APPENDIX D ENGINEERING REPORT FOR WATER QUALITY IMPROVEMENT PROGRAM APPLICATION

Hazen ARCADIS
A JOINT VENTURE

WESTERN BAYS RESILIENCY INITIATIVE: LONG BEACH WPCP CONSOLIDATION PROJECT

Engineering Report for WQIP Application Round 16

July 26, 2019

STATE OF NEW YORK
PETER HERMAN GLUS
076879-1
LICENSED PROFESSIONAL ENGINEER
7/27/19

Prepared for:

Nassau County Department of Public Works

Prepared by:

Arcadis CE, Inc.

27-01 Queens Plaza North

Suite 800

Long Island City

New York 11101

Tel 718 446 0116

Fax 718 446 4020

Hazen and Sawyer

498 Seventh Avenue

New York

New York 111010018

Tel 718 446 0116

Our Ref.:

00726790.0000

Date:

July 26, 2019

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ACRONYMS AND ABBREVIATIONS

BNR	Biological Nitrogen Removal
CFA	Consolidated Funding Act
CFD	Computational Fluid Dynamics
CMU	Concrete masonry units
DIN	Dissolved Inorganic Nitrogen
DO	Dissolved Oxygen
DPW	Department of Public Works
EA	Environmental Assessment
ESD	Empire State Development
EPB	Earth Pressure Balance
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
HM	High Marsh
IM	Intertidal Marsh
IMA	Inter-Municipal Agreement
IPaC	Information, Planning and Conservation
JV	Joint Venture
LINAP	Long Island Nitrogen Action Plan
LZ	Littoral Zone
MGD	Million Gallons Per Day
NAVD88	North American Vertical Datum of 1988
NC	Nassau County
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWI	National Wetlands Inventory
NYCRR	New York Code of Rules and Regulations
NYS DEC	New York State's Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSOGS	New York State Office of General Services
NYSOPRHP	New York State Office of Parks Recreation & Historic Preservation
O&M	Operations and maintenance
OPRHP	New York State Offices of Parks, Recreation, and Historic Preservation
PM-JV	Hazen and Arcadis Program Management Joint Venture
RAS	Return Activated Sludge

RFP	Request for Proposals
ROD	Record of Decision
SAV	Submerged Aquatic Vegetation
SEQRA	State Environmental Quality Review Act
SHPO	New York's State Historic Preservation Office
SM	Coastal shoals, bars, and mudflats
SPDES	State Pollutant Discharge Elimination System
STP	Sewage Treatment Plant
TBM	Tunnel Boring Machine
TDR	Technical Design Report
TOH	Town of Hempstead
TMDL	Total maximum daily load
TRC	Total Residual Chlorine
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WPCP	Water Pollution Control Plant

EXECUTIVE SUMMARY

The purpose of this engineering report is two-fold: a) to summarize the planning and engineering work performed thus far as documentation for funding support, and b) to provide insight into the proposed project's urgency and requirements for completion.

The Western Bays of Long Island – once a productive fishing area with the largest concentration of salt marsh in the South Shore Estuary Reserve – has experienced water quality degradation over several decades. This degradation has suppressed the ecosystem and, with it, economic activity and local quality of life. A significant majority of this water quality degradation is the result of wastewater effluent. Case studies in Chesapeake Bay and Tampa Bay demonstrate that actions taken to reduce nitrogen loadings, address human impacts, and implement restoration efforts can be transformative for a critical ecosystem like the Western Bays. In 2013, the New York State Department of Environmental Conservation (NYSDEC) indicated that it will enact rules requiring stringent nitrogen limitations for sewage treatment plant effluent that is discharged into the Western Bays.

*The Long Beach WPCP Consolidation Project's Objective Statement is to **reduce nitrogen loadings** in the Western Bays to comply with future **regulatory limits**, as well as **improve water quality** and **restore suppressed ecosystems, economic activity, and local quality of life**.*

To improve the water quality in this area, support ecosystem and economic revitalization in the region, and comply with future regulatory limits, the Nassau County Department of Public Works (DPW) in collaboration with the City of Long Beach, plan to divert wastewater from the existing Long Beach plant to the Bay Park STP for treatment. The Bay Park STP has undergone recent mitigation upgrades as a result of the damage from Hurricane Sandy. The upgrades include improvements to treatment processes, which results in a better quality of effluent discharge. The regional overall intents are to divert treated effluent away from the Western Bays, to a final discharge point in the ocean (via a project known as the Bay Park Conveyance). Under the same Western Bays Resiliency Initiative as the Bay Park Conveyance project, the Long Beach Water Pollution Control Plant (WPCP) Consolidation project will help achieve the goals of Nassau County's Consolidated Master Plan for wastewater management, the South Shore Estuary Reserve Act, the Reserve's Comprehensive Management Plan, and the Long Island Nitrogen Action Plan.

The consolidation and diversion project are also aligned with many of the same goals of New York's Consolidated Funding Application (CFA), such as community and economic development, waterfront revitalization, and environmental improvements. Based on a preliminary benefit cost analysis completed for in 2015, the project is expected to provide a significant return on investment in the form of ecosystem services and direct economic benefits from the restoration of marshland, not considering avoided costs of more costly improvements at Long Beach WPCP facility to meet higher effluent quality regulatory standards. A preliminary economic analysis completed in 2017 based on this benefit cost analysis indicates that environmental improvements resulting from the project could result in the long-term support

of 1,000 jobs[1] within Nassau County alone, and support $251 million in further economic activity throughout New York State.[2] The Governor's Office of Storm Recovery (GOSR) is currently performing an updated benefit cost analysis (BCA) and amending the action plan for the Living with the Bay project. Likewise, the County's Program Managers, Arcadis and Hazen - Joint Venture Partners (PM-JV) is performing an updated hazard mitigation proposal to be submitted to the State and FEMA for evaluation. It's also important to note that the Bay Park facility has been flood proofed to the 0.2 percent annual chance coastal flood elevation with sea level rise. As such, flood risk and the risk of associated release of untreated effluent from Long Beach in the case of a coastal flood event will be significantly reduced/eliminated.

The proposed project is currently in the design phase with fundraising, permitting, and initial community engagement continuing through the first quarter of 2020. Design is expected to be completed by late 2019 or early 2020, with construction beginning in late 2020 and continuing through 2022.

Project Advocacy

Appendix A present letters of support from relevant agencies and organization for the Long Beach WPCP Consolidation project for the overall objective of a cleaner Western Bays. The list of project proponents is shown below.

1. Nassau County Legislator Ford
2. State Senator Kaminsky
3. Assemblywoman Miller
4. Atlantic Beach Mayor
5. Town of Hempted supervisor
6. Citizens Campaign for the Environment
7. Operation Stop Polluting, Littering and Save Harbors (SPLASH)
8. Nature Conservancy
9. Long Beach Chamber
10. Stony Brook University
11. Skudin Surf
12. Sludge Stoppers Task Force
13. Pace Law School – Land Use
14. Long Beach Housing Authority
15. Long Beach Martin Luther King Center Inc.
16. Latino Civic Association Inc.

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[1] Jobs refers to all full-time, part-time, and temporary employment opportunities created as a result of economic activity.
[2] $251 million includes direct, indirect, and induced economic impacts on New York State which can be expected from the return of the shellfish industry in the Western Bays.

Financial Status

Nassau County and the City of Long Beach have identified over $100 million in grant and loan funding for various project elements. Nassau County and the City of Long Beach anticipate they will need approximately $63 million in addition to the current $15M committed for construction activities. Additional funding is needed if the County is to succeed in carrying out the flow diversion project within the optimal time frame to achieve maximum benefit and risk avoidance. This project aligns with the County's Sewage Master Plan, which has already committed millions of dollars to preventing pollutants from entering the surrounding bays and estuaries. A breakdown of the financial status of the project is as follows:

- $3.725 million (grants and loans) for program management, planning, design, and environmental permitting through the New York State Environmental Facilities Corporation (NYSEFC) Storm Mitigation Loan Program (SMLP). Funding commitment is in place for Nassau County.
- $4.5 million (in grants) for the project through the 2017 CWIA WIIA program. Funding commitment in place for the City of Long Beach.
- $2.5 million (grants and loans) for the project through the 2017 Empire State Development (ESD) Grant Funds WQIP. Funding commitment in place for the City of Long Beach.
- $5 million in place (grants and loans) for the project through the 2018 ESD Grant Funds WQIP. Funding commitment in place for Nassau County.

Note that the original approved scope for the above grants would need to be modified/updated pending further discussions with the respective funding agencies. Refer to Appendix B for allocation of grants and how it ties to the different project's components. For an additional detailed explanation, refer to Section 5.1.1 through 5.1.3 of the report.

Contact Information

Contact information for the County and the PM-JV for project funding related questions are provided below, respectively.

Vincent Falkowski, P.E., PMP, CCM
Deputy Commissioner of Environmental Programs
Nassau County Department of Public Works
3340 Merrick Road, Building R, 3rd Floor
Wantagh, NY 11793
516 571-7515
vfalkowski@nassaucountyny.gov

Khanhtran Do
Program Manager
Hazen-Arcadis Joint Venture
27-01 Queens Plaza North Suite 800
Long Island City, NY 11101
718-397-2390
khanhtran.do@arcadis.com

Alternate Contact:
Carly A. Foster AICP, CFM
Principal Resilience Planner
Hazen-Arcadis Joint Venture
27-01 Queens Plaza North Suite 800
Long Island City, NY 11101
850-228-6979
carly.foster@arcadis.com

1 INTRODUCTION

1.1 Study Scope and Approach

The Nassau County overall regional resiliency and sustainability vision is to improve the water quality of the Western Bays. The Long Beach WPCP Consolidation Project is an integral part of the overall regional vision to improve the Western Bays. The project consists of the following distinct components that will integrate into one complete system, which will effectively relocate treatment functionality to Bay Park. The ultimate goal is to discharge to an ocean outfall via a separate parallel project. Refer to Figure 1 for an overview of the project routing:

1. Convert the plant to a pumping station
2. Install the HDD force main along Hassock. Connect the pump station at Long Beach to the force main
3. Cut and cover, tie-in force main to a 66-inch interceptor at Bay Park STP

Conceptual studies for the proposed project included the following studies and evaluations:

- Hydraulic Study, Process Modeling and Sampling Studies – evaluate process flow and examine effluent quality, specifically ammonia and total nitrogen effluent, to achieve permit compliance (focusing at Bay Park STP)
- Evaluate Alternatives – prepare schemes of each viable alternative; provide concept drawings, figures, analyses, and narratives to satisfy the overall program
- Evaluate Costs – prepare preliminary construction cost estimates
- Evaluate Permit Requirements – identify applicable permits and other authorizations that would be required from Federal, State, and local agencies and departments for implementation of the proposed project

A summary of the results of the design process thus far is provided herein.

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Figure 1. Proposed force main alignment to consolidate and divert wastewater from the Long Beach WPCP to Bay Park STP.

1.2 Key Assumptions for Current Work

Based on information available to conduct the analysis and prepare possible design solutions, key assumptions for the design include:

- Flow will be pumped to the Bay Park STP for treatment and eventual discharge to the Cedar Creek WPCP's ocean outfall (via the Bay Park Conveyance Project)
- Force main route is within the easement (100-feet wide total), offset from the center of the existing Bay Park outfall pipe. The first HDD force main segment between Long Beach to South Black Banks Hassock is within the Town of Hempstead (TOH) right-of-way. The TOH is in support of this project.

- Boring activities can only occur September 1st to October 31st to reduce impacts to identified species. Boring activities will also consider the existence of a restoration shellfish bed in the vicinity at the northern tip of the North Hassock

It should be noted that the capital cost estimates provided in this report are to inform strategic decision-making and should be considered for feasibility purposes only. These capital cost estimates include base construction costs, percentage mark-ups, such as contingency for design services and construction management, contractor overhead and profit, escalation, or bonds and insurance. Refer to Appendix C of this report for the overall project cost estimate, including markups. Total operations and maintenance (O&M) costs for the project are not included as part of the preliminary estimate as the County and the City of Long Beach has already accounted for O&M in its fiscal spending plan. Nevertheless, much of the anticipated operating costs are associated with the electricity required to power new pumps, and staff labor needs will likely decrease due to reductions in emergency action plan management and associated training, inspection, and exercising of equipment. A detailed cost estimate for O&M will be completed as part of the final design.

