Final Environmental Assessment
Bay Park Conveyance Project

FEMA DR-4085-NY HMGP #4085-0091

Nassau County, New York

September 2020

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency
Region II 26 Federal Plaza, NY, NY 10278

TABLE OF CONTENTS

APPENDICES

APPENDIX A: Figures

APPENDIX B: Tables

APPENDIX C: Documents

APPENDIX D: Correspondence

APPENDIX E: FEMA's Responses to Summarized Comments

LIST OF ACRONYMS

APE – Area of Potential Effects
CBRA – Coastal Barrier Resources Act
CBRS – Coastal Barrier Resources System
CEQ – United States Council on Environmental Quality
CFR – Code of Federal Regulations
CMP – Coastal Management Plan
CO – Carbon Monoxide
CRIS – Cultural Resource Information System
CWA – Clean Water Act
dBA – decibels
DHS – United States Department of Homeland Security
EA – Environmental Assessment
ECL – New York State Environmental Conservation Law
EFH – Essential Fish Habitat
EO – Executive Order
ESA – Endangered Species Act
FEMA – Federal Emergency Management Agency
FONSI – Finding of No Significant Impact
gpm – gallons per minute
L_{dn} – Maximum 24-hour Equivalent Noise Level
L_{eq} – Equivalent Noise Levels
LIRR – Long Island Rail Road
MTBM – Microtunnel Boring Machine
MGD – Million Gallons per Day
NAA – Non-attainment Area
NAAQS – National Ambient Air Quality Standards
NAVD88 – North American Vertical Datum 1988
NEPA – National Environmental Policy Act
NHPA – National Historic Preservation Act
NICE – Nassau Inter-County Express
NOAA – National Oceanic and Atmospheric Administration
NO_2 – Nitrogen Dioxide
NRCS – United States Department of Agriculture Natural Resources Conservation Service
NRHP – National Register of Historic Places
NWI – National Wetland Inventory
NYCRR – New York Codes, Rules and Regulations
NYRCRPs – New York Rising Community Reconstruction Plans
NYSDEC – New York State Department of Environmental Conservation
NYSDOS – New York State Department of State

NYSDOT – New York State Department of Transportation
NYSHPO – New York State Historic Preservation Officer
OPAs – Otherwise Protected Areas
OSHA – Occupational Safety and Health Administration
PCB – Polychlorinated Biphenyl
PM – Particulate Matter
PM_{10} – PM less than 10 micrometers in diameter
$PM_{2.5}$ – fine PM less than 2.5 micrometers in diameter
SCFWH – Significant Coastal Fish and Wildlife Habitat
SIP – State Implementation Plan
SO_2 – Sulfur Dioxide
SPDES – State Pollutant Discharge Elimination System
STP –Sewage Treatment Plant
USACE – United States Army Corps of Engineers
USEPA – United States Environmental Protection Agency
USFWS – United States Fish and Wildlife Service
WPCP – Water Pollution Control Plant

1.0 INTRODUCTION

On October 29, 2012, Hurricane Sandy caused storm damage to several areas across the State of New York. On October 30, 2012, President Barack Obama declared Hurricane Sandy a major disaster. The declaration authorized the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) to provide assistance to the State of New York per federal disaster declaration DR-4085-NY. Nassau County (Subrecipient), New York has applied to the FEMA Hazard Mitigation Grant Program for partial funding of the Western Bays Resiliency Initiative in accordance with Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (42 United States Code [USC] 5170c), as amended; the Sandy Recovery Improvement Act of 2013; and the accompanying Disaster Relief Appropriations Act of 2013. The New York State Division of Homeland Security and Emergency Services is the recipient partner.

FEMA prepared this Environmental Assessment (EA) in accordance with Section 102 of the National Environmental Policy Act (NEPA) of 1969, as amended; and the Regulations for Implementation of the National Environmental Policy Act (40 Code of Federal Regulations [CFR] Parts 1500 to 1508). The purpose of the EA is to analyze the potential environmental impacts of alternatives, including a No Action Alternative, and to determine whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact (FONSI). In accordance with the above referenced regulations and FEMA Directive 108-1 and FEMA Instruction 108-1-1, FEMA must evaluate and consider the environmental consequences of major federal actions it funds or undertakes.

2.0 PURPOSE AND NEED

Section 404 of the Robert T. Stafford Relief and Emergency Assistance Act of 1974 (42 USC 5170c), as amended, authorizes FEMA to provide funding to eligible grant applicants for activities with the purpose of reducing or eliminating risks to life and property from hazards and their effects. The purpose of the Proposed Action is to reduce damage from flooding and coastal storm surge through effective floodplain management and saltmarsh health through improved water quality. The Proposed Action is needed to improve the resiliency of the southern shore of Long Island and to meet compliance with New York State permits.

3.0 BACKGROUND

The Nassau County Department of Public Works operates the Bay Park Sewage Treatment Plant (STP), which currently discharges treated water into Long Island's Western Bays. The Bay Park STP was constructed in the late 1940s and began operation in 1950. The Bay Park STP service area is approximately 70 square miles within western Nassau County. It serves approximately 550,000 residents, about 43 percent of Nassau County's population. The Bay Park STP has a State Pollutant Discharge Elimination System (SPDES) permit issued by the NYSDEC allowing a treatment capacity of 70 million gallons per day (MGD). It currently discharges an average of 50 MGD of treated water to Reynolds Channel within the Western Bays, a large tidal wetland ecosystem comprising Hempstead Bay and South Oyster Bay that lies between mainland Long Island and its outer barrier islands. Several tidal inlets separate the barrier islands and connect the Western Bays with the Atlantic Ocean (Tanski 2017). The Cedar Creek Water Pollution Control Plant (WPCP) went into operation in 1974. Cedar Creek WPCP's SPDES treatment capacity is 72 MGD. The ocean outfall at the Cedar Creek WPCP has a discharge capacity of 150 MGD.

Healthy saltmarsh plants such as smooth cordgrass (*Spartina alterniflora*) and submerged aquatic plants such as eelgrass (*Zostera marina*) dissipate wave energy and amplitude, reduce erosion from waves by slowing water velocity, and stabilize shorelines through sediment deposition (NYSDEC 2014; Shepard et al. 2011; Gedan et al. 2009). Approximately 13 percent of the intertidal, high, and fresh marsh within the Western Bays has been lost since 1974 (NEIWPCC 2015). Historic dredging and filling, as well as coastal development, including the construction of wastewater treatment plants that discharge nitrogen-rich water, have contributed to this loss in the Western Bays (Swanson 2013; NYSDEC 2014; Gobler 2016). The Bay Park STP currently contributes more than 80% of the excess nitrogen entering the Western Bays (Gobler 2016). Excess nitrogen initially makes saltmarsh plants grow taller and increases microbial decomposition of organic matter within the soils below. However, taller saltmarsh plants produce fewer roots and eventually grow too tall and fall over, ultimately destabilizing the saltmarsh edges and exacerbating marsh erosion. With more exposed marsh soil, saltmarshes become increasingly susceptible to the erosive forces of waves, further reducing their extent and elevation (Gobler 2016; Swanson 2013). The loss of saltmarsh continues to occur within the Western Bays, with once vegetated intertidal marsh being converted to non-vegetated underwater lands and mudflats (NYSDEC 2014; Gobler 2016). Excess nitrogen also accelerates macroalgae (specifically *Ulva,* or sea lettuce*)* growth, which further inhibits growth of native saltmarshes. After covering surface waters during summer months, *Ulva* mats die and sink to the bottom of the Western Bays where they decompose, depleting oxygen that is necessary for the growth of native saltmarshes in the process. Reducing nitrogen discharge to the Western Bays would promote a rejuvenation of saltmarshes that are critical to increased resilience against waves and storm surge that currently put areas within Nassau County at risk of experiencing 1.5-foot high or greater breaking waves during a 100-year flood event (Gobler 2016). Coastal flooding, usually caused by storm surges during hurricanes and nor'easters, is a principal flooding problem throughout the coastal areas of Nassau County.

The goal of the 2018 Bay Park Agreement (DEC Index No: CO 1-20170626-244) between the New York State Department of Environmental Conservation (NYSDEC) and Nassau County is to meet the water quality standards contained within the Bay Park STP's SPDES permit. Both parties agreed that Nassau County would undergo facility improvements at the Bay Park STP that would enhance nutrient removal, including capturing and treating water from sludge dewatering. FEMA and the Governor's Office of Storm Recovery supported repairs and some mitigation improvements at the facility with disaster funding.

4.0 ALTERNATIVES

The Subrecipient evaluated five alternatives to address the purpose and need, including a No Action Alternative, on the basis of hazard mitigation goals, engineering constraints, environmental impacts, land availability, and regional coastal resilience and restoration goals.

4.1 Alternative 1: No Action Alternative

Under the No Action Alternative, no federal funds would be provided to reduce damages from flooding and coastal storm surge along the southern shore of Long Island. Nassau County and the City of Long Beach are assessing the feasibility of installing new sanitary sewer infrastructure connecting the hamlet of Point Lookout to the city of Long Beach sanitary sewer system to replace the use of cesspools and septic tanks for wastewater treatment. Nassau County and the City of Long Beach would convert the Long Beach WPCP to a pump station, eliminating the discharge of treated water from the Long Beach WPCP to Reynolds Channel. The Long Beach pump station would send approximately three to five million gallons of wastewater per day, including the redirected wastewater from Point Lookout, to the Bay Park STP for treatment. Nassau County also plans to implement additional nutrient removal at the Bay Park STP by capturing and treating water from sludge dewatering. Even with these improvements already funded, the No Action Alternative would not bring the Bay Park STP into compliance with the 2018 Bay Park Agreement. Without the removal of the largest source of the nitrogen being discharged into the Western Bays, the saltmarshes would continue to degrade, leaving the inland areas of Nassau County at increased risk for coastal storm surge and wave damage.

4.2 Alternative 2: Proposed Action—Bay Park Conveyance Project

The Subrecipient is proposing Alternative 2 to meet the terms of the 2018 Bay Park Agreement as part of the Western Bays Resiliency Initiative. The Initiative is to improve water quality, and subsequently the resilience of the Western Bays. The Proposed Action would divert treated Bay Park STP effluent from the existing outfall in Reynolds Channel to the Cedar Creek WPCP ocean outfall. The diversion of treated water from Bay Park STP to Cedar Creek WPCP would remove between 75 to 90 percent of the nitrogen currently discharged into the Western Bays. Figures 4.2-1 through 4.2-3 in Appendix A indicate the location of the Proposed Action. Under the Proposed Action the Subrecipient would: (1) construct a new dedicated pump station at the Bay Park STP, (2) rehabilitate an existing aqueduct under Sunrise Highway, (3) construct new 72 inch diameter force mains between each of the two treatment plants and the existing aqueduct, and (4) construct a standpipe receiving tank connection at the existing Cedar Creek WPCP pump station. Construction of the new force mains would use microtunneling technology. Microtunneling is a method of constructing underground tunnels to install pipes, such as sewer mains, using a remotely operated microtunnel boring machine (MTBM). This method avoids the need to excavate long sections of open trenches at the ground surface to lay pipes. The Subrecipient would dig a total of 15 construction shafts, approximately 30 feet in diameter, at the beginning, end, and at several locations along the force main alignments; establishing staging areas of approximately half an acre around each construction shaft. The tunnel for each new force main would then be drilled between the shafts at depths below current ground surface of approximately 20 to 60 feet.

The Proposed Action comprises the following elements:

- New Bay Park STP Effluent Diversion Pump Station—The Subrecipient would construct a new dedicated pump station at the Bay Park STP that would be capable of pumping up to 75 MGD of treated water to the Cedar Creek WPCP. The existing Bay Park effluent pump station and Reynolds Channel outfall would remain in place for periodic use compliant with its SPDES permit. While Nassau County would maximize flow to Cedar Creek WPCP to the extent practicable, the Reynolds Channel outfall would be used to allow for maintenance of the proposed Bay Park Conveyance Project and distribution of flows between the Bay Park STP outfall and Cedar Creek WPCP outfall to ensure compliance with the SPDES permits to protect water quality and aquatic biota of Reynolds Channel and the Atlantic Ocean. The additional three to five MGD that the proposed Long Beach WPCP pump station would pump to the Bay Park STP is included in the estimated flow for the Proposed Action.

- New Force Main between the Bay Park STP and Sunrise Highway—The Subrecipient would construct a new underground force main, approximately 2 miles long, from the new Bay Park STP effluent pump station to the existing aqueduct under Sunrise Highway. The Subrecipient would construct nine construction access shafts along the Bay Park route, excavated to depths ranging from 47 feet below ground surface (-34 feet North American Vertical Datum 1988 [NAVD88]) at Shaft 9 and 68 feet below ground surface (-61 feet NAVD88) at Shaft 1, to construct the force main between Bay Park STP and Sunrise Highway. The tunnel for the pipeline would then be drilled between the shafts using a MTBM at depths ranging from approximately 20 feet to approximately 60 feet below current ground surface. Shafts 1 and 9 would remain as permanent access shafts that would allow for future maintenance activities. The permanent shafts would consist of approximately 10-foot diameter covered manholes with removable concrete covers and vents. The Subrecipient would backfill the temporary construction shafts and restore the surface to pre-existing conditions.

- Rehabilitated Sunrise Highway Aqueduct—The force mains would connect to an approximately 7.2-mile-long portion of an existing 72-inch diameter aqueduct pipe underneath NY State Route 27, known as Sunrise Highway, in the Town of Hempstead, the Village of Rockville Centre, and the Village of Freeport. The Subrecipient would install a smaller pipe within the aqueduct, a process known as "slip-lining," and provide air valves at various points to release pressure. To allow for removal of existing infrastructure within the aqueduct and construction of the new force main within the aqueduct, the Subrecipient would excavate approximately 23 aqueduct work pits in the roadway that are 10 to 20 feet deep, 15 to 20 feet wide, and approximately 30 feet long along the aqueduct within Sunrise Highway. The Subrecipient would use sheet piling to establish a secure and dry work zone within the work pits.

- New Force Main between Sunrise Highway and the Cedar Creek WPCP—The Subrecipient would construct a new underground force main, approximately 1.6 miles long, from the rehabilitated aqueduct under Sunrise Highway to the Cedar Creek WPCP. The Subrecipient would construct six construction access shafts along the Cedar Creek route, excavated to depths ranging from 31 feet below ground surface (-19 feet NAVD88) at Shaft 6 and 42 feet below ground surface (-31 feet NAVD88) at Shaft 2. The tunnel for the pipeline would then be constructed between the shafts using a MTBM at depths ranging from approximately 20 feet to approximately 60 feet below current ground surface. Shafts 2 and 6 would remain as permanent access shafts that would allow for future maintenance activities. The permanent shafts would consist of 10-foot diameter manholes with removable precast concrete covers and vents. The Subrecipient would backfill the temporary construction shafts and restore the surface to pre-existing conditions.

- New Cedar Creek Standpipe Receiving Tank and Upgraded Effluent Pump Station—The Cedar Creek force main would terminate at the Cedar Creek WPCP, connecting to a new 70-foot tall standpipe receiving tank. This tank would connect to the existing Cedar Creek pump station to join Bay Park's effluent with Cedar Creek's effluent. The Cedar Creek WPCP currently discharges treated water through an existing 84-inch diameter outfall pipe to 120 diffuser ports located approximately 2.5 miles into the Atlantic Ocean. The Subrecipient would also upgrade pumps, valves, and other control infrastructure at Cedar Creek as part of the project. The Subrecipient would install controls to monitor flow within Cedar Creek ocean outfall, and signal when the capacity of the outfall has been exceeded and treated water from Bay Park STP should instead be discharged through the existing Bay Park outfall to Reynolds Channel.

