results in 129,600 vehicle miles traveled (VMT). Haul truck emission factors for 2014 were obtained from USEPA's MOVES2014 emissions model, using the "combination long-haul truck" source type. Given the limited purpose of the analysis to assess the applicability of general conformity, default/national-scale data was used to develop generic emission factors.[122] January morning meteorology was used. The resulting emissions factors are summarized in **Table 3-10**.

Table 3-10: Haul Truck Emissions (30 MPH)

Pollutant	Running Emissions Factor (grams/mile)	Total Running Emissions in Tons) (129,600 VMT)
NO_x	10.76	1.54
$PM_{2.5}$	0.60	0.09

Off-road equipment emissions were also estimated using MOVES2014, which incorporates the program NONROAD2008. **Table 3-11** summarizes the worst-case off-road equipment assumptions.

Table 3-11: Off-Road Equipment Emissions

Off-Road Equipment Type	Number	Horsepower	Total Operating Hours*	NO_x Emission factor (grams/HP-hour)	$PM_{2.5}$ Emission Factor (grams/HP-hour)
Excavator	2	680	2240	2.56	0.15
Dozer	4	254	4480	2.18	0.14
Loader	1	276	1120	4.48	0.42
Off-Road Dump Truck	2	489	2240	1.95	0.12
Grader	2	193	2240	2.15	0.14

*****140 days of construction at 8 hours per day equals 1,120 hours, which is then multiplied by number of pieces of equipment.

[122] For official conformity determination or a detailed NEPA analysis, inputs from the New York Metropolitan Transportation Council (the municipal planning organization for New York City, Long Island and the lower Hudson Valley) would be required.

$PM_{2.5}$ emissions of fugitive dust were estimated using a worst-case procedure provided by USEPA's AP-42, Compilation of Air Pollutant Emission Factors.[123] Section 13.2.3 of AP-42 provides a conservative total suspended particulate (TSP) emission factor for heavy construction of 1.2 tons/acre/month or alternative methods addressing each component of the construction process separately (e.g. land clearing, bulldozing, scraping etc.). The overall emission factor was used as the basis for estimating fugitive dust emissions because the currently available information on the construction process would not meet the data needs of the alternative methods.

The TSP emission factor was converted to a PM_{10} emission factor assuming 50 percent of the TSP consists of PM_{10} per AP-42 Section 13.2.5.3. $PM_{2.5}$ was assumed to consist of 10 percent of PM_{10} dust.[124] The analysis assumed approximately 50 percent of the 68.94 acre project site would consist of uncovered/open soil at any given time. A 50 percent reduction in emissions was credited for commitment to dust control measures (e.g. watering during dry weather, covering trucks etc.). Table 3-12 summarizes the results of the fugitive dust emissions.

Table 3-12 summarizes the total construction NO_x and $PM_{2.5}$ emissions, demonstrating total emissions would be well under the *de minimis* thresholds and a General Conformity determination is not required. (Backup for the general conformity applicability analysis calculations/ model output is provided in **Appendix C**.)

Table 3-12: Summary of Construction Emissions (Tons)

	NO_x	**$PM_{2.5}$**
Haul Truck Emissions	1.54	0.09
Off-Road Equipment Emissions	11.96	0.77
Fugitive Dust Emissions	NA	7.24
Total Emissions	**13.49**	**8.10**
De minimis threshold	100	100
***De minimis* threshold exceeded?**	**No**	**No**

3.6.5 Cultural Resources

As noted above, a scope of work for the Phase IB archaeological fieldwork has been approved by LPC and SHPO. LPC reviewed and accepted the final archaeological field work protocol on September 5, 2014; while the SHPO signed off on the final archaeological fieldwork protocol on August 13, 2014 (see **Appendix D**).

[123] http://www.epa.gov/ttnchie1/ap42/
[124] http://www.epa.gov/ttnchie1/conference/ei14/session5/pace.pdf

The Phase IB testing is proposed to be completed in coordination with construction. In order to ensure that the required archaeological monitoring obligations are met during construction and are carried out in accordance with applicable standards, a Programmatic Agreement (PA) has been developed among the USACE, the SHPO, LPC, and EDC. All archaeological field monitoring would be completed in accordance with LPC's *Guidelines for Archaeological Work in New York City* (2002), the New York State Education Department, Cultural Resources Survey Program, *Work Scope Specifications for Cultural Resource Investigations on New York State Department of Transportation Projects* (March 2004), and the Standards of the OPRHP (1994, 2000, and 2005).