1.3 Data Required for Continued Work

Detailed design requires further research and analysis to obtain essential information and appropriately proceed with design. Additional data required includes, but is not limited to:

- Geotechnical and groundwater surveys at each treatment plant, and along the select route from Long Beach WPCP to Bay Park STP, to determine foundation design and adequate selection of trenchless technology
- Topographic and utility surveys to identify existing elevations and utilities at the sites and along the route
- Hydraulic study to simulate flow necessary as the design progresses, based on pipe configuration, valves, etc.
- Traffic study to determine impact to residents and commuters at each end points (Bay Park STP and Long Beach WPCP) – part of GOSR's NEPA EA efforts.
- Permitting and environmental studies to identify compliance requirements including continuation of consultation efforts with appropriate government agencies.

1.4 Report Development and Organization

This engineering report includes six main sections, with accompanying appendices:

- Section 1: Introduction. Provides project background and context
- Section 2: Statement of Need. Defines the project purpose, importance, and objectives
- Section 3: Existing Conditions. Describes natural conditions at each project site, particularly reviewing topography, traffic circulation and access, and geotechnical conditions
- Section 4: Proposed Project. Describes the alternative and proposed action, including environmental impacts, permitting considerations, constructability constraints, construction schedule, and construction costs

- Section 5: Conclusions. Presents a summary of findings, the recommended alignment, and next steps
- Section 6: References
- Appendices:
  - Appendix A – Letters of Support
  - Appendix B – Financial Plan
  - Appendix C - Cost
  - Appendix D - FEMA Flood Zone Map
  - Appendix E - IMA and City's Ownership Information
  - Appendix F – Smart Growth Assessment Form
  - Appendix G - HUC Watershed Boundary Map

2 STATEMENT OF NEED

2.1 Definition of the Problem

Long Island is a densely populated, low-lying part of New York State that has historically been an attractive and accessible place to live. Residents of Long Island began calling it home as early as the 1640's, when colonists from England arrived. It was not until the early 1900's, and the 1940's, after the roll out of the Long Island Rail Road (LIRR) and incentives for veterans of World War II that the communities rapidly expanded within Nassau County (Nassau County, 2017). While some of the residents commute directly out to nearby New York City for work and livelihood, other residents and businesses remain in the County.

The Western Bays of Long Island contain the largest concentration of salt marshes in the interconnected South Shore Estuary Reserve and were once highly productive fishing and shellfishing grounds (Citizen's Campaign for the Environment, 2017). According to the New York State Department of Environmental Conservation (NYSDEC), the Reserve was historically important as an economic asset supporting recreation, increased real estate values, and tourism in addition to commercial fisheries (NYSEDC, 2017b). Over time, water quality and productivity of the South Shore Estuary has declined as a product of changing density and land use, aging infrastructure, and increased service population. Both point source and non-point source pollution have contributed to the Estuary's existing conditions.

Figure 2: Previous and current wastewater treatment plant nutrient point source discharges into the Bays, Long Island, NY (Source: Google Earth, 2019)

With about 1.4 million individuals residing in Nassau County, the South Shore Estuary is an important part of the residents' lives and is a critical area in New York State economically.

The South Shore Estuary Reserve Act (1993) states:

> "The legislature also finds that the South Shore Estuary System contains and supports many unique marine habitats and locally significant populations and a diversity of rare, threatened and endangered species of plants and animals and the protection of their habitats is in the best interest of the people of New York.
>
> The legislature further finds that the South Shore Estuary system contains numerous streams that flow into the bays; freshwater and tidal wetlands that serve as a breeding ground, source of primary production for the food chain and a natural filter media; and productive clam fisheries that are mutually supportive and ultimately dependent upon the maintenance of the hydrologic and ecologic integrity of the region.
>
> The legislature, in addition, finds that the South Shore Estuary is of tremendous economic and social importance to the state, containing the largest concentration of recreational and commercial vessels, marinas and other water dependent businesses, supporting hundreds of baymen with a livelihood harvesting clams, finfish and other marine organisms and providing recreation opportunities to millions of residents and tourists each year."

As stated by the Act, neighboring communities, land, and waters are dependent on the health and productivity of the South Shore Estuary ecosystem, and the responsibility of the Western Bays' health is shared amongst a variety of governmental entities and agencies. This once healthy ecosystem has been experiencing reduced water quality, which has led to excessive seaweed growth, degradation of salt marshes, low oxygen levels, human health hazards, and closure of the shellfish harvests (Citizen's Campaign for the Environment, 2017).

The Long Beach WPCP Consolidation Project (as well as the Bay Park Conveyance Project) has the support of groups that have been working to address the water quality issues of the Western Bays, including residents, action groups, global non-profits, academics, and legislators. The community and legislators are aligned on the need to improve these damaged and impaired habitats. See Appendix A for letters of support.

Several pieces of legislation, management plans, and mega-projects work to directly address the problems in the South Shore Estuary and its smaller bays and tributaries. Since 2001, the Department of State, Office of Planning & Development (OPD) has monitored progress in advancing the South Shore Estuary Reserve Comprehensive Management Plan with periodic Implementation Status Reports. It is noted; however, other legislation or management plans may focus on the various other sources of pollution such as stormwater run-off. A few of these works include:

- Long Island South Shore Estuary Reserve Act, 1993 (previously referenced)
- Community Risk and Resiliency Act, 2014
- The Strategic Economic Development Plan for Nassau and Suffolk Counties (2011)
- Proposed Long Island Nitrogen Action Plan (LINAP), 2016

Despite these legislative acts and planning efforts, persistent water quality issues plague the Western Bays. The Western Bays, under Title 6 of the New York Code of Rules and Regulations (NYCRR) Part 701.11, is classified as a Class SB waterbody. Class SB implies primary and secondary contact

recreation like swimming, as well as uses like fishing and suitability for fish, shellfish and wildlife propagation and survival. Nevertheless, the habitat is listed as 'impaired' by the Clean Water Act. Impaired listing requires redress and mitigation of the violating effluent at the Federal level.

2.1.1 Compliance Issues

The cause of degradation in the Western Bays is largely attributable to the effluent discharged from several wastewater treatment facilities, shown in Figure 2. These marshlands have deteriorated over the past decade due to increased nutrient levels contained within the discharges of the area wastewater treatment plants. Currently, three wastewater treatment facilities discharge treated effluent into the Western Bays. According to a study performed by the U.S. Geological Survey (USGS) New York Water Science Center and the New York State Department of State (DOS), about 79.4 percent of dissolved nitrogen is contributed by the Bay Park STP and Long Beach WPCP (USGS, 2017).

The Long Beach WPCP State Pollutant Discharge Elimination System (SPDES) permit (NY0020567) was modified in 2008 by the NYSDEC in accordance with is Environmental Benefits Permit Strategy. The new effluent limitations set in the 2008 permit modification included: an interim ammonia concentration of 23 mg/l with the final effluent limitation of 9.5 mg/l; new effluent limitations of 0.5 mg/l for total residual chlorine (TRC) and 2.0 mg/l for dissolved oxygen (DO) to be achieved by September 2016. The City of Long Beach developed an Engineering Report in January of 2011 that provided a detailed analysis of the existing WPCP and the options available for achieving compliance for both ammonia reduction and total residual chlorine. The City submitted the Engineering Report to NYSDEC and it was subsequently approved, along with a Compliance Schedule, in September 2011.

On October 29, 2012, before the recommended plan of action could be implemented, Hurricane Sandy came ashore in southwestern Nassau County and caused significant damage to the City's wastewater infrastructure as well as the County's Bay Park STP. The ammonia reduction options identified as part of the compliance report were put on hold during Sandy response and recovery. In 2016, the TRC project was completed, allowing the City to achieve compliance with the new effluent limitation for TRC of 0.5 mg/l by dechlorination of the effluent.

The Long Beach plant experienced inconsistent ammonia removal and difficulty in achieving the interim effluent limitation of 23 mg/l. Alternatives in the City's 2011 compliance engineering report identified six (6) process alternatives for nitrification (ammonia reduction) at the plant and a consolidation/diversion option to Bay Park STP. The alternatives for updating the plant included improvements for future nitrogen reduction requirements, not just the current effluent limitations for ammonia of 9.5 mg/l.

The Long Beach WPCP employs a trickling filter treatment process, therefore, obtaining nitrification and TRC reduction may require extensive upgrades and possible change in treatment technology. Combining the Long Beach WPCP Consolidation project with the County's plan of the Bay Park Conveyance Project, the end results will significantly reduce nitrogen effluent loading to the Western Bays and the South Shore Estuary Reserve, eliminating the need for a costly upgrade at the Long Beach WPCP. The design would be in accordance with Ten State Standards and the Long Beach WPCP would remain in service during construction. The recommended option for current and future compliance, given costs and benefits is the flow diversion project. Refer to Section 5 of the report for additional cost comparisons between consolidation of wastewater versus maintaining, mitigating and upgrading.

2.1.2 Public Health

The condition of the Western Bays salt marsh has led to human health impacts. The algae, *Ulva* or sea lettuce, grows within the Bays due to high nitrogen concentrations and will wash ashore during the warmer seasons, producing hydrogen sulphide as it rots onshore (NYSDEC, 2017). Residents have not only complained about property damage and foul odors associated with this occurrence but have also experienced dizzy spells and/or have fainted (Citizen's Campaign for the Environment, 2017).

The Long Beach WPCP Consolidation project (in addition to the Bay Park Conveyance project) will directly reduce the cause of these health impacts by reducing the nitrogen loads that fuel sea lettuce growth.

Potential sanitation and human health impacts in Nassau County were also apparent in the wake of Hurricane Sandy (Schwirtz, 2013). Hurricane Sandy disrupted power at Bay Park STP and Long Beach WPCP. The storm damage resulted in untreated sewage in the streets of nearby residents directly after the storm, and partially treated discharge deposited into the ecologically-sensitive receptor, the East Rockaway Channel, for nearly two months (Schwirtz, 2013). This incident led to widespread bans on shellfishing and boil water alerts. The risk of a future similar event has since been mitigated at Bay Park, but not at Long Beach.

2.1.3 Nitrogen Reduction

High levels of nitrogen in the Western Bays have resulted in the loss of storm attenuation benefits by changing the composition of marsh grasses (Kenney, 2012). High nitrogen concentrations favor growth of taller grasses with shallow root systems, as opposed to diverse composition of marsh grass that provide deeper roots that stabilize the soil of the marshlands (Kenney). As a result, the soil-stabilization and storm surge benefit of a healthy marsh has been largely lost. This degradation and loss of storm attenuation capacity were exemplified during Hurricane Sandy.

Much of the excess nitrogen in the Western Bays is attributed to the wastewater treatment facilities that discharge directly into the system. Due to the low flushing rate of the Western Bays, the nitrogen is retained for prolonged periods of time, and rapidly accumulates in the Western Bays. As a result, the high concentration of nitrogen takes its toll on the integrity of this ecosystem. Therefore, nitrogen concentrations have reduced the protection of Western Bays coastline communities against extreme weather events and flooding.

2.1.4 Consolidation of Wastewater Treatment Infrastructures

The proposed project will ultimately make use of an already improved Bay Park STP. Since Hurricane Sandy, critical portions of Bay Park's collection systems and treatment plant has undergone repair and mitigation work through the FEMA Public Assistance program. The facility has been repaired and protected to the 0.2 percent annual chance flood elevation with sea level rise. The plant is undergoing infrastructure repair as well as treatment process improvements such as Sidestream Treatment and Level 1 Biological Nutrient Removal (BNR) projects. Bay Park STP, as it stands, had already been receiving flow from other smaller plants, similar in capacity to Long Beach WPCP. Lawrence WPCP and Cedarhurst WPCP were consolidated, and flow was diverted to Bay Park since 2015. The diversion of flow from Long Beach WPCP to Bay Park STP centralizes treatment at a facility where considerable investment has been made to improve treatment processes, long-term reliability, and resiliency. Such an action will reduce long-term risk, capital and operating cost, and impacts to the Bays.