The Subrecipient anticipates construction would last approximately three years, with several construction activities taking place concurrently. Construction of the new Bay Park STP effluent diversion pump station would take approximately 29 months. Construction of each of the force main construction shafts would take approximately 9 to 12 months microtunneling between each of the construction shafts would last approximately one month, with work occurring on a 24-hour basis, 7 days per week. Rehabilitation of the Sunrise Highway aqueduct would take approximately 11 weeks for each of the estimated 23 aqueduct work pits, which includes time to install the new pipe within the aqueduct between adjacent pits. Construction of the new Cedar Creek standpipe receiving tank and upgrades to the Cedar Creek WPCP would last approximately 26 months.

The Subrecipient evaluated four alignment options and shaft locations for the force mains as part of the design development of the Proposed Action (Appendix C-1). The evaluation considered methods to;

- minimize tunneling under structures and private properties,
- avoid poor ground conditions, provide sufficient space to construct shafts,
- avoid residential areas,
- minimize alignment length and number of shaft sites,
- optimize hydraulic flow,
- and, minimize impacts on wetlands.

Nassau County selected Alignment 4 of the Bay Park force main and Cedar Creek force main options, as shown on Figures 1 and 2 in Appendix C-1, for evaluation in this EA. These alignments;

- minimize the number of shafts,
- propose no permanent shafts on private property,
- require the fewest easements,
- avoid disturbing wetlands,
- and, contain no 90-degree bends that could impact hydraulic flow.

This EA evaluates the design of the Proposed Action as described in the Final Design Criteria Report, which provides a basis of design for a yet to be selected design-build contractor. The design-build contractor will be overseen by NYSDEC and will be responsible for developing and advancing the design through to final design and construction. Should the design developed by the design-build contractor deviate substantially from the Proposed Action evaluated in this EA, then additional review may be required. The design-build contractor is responsible for obtaining the applicable federal, state, and local permits and other authorizations on behalf of the Subrecipient.

4.3 Alternatives Considered and Dismissed

In addition to the alternatives outlined above, three additional alternatives were considered and dismissed from further consideration in this EA:

- Alternative 3 would extend the current outfall from Bay Park STP, bypass Reynolds Channel, and discharge directly into the Atlantic Ocean. Nassau County determined this alternative to be technically feasible but was not confident that environmental review could be completed, and permits could be granted in the time to demonstrate compliance with water quality-based effluent limitations in its SPDES permit and with the 2018 Bay Park Agreement.

- Alternative 4 would implement a number of technologies at Bay Park STP to achieve a total nitrogen limit in the Bay Park STP effluent of 3 to 5 milligrams per liter. Nassau County determined this alternative to be technically infeasible, due to the lack of available land which is needed to construct facilities that would be required to achieve the nitrogen limit and high cost.

- Alternative 5 would upgrade the existing Bay Park STP outfall pipe. Nassau County determined this alternative to be infeasible because it would not meet the project purpose and need of reducing damages from flooding and coastal storm surge through effective floodplain management to improve the resilience of the Western Bays.

4.4 Summary of Alternatives

The Subrecipient evaluated five alternatives relative to their ability to fulfill the purpose and need for the project. The Subrecipient dismissed three alternatives from further consideration for the reasons discussed in subsection 4.3 above. The two remaining alternatives evaluated in this EA are:

1. Alternative 1: No Action Alternative; and
2. Alternative 2: Proposed Action—Bay Park Conveyance Project.

Section 5 evaluates the potential environmental impacts of the No Action Alternative and the Proposed Action. Section 9, Impact Summary Table, summarizes the potential impacts evaluated in Section 5.

5.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

Section 5 discusses the potential for the No Action Alternative and the Proposed Action to impact environmental resources. Section 5.18 discusses the potential cumulative environmental impacts. When possible, quantitative information is provided to establish potential impacts. Table 1 presents the criteria used to evaluate the scale of the impacts.

Table 1: Evaluation Criteria for Potential Impacts

Impact Scale	Criteria
No Impact	The resource area would not be affected, and there would be no impacts.
Negligible	Changes would be non-detectable or, if detected, the impacts would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor	Changes to the resource would be measurable, but the changes would be small and localized. Impacts would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse impacts.
Moderate	Changes to the resource would be measurable and have both localized and regional impacts. Impacts would be within or below regulatory standards, but historical conditions would be altered temporarily. Mitigation measures would be necessary, and the measures would reduce any potential adverse impacts.
Major	Changes to the resource would be readily measurable and would have substantial consequences on local and regional levels. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts, but long-term changes to the resource would be expected.

5.1 Geology, Topography, and Soils

5.1.1 Existing Conditions

The study area for geology, topography, and soils comprises the southern shore of Nassau County and the Western Bays. The Proposed Action is within the Coastal Plain physiographic region. The surficial geology (Appendix A, Figure 5.1-1) comprises an outwash plain of mostly sand and silt, a result of glacial meltwater flowing south from the Ronkonkoma and Harbor Hill moraines (USGS, 2019; GPM&P, 2019). The elevation decreases southward from the ridges that form these moraines to the shoreline with the Western Bays at a rate of approximately 20 feet per mile. The Proposed Action would be located at an elevation of less than 50 feet above sea level (USGS, 2019). The Western Bays comprise tidal open water and small islands of saltmarsh that are frequently inundated. A line of coastal barrier islands forms the southern boundary of the Western Bays.

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey (Appendix A, Figures 5.1-2 through 5.1-4) classifies the soil types along the Bay Park and Cedar Creek force main alignments and Sunrise Highway as mostly sandy, nearly level, urban land soils. These soils are largely disturbed from development and often underlain by organic saltmarsh sediments. Saltmarsh soils comprise mostly mucky peat with some sandy areas. There are no farmland soils onsite, therefore the Farmland Protection Policy Act does not apply.

5.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative:

The No Action Alternative would have no impact on geology. Under this Alternative, excess nitrogen would continue to enter the Western Bays, furthering the erosion of soils beneath saltmarsh plants and leaving the native saltmarsh communities increasingly susceptible to the erosive forces of waves, further reducing their extent and elevation. Without the protection provided by a healthy saltmarsh, the shoreline of the Western Bays could experience loss of soil and changes in topography when strong coastal storms, such as Hurricane Sandy, cause further damage to the landscape. Therefore, the No Action Alternative would have moderate long-term adverse impacts on soils and topography.

Alternative 2: Proposed Action:

Construction of the new Bay Park STP effluent diversion pump station and Cedar Creek WPCP standpipe receiving tank would require the excavation of soils to depths ranging from approximately 4 feet to 25 feet below the ground. The Subrecipient would excavate construction shafts to install the new force mains to depths ranging from approximately 20 to 60 feet below the ground. Four of the 15 construction shafts would remain in place as permanent access shafts, two on the Bay Park side and two on the Cedar Creek side. The Subrecipient would dig approximately 23 work pits to depths of 10 to 20 feet below the ground surface along Sunrise Highway to rehabilitate the Sunrise Highway aqueduct. Best management practices would minimize the extent of temporary soil erosion impacts. The Subrecipient would backfill all temporary excavation sites and restore surfaces per New York State Department of Transportation (NYSDOT) standards. Construction of the Proposed Action would have minor, short-term impacts on soils and topography. The Proposed Action would have no impact on geology because bedrock in the study area is more than 750 feet from the surface, well below the depth of excavation activities.

Over time, the decrease in nitrogen discharged to the Western Bays resulting from the Proposed Action would promote a rejuvenation of native saltmarsh communities, stabilizing saltmarsh soils and adjacent uplands. The healthy marsh would provide increased resilience to the shorelines of the Western Bays against storm surge and the erosive forces of waves. Therefore, the Proposed Action would have a moderate long-term beneficial impact on topography and soils.

5.2 Air Quality

The Clean Air Act of 1970 (42 USC 7401–7661 [2009]) is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The Act authorized the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The NAAQS include standards for six criteria air pollutants: lead, nitrogen dioxide (NO_2), ozone, carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter (PM), including both particulate matter less than 10 micrometers in diameter (PM_{10}) and fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$). Areas where the monitored concentration of a criteria pollutant exceeds the applicable NAAQS are designated as "in non-attainment" of the standards; conversely, areas where the monitored concentration of a criteria pollutant is below the standard are classified as "in-attainment."

Federally funded actions in non-attainment and maintenance areas are subject to USEPA conformity regulations (40 CFR Parts 51 and 93), which ensure that emissions of air pollutants from planned, federally funded activities would not affect the state's ability to meet the NAAQS. Section 176(c) of the Clean Air Act requires federally funded projects to conform to the purpose of the State Implementation Plan (SIP). Federally funded activities cannot cause any violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone.

Under the general conformity regulations, a general conformity determination for federal actions is required for each criteria pollutant or precursor in non-attainment or maintenance areas where the action's direct and indirect emissions have the potential to emit one or more of the six criteria pollutants at rates equal to or exceeding the prescribed *de minimis* rates for that pollutant. Because the project would be located within an area designated as in non-attainment for the 1-hour ozone NAAQS, the prescribed annual rates are 50 tons of ozone precursors—volatile organic compounds and oxides of nitrogen. The project is also located within a CO and $PM_{2.5}$ maintenance area; therefore, additional prescribed annual rates are 100 tons of CO, $PM_{2.5}$, or SO_2. Activities with total direct or indirect impacts below the prescribed *de minimis* levels are assumed to conform to the SIP and would not result in new violations of the applicable NAAQS. This does not include stationary source emissions regulated under New Source Review programs.

5.2.1 Existing Conditions

Nassau County has been designated as in-attainment for CO, $PM_{2.5}$, PM_{10}, NO_2, lead, and SO_2. The existing background ambient air quality of the project site is based on the air quality monitoring data collected by NYSDEC in Region 1 at the Holtsville and Babylon monitoring stations. Maximum concentrations of the air contaminants measured at these locations (Table 5.2-1 in Appendix B) were all below the applicable NAAQS and any New York State Ambient Air Quality Standards for all pollutants with the exception of ozone. On August 23, 2019, as requested by New York State, USEPA reclassified Nassau County, as part of the New York-New Jersey-Long Island, NY-NJ-CT non-attainment area (NAA), as a "serious" NAA. The state is expected to be able to meet its SIP obligations for the 1997 and 2008 standards by satisfying the requirements for a moderate area attainment plan for the 2008 ozone NAAQS.

5.2.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, air emissions within the project area would remain unchanged from the existing condition. No temporary construction-related emissions would occur within the project area. The project site would continue to create no measurable emissions. Potential, minor long-term localized impacts are possible under the No Action Alternative because this action provides no mechanism to stop the loss of marsh vegetation, which can decrease the amount of carbon the system can store.

Alternative 2: Proposed Action - Bay Park Conveyance Project

Emissions from on-site construction equipment, on-road construction-related vehicles, diverted traffic during construction, and dust-generating construction activities have the potential to affect air quality. Dust generated by construction activities is also a source of PM. In addition, gasoline engines produce relatively high levels of CO. Because USEPA mandates the use of ultra-low-sulfur diesel fuel for all highway and non-road diesel engines, SO_2 emitted from the Proposed Action's construction activities would be negligible. Therefore, PM_{10}, $PM_{2.5}$, and CO are the three primary air pollutants of concern for construction activities. Engine emissions would release all three of these primary pollutants of concern. On-site dust emissions from excavation and transferring of excavated materials onto dump trucks would mainly release PM. Emissions from on-site construction operations would add air pollutants to the background concentrations identified in Appendix B, Table 5.2-1.

Construction activities would be temporary and would not persist at any single location for the full construction duration. The Subrecipient anticipates that shafts accessing the microtunnel would be under construction for approximately 9 to 12 months at each location, and rehabilitation of the Sunrise Highway aqueduct with work pits would take approximately eleven weeks. Appendix B, Table 5.2-2 presents projected annual on-site and on-road construction-related emissions over the Proposed Action's anticipated construction duration of approximately three years from 2021 to 2024, taking into account all the planned construction activities and equipment at the construction sites. These projected emissions, are lower than the *de minimis* rates defined in the general conformity regulations. As a result, no general conformity determination is required. Because the duration of construction at each location would be short, quantitative analyses for local air quality effects due to on-site construction activities are not warranted. Table 5.2-3 in Appendix B presents best management practices that would be used to reduce the effects of construction activities on air quality at nearby sensitive receptor locations.

A NYSDOT standard practice for projects in transportation corridors in non-attainment areas lasting longer than five years in any one location is that projects be quantitatively evaluated in order to demonstrate consistency with the conformity regulations. The Subrecipient anticipates completing the Proposed Action within two construction seasons. Detours and traffic diversions would also move as the construction moves throughout the corridor. Work hours and associated detours/diversions would also be limited to accommodate peak traffic hours along the Sunrise Highway. With these measures in place, construction of the Proposed Action would result in minor, adverse impacts on air quality. Additionally, the Subrecipient concluded that a quantitative conformity determination analysis is not warranted for the construction period.

Because the new Bay Park STP effluent diversion pump station would be powered by electricity, the Proposed Action would not result in stationary source emissions related to fuel combustion. In order to provide emergency backup power, the Subrecipient may install fossil fuel-powered emergency generators. These generators would be operated only for testing and maintenance purposes outside of an actual emergency use. As such, they would be considered intermittent sources of emissions whose annual emissions would be considered insignificant based on the limited usage. Additionally, the operation of the force mains and rehabilitated aqueduct would have negligible trip generation or long-term impacts on traffic patterns. Because total emissions from direct onsite and indirect traffic activities would be well below the prescribed general conformity *de minimis* levels for the Proposed Action, a quantitative conformity determination analysis is not warranted. The Proposed Action would not result in long-term impacts to air quality.

5.3 Water Quality

The objective of the Clean Water Act (CWA) of 1977 (33 USC §§1251-1387) is to restore and maintain the chemical, physical, and biological integrity of the waters of the United States. Under the CWA, USEPA regulates point and non-point source pollution, including stormwater runoff, through the National Pollutant Discharge Elimination System, which is implemented by NYSDEC, via the SPDES program, in New York State. Section 404 of the CWA requires authorization from the U.S. Army Corps of Engineers (USACE), for the discharge of dredged or fill material into waters of the U.S. Activities authorized under Section 404 must comply with Section 401 of the CWA. Under Section 401 of the CWA, any applicant for a federal permit or license for an activity that may result in a discharge to navigable waters must provide to the federal agency a certificate that the discharge would comply with Sections 301, 302, 303, 306, 307, and 316(b) of the CWA.

Section 1424(e) of the Safe Drinking Water Act of 1974 [Public Law 93–523] authorizes EPA to designate an aquifer for special protection under the sole-source aquifer program. USEPA can make this designation if the aquifer is the sole or principal drinking water resource for an area and if its contamination would create a significant hazard to public health. No federal financial assistance may be provided for any project that USEPA determines may contaminate a sole source aquifer such that a significant hazard to public health is created.

Pursuant to 6 New York Codes, Rules and Regulations (NYCRR), Part 601 and its Water Withdrawal Permit Program, NYSDEC acts “to conserve and develop the waters of the state for all beneficial uses for the public.” A Long Island Well permit under the Water Withdrawal Permit Program is needed for installation or operation of any well to withdraw water for any purpose including for construction dewatering using sumps and/or pumps, when the total capacity of the withdrawal is 45 gallons per minute (gpm) or more.