The archaeological fieldwork protocol relies on the presence of archaeological monitors during construction of the project to ensure that any potential archaeological resources that may be present in the project site are appropriately treated. Phase IB archaeological testing within the proposed new tidal channels would be undertaken using the same mechanical excavation machines used to remove the overburden and excavate the new channels. A series of test units at approximately 50-foot intervals within the area determined to be sensitive for archaeological resources. A flat-edged bucket would be used on the backhoe to skim off the underlying soils in successive increments so that they can be examined by archaeologists. Test units would measure approximately 3 feet by 3 feet, or an equivalent size based on the dimensions of the backhoe bucket and depth of excavation. The total depth of excavation would extend no deeper than the base of each proposed tidal channel. The archaeologist(s) present in the field would observe the excavation, scrutinizing for signs of historic archaeological features/resources. The archaeological fieldwork protocol outlines the procedures for recovery, recordation, and laboratory analysis if resources are encountered, as well as the requirements of documenting any findings. Field monitoring would be conducted under the direction of archaeologists that are certified members of the Register of Professional Archaeologists and meet the qualifications of the National Park Service (NPS) listed at 36 CFR 61. EDC's construction manager will be responsible for arranging for the presence of trained and certified archaeologists and ensuring that all protocols are implemented.

With the implementation of the provisions of the PA, no significant adverse impacts to archaeological resources would occur during construction.

No historic architectural properties would be affected during bank construction because none are located in the APE. Therefore, construction of the proposed project would not result in significant adverse impacts to archaeological resources.

3.6.6 Hazardous Materials

Construction of the proposed project would include the removal of subsurface contamination and potentially contaminated debris. A contractor would be selected via a competitive bidding process. EDC would ensure that the numerous BMPs and measures

specified above in Section 3.5.2.2 would be appropriately implemented by the contractor during construction of the proposed project in order to limit exposure to contaminated materials. EDC would require that these specific measures as well as other conditions outlined in the approved Wetland Restoration Plan, construction specifications[125] and approved CHASP, be employed by the contractor. EDC's construction manager would be responsible for ensuring that the contractor adheres to these and other provisions; any infractions would be enforced by EDC through a legally binding contract. Therefore, no significant adverse impacts related to contaminated materials would occur during construction.

3.6.7 Natural Resources

3.6.7.1 Wetlands and Open Water

The proposed project would result in temporary impacts to jurisdictional wetlands and areas located below the MHW line. Following efforts to avoid and minimize impacts to jurisdictional areas, the proposed project would result in temporary impacts of 16.63 acres.

Table 3-13 presents the estimated area of temporary impacts to wetlands and open water areas related to the wetland restoration project. These areas would be restored following completion of construction; therefore, no significant adverse impacts to wetlands would occur. As described below, the temporary impacts are related to removing fill and debris from degraded wetlands.

Table 3-13: Temporary Wetland Impacts by Type and Source

Open Water Impacts (acres)		Tidal Wetland Impacts (acres)		
Temporary (>6 months)	**Temporary (<6 months)**	**Temporary (>6 months)**	**Temporary (<6 months)**	**Totals (acres)**
0.00	0.00	0.00	16.63	**16.63**

Source: Plan sheets in Appendix E of the Saw Mill Creek Pilot Wetland Mitigation Bank USACE-NYSDEC Joint Permit Application.

Construction equipment on timber mats or equivalent would be used to excavate the channels, and removal of nonindigenous fill, which could result in temporary impacts to wetlands. Excavation would be performed by excavators that scoop the material and place it into dump trucks to carry it off-site, based on the dewatering plans as well as materials handling/treatment/disposal plans to be developed by the contractor in accordance with

[125] Standard Specifications (U.S. Customary Units), January 8, 2015, State of New York Department of Transportation; Draft Technical Specification for the Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES) Initiative, Saw Mill Creek Pilot Wetland Mitigation Bank; Supplementary Specifications in Addition to the New York State Department of Transportation (NYSDOT) Standard Specifications U.S. Customary Units in Feet (USC) Dated January 8, 2015.

applicable regulatory requirements. The restoration would remove existing debris, fill material and invasive vegetation from degraded wetlands to create elevations that would support tidal salt marsh habitat. These areas would be graded to appropriate salt marsh elevations, tidal creeks would be excavated to restore tidal flow and circulation, and the marsh plain would be planted with native salt marsh grasses and shrubs. Excavated materials would be handled, treated and disposed of in accordance with applicable local, state and federal regulations. In addition, the proposed project would be constructed in accordance with the regulatory permits to be approved by USACE and the NYSDEC.