With a healthy Western Bays salt marsh habitat, the tidal surge impact could have been attenuated, and damages to the Long Beach WPCP and the nearby residents would not have been as severe. The Hurricane Sandy storm surge map is shown in Figure 3. The persistent water quality issues in the bays will still need to be resolved to decrease the risk of incidents like Hurricane Sandy to communities and critical infrastructure.

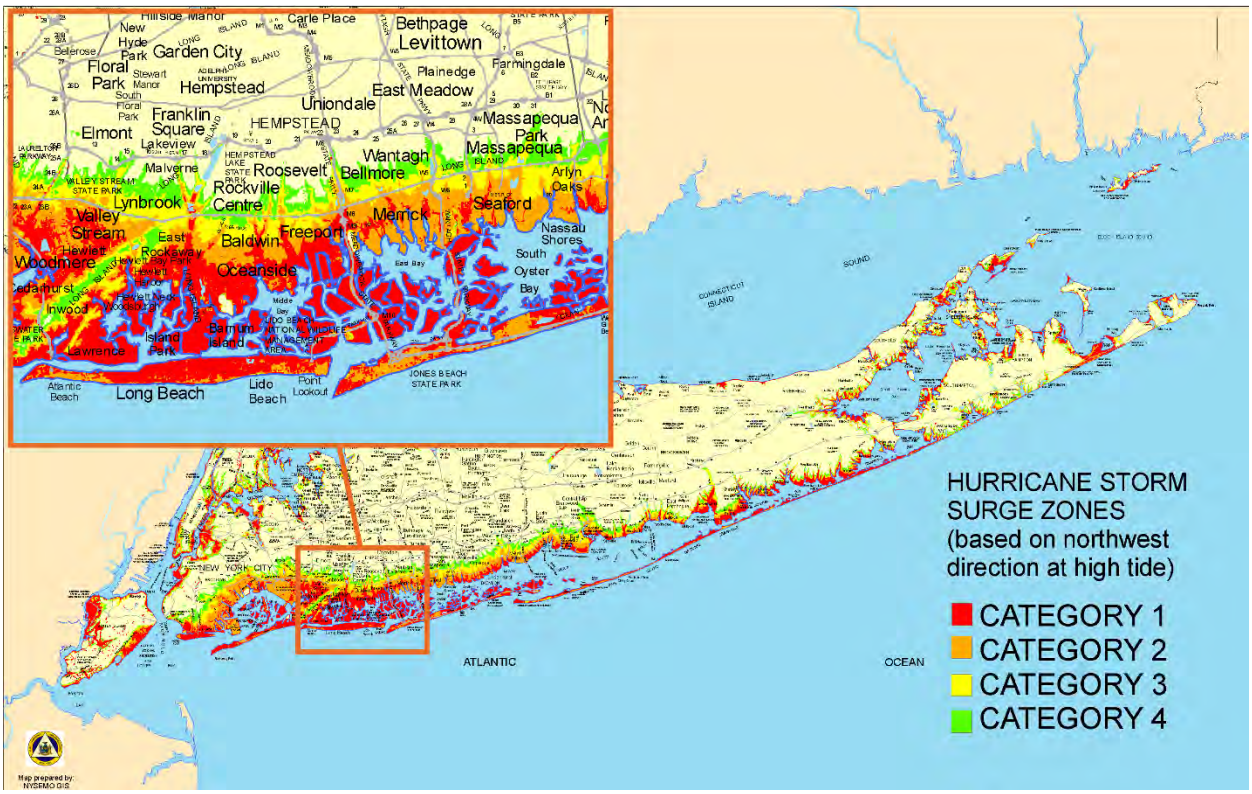


Figure 3: Hurricane Sandy storm surge map (Source: Nassau County, NY)

2.2 Project Objectives

Many of the project objectives and benefits are simultaneously linked to the restoration of aquatic habitats and flooding/storm protection through the improvement of Western Bays water quality. An enhancement of aesthetics in public spaces, such as the beaches and parks, may naturally occur as well. Project objectives and benefits broadly include:

- Reduction of pollutant levels in the Western Bays, particularly nitrogen
- Passive restoration of resilient coastal marshland as a natural flood barrier against wave energy and erosion, which will lead to the protection of densely populated low-elevation communities from storm and flood damage
- Promotion of water-related economic activities
- Reduced risk of untreated effluent release during a flood event

The proposed project's expected outcomes will help achieve the goals of the Consolidation Master Plan for Nassau County[3], South Shore Estuary Reserve Act, the Reserve's Comprehensive Management Plan, and the Long Island Nitrogen Action Plan, as well as flood risk reduction goals. The Long Beach WPCP Consolidation project is also aligned with many of the same goals of New York's CFA, such as community and economic development, waterfront revitalization, and environmental improvements.

2.3 Project Benefits

There are many benefits to the project, including but not limited to the following:

- Converting the Long Beach WPCP to a pump station eliminates discharge points to the South Shore Estuary reserve and Western Bays. The City of Long Beach's discharge is estimated to comprise approximately 5 percent of the nitrogen loading from point discharges. This will improve water quality and benefit the sensitive natural resource, as well as improve health and recreational value from neighboring residents
- Capital costs to upgrade the plant to meet new standards will be eliminated
- Costs to operate and maintain the wastewater facilities decreases
- Application of best-in-class technologies implemented at Bay Park STP to meet more stringent discharge effluent limits would result in greater consistency in the effluent water quality
- Reduced risk of untreated or partially treated wastewater entering the estuary under emergency conditions, such as power outages, due to the mitigation work at Bay Park STP
- Wastewater treatment facilities will be removed from residential neighborhoods, benefiting existing residents and likely improving local property values. Increased aesthetic value in public spaces and new recreational areas because of improved water quality
- Redevelopment of the unused parcel of space after project completion will provide the City of Long Beach economic opportunities to create new waterfront property using the remaining space at the plant. See Figure 4 below for a more detailed view of the new waterfront space that would be available following decommission of the Long Beach WPCP. The decommission and redevelopment of the reclaimed space is not part of the Long Beach WPCP Consolidation project.
- Increased quality of life associated with improved recreational value of affected public space, as well as reduced human health issues associated with nitrogen loading and sea lettuce growth
- Hurricane Sandy repair and mitigation work will not need to be performed on all aspects of the Long Beach site, only the processes used in the pump station, if any. This will significantly reduce costs and eliminate risk for loss of service to the affected populations in the event of another natural disaster similar to Hurricane Sandy
- Demonstrates cooperative efforts between the Federal, State, and Local levels of government
- Builds upon past successes experienced through the Cedarhurst and Lawrence pump station conversion and consolidation projects

[3] The Consolidation Master Plan for Nassau County aims to consolidate and upgrade the County's smaller wastewater treatment facilities.

- Revitalization for local communities due to the increased marine-based economies, food and beverage, and tourism opportunities

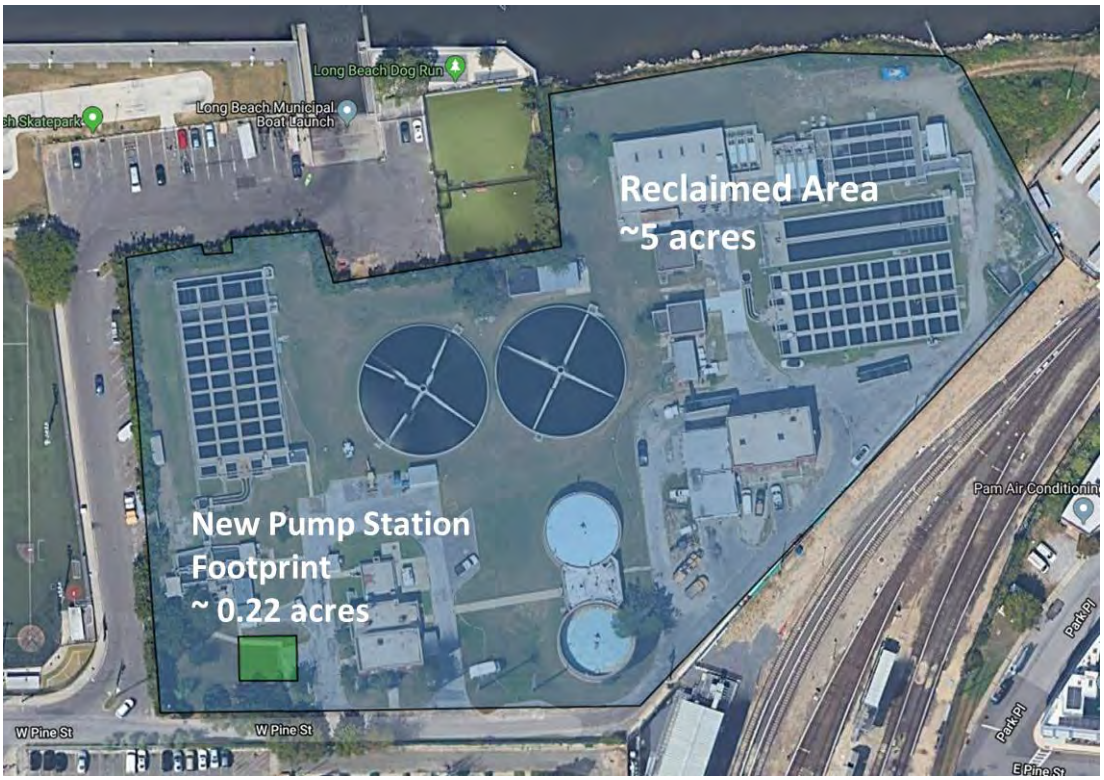


Figure 4: Reclaimed space after consolidation project

2.4 Related and Complementary Activities

Within the last decade, Nassau County has led evaluations of its existing infrastructure and potential consolidation options and improvements to meet its overall objective: addressing water quality issues for a more sustainable Western Bays. By consolidating wastewater treatment, the County will save money by reducing costly and redundant capital expenditures, implementing new and innovative technologies, and streamlining operations and maintenance costs. The service population benefits from a better wastewater system with innovative technology, reduced taxes, and potentially converting public service areas to public spaces. Additional projects planned or implemented to achieve this end include:

- Diversion of Jones Beach STP to Cedar Creek WPCP (completed)
- Consolidation of wastewater from Cedarhurst WPCP and Lawrence WPCP to Bay Park STP (completed)
- Bay Park Conveyance Project (in progress)
- Bay Park STP – Hurricane Sandy Repair and Mitigation. This project will result in new technologies installed and reduced risk of loss from future flood events (in progress)
- Point Lookout septic conversion and consolidation with Nassau County's wastewater treatment system (diverting to Bay Park STP) (planned)

3 EXISTING CONDITIONS

3.1 Introduction

The subsections described herein provide a baseline understanding of the project area. The project force main alignment is discussed later in this report; the pipeline is proposed to cross under Hewlett Bay from Bay Park STP to Long Beach WPCP. The pipeline will be situated under the terrain of the Long Beach WPCP near W. Pine Street at the northern end of Long Beach.

Most of Long Beach is built up with residential homes, though there are high-rise hotels situated along the Boardwalk. Existing underwater pipelines lie within the area to the east of Long Beach WPCP site. The project alignment is to the west to avoid these underwater utilities.

3.2 Ownership and Services Areas

Nassau County, the project proponent, is a local government in Long Island, New York that owns both Bay Park STP and Cedar Creek WPCP, as well as 38 pump stations. The County owns an additional plant, Glen Cove STP, that serves a smaller population in the northern part of the county. A private company, Suez, under agreement with the County, operates and maintains the County's overall wastewater treatment system, including the three plants and 38 pump stations.

The City of Long Beach owns and operates the Long Beach WPCP. The collection system includes three pump stations – Roosevelt Avenue, which serves the eastern portion of the city, and Indiana Avenue and New York Avenue which serves the western portion of the city.

The physical locations of the two wastewater treatment plants that are part of the project are:

- Bay Park STP (also known as the South Shore Water Reclamation Facility or Bay Park Water Reclamation Facility). Located at latitude 40°37'55.99"N and longitude 73°39'47.99"W. The address generally used is 2 Marjorie Lane, East Rockaway, NY 11518-2020
- Long Beach WPCP (also referred to as Long Beach WRF or Long Beach STP). Located on the northern shore of the barrier island, northeast of National Boulevard at latitude 40°35'34.55"N and longitude 73°39'55.80"W.