5.3.1 Existing Conditions

The study area includes the waters of the Western Bays near the Bay Park STP outfall (Reynolds Channel in West Hempstead Bay), and the waters of the Atlantic Ocean near the Cedar Creek WPCP outfall diffuser. NYSDEC classifies the open waters of West and Middle Hempstead Bays as Class SA, the best uses of which are shellfishing for market purposes, fishing, and primary and secondary contact recreation. From the western end of Long Beach to the eastern end of Island Park, an area in which the Bay Park STP outfall is located, NYSDEC classifies Reynolds Channel as Class SB, the best uses for which are primary and secondary contact recreation and fishing. East of Island Park, NYSDEC classifies Reynolds Channel as Class SA. For both designations, the water should also be suitable for fish and shellfish propagation and survival.

Surface waters in the project area include Mill River and Mill Pond. The NYSDEC classifies the Mill River as Class SC, the best use of these waters is for fishing. These waters should be suitable for fish, shellfish and wildlife propagation and survival and should be suitable for primary and secondary contact recreation. NYSDEC classifies Mill Pond as a Class A fresh surface water, best uses for which are sources of water supply for drinking, primary and secondary contact recreation and fishing. The waters shall be suitable for fish, shellfish and wildlife propagation and survival.

The 2018 Draft 303(d) list of impaired waters identifies Hempstead Bay and its tidal tributaries such as Mill River and Reynolds Channel as impaired for nitrogen due to municipal discharges and urban/stormwater runoff. It also identifies tidal tributaries to Hempstead Bay as impaired for nitrogen from the same suspected sources. The 2016 Gobler study linked over 80 percent of the excess nitrogen entering the Western Bays to Bay Park STP effluent and attributed this excess nitrogen to the continued decline in water quality within the Western Bays. Low dissolved oxygen (DO) and summer hypoxia are typical along the northern margins of the bay and tidal tributary mouths where nutrient inputs from runoff are high and flushing by tidal currents is reduced (ASA 2009, SoMAS 2011). All shellfish lands in Hempstead Bay are closed to shellfishing due to unsanitary conditions (NYSDEC 2014).

The Cedar Creek WPCP outfall diffuser is located in the Atlantic Ocean within the New York Bight about 2.5 miles offshore from Jones Beach Island, south of Wantagh State Parkway. Enterococci levels are typically low in this area, and ocean-side beaches along Jones Beach Island rarely fail to meet national bacteria standards for swimming (NRDC 2014). Shellfish lands off the south shore of Jones Beach Island meet health standards and are open to harvesting, except for any area that lies within a one-half nautical mile distance from any portion of the sewer outfall pipes (NYSDEC 2014).

Within the project area, depth to groundwater ranges from less than one foot to approximately 11 feet below the ground surface (WSP 2019). Shallow groundwater likely flows south with some variability due to tidal fluctuation. USEPA has designated all of Nassau County as a sole-source aquifer under the Safe Drinking Water Act. There are three major groundwater bearing aquifers in this area. From shallowest to deepest, they are the Upper Glacial, the Magothy, and the Lloyd aquifers. Along the southern shore of Long Island, the Upper Glacial aquifer ranges in depth from just below the ground surface to approximately 300 feet, the Magothy aquifer extends to approximately 1,400 feet, and the Lloyd aquifer extends to approximately 1,900 feet. The majority of the Nassau County drinking water comes from the Magothy aquifer (NYSDEC 2020).

5.3.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, facility improvements already funded would provide limited nutrient reduction in the wastewater treated by the Bay Park STP. The No Action Alternative would not bring discharges from the Bay Park STP into compliance with the 2018 Bay Park Agreement, and nutrient levels in the Western Bays would continue to be elevated. The Cedar Creek WPCP would continue to operate in accordance with the limits set by NYSDEC in the SPDES permit issued to the County and would not adversely affect water quality in the Atlantic Ocean. Therefore, the No Action Alternative would have long-term moderate adverse impacts on water quality in the Western Bays. The No Action Alternative would have no impact on water quality in the Atlantic Ocean, sole source aquifers, or on groundwater.

Alternative 2 (Proposed Action): Bay Park Conveyance Project

Construction activities would occur entirely on uplands and would not have the potential to affect water quality of Hempstead Bay, or the Atlantic Ocean. The Proposed Action does not require modification of the Cedar Creek WPCP outfall diffuser or any other construction activities within Hempstead Bay, Mill River, Mill Pond, or the Atlantic Ocean. Where the Bay Park force main crosses beneath Mill River and the Cedar Creek force main crosses beneath Mill Pond, the force mains would be underground and well below the lower extent of these surface waters. Best management practices established at shaft locations and staging areas in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, would minimize the potential for deposition of sediment to the Mill River during construction. Because shaft sites and staging areas are located in uplands not adjacent to waterbodies, the potential for accidental spills or leaks during construction is negligible and impacts would be minimized through the implementation of a spill prevention plan. With these measures in place construction activities associated with the Proposed Action would have negligible adverse impacts on water quality of the Western Bays.

The only potential for the Proposed Action to affect water quality is from the diversion of up to 75 MGD of treated water from Bay Park STP to the Cedar Creek WPCP ocean outfall. The existing Bay Park effluent pump station and Reynolds Channel outfall would remain in place for periodic use compliant with its SPDES permit. While Nassau County would maximize flow to Cedar Creek WPCP to the extent practicable, the Reynolds Channel outfall would be used to allow for maintenance of the proposed Bay Park Conveyance Project and distribution of flows between the Bay Park STP outfall and Cedar Creek WPCP outfall to ensure compliance with the SPDES permits to protect water quality and aquatic biota of Reynolds Channel and the Atlantic Ocean. Even with this periodic flow through the existing Reynolds Channel outfall, the diversion of effluent from the Bay Park STP to the Cedar Creek WPCP outfall would result in a significant reduction in discharge to the Western Bays and subsequent improvements in water quality.

Nassau County will submit an application for a modified SPDES permit to NYSDEC for the Cedar Creek WPCP and Bay Park STP. Existing SPDES permits require that Nassau County monitor a number of parameters and report the results to NYSDEC. Both facilities currently meet the state and federal standards identified in those SPDES permits. With the Proposed Action, the volume of discharge from Cedar Creek WPCP will increase, but the concentrations of monitored parameters within the discharge will stay the same. In reviewing the application for a modified SPDES permit, NYSDEC would evaluate the proposed combined effluent to set new effluent limits and would require the appropriate controls to meet those effluent limits. NYSDEC would set effluent limits that meet applicable water quality standards for the receiving water of the Atlantic Ocean and are protective of public health and the survival and propagation of fish and wildlife. Evaluations would include total residual chlorine, ammonia, fecal coliform, and enterococci, as well as physical characteristics in the vicinity of the existing outfall, such as bathymetry, water column stratification, and current speed and direction. The criteria for total residual chlorine and ammonia are specific to the physical characteristics of the outfall and of the receiving waters and will be set by NYSDEC as part of its permitting process.

Ongoing studies by the State University of New York School of Marine and Atmospheric Sciences (SoMAS) indicate that the current discharge at the Cedar Creek WPCP diffuser has a negligible and localized impact on water quality (Schweitzer 2019). The added discharge of treated water from the Bay Park STP with the planned facility improvements in nutrient reduction technology would not be expected to result in a measurable change in water quality. Therefore, the Proposed Action would result in negligible long-term impacts to water quality within the Atlantic Ocean, compared to the No Action Alternative, and would result in moderate long-term beneficial impacts on water quality in the Western Bays.

The Proposed Action would not result in a permanent increase in impervious surface that would have the potential to affect aquifer recharge, nor would it result in groundwater withdrawal. During construction, shafts would be constructed between 31 and 68 feet below ground surface and would not have the potential to affect the Magothy or Lloyd aquifers. Construction of the shaft sites and rehabilitation of the aqueduct may result in minimal contact with groundwater of the surficial Upper Glacial aquifer and could require some dewatering to keep the construction sites dry. Groundwater control systems (e.g., thrust wall, entry ring) would be installed prior to any dewatering and would minimize the potential for groundwater infiltration into the shaft site. As a mandatory requirement for shaft construction, groundwater that seeps into the shaft site despite the control systems would be held at an infiltration rate of less than 45 gpm. The Subrecipient anticipates that groundwater withdrawal at several excavation locations along Sunrise Highway and construction shafts along the microtunnel routes will be below the 45 gpm threshold that would require a Long Island Well Permit. Any groundwater that seeps into the shaft site would be containerized and disposed of at a licensed facility, if it is determined to be contaminated. The limited infiltration would not change the natural direction of groundwater flow or result in depletion of the groundwater supply. Additionally, best management practices during construction would minimize the effects of stormwater runoff. For these reasons, the Proposed Action would have no impact on the Nassau-Suffolk Counties' sole source aquifer.

5.4 Wetlands

USACE and NYSDEC regulate activities within wetlands in the state of New York. Section 404 of the Clean Water Act regulates the discharge of fill into waters of the United States, including wetlands. Article 15 of the NYS Environmental Conservation Law (ECL) regulates discharge and fill activities in navigable waters of the state. ECL Articles 25 and 24 regulate activities in tidal and freshwater wetlands, respectively. Executive Order 11990 was enacted "to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, the Executive Order requires federal agencies to consider alternatives to wetland sites and limit potential damage if any activity affecting a wetland cannot be avoided.

5.4.1 Existing Conditions

The United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping does not identify any wetlands within the above-ground portion of the project area. Appendix A, Figures 5.4-1A through 5.4-1H contain NWI wetland maps of the project area. The NYSDEC tidal and freshwater wetland mapping does not identify any NYSDEC-regulated wetlands within the above-ground portion of the project area. Appendix A, Figures 5.4-2A through 5.4-2H contain NYSDEC tidal and freshwater wetland maps of the project area. Reconnaissance investigations within the project area on October 1 and 2, 2019, confirm these conditions. However, Bay Park Shaft sites 4, 5, and 6, and Cedar Creek Shaft sites 1 and 2 appear to be located within NYSDEC-regulated tidal wetland adjacent areas. These are areas within 300 feet of a NYSDEC tidal wetland boundary, or to the seaward edge of the closest lawfully and presently existing structure (as of August 20, 1977), or to the 10 foot above mean sea level elevation, whichever is closest to the tidal wetland boundary.

The NWI maps the Western Bays and Mill River as estuarine subtidal and intertidal wetlands. NYSDEC maps the Western Bays as a mosaic of intertidal marsh, high marsh, coastal shoals, bars and mudflats, littoral zone, dredged spoil, and formerly connected wetlands (https://www.dec.ny.gov/lands/5120.html). NYSDEC maps the majority of Mill River as littoral zone. Significant natural communities throughout the Western Bays include low salt marsh, high salt marsh, and salt panne ecological communities (NYSDEC Environmental Resource Mapper accessed July 2019). The NWI maps the Mill Pond wetland area as freshwater pond. NYSDEC maps the Mill Pond wetland area as NYSDEC Wetland F-3, a Class 1 wetland of approximately 135.3 acres.

5.4.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, nitrogen-rich effluent that accelerates macroalgae growth and inhibits growth of native saltmarshes, would continue to be discharged into the Western Bays. Vegetated intertidal marsh would continue to convert to non-vegetated underwater lands and mudflats (NYSDEC 2014; Gobler 2016). The Western Bays would continue to lack the important wave attenuation and erosion reduction that healthy saltmarshes typically provide, and the Western Bays shoreline of Nassau County would remain less resilient to the destructive effects of coastal storms. Therefore, the No Action Alternative would have moderate long-term adverse impacts on the wetlands of the Western Bays.

Alternative 2: Proposed Action - Bay Park Conveyance Project

NWI- and NYSDEC-mapped wetlands do not occur within the above-ground portion of the project area of the Proposed Action. Therefore, none of the above-ground portions of the Proposed Action would directly impact wetland resources. NYSDEC-regulated tidal wetland adjacent areas may be present within the project area. Best management practices established at shaft locations and staging areas in accordance with the New York State Standards and Specifications for Erosion and Sediment Control would minimize the potential for deposition of sediment to Mill River, NYSDEC littoral zone tidal wetlands, and tidal wetland adjacent area during construction of the Bay Park force main. Any temporary disturbance to NYSDEC tidal wetland adjacent area would be regulated by the NYSDEC under Article 25 of the New York Environmental Conservation Law. A portion of the force main would pass under Mill River and Mill Pond but would be deep enough beneath these wetlands, at least 25 feet below the Mill River and at least 18 feet below Mill Pond, to avoid potential impacts. The Subrecipient would consult with the USACE and NYSDEC to determine jurisdiction and permit requirements for the installation of the pipeline under these mapped wetlands. Therefore, construction activities associated with the Proposed Action would result in negligible short-term adverse impacts on wetlands.

The Proposed Action would divert treated water from Bay Park STP to Cedar Creek WPCP, removing the largest source of nitrogen currently discharged into the Western Bays. Reducing nitrogen discharge to the Western Bays would promote natural rejuvenation of saltmarshes within the Western Bays that are critical to increased resilience against waves and storm surge. Therefore, Proposed Action would result in moderate positive long-term impacts on the saltmarshes of the Western Bays.

5.5 Floodplain

Executive Order (EO) 11988 (Floodplain Management) requires federal agencies 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 or indirect support of development within the floodplain whenever there is a practicable alternative. FEMA is required to conduct an eight-step decision-making process to determine whether federal actions within the one percent floodplain, or the 0.2 percent floodplain for a critical action facility are in compliance with EO 11988. This process requires evaluating practicable alternatives that avoid development in floodplains or that minimize adverse impacts if no practicable avoidance alternatives exist. FEMA defines a one percent annual chance floodplain (i.e., 100-year floodplain) as an area subject to inundation from a flood that has a one percent chance of being equaled or exceeded in any given year.

5.5.1 Existing Conditions

FEMA uses Flood Insurance Rate Maps to identify the boundaries of floodplains. Appendix A, Figures 5.5-1A through 5.5-1F indicate the floodplains within the project area. Nearly all of the Bay Park STP property and surrounding area is within the 100-year floodplain (Zone AE). The 100-year flood elevation near the Bay Park STP ranges from 9 feet NAVD88 to 10 feet NAVD88. A small area in the northwestern corner of the Bay Park STP property is above the 100-year and 500-year floodplain zone (Zone X unshaded). The northern half of the golf course that is to the south of the Bay Park STP is also above both floodplain zones. A small portion of the Bay Park STP property to the east and proposed Bay Park Shaft sites 3 and 4 are within the Limit of Moderate Wave Action, an informational boundary drawn to identify the extent of areas at greater risk for 1.5-foot wave heights, which have the potential to cause significant damage to structures. Following Hurricane Sandy in October 2012, Nassau County constructed a berm around the entire Bay Park STP to serve as perimeter flood protection. The berm reduces the risk of storm damage and enhances the resilience of the facility. Proposed Bay Park Shaft sites 1 through 6 and the Bay Park force main would be within the 100-year floodplain. Proposed Bay Park Shaft sites 7 through 9 would be outside any floodplain. None of the shaft sites along the Cedar Creek route would be within the floodplain. The Cedar Creek force main route would be mostly outside the 100-year floodplain of Bellmore Creek, only crossing the 100-year floodplain underground between Shaft sites 6 and 5 and again between Shaft sites 3 and 2. The Cedar Creek WPCP property is also outside 100-year and 500-year floodplains. The force main within Sunrise Highway would not be within the 100-year floodplain.