3.6.7.2 Water Quality

Construction of the project would involve temporary soil and sediment disturbances through excavation and grading activities. These disturbances have the potential to result in erosion and delivery of sediment to adjacent water bodies and wetlands, creating temporary increases in turbidity. Increases in turbidity can clog fish gills, bury benthic prey items, and displace fish from affected areas. Increased turbidity also reduces sunlight penetration in the water and could affect foraging by fish which rely on vision for feeding. Construction activities involve the use of fuel which could create a potential contamination hazard to wetlands and surface waters. In addition, construction activities could result in the discharge of litter and debris into wetlands and surface waters. These impacts would be minimized or avoided by employing the Stormwater Pollution Prevention a Plan, which would include restricting the location of refueling activities and requiring immediate cleanup of spills and leaks of materials, and regularly maintaining construction equipment to identify and repair any source of leaks.

Best management practices would be employed to ensure that erosion and delivery of sediment to Saw Mill Creek and the Arthur Kill and associated wetlands are prevented or minimized. These measures would include performing in-water work during periods of low tide, employing turbidity barriers to minimize migration of turbidity offsite, and re-stabilizing soils with plants after construction is completed. A Stormwater Pollution Prevention Plan (SWPPP) and Soil Erosion and Sediment Control Plan was prepared and submitted to NYSDEC as part of the State Pollutant Discharge Elimination System (SPDES) application process.[126] Implementation of these control measures would minimize potential impacts. Construction of the proposed project would not result in significant adverse water quality impacts.

[126] Discharge of stormwater from construction sites requires a SPDES Permit from NYSDEC. The SPDES application process includes an Erosion and Sediment Control Plan and a SWPPP. NYSDEC issued an acknowledgment of coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity for the proposed project on April 24, 2014 (see **Appendix D**).

3.6.7.3 Wildlife Habitat and Special-Status Species

Restoration activities that would occur during construction of the proposed project include noise-generating activities such as excavation and grading. Wildlife (including special-status species) utilizing the project site and adjacent areas during construction of the proposed project could be temporarily affected by construction noise. However, suitable habitat exists within the project area for wildlife to temporarily use and/or relocate to during construction. Any species temporarily displaced would be expected to return to the project site after construction of the wetland habitat is completed. Thus, no significant adverse impacts to wildlife or special status species would result from construction of the proposed project.

Construction of the proposed project would involve excavation and grading work. These activities have the potential to temporarily increase sediment discharge to wetlands and waterways, with resultant adverse impacts to EFH-designated species, their habitat, and prey items. Best management practices would be employed to ensure that erosion and delivery of sediment to Saw Mill Creek and the Arthur Kill and associated wetlands are prevented or minimized. These measures would include performing in-water work during periods of low tide, employing turbidity barriers to minimize migration of turbidity offsite, and re-stabilizing soils with plants after construction is completed. All construction work would comply with the Soil Erosion and Sediment Control Plan.

Within the USACE New York District, in-water work may be restricted from January through June to protect overwintering or spawning habitat for fish, including striped bass, American shad, Atlantic tomcod, and winter flounder. By limiting in-water work to periods where sensitive life stages of these species are unlikely to occur, impacts to these species and their habitats would be minimized.

3.7 Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of federal laws, regulations, policies, programs, and projects. Environmental justice requirements seek to avoid environmental discrimination.

There are three fundamental environmental justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and/or low-income populations;
- To ensure the full and fair participation by all potentially affected communities in the decision-making process;
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

An evaluation of the potential for environmental justice impacts of proposed federal investments is a required component of an environmental assessment.

The analysis presented in this section was performed to comply with the environmental justice requirements of Executive Order 12898 and HUD policy. The analysis showed that there is no environmental justice community in the area immediately surrounding the proposed project. Therefore, the proposed project is not expected to result in any disproportionately high and adverse effects on minority and low-income populations.