The project is within the boundaries of New York Congressional District 4, as illustrated in Figure 5. The force main is expected to traverse through the Hassocks within the 100-foot right of way along the existing Bay Park STP outfall pipe. The area between the South Black Banks Hassock and the City of Long Beach boundary is within the right of the Town of Hempstead (see Figure 6).

Figure 5: New York's Congressional Districts from 2013 to present (Source: US Department of Interior)

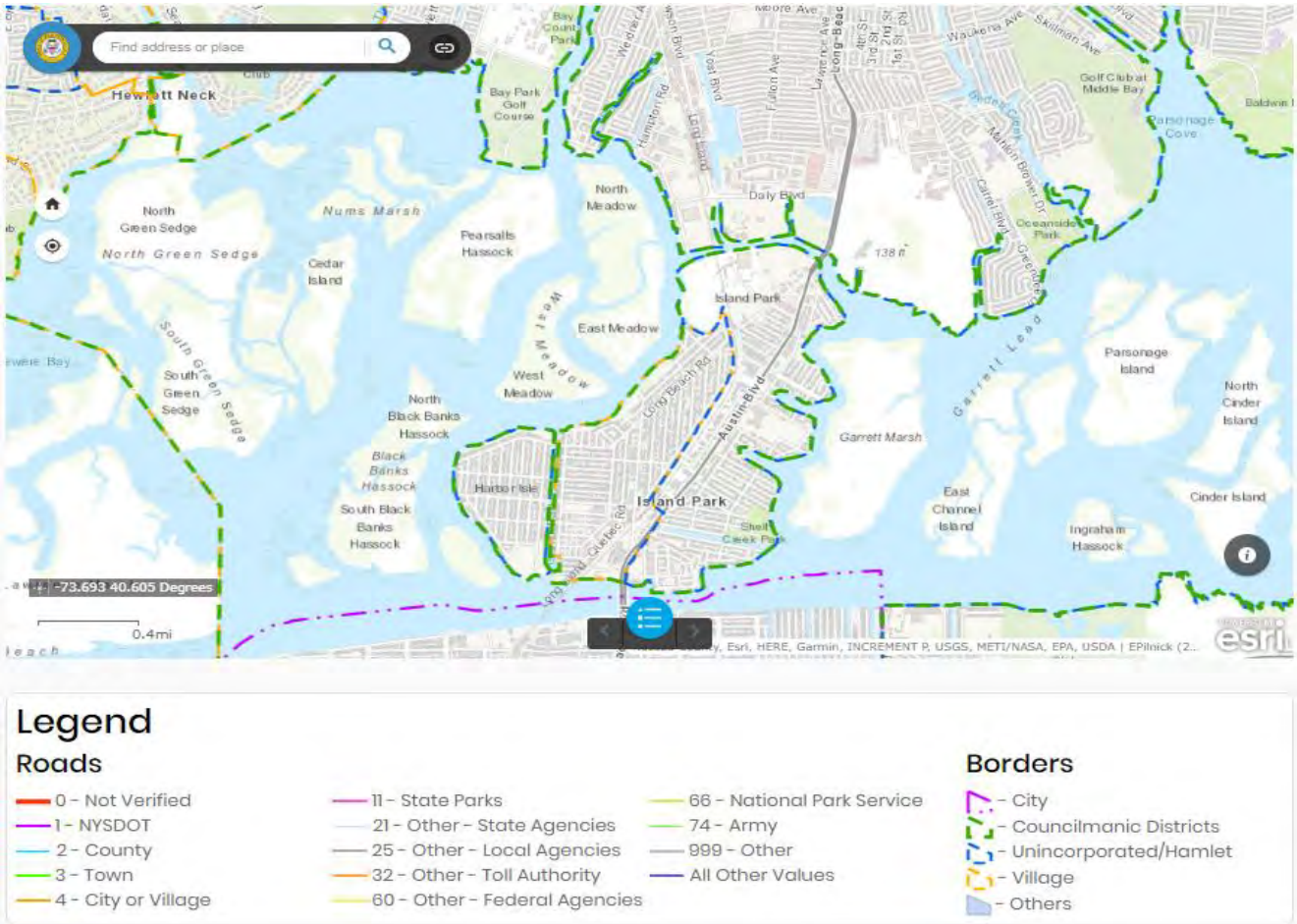


Figure 6: Boundaries of the Town, Villages, and Hamlets, Nassau County (Source: Town of Hempstead, 2019)

3.3 Topography

The saline brackish estuary of Hewlett Bay is situated between Bay Park STP and Long Beach WPCP. In the bay, extensive low-lying islands with areas of salt marsh, intertidal flats, and uploads are present. The center of the Bay is dominated by sub-tidal open water with a depth varying from 1 feet to 30 feet in the Mean Lower Low Water (MLLW) Datum (see Figure 7 and Figure 8) and a tidal range averaging 4.9 feet. Hewlett Bay is bounded to the south by Long Beach, a flat area dominated by urban residential buildings. No flood protection measures currently exist near the Long Beach WPCP, but the City plans to implement a $20 million bulkhead and shoreline protection plan; key project components include bulkhead installation, drainage system enhancements, enhancement of critical bayfront utilities, and restoring the Reynolds Channel shoreline. The project is the Northshore Critical Infrastructure Protection Program and it is being funded through the FEMA 404 Mitigation Program (City of Long Beach, 2018).

Grade elevations range from approximately 6 feet to 18 feet North American Vertical datum of 1988 (NAVD88) at the Bay Park STP, with the majority of the plant lying between 8 feet and 12 feet. Elevations are based upon plant drawings. The plant is currently partially bordered by an earthen levee and a concrete I-wall. The I-wall was built to an elevation of 17 feet to provide flood protection to the current 0.2 percent annual coastal flood event and sea level rise.

For the Long Beach WPCP, grade elevation ranges from approximately 7 feet to 11 feet (NAVD88). Elevations are also based upon plant drawings.

3.4 Geology

Geotechnical data has not been collected for this project. Work is underway for a geotechnical firm to perform a desktop and geotechnical investigation. Geotechnical field work is estimated to start September 1, 2019 and be completed by October 31, 2019. The soil characteristics will be critical to the design approach of the force main.

Based on research data for the project area, Long Island was formed during the last two pulses of the Wisconsin glaciation some 21,000 years ago (19,000 BC) in which moraines consisting of gravel and loose rock were left behind. The glaciers melted and receded to the north, resulting in the difference between the North Shore beaches and the South Shore beaches. The North Shore beaches are rocky from the remaining glacial debris, while the South Shore beaches consist of outwash sand. Long Beach is situated on the south shore, on the most southern moraine, known as Ronkonkoma Moraine, with a large outwash plain southeastward, towards its barrier islands and the Atlantic Ocean.

The near shore coastal-plain strata and associated lag deposits of gravel are overlain by Pleistocene sediments. Offshore, these sediments are cut by numerous paleochannels, which are filled by reworked Pleistocene glaciofluvial gravelly deposits and early Holocene estuarine deposits. At many aforementioned places, sediments are buried by a veneer of fine sand (Shwah W.C. et.al, 2000).

Figure 9 shows the geomorphology of the project area within the Long Island region. Based on the available information and local experience, the regional geology can be characterized as follows (from bedrock to surface, see Figure 10):

- Bedrock at a depth of approximately 1,500 feet
- Lloyd Sand formation with thickness of approximately 300 feet fine to medium fine sand
- Raritan Clay with thickness of approximately 200 feet to 300 feet

- Magothy Sand formation with thickness of approximately 600 feet to 800 feet fine to medium fine sand, principal aquifer
- Outwash deposits with thickness of approximately 40 feet with a possible clay layer at 20 feet depth.

Figure 11 shows the soil characteristics along the project area ranging from mucky peat to sand. For the design, the subsurface engineering properties of the upper Pleistocene and Holocene (outwash) deposits area are of main interest. Within these deposits, layers of organic silts are found, as well as a clay bed lenses at 20 feet below sea level, approximately 6 feet thick. The upcoming soil boring program will collect soil samples at depths ranging from 40 feet to 80 feet (see Table 1 below).

Table 1: Upcoming Part 1 of the geotechnical boring program

			Access Type			**Type**	
Bore-ID	Segment	Boring Depth (FT)	Land Boring (LB)	Water Boring (WB)	Mash Boring (MB)	Standard Penetration Test (SPT)	SPT+Cone Penetration Test (CPT)
TB-101	1	40	✓			✓	
TB-102	1	74		✓		✓	
TB-103	1	80		✓			✓
TB-104	2	40			✓		✓
TB-105	2	57			✓		✓
TB-106	2	55		✓			✓
TB-107	2	40			✓		✓
TB-108	3	54		✓			✓
TB-109	4	40			✓		✓
TB-110	4	52			✓	✓	
TB-111	4	57			✓	✓	
TB-112	5	55		✓			✓
TB-113	5	62	✓			✓	
TB-114	5	71	✓			✓	
TB-115	5	40	✓			✓	
SUM		817	4	5	6	7	8

The main direction of sediment transport along the south shore of Long Island is from the east to west. The largest amount of sediment is transported between Fire Island and Jones Beach Island, both of which are to the east of Long Beach. The coast at the east of Fire Island is subject to erosion, and the south shore of Long Island between Fire Island Inlet and Montauk Point is subjected to accretion. In general, between 1947 and 1999, the shoreline changed between 20 feet and 320 feet seawards (Coastal Planning & Engineering, Inc. 2009; Schwab, W.C. et.al, 2000).

The shoreline of Long Beach exhibits long term accretion, gaining 53,700 cubic yards per year. Meaning, the shoreline of the City of Long Beach has been generally accretional over the long term (Coastal Planning & Engineering, Inc., 2009). An existing groin field appears to have been effective in trapping net longshore sand transport and stabilizing a wide beach that currently exists. Based on these observations and analysis, the study concludes that the shoreline is receding at a rate of about 19.4 feet per year in the 4,000-foot section adjacent to Jones Inlet. The next 20,000 feet of shoreline to the west was shown to be eroding about 4 feet per year on average with a decreasing trend from east to west, tapering to near zero at the City of Long Beach boundary. The Atlantic Coast of Long Island Jones Inlet to the East Rockaway Inlet Long Beach Island, NY Coast Storm Risk Management Project is also nearing completion. The project involved beach nourishment in the amount of 4.5 million cubic yards of sand, reconstruction of the groins, and the erection of a dune (City of Long Beach, 2019). This project supports restoration of the marshlands, which will help stabilize the shoreline of Long Island.

3.5 Groundwater

The marine alignment consists of mostly offshore, below seafloor pipeline installation. High water pressure is another significant component affecting the design and installation of the horizontal directional drill (HDD) force main. During installation, when a borehole is drilled, the contractor will need to determine the extent of groundwater pressure that is being exerted on the borehole. If the groundwater pressure is great enough to deform the borehole, the contractor will need to take precautions to ensure the force mains are installed properly.

There will not be any dewatering associated with the HDD process. Dewatering is during open cut installation when the overlapping sections of pipe from different drills are connected. It is anticipated that the size of the trench would be approximately 7-feet deep by 50-feet long by 7-feet wide. A filter bag will be used to control dewatering unless unforeseen conditions require additional means. All environmental and permitting considerations are being evaluated to limit impact to the Hassocks from the project construction activities.

3.6 Floodplains

Bay Park STP is on the edge of a large tidal wetland system off Long Island's South Shore near East Rockaway Channel, a tidal tributary. Bay Park STP and the force main linking Bay Park STP to Long Beach WPCP are within the tidal floodplain, meaning coastal flooding affects these assets. Storm surge from hurricanes and nor'easters causes coastal flooding, which is a principal flood source throughout the coastal areas of Nassau County. Project design will consider coastal flood risk so that future flooding does not impact the effectiveness of the project at the Bay Park STP and the Long Beach WPCP sites.

Appendix D shows the FEMA flood zones within the project area. Most of the project alternatives fall within the special flood hazard area, the area with a 1 percent chance of flooding each year. The current FEMA base flood elevation at the Bay Park STP is 10 feet North American Vertical Datum of 1988 (NAVD88).