5.5.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, nitrogen-rich effluent that accelerates macroalgae growth and inhibits growth of native saltmarshes, would continue to be discharged into the Western Bays. As a result, vegetated intertidal marsh would continue to be converted to non-vegetated underwater lands and mudflats, resulting in moderate impacts on the functioning of the floodplain to coastal flooding. The coastal communities of Nassau County would remain at increased risk for storm surges and waves. The No Action Alternative would have a moderate adverse effect on floodplains.

Alternative 2: Proposed Action - Bay Park Conveyance Project

The Proposed Action would result in the following actions in the floodplain: construct a new dedicated pump station at the Bay Park STP; and construct new 72-inch diameter force mains between each of the two treatment plants and the rehabilitated Sunrise Highway aqueduct. Construction of the Bay Park force main would require excavation of construction shafts within the 100-year floodplain at Bay Park Shafts 1 through 6. These excavations and staging areas would result in minimal temporary occupation of the floodplain that would not result in impacts to the floodplain. Only Shaft 1 would be permanent. All temporary construction shafts would be backfilled and the surface would be restored such that there would be no impact to the floodplain

The Proposed Action would convert less than one acre of pervious land within the floodplain to impervious surface as a result of the permanent shaft at Bay Park, Shaft 1, and the new Bay Park effluent diversion pump station. The new force mains would be below ground and would not develop the floodplain. The new Bay Park STP effluent diversion pump station would have a design flood elevation of +17 feet NAVD88, which is equivalent to the current 500-year flood elevation. All equipment within the new Bay Park STP effluent diversion pump station not rated for submerged operation would be located at or above the design flood elevation. Bay Park Shaft 1 would be the only permanent shaft within either the 100-year or 500-year floodplain and would be fitted with a concrete cover and flood-proofed with a watertight gasket. The Cedar Creek WPCP, including the proposed standpipe receiving tank, is entirely outside the 100-year floodplain.

Additionally, the floodplain within the project area is mostly affected by coastal flooding. Coastal floodplains are influenced by astronomic tide and storm events rather than local flooding caused by precipitation. The minimal occupancy of the floodplain by portions of the Proposed Action would have no impact on the flood elevation or increased risks due to flooding adjacent to the project area. Removing 75 to 90 percent of the excess nitrogen discharged into the Western Bays would allow the saltmarsh to rejuvenate naturally. The Subrecipient expects that healthier saltmarshes will dissipate wave energy and may lessen the impacts from flooding associated with large coastal storms. Therefore, the Proposed Action would have a long-term moderate beneficial effect on floodplains.

5.6 Coastal Resources

The Coastal Zone Management Act, administered by states with shorelines in coastal zones, requires those states to have a Coastal Zone Management Plan to manage coastal development. Projects falling within designated coastal zones must be evaluated to ensure they are consistent with the Coastal Zone Management Plan. Projects receiving federal assistance must follow the procedures out-lined in 15 CFR 930.90 – 930.101 for federal coastal zone consistency determinations. The purpose of this legislation is to minimize the adverse impact of development, redevelopment, and revitalization efforts on natural coastal resources. In order to guide development and resource management within the State's coastal area, New York created a State Coastal Management Plan (CMP) that outlines the boundaries of the coastal area and the structure of the program and provides statewide policies.

The Coastal Barrier Resources Act (CBRA) of 1982 designated relatively undeveloped coastal barriers along the Atlantic and Gulf coasts as part of the John H. Chafee Coastal Barrier Resources System (CBRS) and made these areas ineligible for most new federal expenditures and financial assistance. The CBRA encourages the conservation of hurricane prone, biologically rich, coastal barriers by restricting federal expenditures. The CBRA was amended by the Coastal Barrier Improvement Act of 1990 which added a new category of coastal barriers: Otherwise Protected Areas (OPAs). OPAs are undeveloped coastal barriers that are within the boundaries of an area established under federal, state, or local law, or held by a qualified organization, primarily for wildlife refuge, sanctuary, recreational, or natural resource conservation purposes.

5.6.1 Existing Conditions

The study area for coastal resources comprises the southern shore of Long Island in Nassau County and the Western Bays. The Proposed Action is located within the regulated coastal zone (Figure 5.6-1 in Appendix A) for New York State. The Western Bays is within an area designated as Significant Coastal Fish and Wildlife Habitat, as discussed in Section 5.8 "Wildlife and Fish" of this EA. The eastern portion of the Western Bays is located within Unit NY-59 of the John H. Chafee CBRS.

5.6.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, nitrogen-rich effluent that accelerates macroalgae growth and inhibits growth of native saltmarshes would continue to be discharged into the Western Bays. This would result in moderate adverse impacts to saltmarsh and other associated coastal resources protected under the New York State CMP. Native saltmarshes would likely continue to degrade, leaving coastal resources increasingly vulnerable to waves and storm surge within the Western Bays. Therefore, the No Action Alternative would have the potential to result in moderate adverse impacts on coastal resources.

Alternative 2: Proposed Action - Bay Park Conveyance Project

No NWI- and NYSDEC-mapped wetlands or surface waters occur within the above-ground portion of the Proposed Action. Therefore, construction of the above-ground portions of the Proposed Action would not directly impact these coastal resources. Best management practices established at shaft locations and staging areas in accordance with the New York State Standards and Specifications for Erosion and Sediment Control would minimize the potential for deposition of sediment to Mill River, NYSDEC littoral zone tidal wetlands, and tidal wetland adjacent area during construction of the Bay Park force main. A portion of the force main would pass under Mill River and Mill Pond but would be deep enough beneath these coastal resources to avoid potential impacts. Therefore, construction activities associated with the Proposed Action would result in negligible short-term adverse impacts to coastal resources.

The Proposed Action would provide protection for coastal resources within the study area by removing between 75 and 90 percent of the nitrogen currently discharged into the Western Bays. Nitrogen typically found in treated wastewater has historically contributed to the widespread loss of saltmarshes that serve as natural storm buffers in the Western Bays in two ways: 1) through the proliferation of macro-algae, and 2) by extensive damage to the saltmarshes and their substructures. Removal of this nitrogen would allow saltmarshes to rejuvenate naturally. The Subrecipient expects that healthier saltmarshes will dissipate wave energy and may lessen the impacts from flooding associated with large coastal storms.

The Proposed Action would be consistent with the designation of the John H. Chafee CBRS by bolstering the ability of the Western Bays to serve as a natural storm buffer through the ultimate enhancement of the saltmarshes. It would also lead to improvements in water quality, and, in turn, wetland and aquatic habitat for fish and wildlife. FEMA has determined that funding the Proposed Action would be consistent with the coastal policies of the New York State CMP, as administered by the New York State Department of State (NYSDOS) (Appendix D) and initiated consultation with NYSDOS on February 18, 2020. NYSDOS issued a General Concurrence – No Objection to Funding on March 11, 2020. The Proposed Action would have a long-term moderate beneficial effect on coastal resources.

5.7 Vegetation

5.7.1 Existing Conditions

Five ecological communities, according to the classification of Edinger et al. (2014), best characterize the habitat within and immediately adjacent to the project areas. Table 5.7-1 in Appendix B describes these ecological communities as mowed lawn, successional southern hardwoods, paved road/path, urban vacant lot, and junkyard. Table 5.7-2 in Appendix B lists the plant species that were observed within the project area during the October 1 and 2, 2019 site reconnaissance visits.

5.7.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no construction and therefore no direct impact on vegetation within the project area. However, treated water containing nitrogen would continue to be regularly discharged into the Western Bays and the ecological communities along the southern shore of Nassau County. The communities would continue to be vulnerable to the destruction caused by storm surges and waves associated with coastal storms. Therefore, the No Action Alternative would result in minor adverse impacts on vegetation.

Alternative 2: Proposed Action - Bay Park Conveyance Project

Table 5.7-3 in Appendix B presents the total areas of temporary and permanent disturbance within each ecological community due to the Proposed Action. Construction of the Proposed Action would result in temporary disturbance to approximately 2.5 acres of successional southern hardwoods, with additional tree removal within approximately 0.3 acres of junkyard and 0.5 acres of urban vacant lot ecological communities within the footprints of the Sunrise Highway work areas, and the Bay Park STP and Cedar Creek WPCP construction shaft sites and their associated construction staging areas. The Subrecipient would conduct tree removals according to local regulations and, to the extent possible, in the winter months. Post-construction landscaping would restore vegetation to the existing cover or would stabilize the soil with native herbaceous and/or woody species or turf grass where appropriate. With the post-construction restoration, construction of the Proposed Action would result in short-term, minor adverse impacts on vegetation.

The Proposed Action would result in permanent disturbance to approximately 0.7 acres of vegetated ecological communities, 0.5 acres of mowed lawn and 0.2 acres of successional southern hardwoods in the footprint of the new Bay Park effluent diversion pump station, the standpipe receiving tank, and the permanent shaft locations. The permanent loss of vegetation would be relatively small compared to unaffected vegetated ecological communities in the surrounding areas. Many of these areas are disturbed and currently dominated by non-native/invasive species. Throughout the operational life of the Proposed Action, the Subrecipient would regularly manage vegetation within the immediate vicinity of the new permanent structures in order to maintain access to these structures. Management may include mechanical or chemical treatments of the vegetation. Because the size of these maintained areas would be small, operational impacts on vegetation would be negligible. Therefore, the Proposed Action would have negligible adverse impacts on vegetation.

5.8 Wildlife and Fish

Federal agencies are required to consider the potential effects of federally authorized actions on certain fish and wildlife. The Migratory Bird Treaty Act of 1918 makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid federal permit. The Endangered Species Act (ESA) of 1973, implemented by the USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries, requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also prohibits any action that causes a "taking" of any listed species. Federal agencies are required to assess the potential impacts that proposed actions and alternatives may have on NOAA Fisheries-regulated Essential Fish Habitat (EFH), in accordance with the Magnuson-Stevens Fishery Conservation and Management Act.

5.8.1 Existing Conditions

Terrestrial Wildlife

The Subrecipient characterized habitats and potential presence of birds, mammals, reptiles, and amphibian species on the basis of a site reconnaissance visit on August 23, 2019 and a review of available data, including the New York State Breeding Bird Atlas (2000-2005) and NYSDEC Herp Atlas Project (1990-1999). Table 5.8-1 in Appendix B lists the birds and Table 5.8-2 in Appendix B lists the reptiles and amphibians that have been documented in the vicinity of the project area. Table 5.8-3 in Appendix B describes the type of habitat present and the birds, mammals, and amphibian species that would be expected to occur at the Bay Park STP and Cedar Creek WPCP and force main construction shaft and staging sites.

Wildlife habitat in the vicinity of the Proposed Action is mainly limited to sports fields, roadside margins, and residential yards, all of which do not support diverse wildlife communities. The surrounding area is heavily developed with industrial, commercial, residential, and recreational land uses and transportation infrastructure, with impervious surface as the dominant land cover type. Therefore, the wildlife communities within the Bay Park STP, Cedar Creek WPCP, and proposed shaft sites consist of urban-adapted, disturbance-tolerant generalist species that can live in the heavily human-modified, largely degraded habitats in these areas. Wildlife habitat with the potential to support more diverse native species include two uninhabited salt marsh islands in Mill River near Bay Park Shaft site 4, as shown in Appendix A, Figure 5.4-2B, a fragment of tidal marsh near Cedar Creek Shafts 1 and 2, as shown in Appendix A, Figure 5.4-2E, and the northern edge of the successional southern hardwood forest in Mill Pond County Park near Cedar Creek Shaft 6 as shown in Appendix A, Figure 5.4-2F. While these areas may provide habitat for some generalist species, they are degraded due to their small size, fragmentation, isolation, proximity to roads and urban/suburban developments, and the dominance of non-native and invasive plants.

Threatened and Endangered Species

The USFWS identifies four federally listed wildlife and two plant species as having the potential to occur near the project area: northern long-eared bat (threatened), piping plover (threatened), red knot (threatened), roseate tern (endangered), sandplain gerardia (endangered), and seabeach amaranth (threatened). Document C-6 in Appendix C provides a description of these species. With the exception of northern long-eared bat, none of the listed species have the potential to occur within the project area.

Aquatic Resources

Aquatic resources in the project area include the waters of the Western Bays and the waters of the Atlantic Ocean near the Cedar Creek WPCP outfall diffuser.

Western Bays

Aquatic Biota

Table 5.8-4 in Appendix B lists aquatic biota that have the potential to occur in the Western Bays, including submerged aquatic vegetation, benthic algae, benthic invertebrates, and finfish. Submerged aquatic vegetation comprising eelgrass (*Zostera marina*) is limited within the Western Bays (USFWS 1997, NOAA 2003, NYS Seagrass Task Force 2009). Aquatic vegetation more commonly comprises attached macroalgae. Watershed development and high nutrient loads, which have caused eutrophication, poor water clarity, and dominance by macroalgae, have led to a general loss of eelgrass habitat (SoMAS 2010). The Western Bays provide habitat for a number of benthic invertebrate species, and generally exhibit high fish species richness, with at least 80 species of finfish documented (Duguay et al. 1989, ASA 2005, ASA 2009). Table 5.8-4 in Appendix B lists the aquatic species with the greatest potential to occur in the Western Bays.

Essential Fish Habitat

NOAA Fisheries defines EFH as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. NOAA Fisheries designates EFH within the Western Bays for 23 species. Table 5.8-5 and Table 5.8-6 in Appendix B list the species and life stages of fish NOAA Fisheries has identified as having EFH in the portion of West and Middle Hempstead Bay, respectively.

Significant Coastal Fish and Wildlife Habitat

The Western Bays include the West Hempstead Bay and Middle Hempstead Bay Significant Coastal Fish and Wildlife Habitats (SCFWH), as designated by NYSDOS. The West Hempstead Bay SCFWH includes an approximately 400-acre area along the south shore of Long Island between the Villages of Lawrence to the west and Island Park to the east and is bounded by the center line of the Reynolds Channel to the south. It comprises extensive areas of undeveloped salt marsh, tidal flats, dredged material islands, and open water. The West Hempstead Bay SCFWH was designated in part because it represents one of the largest undeveloped coastal wetland ecosystems in New York State and provides habitat for a variety of fish and wildlife. It is one of the most important waterfowl wintering areas on Long Island (NYSDOS 2008a). The Bay is also a productive area for marine finfish and shellfish. It serves as critical pre-migratory and nursery habitat for yearling striped bass and bluefish, winter flounder, Atlantic menhaden, Atlantic silverside, bay anchovy, and killifish. It also supports populations of soft clam, hard clam, scallop, ribbed mussel, and blue crab.

The Middle Hempstead Bay SCFWH includes approximately 5,000 acres bounded by the Village of Island Park in the west, the Meadowbrook State Parkway in the east, and the center line of Reynolds Channel to the south. It is characterized by an extensive system of sheltered shallow bays and salt marsh islands connected by a network of channels and tidal creeks (NYSDOS 2008b). The Middle Hempstead Bay SCFWH was designated in part because it represents a highly diverse habitat for fish and wildlife throughout the year. Like the West Hempstead Bay SCFWH, it is one of the largest undeveloped coastal wetland ecosystems in New York State and is a productive area for marine finfish, shellfish, and waterfowl. Similar species are found in both SCFWHs.