3.7.1 Regulatory Context

The framework for the evaluation of potential environmental justice impacts is provided by existing statues, executive orders and policies.

- Title VI of the Civil Rights Act of 1964 (42 USC 2000d) requires nondiscrimination on the basis of race, color, or national origin in programs or activities receiving federal financial assistance.
- Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed on February 11, 1994. Executive Order 12898 requires that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations." The executive order also addresses the importance of public participation in the review process.
- The Council on Environmental Quality (CEQ) has oversight of the federal government's compliance with Executive Order 12898. In 1997, CEQ published a guidance document on environmental justice for federal agencies entitled *Environmental Justice Guidance under the National Environmental Policy Act*. In addition, all federal agencies were directed under Executive Order 12898 to establish internal directives to ensure that the spirit of the order is reflected in the full range of their activities.
- HUD regulations found at 24 CFR Parts 50 and 58 mandate compliance with EO 12898 for HUD and/or HUD applicants.

3.7.2 Methodology

The technical assessment of environmental justice involves four basic steps:

1. Identify the study area, which is the area where the project may cause significant and adverse effects.
2. Examine race and ethnicity and poverty data for the study area to determine whether the study area includes minority or low-income communities.

3. If minority and/or low-income communities are identified, assess whether the proposed project has potential significant adverse effects on these communities.
4. Finally, evaluate the proposed project's potential significant adverse effects on minority and low- income communities relative to its overall effects to determine whether any potential significant adverse effects on those communities would be disproportionate.

In addition, environmental justice includes a procedural requirement. If environmental justice populations are identified, the public participation process should ensure their full and fair participation in the transportation decision-making process.

3.7.2.1 Study Area

Any potential adverse impacts or benefits to the surrounding community are expected to occur within a 1-mile radius of the proposed project. Therefore, the study area for the environmental justice analysis was defined as those census block groups that are at least 50 percent within a 1-mile radius from the proposed project. The study area includes a total of 4 block groups as presented in **Figure 3-8** Environmental Justice Study Area.

3.7.3 Affected Environment

A race, ethnicity, and poverty status profile for the study area and for the borough of Staten Island was compiled using data from the 2009-2013 American Community Survey (ACS) from the U.S. Bureau of Census (see **Table 3-14**).

3.7.3.1 Minority communities

CEQ guidance defines minorities to include American Indians or Alaskan Natives, Asian and Pacific Islanders, African Americans or Black persons, and Hispanic persons. For this analysis, all non-white persons were considered to be minorities. CEQ guidance requires minority communities to be identified where the minority population exceeds 50 percent, or where the minority population percentage is meaningfully greater than the minority population in the reference area. In Staten Island, the reference area for the proposed project, the minority population comprises 24 percent of the total population. Because the minority population accounts for less than 24 in each of the study area block groups, none of the block groups are considered minority communities.

3.7.3.2 Low-income communities

CEQ guidance does not specify a threshold to be used for identifying clusters of low-income populations. The analysis is based on the 2009-2013 ACS estimates of population living below the poverty standard. Under this approach, any census block group with a greater share of its population living in poverty than in the reference area was considered a low-income community. In Staten Island, the population in poverty accounted for 9 percent of the total population. Because the low income population accounts for less than 9 percent

in each of the study area block groups, none of the block groups were considered low-income communities.

Table 3-14: Minority and Low Income Communities

	Geography				
Demographic	**Staten Island**	**Census Tract 291.02, Block Group 1**	**Census Tract 291.03, Block Group 1**	**Census Tract 291.03, Block Group 2**	**Census Tract 291.04, Block Group 2**
White alone	76%	88%	94%	100%	87%
Black or African American alone	10%	2%	0%	0%	0%
American Indian and Alaska Native alone	0%	1%	0%	0%	0%
Asian alone	8%	7%	6%	0%	11%
Native Hawaiian and Other Pacific Islander alone	0%	0%	0%	0%	0%
Some other race alone	4%	0%	0%	0%	0%
Two or more races	2%	2%	0%	0%	2%
Total Minority Population	**24%**	**12%**	**6%**	**0%**	**13%**
Total Population	470,223	1,035	1,335	1,005	1,351
Population with Income below Poverty Line	**9%**	**8%**	**4%**	**0%**	**5%**

Source: U.S. Bureau of Census, 2009-2013 American Community Survey

3.7.4 Environmental Consequences

The third step in an environmental justice analysis is to consider the adverse effects of the proposed project and whether the adverse effects to minority or low income populations are disproportionately high and adverse. As determined above, no environmental justice communities have been identified. Therefore, in accordance with the provisions of E.O. 12898, no further environmental justice analysis is required.