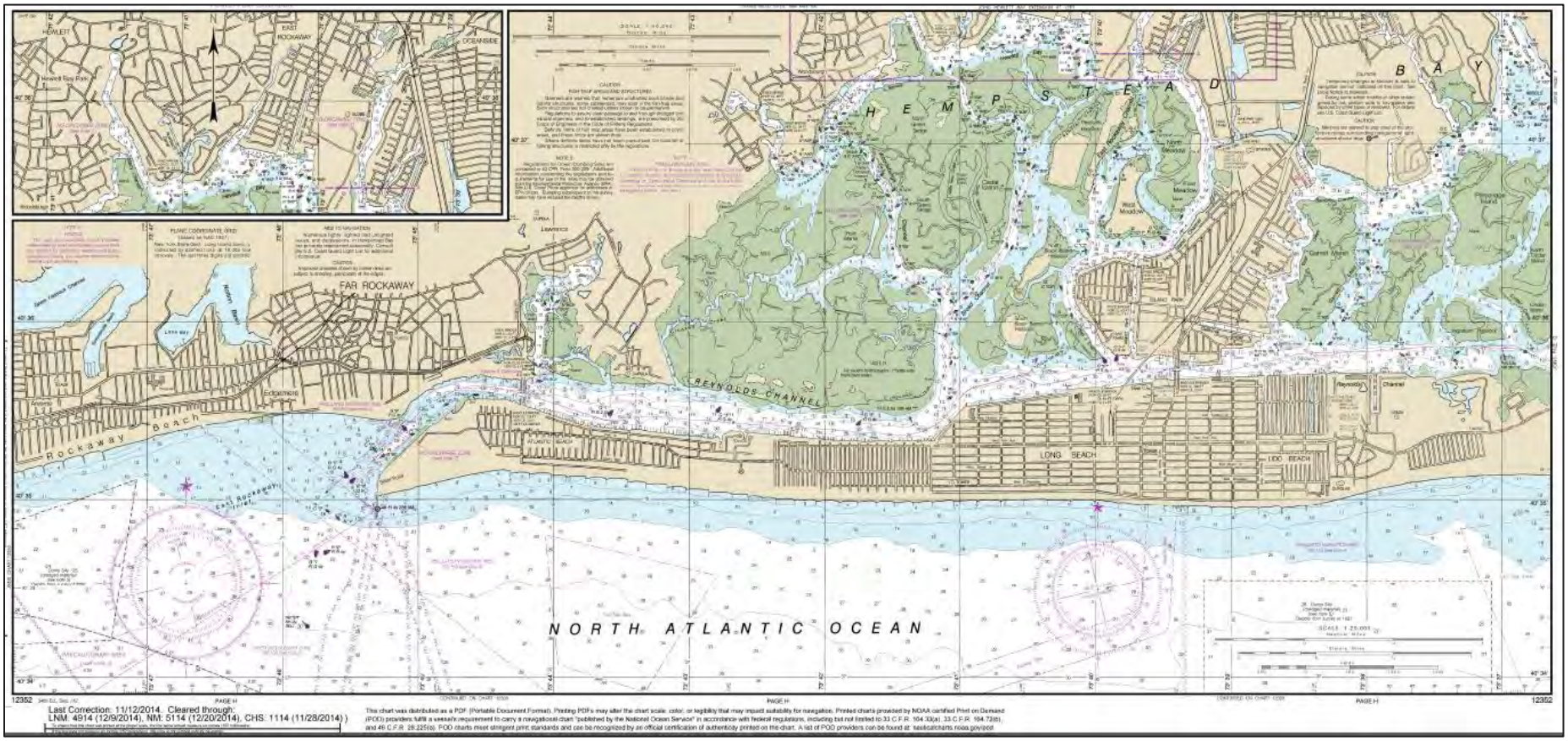


Figure 7: Shinnecock Bay to East Rockaway Inlet South Coast of Long Island, New York Bathymetry - Nautical Chart 12352

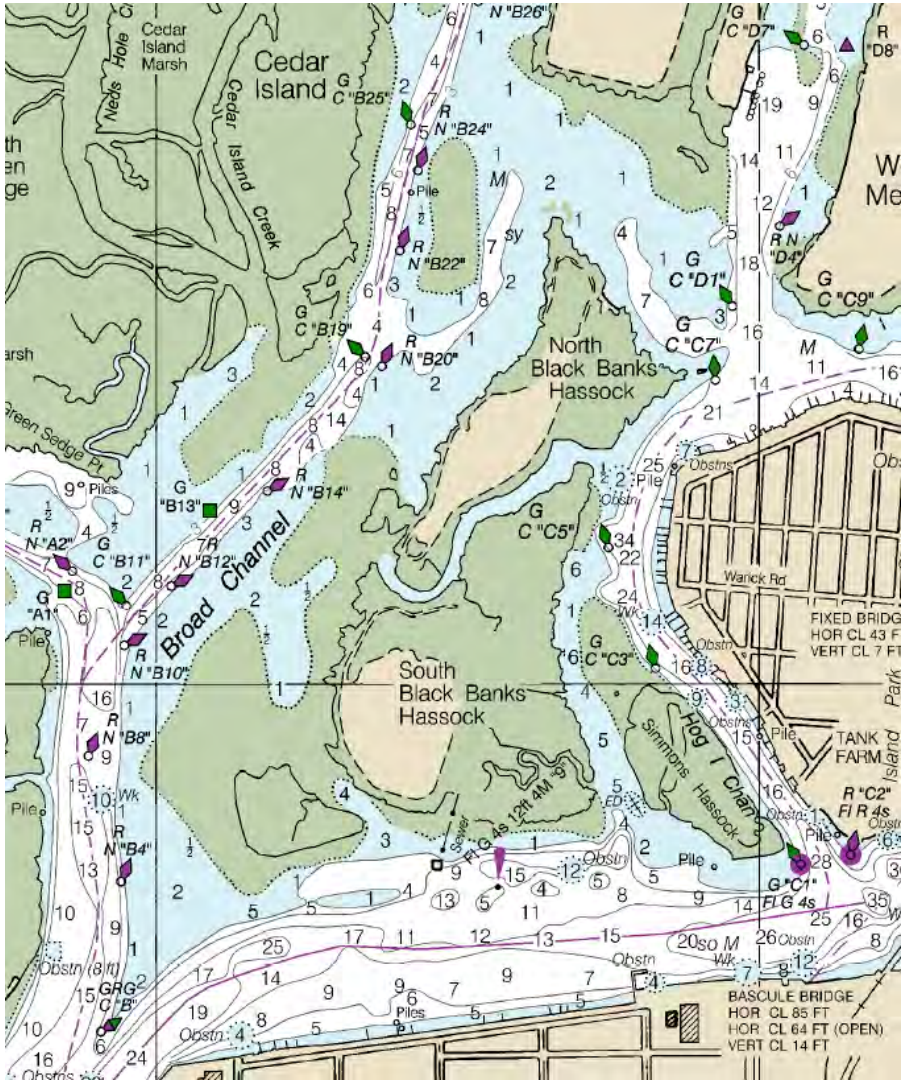


Figure 8: Closeup of Nautical Chart 12352 (above)

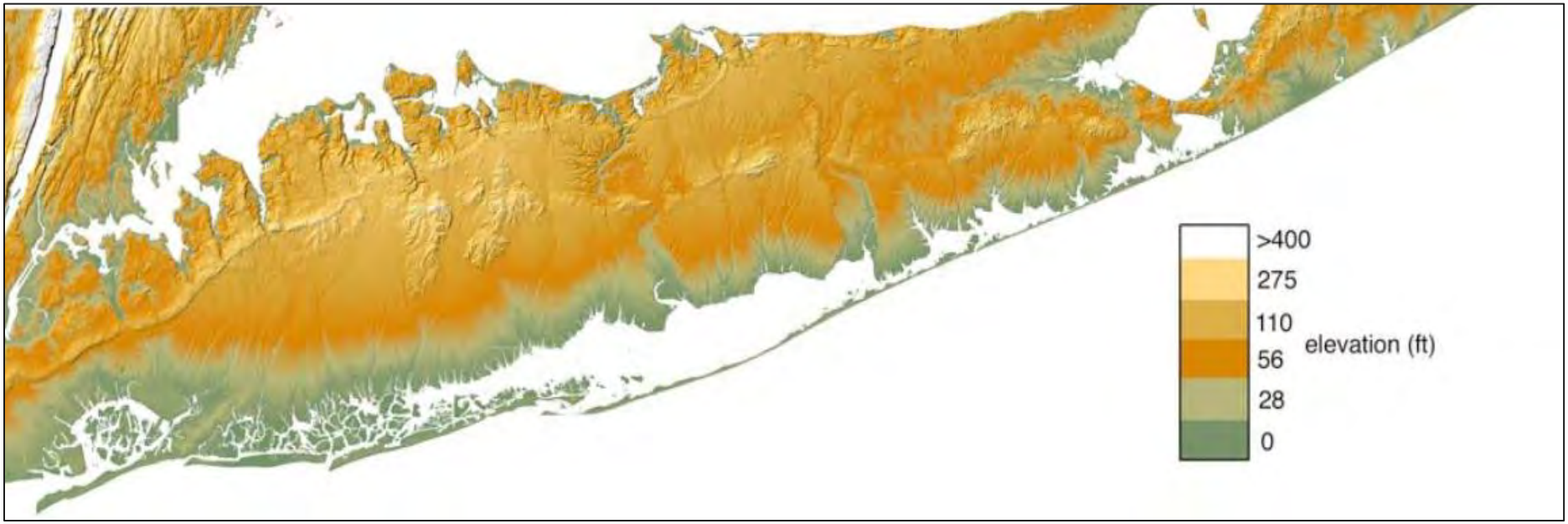
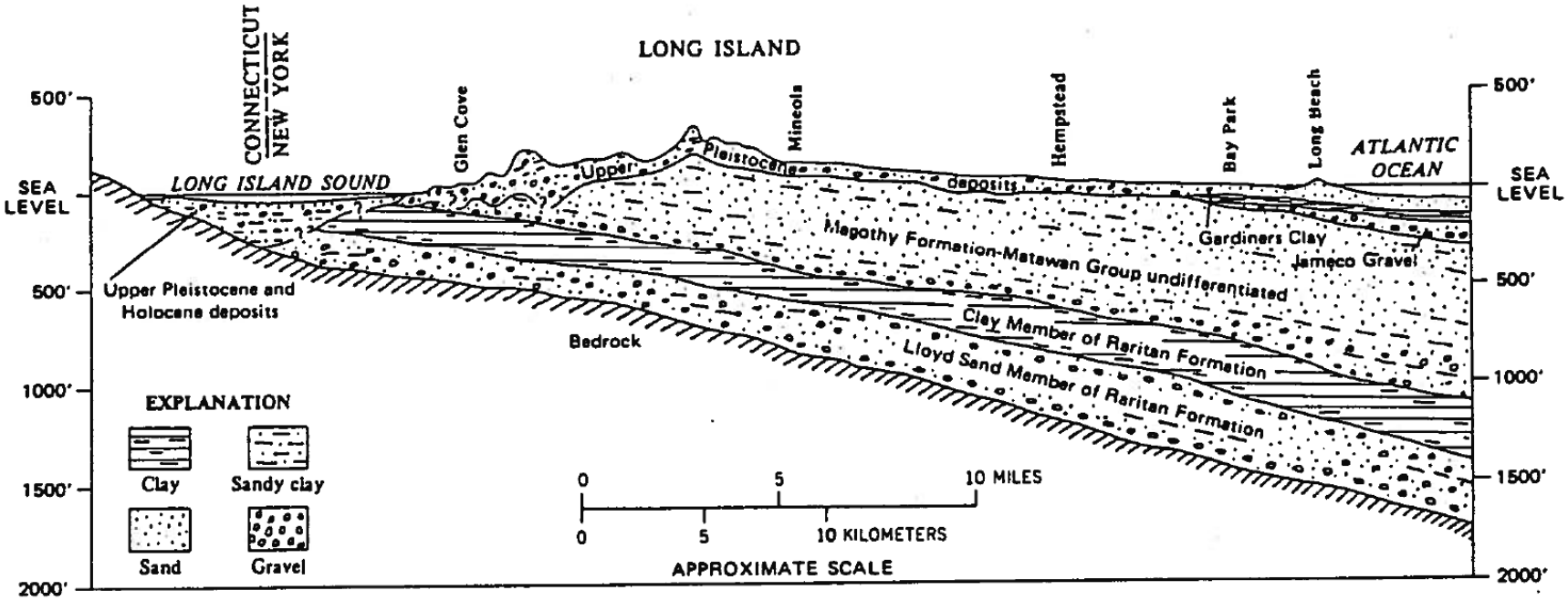
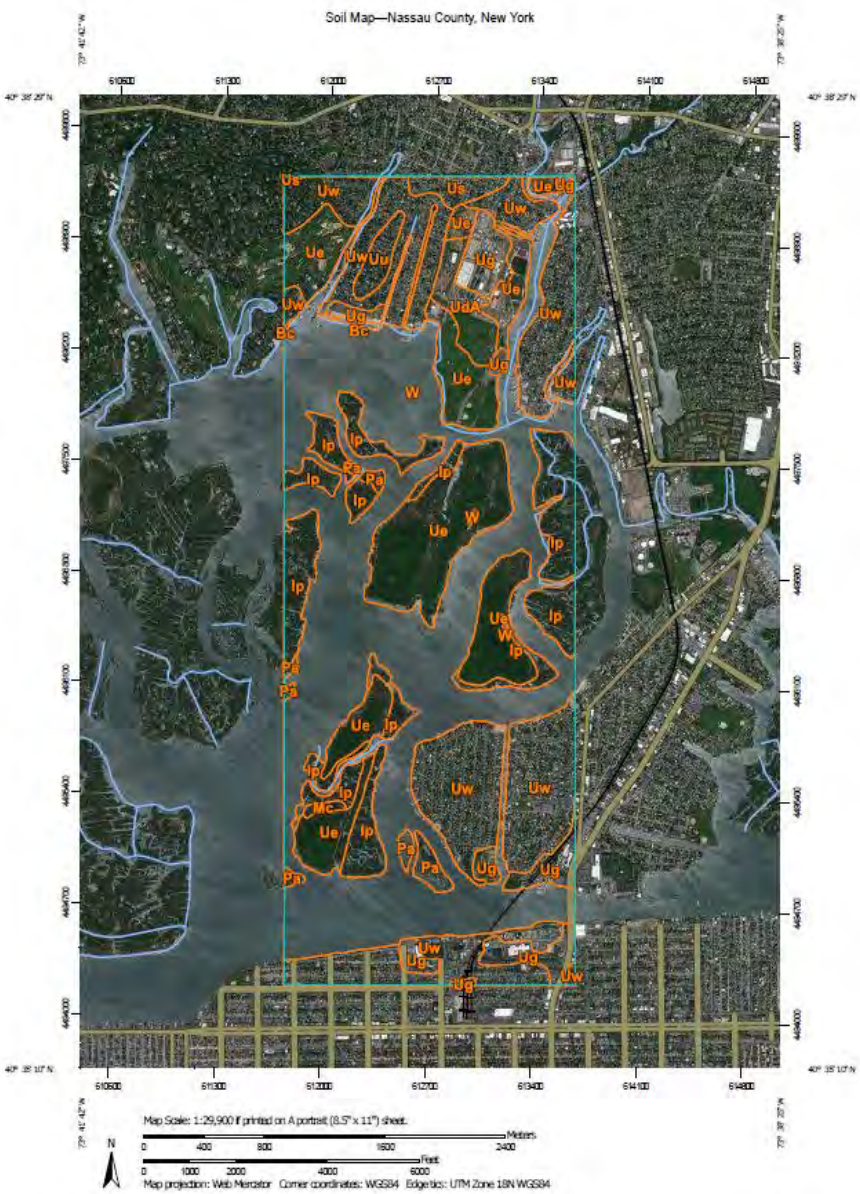