Threatened and Endangered Species

There are no records of State threatened or endangered species within the Western Bays. NOAA Fisheries identified Atlantic sturgeon (threatened), green sea turtle (threatened), Kemp's ridley sea turtle (endangered), leatherback sea turtle (endangered), loggerhead sea turtle (threatened), North Atlantic right whale (endangered), and fin whale (endangered) as having the potential to occur in the Western Bays. Atlantic sturgeon and sea turtles have the potential to occur in the vicinity of the Western Bays, but North Atlantic and fin whales require deeper water and are not likely to occur in the Western Bays.

Atlantic Ocean

Aquatic Biota

The phytoplankton community in the vicinity of the Cedar Creek WPCP outfall diffuser consists of diatoms in the spring and fall and dinoflagellates in the summer. Crustaceans and polychaetes dominate the benthic macroinvertebrate community of the nearshore Atlantic Ocean off western Long Island, followed by mollusks and oligochaetes (ESS Group Inc. 2013). Commercially important invertebrates include Atlantic surf clam (*Spisula solidissima*), ocean quahog (*Arctica islandica*), hard clam, eastern oyster, sea scallop (*Placopecten magellanicus*), and American lobster (*Homarus americanus*) (USFWS 1997, NOAA 2009). The nearshore zone in the vicinity of the Cedar Creek WPCP outfall diffuser is part of this highly productive system that supports a mixture of more than 60 species of boreal, temperate, and semi-tropical marine and anadromous fish, including both coastal and highly pelagic species (USFWS 1997). Table 5.8-7 in Appendix B lists fish species of the nearshore oceanic waters of the New York Bight as shown in Figure 4.2-1 that have the potential to occur in the vicinity of the existing Cedar Creek WPCP ocean outfall diffuser.

Essential Fish Habitat

NOAA Fisheries designates EFH within the vicinity of the Cedar Creek WPCP outfall diffuser for 26 species. Table 5.8-8 in Appendix B lists the species and life stages of fish as having EFH in the vicinity of the Cedar Creek WPCP outfall diffuser.

Marine Mammals

The New York Bight has some of the highest diversity of marine mammals among the waters of the United States (USFWS 1997). Table 5.8-9 in Appendix B lists the marine mammals of the New York Bight. All marine mammals are federally protected under the Marine Mammal Protection Act of 1972. While some species of whales, dolphins, and porpoises may be found in nearshore waters in the vicinity of the Western Bays and Cedar Creek WPCP outfall diffuser, many are typically found in deeper pelagic waters of the Atlantic Ocean (USFWS 1997, NYSDOS 2013).

Threatened and Endangered Species

NOAA Fisheries identifies North Atlantic right whale, finback whale, Atlantic sturgeon, green sea turtle, leatherback sea turtle, and loggerhead sea turtle as having the potential to occur near the Cedar Creek WPCP outfall diffuser. State-listed harbor porpoises (*Phocoena phocoena*; NYS Special Concern) also occur in nearshore waters off western Long Island and could be found near the diffuser.

5.8.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, construction associated with facility improvements that would be completed at the Bay Park STP and Cedar Creek WPCP independent of the Proposed Action would have minor effects on terrestrial wildlife that would be limited to temporary avoidance of active construction areas, resulting in short-term negligible adverse impacts. Under the No Action Alternative, the Bay Park STP would continue to undergo limited nutrient reduction that would reduce nutrient input to the Western Bays. However, this would not bring the Bay Park STP into compliance with the 2018 Bay Park Agreement. Without the removal of up to 90 percent of the nitrogen being discharged into the Western Bays, the No Action Alternative would have moderate adverse impacts on aquatic resources within the Western Bays, EFH, and the SCFWH. The No Action Alternative would have no impact on aquatic resources of the Atlantic Ocean, including state and federally listed species, marine mammals, and EFH.

Alternative 2 (Proposed Action): Bay Park Conveyance

Terrestrial Wildlife

Construction activities resulting from the Proposed Action have the potential to affect terrestrial wildlife at the Bay Park STP, the Cedar Creek WPCP, and the 15 construction shaft sites. Document C-6 in Appendix C provides detailed evaluations of the potential for the Proposed Action to affect terrestrial species protected under the ESA. Impacts on terrestrial wildlife would include ground disturbance and increased noise and human activity during construction, temporary loss of vegetation on about 3 acres of land within the project area, and permanent loss of vegetated habitat in the 0.7-acre footprint of new structures. The proposed construction and staging sites are of extremely limited value to native wildlife and are already subject to high levels of anthropogenic noise and activity under existing conditions. Multiple Bay Park and Cedar Creek shaft sites contain either impervious surface, mowed lawn, or a mix of both; Bay Park Shaft site 3 is within an active junk yard; Bay Park Shaft 7 is within a vacant dirt lot with ruderal vegetation; and a few Cedar Creek shaft sites are on the roadside edges of successional southern hardwood forest fragments. Except for sites containing roadside edges of successional hardwood forest, wildlife with the potential to occur is limited to non-native species and the most common urban-adapted native species. Construction activities associated with the Proposed Action would result in minimal habitat loss, and would not eliminate unique or high-quality wildlife habitat.

All tree clearing would be conducted during the winter to the extent practicable to avoid potential impacts to northern long-eared bat, breeding birds, and active sites would be surrounded by silt fencing that would prevent reptiles and amphibians from entering the area while construction is ongoing. Any wildlife temporarily displaced during construction would be able to move to similar habitats nearby and would be expected to return once construction is complete. Vegetation removed during construction would be restored through a post-construction landscaping plan. With these measures in place, construction activities resulting from the Proposed Action would result in minor short-term adverse impacts on terrestrial wildlife.

The Proposed Action would result in the permanent loss of 0.7 acres of vegetated habitat comprising 0.5 acres of mowed lawn and 0.2 acres of successional southern hardwoods. The minimal loss of successional southern hardwood edge habitat, which is not unique or of high quality, would result in minor long-term adverse impacts to terrestrial wildlife.

Aquatic Resources

Document C-4 in Appendix C provides detailed evaluations of the potential for the Proposed Action to affect aquatic species protected under the ESA and Marine Mammal Protection Act. Document C-5 in Appendix C provides an assessment of the potential impacts of the Proposed Action on EFH. Construction of the Proposed Action would occur entirely on uplands and would not have the potential to affect water quality or aquatic organisms of the Western Bays or Atlantic Ocean. The Bay Park STP and Cedar Creek WPCP would continue to operate under current conditions throughout construction of the Proposed Action. The Proposed Action does not involve modification of the Cedar Creek WPCP outfall diffuser or any other construction activities within the Western Bays or the Atlantic Ocean. Therefore, construction of the Proposed Action would have no impact on aquatic resources within the Western Bays or the Atlantic Ocean.

The Proposed Action would remove approximately 75 to 90 percent of the nitrogen currently discharged into the Western Bays. While the existing Bay Park STP outfall would remain available for service, it would only be used for required maintenance or during events that cause treated water to exceed the 75 MGD diversion limit, which is expected to happen infrequently. The diversion of discharge from Bay Park STP to Cedar Creek WPCP would result in a reduction in discharge to the Western Bays and subsequent improvements in water quality. This would lead to moderate beneficial effects to aquatic resources and wildlife within the Western Bays, including EFH and the SCFWH.

NYSDEC would set the SPDES permit limits for the Cedar Creek WPCP and Bay Park STP effluent streams so that the combined discharges meet applicable water quality standards. The Proposed Action would not result in any construction related effects to aquatic biota in the vicinity of the Cedar Creek WPCP outfall diffuser, or result in changes in water quality. The adverse impacts of the Proposed Action on aquatic resources of the Atlantic Ocean in the vicinity of the Cedar Creek WPCP outfall diffuser would be negligible.

5.9 Cultural Resources

As a federal agency, FEMA must consider the potential effects that actions it funds may have on cultural resources prior to engaging in any undertaking. This obligation is defined in Section 106 of the National Historic Preservation Act (NHPA), as amended and implemented by 36 CFR Part 800. The NHPA of 1966 defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register." Only those cultural resources determined to be potentially significant under NHPA are subject to protection from adverse impacts resulting from an undertaking. To be considered significant, a cultural resource must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the National Register of Historic Places (NRHP), as found at 36 C.F.R. Part 60. The term "eligible for inclusion in the NRHP" includes all properties that meet the NRHP listing criteria. Sites not yet evaluated may be considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as nominated properties. Pursuant to 36 CFR 800.4(a)(1), the Area of Potential Effects (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. Within the APE, FEMA evaluated impacts on cultural resources for both above ground standing structures and prehistoric or historic archaeological resources.

FEMA Policy #101-002-02, "FEMA Tribal Consultation Policy," dated July 3, 2019, provides guidance concerning cooperation and consultation with Indian Nations on issues relating to protection of environmental and cultural resources. This guidance was prepared to comply with consultation requirements issued in Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments."

5.9.1 Existing Conditions

The New York State Historic Preservation Officer (NYSHPO) maintains a regularly updated list of New York's historic properties that are subject to NYSHPO and federal agency review. This list is accessible through the NYSHPO-maintained Cultural Resource Information System (CRIS). FEMA evaluated the Proposed Action's potential effects on cultural resources in compliance with Section 106 of NHPA through a CRIS review, consultation with NYSHPO, completion of a Phase 1A Archaeological Documentary Study (Phase 1A Study), and consultation with Tribal Nations.

In accordance with Section 106 of NHPA, FEMA sent information regarding the Proposed Action, copies of the Phase 1A Study, and FEMA's determination of effect to the following Tribal Nations requesting their concurrence:

- Delaware Nation on February 24, 2020;
- Delaware Tribe of Indians on February 24, 2020;
- Shinnecock Nation on February 24, 2020; and

- Stockbridge Munsee on February 24, 2020.

The Phase 1A Study is included as Appendix C-10. Appendix D contains the consultations with NYSHPO and with Tribal Nations.

Architectural Resources

The APE for standing structures for the Proposed Action includes a one-half mile radius from the project components: the two treatment plants, the two force main routes, and the approximately 7-mile-long portion of Sunrise Highway. Prior to FEMA assuming the role of Lead Federal Agency for the Proposed Action, Nassau County prepared a Project Review Cover Form for review by NYSHPO (Document D-3 in Appendix D). In its review of this form, NYSHPO commented that the Proposed Action is "substantially contiguous to a property listed or recommended for listing in the NY State or National Registers of Historic Places," presumably referring to Wantagh State Parkway. Although NYSHPO did not specifically identify any such properties, it stated that there are no historic architectural resources that would be affected by the Proposed Action. A CRIS review indicates that both Bay Park STP and Cedar Creek WPCP were previously determined not eligible for listing on the National Register of Historic Places.

Archaeological Resources

The APE for potential archaeological resources is limited to those areas where the project is expected to directly impact or disturb the ground surface as a result of excavation and other construction activities. The archaeology APE comprises portions of the Bay Park STP and the Cedar Creek WPCP, the 15 shaft sites along the Bay Park STP and Cedar Creek WPCP force main alignments and their associated construction staging areas, approximately 23 work pit locations along Sunrise Highway, and three staging areas along Sunrise Highway; all but two of these work pits would be excavated within the footprint of the roadway. The microtunnel itself would occur approximately 20 to 60 feet below the ground surface, well below the potential to affect archaeological resources. The Sunrise Highway portion of the undertaking would re-purpose the existing aqueduct, the bottom of which is located between approximately 10 to 30 feet beneath the roadway and is an area of no archaeological sensitivity due to extensive previous disturbance.

FEMA prepared a Phase 1A Study to determine the sensitivity of the APE for the presence of archaeological resources. That study (Document C-10 in Appendix C) consisted of a CRIS database search for site files and previous surveys, a review of historic maps and other historical documents, and an examination of geotechnical boring logs for information concerning the depth of fill and possible deeply buried habitable landforms. The Phase 1A Study concluded that ground surfaces along the project corridor are either highly disturbed, such as Sunrise Highway, or buried beneath significant quantities of fill, as is the case for the force main alignments. Additionally, due to lack of historic development, the project area has a low sensitivity for below ground historic-period archaeological resources. Several Native American prehistoric archaeological sites have been previously identified in the APE and it is likely that currently buried prehistoric ground surfaces along the force main alignments would have been attractive for habitation during prehistory. However, subsequent submergence from rising sea levels over the past few thousand years, development of the marshland that occupied the area until the early 1900s, and more recent burial beneath landfill may have disturbed these deeply buried surfaces leading to a low to moderate sensitivity for prehistoric resources. Of the 15 shaft sites, the Phase 1A Study identified 9 as being sensitive for the presence of prehistoric resources below modern fill and layers of organic soil.

5.9.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would result in no ground disturbance. Therefore, it would have no impact on historic structures or archaeological resources.

Alternative 2: Proposed Action - Bay Park Conveyance Project

Architectural Resources

Because the Bay Park STP and the Cedar Creek WPCP are not NRHP eligible; the proposed microtunnels and temporary and permanent construction shafts would be in areas with a significant amount of existing infrastructure; and the manholes would be low-profile, FEMA concurred with a NYSHPO 2017 determination that there would be "No Adverse Effect to Historic Properties with Conditions." This conclusion is documented in the Section 106 consultation with NYSHPO, dated February 24, 2020, which is included in Appendix D. In a letter dated March 5, 2020, NYSHPO concurred with this determination. On March 18, 2020, the Stockbridge-Munsee Tribal Historic Preservation Office concurred with FEMA's determination of No Adverse Effect to Historic Properties with Conditions for select archaeological monitoring.

Archaeological Resources

As stated in the Phase 1A Study (Document D-3 in Appendix D), the Proposed Action may have the potential to disturb deeply buried, potentially habitable landforms in 9 of the 15 shaft sites. If an archaeological resource is present within the habitable landform in any of these shaft sites, it could be impacted during excavation activities. These impacts are unavoidable as the potentially habitable landform appears to be present along extensive stretches of the force main alignment. FEMA recommended archaeological monitoring during construction and the NYSHPO concurred in a letter dated March 5, 2020. Similarly, the Stockbridge-Munsee Tribal Historic Preservation Office concurred with FEMA's monitoring recommendation on March 18, 2020. Appendix D contains these correspondences.

FEMA determined that the Proposed Action would result in "No Adverse Effect to Historic Properties with Conditions." The conditions comprise developing an archaeological monitoring plan, conducting said monitoring during construction, and providing a final archaeological monitoring report. In accordance with Section 106 of NHPA, if NRHP-eligible archaeological resources are encountered during monitoring that would be adversely affected by the Proposed Action, FEMA, in consultation with NYSHPO and Tribal Nations, would identify ways to avoid or mitigate such effects. With the implementation of these measures, the Proposed Action would result in minor long-term impacts to archaeological resources.

5.10 Aesthetic Resources

Aesthetic resources, or viewsheds, are areas of land, water, or other environmental elements that are visible to the human eye from a fixed vantage point. Viewsheds are areas of particular scenic or historic value that have been deemed worthy of preservation against development or other change and include spaces that are readily visible from public areas and thoroughfares, such as from public roadways, public parks, or high-rise buildings. If a viewshed is integral to the setting of an historic resource or part of the NHPA Evaluation Criterion for a resource's eligibility, it must be considered in any new development or renovation proposal.

5.10.1 Existing Conditions

The study area for aesthetic resources encompasses the Bay Park STP, the force main between the two treatment plants, the Sunrise Highway aqueduct, and the Cedar Creek WPCP. The study area does not fall within a New York State Scenic Area of Statewide Significance. The Wantagh State Parkway, which runs parallel to the Cedar Creek WPCP, is part of the Historic Long Island Parkways, a designated New York State Scenic Byway and NRHP resource. Section 5.9, Cultural Resources, includes a discussion of cultural resources in the study area. In its review of the project, the NYSHPO did not identify any viewsheds as integral to the setting of any NRHP resource or part of the NHPA Evaluation Criterion for a NRHP resource's eligibility.