3.7.5 Public Participation

Although no environmental justice communities have been identified in the study area, EO 12898 also addresses the importance of public participation in the review process. The public review process for this EA includes the two week public review and comment period for the Combined Finding of No Significant Impact (FONSI) and Notice of Intent to Request Release of Funds (RROF). Notification of the Combined FONSI/RROF has been included in several local newspapers and marks the start of the public review and comment period. During the two-week public comment period the EA and Environmental Review Record (ERR) will be on file with Mr. Calvin Johnson, Assistant Director of Community Development Block Grant Disaster Recovery, New York City Office of Management and

Budget (OMB), 255 Greenwich Street, 7th Floor, New York, NY 10007, (212) 788-6024 and may be examined or copied weekdays 10:00 AM to 5:00 PM. Any individual, group, or agency may submit written comments to OMB at the address listed above. All comments received before the close of the public comment period will be considered by OMB prior to authorizing submission of a request for release of funds.

3.8 Conclusion

The proposed project would restore and enhance former and degraded wetlands on the 68.94-acre project site so that it can serve as the proposed wetland mitigation bank. The proposed restoration and enhancement of ditched, filled, and/or degraded wetland and upland areas to a high level of function would be accomplished by a combination of practices, including removal of remnant berms and other fill material, regrading to suitable tidal marsh elevations, restoration of tidal creeks, treating non-native invasive species with a USEPA-approved herbicide for use in aquatic habitats, and replanting with native vegetation. One of the main objectives of the proposed project is to establish tidal wetlands, tidal creeks and mudflat communities to provide a positive contribution to water quality, plant and animal habitat, and erosion control.

The proposed Saw Mill Creek Wetland Mitigation Bank would employ the first MBI in New York City as a means to facilitate the long-term improvement and protection of critical coastal resources, and to provide a predictable, efficient and environmentally responsible process to serve the mitigation needs of permit applicants in the geographical service area. The primary purpose of the proposed project is to provide compensatory mitigation for unavoidable impacts to waters of the U.S., including wetlands, which result from activities authorized under Sections 404 and 401 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, New York State ECL Article 15, Title 5 and New York State ECL Article 25. The bank would be established to compensate for wetland and other aquatic resource losses anticipated by such authorized development within the bank service area in a manner that contributes to the long-term ecological functioning of the Arthur Kill Drainage Basin, with an immediate goal of no net loss of wetlands functions and services and a long-term goal of a net gain of wetlands functions and services.

As supported above by the technical analyses, the proposed project would not result in significant adverse impacts with respect to land use, zoning and public policy; socioeconomic conditions; community facilities and services; open space; shadows; historic and cultural resources; urban design and visual resources; natural resources; hazardous materials; water and sewer infrastructure; solid waste and sanitation services; energy; transportation; air quality; climate changes and greenhouse gas emissions; noise; public health; neighborhood character; construction impacts; or environmental justice.

CHAPTER 4: INDIRECT EFFECTS AND CUMULATIVE IMPACTS

4.1 Indirect Effects

Indirect or "secondary" effects are defined as reasonably foreseeable effects caused by an action that are later in time or farther removed in distance. Indirect effects may include growth inducing impacts or other effects resulting from induced changes in the pattern of land use, population density or growth rate, and related effects on natural systems (e.g., air, water, ecosystems, etc.). Actions that result in the addition of substantial new land use, residents, or employment could trigger additional development of a similar kind or of support uses. In addition, actions that introduce or greatly expand infrastructure capacity (e.g., sewers, central water supply) may have the potential to spur growth.