Figure 9: Digital Elevation model, Long Island, NY. (Source: New observations on the glacial geomorphology of Long Island from a Digital Elevation Model (DEM), Bennington J.Bret 2003.))



Generalized geologic section showing stratigraphic units in central Nassau County, Long Island, N.Y. (after Perlmutter and Geraghty, 1963, p. A13).

Figure 10: Geology of Long Island (source: Charles F. Vachris, P.E., June 1984)



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Bc	Beaches	3.9	0.2%
Ip	Ipswich mucky peat, 0 to 2 percent slopes, very frequently flooded	260.2	10.6%
Mc	Matunuck mucky peat, 0 to 2 percent slopes, very frequently flooded	4.0	0.2%
Pa	Pawcatuck mucky peat, 0 to 2 percent slopes, very frequently flooded	28.2	1.2%
UdA	Udipsamments, nearly level	41.5	1.7%
Ue	Udipsamments, wet substratum	403.3	16.5%
Ug	Urban land	114.0	4.7%
Us	Urban land-Sudbury complex	21.7	0.9%
Uu	Urban land-Udipsamments complex	19.8	0.8%
Uw	Urban land-Udipsamments, wet substratum complex	553.6	22.6%
W	Water	994.9	40.7%
Totals for Area of Interest		**2,445.1**	**100.0%**

Figure 11: Soil survey of project area (Source: National Resources Conservation Service)

3.7 Environmental Resources

It is noted that limited field surveys or investigations were completed to confirm the data herein; however, field surveys are a part of the environmental study (by GOSR) and permitting works. These future surveys and studies will confirm the information presented in this section for use in the National Environmental Policy Act (NEPA) environmental assessment. GOSR and its subconsultant, WSP, will assume the coordination of the environmental review of the project and completion of the NEPA documentation. The PM-JV will be responsible for the permitting of the geotechnical investigation and construction work.

Natural resources and the potential impacts of the proposed project were evaluated, based on readily available information and a limited terrestrial field survey within both terrestrial and aquatic ecosystems. For terrestrial natural resources, consideration was given to the vicinity of the Bay Park STP and the site of land disturbance (e.g., shallow trenching) on Long Beach Island. For aquatic natural resources, consideration was given to East Rockaway Channel, Hempstead Bay, and the open ocean between Long Beach Island.

The existing conditions of natural resources, including wetlands, floodplains, water quality, aquatic biota, wildlife, threatened and endangered species, and significant habitats within the study area were characterized using information from scientific and gray literature (as cited throughout) and the following databases, maps, and other sources:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs);
- Water quality data from: (1) USGS monitoring station in Hempstead Bay (gauge # 01311143), (2) the New York State Department of Health monitoring station along the south shore of Long Beach Island, (station ID: 21NYBCH-NY962496-01; United States Environmental Protection Agency [USEPA] STOrage and RETrieval [STORET] database), (3) USEPA New York Bight Water Quality Monitoring Program, and (4) Stony Brook University School of Marine and Atmospheric Science (SOMAS) Western Bays Water Quality Monitoring System 2011 Report (SOMAS 2011);
- United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps and Information, Planning, and Conservation (IPaC) System list of threatened, endangered, candidate, and proposed species for Nassau County;
- New York State Department of Environmental Conservation (NYSDEC) tidal wetlands maps, 2000-2005 Breeding Bird Atlas results for Blocks 6049B and 6049D, and Herp Atlas Project results for the Lawrence census quadrangle;
- Responses to requests for information on rare, threatened and endangered species and special habitats within the vicinity of the study area made to the New York Natural Heritage Program (NYNHP) and essential fish habitat through a query of the National Marine Fisheries Service (NMFS) essential fish habitat mapper.

3.7.1 Water Quality

The Bay Park STP is adjacent to the East Rockaway Channel in the western Hempstead Bay and currently discharges effluent to the bay through an outfall in Reynolds Channel, between the northern shore of Long Beach Island and the southern end of South Black Banks Hassock. Reynolds Channel in the vicinity of the outfall discharge point is classified as an SB waterbody. East Rockaway Channel and the open waters of Hempstead Bay are designated as Class SC and Class SA water bodies, respectively,

under 6 NYCRR Part 885 and the 2012 New York State 303(d) listing. Class SC waters consist of fishing, and primary and secondary contact recreation. The water quality shall be suitable for fish and shellfish propagation and survival. Class SB waters consist of primary and secondary contact recreation and fishing. The water shall be suitable for fish, shellfish, and wildlife propagation and survival. Class SA waterbodies consist of shellfishing for market purposes, fishing, and primary and secondary contact recreation. The water should also be suitable for fish and shellfish propagation and survival. The ambient water quality standard for dissolved oxygen (DO) for Class SA, SB, and SC waters is 4.8 mg/L, with a lower limit of 3.0 mg/L for certain periods of time.

Since 1998, Hempstead Bay has been listed under Part 2c of the 303(d) list (the multiple segment/categorical impaired waterbody segments for shellfishing) as impaired for pathogens due to urban and storm runoff (NYSDEC 2012). In 2006, over-enrichment of nitrogen from point and non-point sources was cited as another cause of the bay's impaired status. Sources of nitrogen include effluent from multiple wastewater treatment plants, as well as stormwater runoff (SSERC and NYSDOS 2001, SOMAS 2011). High nutrient loadings promote algal blooms and Hempstead Bay's excessive growth of benthic macroalgal mats, including the sea lettuce Ulva lactuca, leading to blockage of sunlight, loss of submerged aquatic vegetation (SAV), and dissolved oxygen (DO) depletion in some locations. Low levels of DO, with clear signs of summer hypoxia, are typical along the northern margins of the bay and in 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).

Hempstead Bay is also listed as an impaired segment on the NYSDEC Waterbody Inventory/Priority Waterbodies List. Known pollutants include pathogens, chlorine, and ammonia, and suspected pollutants include nutrients (nitrogen), oil and grease, and priority organics (PCBs) (NYSDEC 2011).

At the completion of the Long Beach WPCP Consolidation project, the impact to the water quality of Western Bays is expected to be largely positive impacts. Coupled with the Bay Park Conveyance project, nitrogen loading in Reynolds Channel and the Western Bays is expected to be greatly reduced, providing a beneficial impact on water quality. It is expected that both permitted discharges and effluent volume will be regulated under a modified SPDES permit for Bay Park STP via NYSDEC.

3.7.2 Wetlands

The NWI maps identify the majority of Hempstead Bay, including East Rockaway Channel, as estuarine, subtidal, unconsolidated bottom wetland, as shown in Figure 12 . Subtidal areas are continuously submerged, and unconsolidated bottoms have at least 25 percent cover of particles smaller than 7 centimetres and less than 30 percent vegetative cover. The salt marsh islands of Hempstead Bay and the channels between them are respectively classified on NWI maps as estuarine, subtidal, aquatic bed, algal, subtidal wetland, and estuarine, intertidal, emergent, persistent, irregularly flooded, partially drained/ditched wetland. The former describes subtidal, estuarine wetlands that are dominated by algal beds or other plants that grow on or below the surface of the water for most of the growing season in most years, and the latter describes wetlands located between the high and low water point that have perennial, erect vegetation throughout the year, are flooded less often than daily, and have been hydrologically altered. The immediate ocean shoreline of Long Beach Island is mapped as marine, intertidal, unconsolidated shore, sand, regularly flooded wetland, which describes high energy coastlines in the area between extreme high and low water that are flooded daily and have predominantly sandy bottoms with less than 75 percent coverage of stones or bedrock, and less than 30 percent coverage of

vegetation. Landward of this wetland zone, the beach is classified on NWI maps as marine, intertidal, unconsolidated shore, sand, irregularly flooded wetland, which are flooded less than daily. The open waters of the Atlantic Ocean are mapped as marine, subtidal, unconsolidated bottom, subtidal wetland, which describes marine systems that have unconsolidated bottoms, as described above, and are permanently flooded.