The Bay Park STP is a relatively flat site with bermed perimeters. It is developed with low-rise, utilitarian structures and equipment and is enclosed in part by a low, decorative concrete floodwall and earthen berm. Surrounding the Bay Park STP are park facilities to the west and south, one- and two-story single-family residences to the north, and park facilities and the East Rockaway Channel to the east. The Cedar Creek WPCP also is a relatively flat site with low-rise, utilitarian structures and equipment. It is bounded by Cedar Creek Park to the north, undeveloped, heavily wooded land and a narrow waterway to the east; a solar energy generation array, aerodrome, and heavily wooded land to the south; and Wantagh State Parkway, the Jones Beach Bikeway, and Wantagh Park to the west. There is dense vegetation, including phragmites and mature trees, along the site's western perimeter, limiting views from this location. Figure 5.10-1 in Appendix A documents existing views toward the Cedar Creek WPCP. Three of the proposed shafts and construction staging areas are within the Bay Park STP and Cedar Creek WPCP sites. The remaining shaft sites are located in a mix of areas, including parking lots, materials storage areas, and undeveloped areas adjacent to roadways. Some of the proposed shaft sites are surrounded and visually shielded by fencing and mature trees; others are more visible. The portion of Sunrise Highway within the study area includes a mix of suburban-scale strip commercial development, some street trees and overhead power lines. The Long Island Rail Road (LIRR) Babylon Branch rail line runs roughly parallel to the highway along its north side; some sections of the rail line are bordered with dense vegetation, and in other sections the rail line is carried above ground on a viaduct.

5.10.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative:

Under the No Action Alternative, there would be no new structures built. Therefore, aesthetic resources and viewsheds would not be impacted.

Alternative 2: Proposed Action:

The Subrecipient would construct the Bay Park STP effluent diversion pump station just north of the existing Bay Park effluent pump station. The new facility would not exceed 65 feet in height and the pump station would be visually consistent with existing infrastructure elements at this location. The two new underground force mains connecting the new Bay Park STP effluent diversion pump station and the Cedar Creek WPCP to the existing aqueduct under Sunrise Highway, as well as the rehabilitation of the aqueduct, would not be visible above grade following construction, with the exception of manhole covers and removable precast concrete covers around the manholes at Bay Park Shafts 1 and 9 and Cedar Creek Shafts 2 and 6, which would remain as permanent access shafts. Bay Park Shaft 1 and Cedar Creek Shaft 2 would be within the property boundaries at the Bay Park STP and Cedar Creek WPCP, respectively, and would be visually consistent with existing infrastructure elements at those locations. The new standpipe receiving tank at the Cedar Creek WPCP would be approximately 76 feet tall above grade. While the tank would be somewhat taller than existing equipment and buildings at this site, it would be visually consistent with existing infrastructure elements at this location (Figure 5.10-2 in Appendix A). The proposed method of microtunneling and the resulting permanent manhole covers would not have impacts to aesthetic resources, considering existing adjacent infrastructure and the low profile of the proposed permanent manholes. The Subrecipient anticipates equipment and access manholes along Sunrise Highway would be minimally visible. Upgrades to the Cedar Creek WPCP would be in-kind. Therefore, the Proposed Action would have no impact on aesthetic resources or viewsheds.

5.11 Environmental Justice

Executive Order 12898, *Federal Actions to the address the Environmental Justice in Minority Populations and Low-Income Populations*, requires agencies to identify and address any disproportionately high and adverse human health or environmental effects its activities may have on minority or low-income populations. According to the Council on Environmental Quality (CEQ), and Department of Homeland Security (DHS) guidance for conducting environmental justice analyses within the context of NEPA, a community would be considered a potential environmental justice area if the minority population of the affected area exceeds 50 percent or if the percent of low income people in a census block group is meaningfully greater than the population in defined reference areas.

5.11.1 Existing Conditions

The study area population within the affected area used for the minority and low income populations was determined by selecting all census block groups with at least half of their physical area within a ¼ mile of the project area or half of their physical area within the floodplain (Figure 5.11-1 in Appendix A), to account for any potential effects from the Proposed Action. Data on race, ethnicity, and poverty status were gathered from the most recent (2014–2018) American Community Survey. For comparison purposes, data were also compiled for the study area as a whole, for the Town of Hempstead, and for Nassau County. Potential environmental justice areas were identified on the basis of census data and applicable thresholds (Table 5.11-1 in Appendix B). For the purposes of a conservative analysis, following guidance within Executive Order 12898, block groups were determined as having a meaningfully greater low income population if the population living below the poverty level is more than 5 percentage points above the percentage of the low income population in the Town of Hempstead (defined reference area).

Appendix A, Figure 5.11-1 and Appendix B, Table 5.11, identify the 78 census block groups within the study area and indicates those considered minority and low-income. The minority areas are typically concentrated near State Route 27 (Sunrise Highway) or Freeport Village. While certain block groups are minority areas, because minority populations within the study area do not exceed 50 percent of the population, in accordance with CEQ and DHS guidance, the study area as a whole does not meet the accepted threshold for defining an environmental justice community on the basis of the minority population.

Appendix A, Figure 5.11-1 and Appendix B, Table 5.11 identify the two block groups considered low-income areas and an additional five block groups that are low-income and minority areas. Overall, approximately 6 percent of the population lives below the poverty level. These areas are also typically concentrated near State Route 27 (Sunrise Highway) or Freeport Village. Furthermore, the study area's poverty rate (5.9 percent) is lower than in the Town of Hempstead (6.2 percent) but slightly higher (not "meaningfully greater") than in Nassau County (5.7 percent). While certain block groups are low-income, because the percent of low-income people within the entire study area is not meaningfully greater than the population in the Town of Hempstead serving as the reference area, in accordance with CEQ and DHS guidance, the study area as a whole does not meet the accepted threshold for defining an environmental justice community on the basis of low-income population.

5.11.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action:

Under the No Action Alternative, the study area population may experience long-term, moderate, adverse impacts from the impacts associated with reduced resilience against coastal flood hazards. The impact on environmental justice populations would not be considerably more severe or greater in magnitude than the impact on the general population.

Alternative 2: Proposed Action - Bay Park Conveyance Project

Construction of the Proposed Action may result in minor, adverse impacts on air quality, vegetation, terrestrial wildlife, and land use and planning. These impacts would be localized and temporary, and would be mitigated through measures such as using best available technology for reducing diesel particular matter, post-construction landscaping to restore vegetation, conducting tree clearing in winter months to the extent practicable, and restoring all park uses to pre-existing conditions. Therefore, the potential short-term minor adverse construction impacts on environmental justice populations for the block groups identified as minority or low-income would not be disproportionally higher than those on the general population. Additionally, only three of the fifteen shaft locations are within a block group identified as minority or low-income. The Proposed Action would result in a moderate long-term beneficial impact on water quality and aquatic biota of the Western Bays, to wetlands, to floodplains and public health and safety for the study area, and Nassau County as a whole that would benefit minority and low-income areas.

5.12 Land Use and Planning

NEPA directs federal agencies to make sure that their actions are consistent with state and local plans. Zoning within Nassau County is established and regulated by the incorporated villages, cities and towns within the County. Regulations that govern land use planning in New York State require that towns and villages prepare and adopt a comprehensive plan and that all land use regulations be in accordance with the adopted plan. The Subrecipient reviewed the existing plans to determine land use consistency for the Proposed Action. Table 5.12-1 in Appendix B lists the potential effects, and compliance with the New York State Smart Growth Public Infrastructure Act, Environmental Conservation Law, Article 6 (Smart Growth Act, 2015) which directs New York State agencies, authorities, and public corporations to screen their infrastructure programs and investments to ensure that they are not funding inefficient, redundant, and costly sprawl. Document C-9 in Appendix C contains the Smart Growth Assessment Form.

5.12.1 Existing Conditions

The study area, for the purposes of evaluating existing land uses, extends 400 feet from the limits of the force main, Sunrise Highway and the Bay Park STP and Cedar Creek WPCP (Figure 5.12-1 in Appendix A). Primary existing land uses within the study area include residential, commercial, community services, parks and open space, and transportation uses. Secondary land uses in the study area include recreation and entertainment that include private enterprises such as marinas, indoor racquet clubs, and movie theatres, industrial land uses like junk and recycling yards, and warehouse, manufacturing, and supplier facilities, public/utility services like National Grid offices, electrical substations, and pump stations, and vacant land (Figure 5.12-2a through Figure 5.12-2r in Appendix A).

Table 5.12-1 in Appendix B lists the existing land use plans that apply to the project area. Table 5.12-2 in Appendix B identifies the New York Rising Community Reconstruction Plans (NYRCRPs) within the land use study area.

5.12.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, the Western Bays would continue to receive treated water with elevated nitrogen levels. Bay Park STP would continue to undergo limited nutrient reduction which would reduce nutrient input to the Western Bays, but would not bring Bay Park STP into compliance with the 2018 Bay Park Agreement. Without the removal of up to 90 percent of the nitrogen being discharged into the Western Bays, the saltmarshes would continue to degrade. The inland areas of Nassau County at increased risk for coastal storm surge and wave damage, with the potential to result in minor adverse impact in land use around the Western Bays over time. The No Action Alternative would also not facilitate, advance, or support the projects in the NYRCRPs listed in Appendix B, Table 5.12-2. Therefore, the No Action Alternative would result in minor, long-term adverse impacts on land use and planning.

Alternative 2: Proposed Action - Bay Park Conveyance Project

During construction, land uses are anticipated to be temporarily impacted through the establishment of construction work zones around areas where access shafts would be excavated and during aqueduct rehabilitation. Some temporary and permanent property acquisitions and easements would be needed to implement the Proposed Action. However, the Subrecipient anticipates that construction would not interrupt any given location for a prolonged period of time. Nassau County would coordinate with the Town of Hempstead and the Villages of East Rockaway, Rockville Centre, and Freeport to obtain applicable permits and necessary approvals. Therefore, only minor adverse impacts related to land use and planning would occur during construction within the study area.

The Bay Park STP effluent diversion pump station and Cedar Creek standpipe receiving tank would be located within the existing footprints of the Bay Park STP and Cedar Creek WPCP facilities, respectively, and would not represent a change in land use. The two permanent shafts, Bay Park Shaft 1 and Cedar Creek Shaft 2, would be on county-owned property already used for wastewater treatment and would not result in a change of land use. The permanent Bay Park Shaft 9 would be located within the county-owned roadway buffer between Sunrise Highway and an on-ramp from Merrick Road to Sunrise Highway. Although this represents a change in land use, the majority of the shaft structure would be sub-surface and represent a negligible surface footprint, and therefore would not represent a substantial change from existing land uses. The permanent Cedar Creek Shaft 6 would be located within state-owned Mill Pond Preserve parkland. Although this represents a change in land use, the majority of the shaft structure would be sub-surface and surface features, such as 10-foot diameter manhole covers and removable precast concrete covers, would represent a negligible footprint. Other components such as the Sunrise Highway aqueduct rehabilitation and force mains, would be located below ground. Therefore, the Proposed Action would result in negligible long-term adverse impacts to land use and planning within the study area.

The Proposed Action would be consistent with the recommendations of the plans and policies described in Appendix B, Table 5.12-1. Additionally, the Proposed Action has the potential to facilitate, advance, or support the proposed projects in the NYRCRPs listed in Appendix B, Table 5.12-2.

Construction of certain shafts within public parklands would result in a temporary 9- to 12-month disruption to park use within the construction zone. Because the Subrecipient would fully restore all park uses to pre-existing conditions, the Proposed Action would not permanently change the existing land use. Occupancy of parkland for the subsurface force main and temporary construction use requires parkland alienation pursuant to New York State regulations. Nassau County has received resolutions of support from all impacted municipal parkland owners and has processed the requisite requests for alienation of parkland through inclusion of legislation in the Governor's Executive Budget, which was approved by the New York State Legislature on April 3, 2020. The Proposed Action would not require changes to zoning regulations and only negligible changes to land use. Surrounding land uses within the study area would be largely unaffected by operations. Therefore, the Proposed Action would result in negligible impacts related to land use and planning.

5.13 Noise

The Noise Control Act of 1972 required the USEPA to create a set of noise criteria. In response, the USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* in 1974, which explains the impact of noise on humans. The USEPA report found that keeping the maximum 24-hour equivalent noise level (L_{dn}) value below 70 decibels (dBA) would protect the majority of people from hearing loss. The U.S. Department of Housing and Urban Development noise standards describe exterior L_{dn} noise levels less than 65 dBA as "Acceptable" and between 65 and 75 dBA as "normally unacceptable."

5.13.1 Existing Conditions

Noise criteria and the factors used to evaluate project noise are dependent on the type of land use in the vicinity. Land uses near the proposed new pump station, the alignment of the proposed new force main, and the existing receiving station include parkland, schools, and residences. The dominant sources of ambient noise levels in the area of the project site are vehicular traffic along Sunrise Highway, Wantagh State Parkway, and local roadways. Other contributors to noise levels include aircraft over-flights and operation of the existing Bay Park STP and Cedar Creek WPCP. Depending on each receptor's proximity to these sources, existing noise levels at the receptors range from relatively low to moderate.

5.13.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

The No Action Alternative does not include any construction or site preparation. Therefore, there would be no noise impacts under the No Action Alternative.

Alternative 2: Proposed Action

The Proposed Action would result in temporary increased noise levels during construction resulting from: construction vehicles, equipment, tools, and delivery vehicles. The construction noise analysis considered three of the potential noise-producing construction activities. These representative activities were evaluated because they are the relatively long-term construction activities with the greatest potential to produce noise at receptors in the surrounding area. Other construction activities that would occur under the Proposed Action would be very brief or include less noise-producing equipment and would consequently have less potential to result in noise at surrounding receptors. The following three representative construction scenarios were analyzed:

1) Microtunneling Shaft Excavation – Each shaft excavation operation would typically take approximately 3 weeks to complete with work occurring on a 24-hour basis, 7 days per week.

2) Microtunneling Tunnel Boring – Each tunnel run would typically take approximately 27 days to complete with work occurring on a 24-hour basis, 7 days per week. While operation of the MTBM would not have the potential to produce noise at receptors because it operates underground, some support equipment would operate at the surface of shafts between which the MTBM is running.
3) Sunrise Highway Sheet Piling for Work Pit Establishment – Sheet pile installation represents a worst-case condition due to the high noise levels produced by pile installation equipment. Sheet pile installation would occur for approximately three overnight shifts at each sliplining work pit location. Construction would occur at night during regular work hours from 10:00 p.m. to 6:00 a.m, or during extended work hours from 9:00 p.m. to 6:00 a.m, as allowed by NYSDOT. The Subrecipient is proposing night construction to reduce the impact on daytime traffic, as described in Section 5.14. Sheet pile installation could be conducted within two neighboring pits concurrently.