The proposed project would not result in growth-inducing effects. It would not introduce a new land use, new residents or new employees, nor would it increase infrastructure capacity. Compensatory mitigation credits would be available for purchase by public agencies and private property owners for projects with *permitted* wetland impacts. Such authorized development would be expected to occur in the future in the absence of the proposed project. As such, the proposed project would not spur development; rather it would facilitate economically efficient, environmentally sustainable, and flexible off-site compensatory mitigation opportunities for public agencies and private property owners seeking to develop in accordance with all relevant Federal, State and local regulations.

The proposed project would restore wetlands and habitat areas and would result in positive direct effects to natural resources within the project site and surrounding area. These benefits would trigger additional positive impacts in the reasonably foreseeable future both on-site and in the aquatic and upland areas proximate to the project site. The indirect effects that would reasonably be expected as a result of the proposed project are detailed in Chapter 3, Affected Environment and Potential Environmental Impacts, and summarized below.

- Construction of new tidal creeks would support native low and high marsh vegetation and serve as a barrier to re-invasion of *Phragmites* from surrounding areas. Over time, this would result in recruitment of new plant species and increased plant diversity.
- The new tidal creeks and regrading to suitable tidal marsh elevation would also reintroduce complete tidal flushing and result in long-term benefits to wetland functions and structure, inducing improved water quality, tidal flood storage and conveyance capability, and fish and benthic habitat.
- Restoring marshland at the site would have long-term benefits on sediment quality and water quality in the Arthur Kill systems; benefits that would be expected to increase over time and result in improvements in dissolved oxygen concentrations and in the marsh's ability to trap nutrients and export detritus thereby increasing food supply to organisms in the system.

- The proposed project would improve fish and wildlife habitat by removing existing soils containing metals and other harmful substances, exposing cleaner soils. As site would continue to be subject to tidal exchange with the waters from the nearby impaired Arthur Kill, there is a small risk that metals and other substances from the Arthur Kill may re-enter the restored wetland; however, it would likely to be much lower concentrations than currently exist on the site. While restoration of the site would not in and of itself address regional water quality issues associated with the Arthur Kill, it would contribute to regional improvements in water quality.
- Over time, the improved habitats and increased habitat diversity would increase the diversity and abundance of fish, wildlife and avian species, including migratory birds, waterfowl and other water-dependent birds in particular.
- The protection of the project site from future disturbance and development would lead to an increase in regional habitat connectivity and advances in species conservation due to its geographic location and on-site biological resources.
- The proposed project would restore 24.27 acres of wetland, improving the resiliency of the area and helping to protect residents and businesses in the immediate area as well as upland areas from future flooding events and sea level rise associated with climate change.
- Wetland restoration at the site would lead to improved regulation of greenhouse gasses. Because coastal wetlands sequester carbon dioxide from the atmosphere and store it in the form of biomass and soil carbon, the proposed project can be expected to provide potential GHG emission reductions or removals, such as: increasing biomass, increasing soil organic carbon, reducing methane and/or nitrous oxide emissions, and reducing carbon dioxide emissions.[127]
- Over time, the restoration of the site's ecological system would provide aesthetic benefits to the surrounding area.

4.2 Cumulative Impacts

Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (15355[b], 40 CFR 1508.7). Such impacts can result from individually minor but collectively significant actions taking place over time.

Much of the Saw Mill Creek project area was originally tidal salt marsh, but the topography of the area has been significantly altered over the past century by wetland filling and ditching. Sections of the site have been historically altered from the tidal influence of Saw Mill Creek by the creation of multiple berms and the construction of a human-made

[127] http://thebluecarboninitiative.org/first-greenhouse-gas-methodology-for-tidal-wetland-and-seagrass-restoration/

mosquito ditch network. A large portion of the Saw Mill Creek project site is currently degraded and contains the invasive *Phragmites australis* (common reed) that has outcompeted native plant species. The project area also has a history of being used as an illegal dumping ground and portions of the site are littered with debris. As discussed in Section 3.5, the Phase I Environmental Site Assessment (ESA) confirms the use of the project site for illegal dumping and filling activities, and the results of subsequent soil and groundwater sampling indicate the presence of contaminated fill in portions of the site.[128] The environmental conditions of the project site may also have been adversely affected by adjacent property uses, recent and/or historic spills, and suspected wide-spread pesticide application during the early- and mid-20th century to reduce mosquito populations (see Section 3.5).