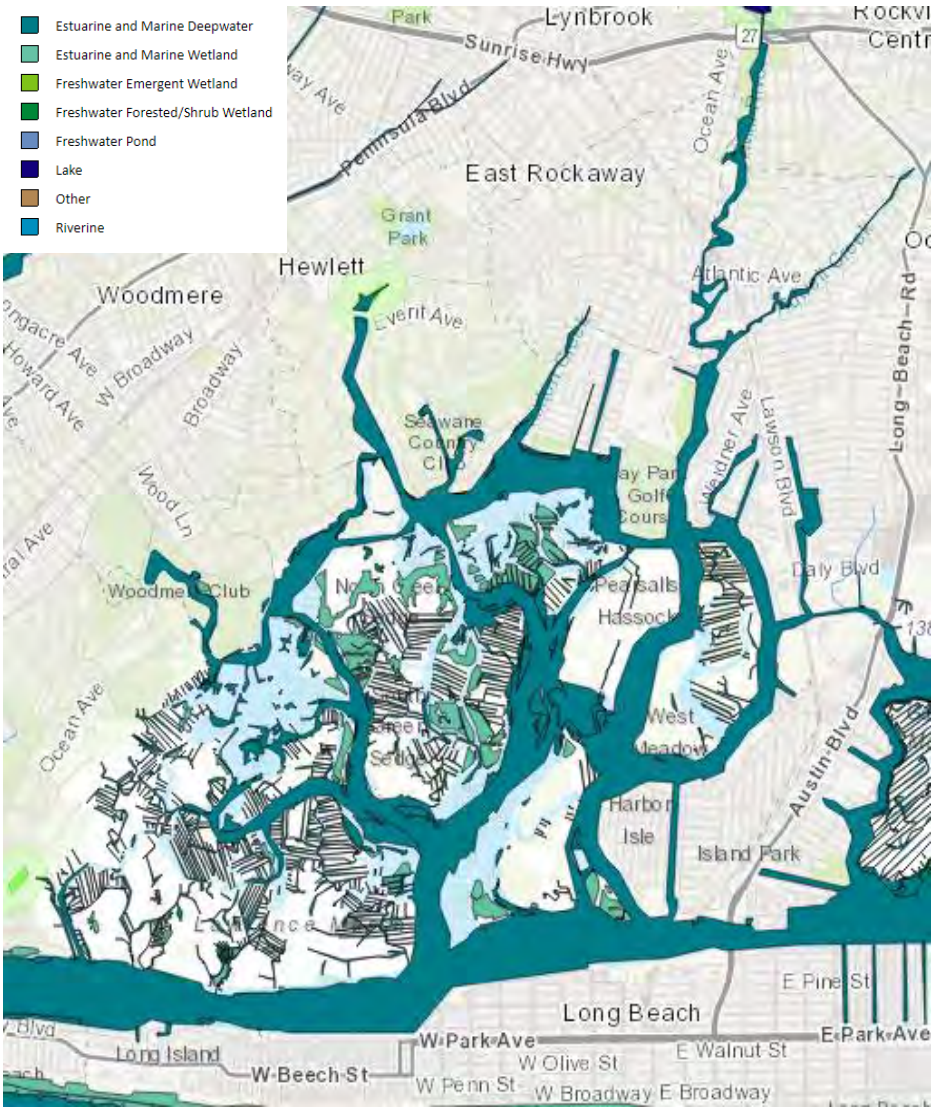


Figure 12: Wetlands Classifications Along Project Area. (Source: National Wetlands Inventory.)

East Rockaway Channel and other open areas of Hempstead Bay are mapped by NYSDEC as littoral zone tidal wetland (LZ). Littoral zone wetlands refer to all lands that are submerged by tidal waters less than 6 feet deep at mean low water. The bay's islands are mapped by NYSDEC as having interior areas of High Marsh (HM) with fringes of Intertidal Marsh (IM) and coastal shoals, bars, and mudflats (SM). HM occurs in uppermost tidal wetland zones that are irregularly flooded and are usually dominated by salt meadow grass (*Spartina patens*) and spike grass (*Distichlis spicata*), while IM occurs in frequently flooded areas between the average high and low water point, where low marsh cordgrass (*Spartina alterniflora*) is typically the dominant vegetation cover. SM refers to tidal wetland zones that are submerged at high tide

and exposed or nearly exposed at low tide, and are not vegetated. The bayside shoreline of Long Beach Island is mapped as SM in most areas, and the Oceanside shoreline is mapped as LZ up to the mean high-water mark. No NWI- or NYSDEC-mapped tidal or freshwater wetlands are present within the Bay Park STP or Long Beach WPCP. A delineation of wetlands within the Hassocks will be completed as part of going permitting efforts.

3.7.3 Vegetation and Terrestrial Ecological Communities

The terrestrial vegetative communities within and around the Bay Park STP are part of the suburban landscape that would be defined by Edinger et al. as “terrestrial cultural” communities (2002).

Terrestrial cultural communities are “communities that are either created and maintained by human activities, or are modified by human influence to such a degree that the physical conformation of the substrate, or the biological composition of the resident community is substantially different from the character of the substrate or community as it existed prior to human influence” (Edinger et al.). The cultural terrestrial communities within the project site and study area are “mowed lawn” and “mowed lawn with trees.”

The “mowed lawn with trees” community is defined as “residential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs, and it is shaded by at least 30 percent cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50 percent cove. The groundcover is maintained by mowing. This ecological community is found within the immediate vicinity of the perimeter chain-link fence” (Edinger et al., 2002). The “mowed lawn” community is defined as “residential, recreational, or commercial land, or unpaved airport runways in which the groundcover is dominated by clipped grasses and there is less than 30 percent cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50 percent cover. The groundcover is maintained by mowing” (Edinger et al.). This ecological community is found within and around the Bay Park STP.

Sandplain gerardia is a federally listed endangered plant that was designated in 1988. It typically occurs on dry, sandy poor-nutrient soils of sparsely vegetated sandplain environments and serpentine barrens (USFWS, Sandplain Gerardia Recoverty Plan, 1989). There are numerous recordings of the plant’s presence on Long Island with recordings having declined over the years. Based on the grasslands type of habitat where Sanplain Gerardia is typically located and information on historical locations of this species, it is unlikely that Sandplain Gerardia would occur in within the project site.

Seabeach amaranth is a federally and state-listed threatened annual herbaceous plant that was thought to be extinct in New York State until it was rediscovered in 1990 (Stalter et al. 1996). It grows along sandy beaches of the Atlantic coast in areas of accreting shoreline, upper beach, foredune, or overwash flat, as well as beach nourishment sites (USFWS 2012). Seabeach amaranth requires wide beaches that are free from vehicle use and excessive trampling (NYNHP 2014). Given the high levels of recreational use and other human activity on the beaches of Long Beach Island, seabeach amaranth is unlikely to occur in the vicinity of the project site.

3.7.4 Fauna

Fauna in the project area, specifically the Hassocks may experience some temporary impacts within the construction staging areas from construction activities. Construction methodology and timing has not yet been defined (e.g. seasonal timing, duration of works, etc.); these factors will influence the degree of

impact to fauna in the project area. The below describes the current baseline understanding of fauna based on desktop research, initial agency consultation, and limited field works.

According to the United States Fish and Wildlife Service (USFWS), the greater Hempstead Bay-South Oyster Bay habitat complex supports regionally significant and diverse wildlife communities (1997). Nevertheless, the Bay Park STP and Long Beach WPCP and its immediate surroundings are largely industrial, commercial, residential, and recreational land uses that provide limited habitat for few native wildlife species. Extensive human disturbance in these areas further limit the wildlife community to primarily urban-adapted, generalist species. The uninhabited salt marsh islands within Hempstead Bay likely support sensitive species of marsh-nesting birds, as well as some other tidal marsh specialists, such as the northern diamondback terrapin.

3.7.5 Birds

The New York State Breeding Bird Atlas is a periodic census of the state's breeding bird's distribution. The New York State Department of Environmental Conservation released the most recent census that was conducted from 2000 to 2005, and the census documented 45 species within the project area. Terrestrial habitats available to breeding birds in the area mainly include the salt marsh islands and margins of Hempstead Bay, and human-modified green spaces (e.g., golf course, recreational fields and other manicured lawn) and artificial structures in the heavily developed neighbourhoods around the Bay Park STP and Long Beach WPCP. Based on their habitat associations, most of the 45 species documented by the Breeding Bird Atlas are considered to have the potential to nest within these terrestrial portions of the study area (Table 2 and Table 3) (Poole 2005).

Birds observed in the vicinity of the Bay Park STP (including waterbirds in or over East Rockaway Channel) during previous field survey included: American crow (*Corvus brachyrhynchos*), American goldfinch (*Carduelis tristis*), American robin (*Turdus migratorius*), Canada goose (*Branta canadensis*), cedar waxwing (*Bombycilla cedrorum*), double-crested cormorant (*Phalacrocorax audits*), grey catbird (*Umatilla carolinensis*), great black-backed gull (*Larus marinus*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), killdeer (*Charadrius vociferus*), laughing gull (*Leucophaeus atricilla*), least sandpiper (*Calidris minutilla*), mallard (*Anas platyrhynchos*), mourning dove (*Zenaida macroura*), mute swan (*Cygnus olor*), northern mockingbird (*Mimus polyglottos*), ring-billed gull (Larus delawarensis), rock dove (*Columbia liva*), song sparrow (*Melospiza melodies*), and tree swallow (*Tachocline bicolor*).

Landbirds that would be expected around the wastewater treatment facilities during winter include each of the non-migratory species above, such as American goldfinch, house sparrow, European starling, mourning dove, and rock dove. Herring gulls, ringbilled gulls, and greater black-backed gulls are likely to occur on the beaches of Long Beach Island during winter. Waterfowl, such as brant (*Branta bernicla*), lesser scaup (*Aythya affinis*), canvasback (*A. valisneria*), red-breasted merganser (*Mergus serrator*), mallard, American widgeon (*Anas americana*), American black duck (*Anas rubripes*), bufflehead (*Bucephala albeola*), and ruddy duck (*Oxyura jamaicensis*) may occur in East Rockaway Channel and elsewhere throughout Hempstead Bay during winter. Numerous seabirds congregate on the ocean waters off Long Island during winter, and several seabird species also occur in this area at other times of year. Common groups include alcids, petrels, shearwaters, loons, and scoters. Table 6 lists the coastal and pelagic bird species of Long Island that would have the potential to occur near the project area.

Terrestrial habitats within the study area are not high quality or an attractive stopover habitat for migrating landbirds. It is also noted that during spring and fall migration, the landbird community in the study area is likely composed of the same suite of species described above for the breeding season and winter.

Similarly, the same waterbirds that are expected in Hempstead Bay during winter or the breeding season are also expected during spring and fall migration. The sandy beaches of Long Beach Island are likely used by migrating shorebirds, such as sanderling (*Calidris alba*), semi-palmated plover (*Charadrius semipalmatus*), estipulate sandpiper (*Calidris fusilli*), and ruddy turnstone (*Avenair interpres*).

Table 2: Birds Documented by the 2000-2005 NYS Breeding Bird Atlas in Block S 6049B and 6049D

Common Name[4]	Scientific Name
Canada Goose	*Branta canadensis*
Mute Swan	*Cygnus olor*
American Black Duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Black-crowned Night-Heron	*Nycticorax*
Glossy Ibis	*Plegadis falcinellus*
Osprey	*Pandion haliaetus*
Northern Harrier	*Circus cyaneus*
Clapper Rail	*Rallus longirostris*
Killdeer	*Charadrius coviferus*
American Oystercatcher	*Haematopus palliates*
Willet	*Trang semipalmata*
Common Tern	*Sterna hirundo*
Forster's Tern	*Sterna forsteri*
Least Tern	*Sternula antillarum*
Laughing Gull	*Leucophaeus atricilla*
Herring Gull	*Larus argentatus*
Great Black-backed Gull	*Larus marinus*
Rock Pigeon	*Columba livia*
Mourning Dove	*Zenaida macroura*
Chimney Swift	*Chaetura pelagica*
Barn Owl	*Tyto alba*
Belted Kingfisher	*Megaceryle alcyon*
Downy Woodpecker	*Picoides pubescens*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrynchos*
Tree Swallow	*Tachycineta bicolor*
Barn Swallow	*Hirundo rustica*

[4] Boldface indicates the species that are unlikely to breed within the study area on the basis of their habitat associations (Poole 2005).