In accordance with NYSDOT's Noise Analysis Policy and Procedures, a construction noise impact will not normally occur at equivalent noise levels (L_{eq}) less than 80 dBA. However, much of the construction under the Proposed Action would occur at night, when residential receptors are more sensitive. Because some construction activity would occur during night and weekend hours, expected construction noise levels have been compared to existing baseline levels as well. The construction noise analysis found that sheet piling work along Sunrise Highway would result in the highest noise levels and would potentially cause noise impacts over the greatest surrounding area due to the high level of noise produced by sheet pile installation equipment. The distance at which noise from construction equipment and activities falls below the 80 dBA noise level impact threshold is described below for each construction activity under consideration:

1) The microtunnel shaft excavation work would produce L_{eq} noise levels greater than or equal to 80 dBA within 98 feet of the center of the work area.
2) The work occurring at the micro-tunneling shafts during boring would produce L_{eq} noise levels greater than or equal to 80 dBA within 81 feet of the center of the work area (i.e., the shaft from which the MTBM is running).
3) The Sunrise Highway sheet piling work would produce L_{eq} noise levels greater than or equal to 80 dBA within 272 feet of the center of the work area.

Noise level contours for each construction work area are shown on the Figures within the Noise Study Report (Document C-7 in Appendix C). Noise level increases can be determined by comparing the construction noise level contours with the background noise level ranges identified for the likely noise sensitive areas on the Figures in Appendix C, Document C-7.

Construction under the Proposed Action would have the potential to result in noise levels at residential, school, and open space receptors that would exceed the 80 dBA impact threshold specified by NYSDOT. The Subrecipient anticipates that such noise impacts at these areas would typically occur over 3 weeks for shaft excavation, 4 weeks for each tunnel run, and 3 nights for sheet pile installation. While surrounding receptors at each work area may experience intrusive levels of noise at times during these periods, the potential construction noise impacts would be transient and temporary. The Subrecipient would use standard construction practices that reduce noise impacts at nearby noise receptor locations. The Subrecipient would implement a noise mitigation program for construction under the Proposed Action, incorporating real-time noise monitoring, and feasible and reasonable mitigation measures to reduce construction noise within the project area as appropriate. Document C-7 in Appendix C describes the potential mitigation measures. With these mitigation measures in place, the Subrecipient has concluded that the Proposed Action would result in a minor, short-term adverse impact on noise levels.

The Proposed Action would not result in permanent changes to roadways or traffic patterns that would affect traffic related noise. Additionally, any noise generating equipment for the Bay Park STP effluent diversion pump station or the Cedar Creek WPCP standpipe structure would be inside the structures within the plants and would not impact ambient noise levels of surrounding land uses. Therefore, operation of the Proposed Action would have no impact on the ambient noise levels.

5.14 Transportation

Construction activities for the Proposed Action are anticipated to begin in the spring of 2021 and be substantially completed in 2024, for an approximate duration of three years. Of the project components, only the Sunrise Highway Aqueduct rehabilitation would have an effect on transportation conditions and the potential for significant impacts on commuters and local businesses because it would entail sliplining the aqueduct via 23 work pits in the roadway.

5.14.1 Existing Conditions

Sunrise Highway, a major principal arterial roadway generally characterized by free access, contains three eastbound lanes and three westbound lanes within the study area, with on-street parking on many segments and dedicated turning lanes at several major intersections. It is owned by NYSDOT and is designated as State Route 27. There are grade-separated interchanges with Merrick Road and Meadowbrook State Parkway within the study area, but all other intersections are at-grade. Sunrise Highway carries moderate to high volumes of commuter traffic on weekdays, with annual average daily traffic counts of between 41,500 and 60,600 vehicles per day, as an alternative local east-west route parallel to the Southern State Parkway, and because it is also adjacent to the Long Island Rail Road Babylon Branch stations in Rockville Centre, Baldwin, Freeport, Merrick, and Bellmore. Weekday traffic is highest during the morning and evening commuter periods. Sunrise Highway is lined primarily by commercial land uses, and therefore also carries moderate to high volumes of shopper traffic on weekends, although at slightly lower levels than the commuter peak hour volumes. Local bus service is operated by Nassau Inter-County Express (NICE), which does not operate any through-routes along Sunrise Highway. The following NICE routes cross Sunrise Highway in the study area: 4, 16, 19, and 35. In addition, the number 15 north-south route travels along Sunrise Highway for three blocks between North Centre Avenue and South Park Avenue in Rockville Centre.

5.14.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative:

Under the No Action Alternative, no modifications would be made to Sunrise Highway, and it would remain in its current condition. Therefore, the No Action would have no impact on transportation.

Alternative 2: Proposed Action:

The Proposed Action would include work zone traffic control modifications to Sunrise Highway on a rolling basis. Traffic controls would be coordinated with NYSDOT, in consultation with local communities, to minimize disruption to community traffic. The Subrecipient would develop work zone traffic control plans that NYSDOT would review and approve. The Subrecipient would also develop plans to retain access to businesses. Where possible, the Subrecipient would conduct work at night during regular (10:00 p.m. to 6:00 a.m.) or extended (9:00 p.m. to 6:00 a.m.) work hours as allowed by NYSDOT. In certain locations, where continuous work is required, extended weekend work from 9:00 p.m. Friday to 6:00 a.m. Monday could be allowed subject to concurrence by NYSDOT. The work zone traffic control would retain at least one through lane in the eastbound and westbound directions of Sunrise Highway (NY Route 27) for overnight work and two through lanes in the eastbound and westbound directions during any daytime work and is not anticipated to result in any modifications to turn lanes/restrictions on or off Sunrise Highway at major intersections, or any physical changes to the northbound or southbound approaches of any intersections. The work zone traffic control may require temporary removal of on-street parking to maintain traffic flow, but access to off-street parking and driveways would largely be unaffected. The Subrecipient anticipates vehicular delays for eastbound and westbound vehicular traffic during peak periods when the work zone traffic control plan is in place. There would be close coordination between Nassau County, the design-build contractor, NYSDEC, and NYSDOT to give advanced notice to motorists of when and where construction would take place. The work zone traffic control would maintain pedestrian and public bus access and is not anticipated to require modifications to NICE or LIRR service schedules, so there would be no potential impacts on pedestrians or transit under this alternative.

As a result of construction worker and vehicular activity associated with the Proposed Action, there would be vehicular trips generated where the rolling work zone traffic control is in place. Each work zone would have an estimated 10 to 15 daily construction workers and 5 to 10 daily truck trips. The additional traffic generated by the construction worker and vehicular activity by itself is not anticipated to noticeably increase vehicular delays and would therefore not have the potential for significant transportation impacts. However, in combination with the work zone traffic control plan, there would be the potential for short-term, minor adverse traffic impacts on limited segments of Sunrise Highway.

The Proposed Action would not result in permanent changes to roadways or traffic or pedestrian patterns. Therefore, operation of the Proposed Action would have no long-term impact on transportation.

5.15 Public Services and Utilities

Regulatory requirements and policies that affect the design, use, and the forecasted use of utilities in Nassau County include the NYSDEC policy document, *Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements* (2009); the State's Smart Growth Public Infrastructure Policy Act (Smart Growth Act); the *Cleaner Greener Long Island Regional Sustainability Plan* (2013); the Nassau County Public Health Ordinance; and local zoning regulations.

5.15.1 Existing Conditions

The study area, for the purposes of evaluating existing public services and utilities, extends 400 feet from the limits of the force main, Sunrise Highway, and around the Bay Park STP and Cedar Creek WPCP. It is located within a highly developed urban area and is served by major utilities and infrastructure, including electric, natural gas, and water and sewer lines. PSEG Long Island is the public utility company operating the Long Island Power Authority's transmission and distribution system. The study area is located in both the Queens/Nassau Division, and the Central Division, two of four divisions served by PSEG. The exceptions are the Villages of Rockville Centre and Freeport which operate respective municipal electric utilities. National Grid widely provides natural gas service to the project area. Three water districts serve the study area (LII, 2020). The New York American Water System serves the majority of the project area. However, the Incorporated Villages of Rockville Centre and Freeport each have their own dedicated water systems. Three different sewer systems, the Nassau County Sewage District, Rockville Centre Village Sewer District, and Freeport Village Sewer District, serve the study area.

5.15.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

The No Action Alternative would not directly affect any utilities in the project area. However, with the system that is currently in place, treated water containing nitrogen would continue to degrade the natural systems that provide important resilience against coastal storm surge and waves, and existing public utility infrastructure would be more likely to suffer damage from future storm events. Therefore, the No Action Alternative would have minor adverse effects on utilities.

Alternative 2: Proposed Action

The Proposed Action would require ground disturbance during construction that could potentially disrupt existing utility services. During construction, the Subrecipient would be responsible for temporarily supporting or relocating, any utilities affected by shaft construction or connection to the Sunrise Highway aqueduct. With these measures in place, construction activities associated with the Proposed Action would result in minor short-term adverse impacts to utilities. The Bay Park STP and Cedar Creek WPCP would continue to operate throughout construction of the Proposed Action.

The Proposed Action would have a minor beneficial long-term effect on nearby utility infrastructure because it would provide increased resilience against storm surge and waves to the coastal communities of Nassau County that are particularly vulnerable to damage from flooding during storm events.

5.16 Public Health and Safety

Executive Order 13045, "Protection of Children;" the DHS National Response Framework (January 2008; updated October 2019); and the New York State Department of Health public and human health standards protect vulnerable populations from risk and harm to the physical environments in which they live.

5.16.1 Existing Conditions

The 1st, 4th, and 7th Precinct of the Nassau County Police Department, the Village of Freeport, Village of Lynbrook and Village of Rockville Centre Police Departments, and various agencies within Nassau County are responsible for the general protection of public health and safety in the vicinity of the project area. Fire departments in East Rockaway, Oceanside, Lynbrook, Rockville Centre, Baldwin, Freeport, Merrick, Bellmore, and Wantagh provide fire protection services to the project area. The South Ocean Care Health Center of Freeport is the only family/community health center located within the project area. The Nassau County Division of Emergency Services provides education and support to the Nassau County Emergency Medical Services agencies and coordinates components of the Emergency Medical Services system. The Nassau County Public Health Emergency Preparedness is tasked with responding to a range of public health threats, including diseases; natural disasters; and biological, chemical, nuclear, and radiological events (Nassau County, 2020). Mount Sinai South Nassau Hospital and South Nassau Communities Hospital are located in the vicinity of the project area.

5.16.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, nitrogen from treated water discharged to the Western Bays would continue to degrade the ecosystem, further reducing Nassau County's resilience to storm surges and waves. This alternative could require increased assistance from public health and safety forces due to the continued risk of flooding to Nassau County's coastal communities. It may affect the ability of emergency services to effectively meet response time goals, as well as to respond to needs elsewhere in the community during storm events. Therefore, the No Action Alternative would have the potential to result in moderate long-term, impacts on public health and safety.

Alternative 2: Proposed Action - Bay Park Conveyance Project

Construction of the Proposed Action would present minor health and safety risks to contractors performing the work. All construction activities would be performed using qualified personnel trained in the proper use of the appropriate equipment, including all appropriate safety precautions, to minimize risks to safety and human health. The MTBM would create an intact tunnel as it excavates the force main route. The design-build contractor would be required to evaluate the potential for ground settlement and develop mitigation measures to minimize settlement. Thus, there would be minimal risk of subsidence during microtunnel activity. Experience with MTBMs in similar geology indicates that vibrations at the ground surface would be minimal. However, to ensure that there would be no impacts on existing structures, the Subrecipient would implement a pre-construction inspection and vibration monitoring program for the tunneling activity. Additionally, all activities would be conducted in a safe manner in accordance with the standards specified in Occupational Safety and Health Administration (OSHA) regulations. The Subrecipient would put up appropriate signage and barriers prior to construction activities to alert pedestrians and motorists of project activities. The Subrecipient would also restrict access to unsafe areas and heavy equipment during construction, and post signage to warn of unsafe conditions. The Subrecipient would ensure adequate access to sites for the safe ingress and egress of fire and emergency vehicles. As noted in Section 5.14, Transportation, the Subrecipient would make arrangements to ensure the continued function of roadways, intersections, and emergency vehicle access to nearby locations should lane closures be necessary. The Subrecipient would address potential air and noise impacts on workers and nearby residents through adherence to OSHA regulations and mitigation measures identified in Sections 5.2-Air Quality and 5.13-Noise. With these measures in place, construction activities associated with the Proposed Action would result in minor short-term adverse impacts to public health and safety.

The Proposed Action would have moderate long-term beneficial impacts on public health and safety by increasing Nassau County's coastal communities' resilience to storm surges and waves and reducing demands on medical and emergency service units.

5.17 Hazardous Materials

5.17.1 Existing Conditions

Nassau County conducted a hazardous materials screening assessment of the project area in September 2019 to identify potential sources of hazardous or contaminated materials that could impact the Proposed Action. Potential areas of environmental concern were identified based on the known or suspected presence of hazardous materials and the reasonable potential for such materials to impact the limits of construction and/or property acquisition for the project. Nassau County identified locations where the collection and analysis of soil samples and ground water samples would be necessary to avoid contaminated areas; identified material handling, reuse, and disposal options; and determined if special health and safety precautions would be required during construction. Thirty-one potential areas of concern were identified within or adjacent to the project corridor (Document C-8 in Appendix C).

In October of 2019, Nassau County reviewed existing documentation and conducted a field inspection of the existing Cedar Creek WPCP to determine if there are asbestos-containing materials, lead based paint, or polychlorinated biphenyl (PCB) containing materials that would be encountered during upgrades made to the Cedar Creek WPCP. Nassau County determined that none of the materials expected to be disturbed by the Proposed Action contain asbestos or PCBs, but that lead paint is present within the Cedar Creek WPCP pump room.

5.17.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative:

Under the No Action Alternative, no impacts related to hazardous materials would be anticipated.

Alternative 2: Proposed Action:

In most cases, NYSDEC has closed the historic spills with documented impacts. However, residual soil and groundwater contaminants likely remain and could be encountered during construction excavation and dewatering. Contaminated soils would not be used as backfill. The Subrecipient anticipates groundwater dewatering at several excavation locations along Sunrise Highway and construction shafts along the microtunnel routes. The Subrecipient would manage and dispose of contaminated soils and groundwater recovered during dewatering in accordance with environmental regulations under a Soil Management Plan and Dewatering Plans prepared in accordance with NYSDEC standards. The Subrecipient would dispose of excavated soils that are not suitable for reuse in accordance with 6 NYCRR Part 375 at the proper permitted receiving facilities. The Subrecipient would treat groundwater recovered during dewatering to remove suspended sediment and dissolved contaminants in accordance with permit requirements prior to discharge. No treated groundwater would be discharged directly to a surface water. With these measures in place, construction of the Proposed Action would result in negligible adverse impacts due to hazardous materials. Operation of the Proposed Action would not result in the generation of hazardous materials.

5.18 Cumulative Impacts

In accordance with NEPA, this EA considers the overall cumulative impact of the Proposed Action and other actions that are related in terms of time or proximity. Cumulative impacts represent the impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what federal agency, non-federal agency, or person undertakes such other actions. Cumulative impacts can result from "individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7). In addition to NEPA, other statutes require federal agencies to consider cumulative impacts. These include the CWA Section 404(b)(1) guidelines; the regulations implementing conformity provisions of the Clean Air Act; the regulations implementing Section 106 of the NHPA; and the regulations implementing Section 7 of the ESA.

Independent of the Proposed Action, multiple projects are ongoing and/or planned with the intent of upgrading infrastructure, reducing nitrogen input to the Western Bays, and improving flood resilience. These include: a nutrient removal system at Bay Park STP, as described in Section 4.1; construction upgrades and modifications to the Cedar Creek WPCP; the completion of a Point Lookout Sewer Collection Feasibility Study; and the diversion of wastewater from Long Beach Water Pollution Control Plant to Bay Park STP for treatment.