All of these past and current actions have severely degraded the site and have altered the functions and services provided by the wetlands and waterways of the Saw Mill Creek project area. The ability of the project area to effectively retain floodwaters and protect the area from inundation has been adversely affected as a result of these activities.

Currently and in the recent past, projects have been completed as part of the City's response to Superstorm Sandy and PlaNYC within the project vicinity as well as other areas of Staten Island, and have resulted in an increase in the resiliency of Staten Island. Examples include beach nourishment and dune restoration and stabilization on the eastern and southern shores, elevation of structures in flood hazard areas, expansion of the Bluebelt system and implementation of green infrastructure projects.

The proposed project includes the restoration and enhancement of ditched, filled, and/or degraded wetland and upland areas to a high level of function, and would substantially improve the marsh's ability to filter pollutants and to control for flood and erosion. Construction of the proposed project would include the removal of subsurface contamination, storm debris and potentially contaminated debris, substantially improving the current environmental conditions of the site. Significant adverse environmental impacts would not occur as a result of the proposed project.

The proposed project would also result in numerous beneficial effects on natural resources, including the restoration of wetlands; tidal marsh enhancement; restoration of upland buffers; increased plant diversity; improved water quality, sediment quality and fish and benthic habitat of Saw Mill Creek and the Arthur Kill system; improved dissolved oxygen concentrations in the marsh; improved wildlife habitat; increased wildlife diversity; and improved aesthetic value provided by the extensive natural area.

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[128] *Draft Phase I Environmental Site Assessment Report for The Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES) Initiative Saw Mill Creek Pilot Wetland Mitigation Bank Blocks 1780, 1790, and 1815, Multiple Lots Staten Island, NY*, prepared for the New York City Economic Development Corporation by Louis Berger & Assoc., P.C. May 2013.

Cumulative impacts would not occur during construction of the proposed project as no other projects with an overlapping construction schedule have been identified in the project area.

Based on future initiatives and planned and proposed projects outlined in the CDBG-DR Action Plan, the New York City Special Initiative for Rebuilding and Resiliency's (SIRR's) *A Stronger and More Resilient New York* report, *The Working West Shore 2030* report and PlaNYC/OneNYC, other reasonably foreseeable actions in the future include the cleanup of brownfield sites, such as the nearby 440-acre former GATX site, the City's largest privately-held tract of industrial land;[129] expansion of Staten Island's Bluebelt system; preservation and restoration of wetlands; and the implementation of green infrastructure, storm hardening and resiliency projects. As one of the strategies noted in the Working West Shore 2030 report is the recovery and utilization of brownfield areas, it can be expected that in addition to GATX, other West Shore brownfields will be cleaned up as part of redevelopment plans.

With respect to SIRR's resiliency efforts, the success and profitability of the proposed project could lead to additional restoration of degraded wetlands. The City has thousands of acres that could provide increased coastal resiliency if they were also restored and expanded as wetland mitigation banks.[130] Additional wetland creation and restoration can also be reasonably expected to occur as a result of the PlaNYC 2030 initiative's Wetlands Strategy, which calls the restoration of wetlands including implementation of the Comprehensive Restoration Plan which would provide the blueprint for restoration for the entire New York-New Jersey Harbor Estuary. The Comprehensive Restoration Plan identifies numerous coastal wetland creation and potential coastal wetlands restoration opportunities along the West Shore (including Saw Mill Creek).[131] Wetland creation and restoration would have many direct and indirect beneficial effects on natural resources, similar to those described above for the proposed project.

Therefore, the cumulative effect of the proposed project, combined with other past, current and future actions, would include improved environmental/ subsurface conditions; improved wetland complexes, water quality, wildlife and aquatic habitat; and an increase in the overall resiliency of Staten Island.

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[129] The New York City Economic Development Corporation and the New York City Department of City Planning, *Working West Shore 2030, Creating Jobs, Improving Infrastructure and Managing Growth*. June 2011.
[130] *A Stronger and More Resilient New York*, page 65. The New York City Special Initiative for Rebuilding and Resiliency. June 11, 2013.
[131] *The Comprehensive Restoration Plan*, developed by the New York-New Jersey Harbor & Estuary Program, The Port Authority of New York & New Jersey and the U.S. Army Corps of Engineers - New York District, was developed to provide the blueprint for restoration for the entire New York-New Jersey Harbor Estuary.