Bay Park STP Facility Improvements—Work currently underway at Bay Park STP includes upgrades to the effluent pumps, effluent pumping facility, and stormwater pump stations, and the improved nutrient removal mentioned in Section 3. The improvements would reduce the nitrogen concentration in treated water leaving the Bay Park STP. Facility improvements at Bay Park STP would result in minor construction activities on Bay Park STP property that would be consistent with existing uses of the site. While the Proposed Action would include construction of a pump station onsite, the Bay Park STP is a heavily developed industrial site that offers limited habitat to species tolerant of disturbance. Construction associated with these actions would have minor effects on wildlife that would be limited to temporary avoidance of active construction areas. The combined effects of the Proposed Action with the other facility improvements would be negligible.

Cedar Creek WPCP Facility Improvements, Inspection and Maintenance Activities—Work at the Cedar Creek WPCP includes the replacement of five pumps and associated controls, as well as the repair of a sluice gate in the effluent pump building, construction of structural standpipe and tank foundation, and proposed connection to the existing 84-inch outfall. Independent of the Proposed Action, the existing Cedar Creek WPCP outfall pipeline and diffuser will undergo inspection and maintenance necessary to maintain the operation of the Cedar Creek WPCP with or without the Proposed Action. Prior to inspection, the access roads and grounds surrounding the access points will be prepared for truck and trailer access, which includes the temporary removal of approximately 0.3 acres of vegetation at the Jones Beach access point; there will be no permanent impacts to vegetation, as all areas cleared will be stabilized after the work is complete. It is likely that the concrete slab over the cleanout hatch will also need to be replaced. Clearing or vegetation is not anticipated at the access point on Cedar Creek WPCP property. Based on the findings of the outfall and diffuser inspections, any necessary maintenance or repairs, as determined by Nassau County, would be implemented to optimize the conveyance of treated water.

Point Lookout Sewer Collection Feasibility Study—Nassau County and the City of Long Beach plan to design and build new sewer infrastructure for the hamlet of Point Lookout, which will replace the hamlet's use of existing cesspools and septic tanks for wastewater discharge. The new sanitary sewer will connect to the Long Beach WPCP.

Long Beach WPCP Consolidation Project—Nassau County and the City of Long Beach will convert the Long Beach WPCP from a wastewater treatment plant to a pump station that will send approximately three to five million gallons of wastewater per day to Bay Park STP, including the redirected wastewater from Point Lookout, rather than treating it onsite and discharging into Reynolds Channel. The project will eventually decommission and demolish the Long Beach WPCP. Nassau County and the City of Long Beach would divert the three to five MGD of wastewater from the Long Beach WPCP to be treated at the Bay Park STP and ultimately diverted to Cedar Creek WPCP for discharge through the existing ocean outfall diffuser. This is included in the estimated flow for the Proposed Action. The Long Beach WPCP Consolidation Project combined with the Proposed Action would result in greater reductions of nitrogen input into the Western Bays, leading to a greater chance for improvements in the health of the marsh and the resilience the marsh provides.

5.18.1 Summary of Potential Cumulative Impacts

Construction activities associated with the Bay Park STP and Cedar Creek WPCP facility improvements and Cedar Creek WPCP inspection and maintenance activities would result in negligible cumulative impacts on terrestrial habitats and wildlife, which are primarily common urban-adapted species. These effects would be limited to temporary avoidance of the construction areas by wildlife. The Bay Park STP and Cedar Creek WPCP properties are heavily developed industrial sites that offer limited habitat to species tolerant of disturbance, and construction and/or maintenance activities in these locations would have negligible temporary effects on wildlife. While the Jones Beach access site has the potential to support additional terrestrial species, the minimal vegetation that would be cleared at the Jones Beach access point combined with the temporary disturbance of vegetation at the shaft sites associated with force mains, Sunrise Highway work areas, Bay Park STP, and Cedar Creek WPCP would result in minor, adverse impacts on vegetation and wildlife. All vegetation temporarily removed would be replanted post-construction, and there would be no additional permanent impacts resulting from the Cedar Creek WPCP maintenance activities or Bay Park STP facility improvements. There is no potential for temporary cumulative impacts on water quality as no in-water construction would occur under the Proposed Action. The Proposed Action in conjunction with the projects described above would improve water quality in the Western Bays and Nassau County's resilience against coastal storm surge and waves through upgrades to existing infrastructure and the reduction of nutrient inputs to surface waters.

6.0 PERMITS AND PROJECT CONDITIONS

The Subrecipient is responsible for obtaining and adhering to all applicable federal, state, and local permits and other authorizations for project implementation. Any substantive change to the approved scope of work would require re-evaluation by FEMA for compliance with NEPA and other laws and executive orders. The following permits and/or consultations are required for the Proposed Action:

6.1 Federal

- Review for consistency with coastal policies under the New York State Coastal Management Program (Appendix D, Document D-1),
- Endangered Species Act, Section 7 Consultation with USFWS (Appendix C, Documents C-4 and C-6);
- National Historic Preservation Act Section 106 Consultation with NYSHPO and Tribal Consultation (Appendix D, Document D-3);
- Section 1424(e) Safe Drinking Water Act of 1974-Sole Source Aquifer Protection Program with USEPA (Appendix C, Document C-5); and
- USACE Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

6.2 State

- SPDES discharge permit from NYSDEC;
- SPDES General Permit for Stormwater Discharges from Construction Activity/Stormwater Pollution Prevention Plan from NYSDEC;
- Article 24 Freshwater Wetland Permit from NYSDEC;
- Highway Work Permit for utility work from (NYSDOT) (NYSDOT Permit 32);
- Highway Work Permit for non-utility work from NYSDOT (NYSDOT Permit 33); and
- Use & Occupancy permit from NYSDOT.

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

Nassau County held multiple stakeholder sessions and has presented the Proposed Action to the City of Long Beach, the Town of Hempstead, the Village of East Rockaway, the Village of Rockville Centre, and the Village of Freeport. Nassau County has also discussed the project with relevant public officials and businesses that would be impacted along Sunrise Highway. An electronic copy of the EA was available for agency and public review at https://www.fema.gov/media-library/assets/documents and at www.bayparkconveyance.org starting on July 3, 2020. The public information process included a public notice with information about the Proposed Action in *Newsday*, also published on July 3, 2020. A hard copy of the EA was made available for review at: Nassau County Department of Public Works, 1194 Prospect Avenue, Westbury, NY 11590. The public was invited to submit written comments during the 30-day public review period that ended on August 2, 2020 by emailing FEMAR2COMMENT@fema.dhs.gov or via mail to: Federal Emergency Management Agency, Region II, Environmental Planning and Historic Preservation, One World Trade Center, Suite 53, (285 Fulton Street), New York, NY 10007.

FEMA has taken into consideration the comments received during the 30-day public review period to inform the final decision regarding grant approval and project implementation. Substantive comments received from the public and agency reviewers have been addressed in this Final EA, which will be posted on FEMA's website and, FEMA intends to issue a FONSI. Appendix E provides FEMA's responses to summarized public comments.

8.0 LIST OF PREPARERS

FEMA
Region II
One World Trade Center
New York, NY 10007

Nassau County
Department of Public Works
1194 Prospect Avenue
Westbury, NY 11590

ARCADIS U.S., Inc.
27-10 Queens Plaza North, Suite 800
Long Island City, NY 11101

Hazen & Sawyer, P.C.
498 Seventh Avenue
New York, NY 10018

WSP USA
One Penn Plaza, 2nd Floor, 250 W 34th Street
New York, NY 10119

AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, NY 10016

9.0 IMPACT SUMMARY TABLE

Section	Area of Evaluation	No Action Alternative	Proposed Action: Short-term / Temporary Impacts	Proposed Action: Long-term / Permanent Impacts
5.1	Geology	No Impact	No Impact	No Impact
5.1	Topography and Soils	Moderate Adverse	Minor Adverse	Moderate Beneficial
5.2	Air Quality	Minor Adverse	Minor Adverse	No Impact
5.3	Water Quality – Western Bays	Moderate Adverse	Negligible Adverse	Moderate Beneficial
5.3	Water Quality – Atlantic Ocean	No Impact	No Impact	Negligible Adverse
5.3	Groundwater	No Impact	Negligible Adverse	No Impact
5.3	Sole Source Aquifers	No Impact	No Impact	No Impact
5.4	Wetlands	Moderate Adverse	Negligible Adverse	Moderate Beneficial
5.5	Floodplains	Moderate Adverse	No Impact	Moderate Beneficial
5.6	Coastal Resources	Moderate Adverse	Negligible Adverse	Moderate Beneficial
5.7	Vegetation	Minor Adverse	Minor Adverse	Negligible Adverse
5.8	Terrestrial Wildlife	Negligible Adverse	Minor Adverse	Minor Adverse
5.8	Aquatic Resources (Western Bays)	Moderate Adverse	No Impact	Moderate Beneficial
5.8	Aquatic Resources (Atlantic Ocean)	No Impact	No Impact	Negligible Adverse
5.9	Architectural Resources	No Impact	No Impact	No Impact
5.9	Archaeological Resources	No Impact	Minor Adverse	Minor Adverse
5.10	Aesthetic Resources	No Impact	No Impact	No Impact
5.11	Environmental Justice	No Impact	Minor Adverse	Moderate Beneficial
5.12	Land Use and Planning	Minor Adverse	Minor Adverse	Negligible Adverse
5.13	Noise	No Impact	Minor Adverse	No Impact
5.14	Transportation	No Impact	Minor Adverse	No Impact
5.15	Public Services and Utilities	Minor Adverse	Minor Adverse	Minor Beneficial
5.16	Public Health and Safety	Moderate Adverse	Minor Adverse	Moderate Beneficial
5.17	Hazardous Materials	No Impact	Negligible Adverse	No Impact

REFERENCES

ASA Analysis and Communication, Inc. (ASA). (2009). *E.F. Barrett Power Station Thermal Studies, Volume III, Biological Monitoring Report*. July 2009.

Duguay, L.D., D.M. Monteleone and C.E. Quaglietta. (1989). *Abundance and distribution of zooplankton and ichthyoplankton in Great South Bay, New York, during the Brown Tide outbreaks of 1985 and 1986.* In: Lecture Notes on Coastal and Estuarine Studies: Novel Phytoplankton Bloom-Causes and Impacts of Recurrent Brown Tides (E.M. Cosper, et al., Eds.).

Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (ed.s). (2014). *Ecological Communities of New York State, Second Edition*. New York Natural Heritage Program, New York State Department of Environmental Conservation. March 2014.

ESS Group, Inc. (2013). *Benthic Macroinvertebrate Community Assessment, Poseidon Project, Union Bay, New Jersey to Jones Beach, New York Part I: New York Bight.* Submitted to: Poseidon Transmission 1, LLC, Wakefield, MA, September 16, 2013. Available from: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B45CE7FC7-29E7-440E-9227-A5B7239706FA%7D

Garvies Point Museum & Preserve (GPM&P). (2019). *Geology of Long Island*. Retrieved from http://www.garviespointmuseum.com/geology.php;

Gedan, K.B., B.R. Silliman, and M.D. Bertness. (2009). *Centuries of Human-Driven Change in Salt Marsh Ecosystems*. The Annual Review of Marine Science 1:117-141.

Gobler, C.J. (2016). *Mitigating nutrient loading from the Bay Park Sewage Treatment Plant outfall: Effects on seagrasses, salt marshes, coastal flooding, and ecosystem restoration.* Technical Report for CDM Smith. May 13, 2016.

Long Island Index (LII). (2020). Long Island Index Maps. Available from: www.longislandindexmaps.org/

Nassau County. (2020). *Public Health Emergency Preparedness (PHE)*. Available from: https://www.nassaucountyny.gov/3925/Public-Health-Emergency-Preparedness-PHE.

National Oceanic and Atmospheric Administration (NOAA). (2003). *Long Island South Shore Estuary Benthic Habitat Line Data Set, 2002*. NOAA Ocean Service, Coastal Services Center, Charleston, SC. Available from: https://catalog.data.gov/dataset/2002-long-island-south-shore-estuary-benthic-habitat-line-data-set.

National Oceanic and Atmospheric Administration (NOAA). (2009). *Coastal Resources Atlas, Long Island, New York*. NOAA National Ocean Service, Seattle, WA.

Natural Resources Defense Council (NRDC). 2014. A guide to water quality at vacation beaches: state summary for New York. Available from: http://www.nrdc.org/water/oceans/ttw/ny.asp

New York State Department of Environmental Conservation (NYSDEC). 2014. Sanitary condition of shellfish lands. Available from: http://www.dec.ny.gov/regs/4014.html

New York State Department of Environmental Conservation (NYSDEC). 2020. Long Island Aquifers. Available from: https://www.dec.ny.gov/lands/36183.html

New York State Department of State (NYSDOS). (2008a). *Coastal Fish & Wildlife Habitat Assessment Form, West Hempstead Bay*. Revised December 15, 2008.

New York State Department of State (NYSDOS). (2008b). *Coastal Fish & Wildlife Habitat Assessment Form, Middle Hempstead Bay*. Revised December 15, 2008.

New York State Department of State (NYSDOS). (2013). *Offshore Atlantic Ocean Study*. February, 2013. Available from: http://docs.dos.ny.gov/communitieswaterfronts/ocean_docs/NYSDOS_Offshore_Atlantic_Ocean_Study.pdf

New York State Seagrass Task Force. (2009). *Final Report of the New York State Seagrass Task Force: Recommendations to the New York State Governor and Legislature*. December 2009.

New England Interstate Water Pollution Control Commission (NEIWPCC). (2015). *Long Island Tidal Wetlands Trends Analysis*. Prepared by Cameron Engineering & Associates, LLP. August 2015.

Schweitzer, K. (2019). *The seasonal and spatial effects of a sewage outfall on the planktonic community composition and abundance.* Thesis: Master of Science in Marine and Atmospheric Science, Stony Brook University. December 2019.

Shepard, C.C., C.M. Crain, and M.W. Beck. (2011). *The protective role of coastal marshes: a systematic review and meta-analysis.* PLoS ONE 6(11): e27374. https://doi.org/10.1371/journal.pone.0027374.

Stony Brook University School of Marine and Atmospheric Sciences (SOMAS). (2010). *SoMAS Begins Investigation of Water Quality Issues in the "Western Bays" of the South Shore Estuary Reserve*. September 24, 2010. Available from: https://www.somas.stonybrook.edu/2010/09/24/somas-begins-investigation-of-water-quality-issues-in-the-western-bays-of-the-south-shore-estuary-reserve/.

Stony Brook University School of Marine and Atmospheric Sciences (SOMAS). (2011). *Memorandum of Understanding between New York State Department of State and The School of Marine and Atmospheric Sciences, Stony Brook University for the Western Bays Water Quality Monitoring System*. Progress Report #3, Task 1. December 2011.

United States Fish and Wildlife Service (USFWS). (1997). *Significant habitats and habitat complexes of the New York Bight watershed*. Hempstead Bays - South Oyster Bay Complex. Charlestown, RI. Available from: https://www.nrc.gov/docs/ML0719/ML071970390.pdf.

United States Geological Survey (USGS). (2019). *Long Island Topography*. Retrieved from https://www.usgs.gov/centers/ny-water/science/long-island-topography?qt-science_center_objects=0#qt-science_center_objects

WSP. (2019). *Ocean Outfall Effluent Diversion Project: Geotechnical Baseline Report-B.* Project No. 187917A. November 18, 2019.