Common Name[4]	Scientific Name
American Robin	*Turdus migraorius*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
Brown Thrasher	*Toxostoma rufum*
European Starling	*Sturnus vulgaris*
Cedar Waxwing	*Bobycilla cedorum*
Yellow Warbler	*Dendroica petechia*
Common Yellowthroat	*Gethlypis trichas*
Song Sparrow	*Melospiza melodia*
Northern Cardinal	*Cardinalis*
Red-winged Blackbird	*Afelaius phoeniceus*
Common Grackle	*Quiscalus quiscula*
Boat-tailed Grackle	*Quiscalus major*
Brown-headed Cowbird	*Molothrus ater*
House Finch	*Carpodacus mexicanus*
American Goldfinch	*Spinus tristis*

Table 3: Coastal and Pelagic Waterbirds Occurring off Long Island

Common Name	Scientific Name	Season	Distribution	Relative Abundance
Black scoter	*Melanitta nigra*	M/W	Coastal	C
Black-legged kitiwake	*Rissa tridactyl a*	M/W	Pelagic	C
Common eider	*Somateria mollissima*		Coastal/bays	U
Common loon	*Gavia immer*	M/W	Coastal/pelagic/bays	C
Common Tern	*Sterna hirundo*	B/M	Coastal/bays	C
Cory's shearwater	*Calonectris diomedea*	S/M	Pelagic	U
Double-crested Cormorant	*Phalacrocorax auritus*	B/M/W	Coastal	C
Dovekie	*Alle*	W	Pelagic/coastal	U
Forster's Tern	*Sterna forsteri*	B/S	Coastal/bays	U
Great black-backed gull	*Larus marinus*	B.M/W	Bays/coastal/pelagic	C
Great Cormorant	*Phalacrocorax carbo*	S/W	Coastal	U
Great skua	*Catharacta skua*	M/W	Pelagic	C
Greater shearwater	*Puffinus gravis*	S/M	Pelagic	C

Common Name	Scientific Name	Season	Distribution	Relative Abundance
Harlequin duck	*Histrionicus*	W	Coastal	R
Herring gull	*Larus argentatus*	B/M/W	Coastal/bays/pelagic	C
Horned grebe	*Podiceps auritus*	M/W	Coastal/bays	U
King eider	*Somateria spectabilis*	W	Coastal	R
Laughing Gull	*Larus atricilla*	B/S/M	Coastal/bays	C
Leach's storm-petrel	*Ocenodroma leucorhoa*	S/M	Pelagic	U
Least Tern	*Sterna antillarum*	B/M	Coastal/bays	C
Long-tailed duck	*Clangula hyernalis*	M/W	Coastal/bays	U
Manx shearwater	*Puffinus*	S/M	Pelagic	R
Northern fulmar	*Fulmarus glacialis*	M/W	Pelagic	U
Northern gannet	*Sula bassanus*	M/W	Pelagic/coastal	C
Parasitic jeager	*Stercorrius parasiticus*	M	Pelagic	R
Pomarine jaeger	*Stercorarius pomarinus*	M	Pelagic	R
Razorbill	*Alca torda*	W	Pelagic	U
Red phalarope	*Phalaropus fulicaria*	M	Pelagic	U
Red-throated loon	*Gavia stellate*	M/W	Coastal/pelagic/bays	
Ring-billed Gull	*Larus delawarensis*	B/M/W	Coastal/bays	C
Roseate Tern	*Sterna Maxima*	B/M	Coastal	R
Royal Tern	*Sterna maxima*	S/M	Coastal	R
Sooty shearwater	*Puffinus griseus*	S/M	Pelagic	U
Surf scoter	*Melanitta perspicillata*	M/W	Coastal	U
Thick-billed murre	*Uria lomvia*	W	Pelagic	U
White-winged scoter	*Melanitta fusca*	M/W	Coastal/bays	U
Wilson's storm-petrel	*Oceanites oceanicus*	S/M	Pelagic	C

Notes: B=breeding, S=non-breeding summering, M=migration, W=wintering, R=rare, U=uncommon, C=common
Sources: USFWS (1997), Poole (2005), Turner (2011, 2014), New York State Department of State (NYSDOS) (2013)

3.7.6 Mammals

The manicured lawn, narrow rows of young trees, weed beds, buildings, and other artificial structures that compose most of the project area's terrestrial portions provide habitat for few terrestrial mammal species. Terrestrial mammals expected to occur in the study area are limited to common, urban-adapted species, such as the raccoon (*Procyon lotor*), domestic cat (*Felis catus*), eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), groundhog (*Marmota monax*), house mouse (Mus musculus), and Norway rat (*Rattus norvegicus*). The eastern gray squirrel was the only mammal

observed in the vicinity of Bay Park STP during the August 29, 2013 field survey. National Oceanic and Atmospheric Administration (NOAA) stated muskrats (*Ondatra zibethicus*) and mink are semi-aquatic mammals associated with salt marshes and may occur within Hempstead Bay (2009). The section "Aquatic Biota" describes marine mammals.

3.7.7 Reptiles and Amphibians

The NYSDEC Herp Atlas Project was a survey conducted from 1990 to 1999 to document the geographic distribution of New York's reptile and amphibian species. The survey recorded only the following species in the census block that spans the area from the Bay Park STP to the site of the Long Beach Island: the northern diamondback terrapin (*Malaclemys terrapin*), snapping turtle (*Chelydra serpentine*), Italian wall lizard (*Podarcis sicula*), and northern brown snake (*Storeria dekayi*). Each of these species is likely to occur in the project area based on their habitat associations; diamondback terrapins and snapping turtles would be expected to occur within Hempstead Bay, while Italian wall lizards and northern brown snakes would occur in the developed, terrestrial areas of Long Beach island and in the vicinity of the Bay Park STP.

Kemp's ridley (*Lepidochelys kempii*), loggerhead (*Caretta caretta*), and green sea turtles (*Chelonia mydas*) frequently occur off the south shore of Long Island, but primarily towards the island's east end, rather than in its western bays, such as Hempstead Bay (Morreale and Standora 1994, 1998). Leatherback sea turtles (*Dermochelys coriacea*) occur in the New York Bight[5] (USFWS 1997, NOAA 2009, Turner 2011), and have the potential to occur in the oceanic portion of the study area (see the "Threatened, Endangered, and Special Concern Species" section below for additional details regarding sea turtles).

Field surveyors did not observe reptiles or amphibians near the Bay Park STP during the previous field survey.

3.7.8 Aquatic Biota

3.7.8.1 Benthic Algae and Submerged Aquatic Vegetation

The majority of seagrass habitat in the South Shore Estuary is found in Great South Bay and South Oyster Bay to the east of Hempstead Bay, and at depths shallower than 6 feet (New York State Seagrass Task Force 2009). Although there is very little submerged aquatic vegetation (SAV) in Hempstead Bay, eelgrass does occur (USFWS 1997, NOAA 2003, NYS Seagrass Task Force 2009). Vegetated benthic habitat in Hempstead Bay is more common in the form of continuous and discontinuous attached macroalgae. Among the more common species of benthic algae are sea lettuce, rockweed (*Fucus* spp.), red weed (*Gracilaria* spp.), and banded weed (*Ceramium* spp.) (United States Fish and Wildlife Service [USFWS] 1997, NOAA 2003, School of Marine and Atmospheric Science [SOMAS] 2011). In general, loss of seagrass habitat in Hempstead Bay and in the western portion of the South Shore Estuary has resulted from watershed development and high nutrient loads, which have caused eutrophication, poor water clarity, and dominance by macroalgae (SOMAS 2010).

[5] The New York Bight is an indentation along the Atlantic coast of the United States, extending northeasterly from Cape May Inlet in New Jersey to Montauk Point on the eastern tip of Long Island.

3.7.8.2 Benthic Macroinvertebrates

Substrate type (rocks, pilings, sediment grain size, etc.), salinity, and DO levels are the primary factors influencing benthic invertebrate communities' habitat; secondary factors include currents, wave action, predation, succession, and disturbance. Hempstead Bay provides habitat for soft clam (*Mya arenaria*), hard clam (*Mercenaria mercenaria*), bay scallop (*Argopecten irradians*), ribbed mussel (*Geukensia demissa*), blue crab (Callinectes sapidus), and horseshoe crab (*Limulus polyphemus*) (NYSDOS 2008a, b). A few small reefs in East Hempstead Bay limit the occurrence of eastern oysters (Crassostrea virginica) (NOAA 2003).

A 2007 survey of benthic macroinvertebrate infauna near Island Park in Hempstead Bay documented 128 taxa (ASA 2009). The dominant species were the gammarid amphipod *Ampelisca abdita* and the polychaete worm *Streblospio benedicti*, which accounted for 63 percent of all benthic macroinvertebrates collected. Both species are common throughout the muddy-fine sand sediments of Long Island's coastal estuaries (Franz and Harris 1988). Also abundant were capitellid polychaete worms (*Capitella capitata* and *Heteromastus filiformis*) and pollution-sensitive taxa, including the polychaete worm *Ninoe nigripes* and the bivalve mollusc, *Tellina agilis*. Benthic community structure in Hempstead Bay was typical of those found in other estuaries throughout the New York Bight. For example, macroinvertebrate density in Hempstead Bay ranged from 3,229 to 15,507 individuals/m^2, 5,900 individuals/ m^2 in Newark Bay, and 34,000 individuals/m^2 in Jamaica Bay.

A study by the United States Army Corps of Engineers (USACE) of benthic invertebrates from SAV habitats (primarily eelgrass and benthic macroalgae) from South Oyster Bay to Shinnecock Bay documented 50 species (2004); while this area is to the east of the study area, the information provides a representative overview of the benthic community in a comparable part of the South Shore Estuary. Dominant species included the green crab (*Carcinus maenas*), which represented 88 percent of all invertebrates collected, as well as Atlantic mud crab (*Panopeus herbstii*), ctenophores, eastern mudsnail (*Ilyanassa obsoleta*), grass shrimp (*Palaemonetes vulgaris*), golden star tunicate (*Botryllus schlosseri*) and red beard sponge (*Microciona prolifera*). Blue crabs represented 5 percent of the collection, while several other decapod crabs, including lady crab (*Ovalipes ocellatus*), rock crab (*Cancer irroratus*) and portly spider crab (*Libinia emarginata*) each represented 2 percent. Many of these species are likely to be widely distributed throughout the South Shore Estuary Reserve, including Hempstead Bay, while some will be more commonly found in association with SAV habitat.

Crustaceans and polychaetes, followed by mollusks and oligochaetes, dominate the benthic marcoinvertebrate community of the nearshore Atlantic Ocean off western Long Island (ESS Group Inc. 2013). The most abundant taxa generally include the blind tube-builder amphipod (*Pseudunciola obliquua*), capitellid threadworm (*Amastigos spp*.), false quahog (*Pitar morrhuana*), and spaghetti-mouth tubeworm (*Asabellides oculata*). Densities are highly spatially variable, but average around 550 individuals/m^2 (ESS Group Inc. 2013). Commercially important invertebrates in the area include: the Atlantic surf clam (*Spisula solidissima*), ocean quahog (*Arctica islandica*), northern quahog (*Mercenaria mercenaua*), eastern oyster (*Crassostrea virginica*), sea scallop (*Placopecten magellanicus*), and American lobster (*Homarus americanus*) (USFWS 1997, NOAA 2009). Benthic macroinvertebrate grab sampling conducted in 2013, about 1.5 miles offshore from Long Beach Island and near the site of the proposed outfall, found the community to be composed of 57 percent crustaceans, 29 percent polychaetes, 7 percent mollusks, and 7 percent other. More specifically, the 8 taxa documented include: *Polygordius spp*., *Amastigos* spp., *Scalibregma inflatum*, *Pherusa plumosa*, *Pseudunciola obliquua*,

Acanthohaustorius shoemakeri, *Tellina agilis*, and *Nematoda* spp. Density was very low relative to other areas of the Bight (140 individuals/m^2) (ESS Group Inc. 2013).

3.7.8.3 Fish

The Hempstead Bay estuary has high fish species richness, with at least 80 species documented during various survey efforts (Duguay et al., 1989; ASA, 2005, 2009). SAV habitat in the Great South Bay, just to the east of Hempstead Bay, is known to support at least 49 species of estuarine and marine fish (NYS Seagrass Task Force 2009). Many of the fish species that occupy Hempstead Bay can be considered estuarine residents, because they occur throughout a large portion of the estuary year-round and are generally euryhaline (i.e., tolerant of wide salinity ranges). Several fish species that occur in Hempstead Bay are found in the estuary during a specific life stage, often as juveniles, or are marine transients that migrate between the estuary and the open waters of the Atlantic Ocean.

The mid-latitude location of the South Shore Estuary enhances diversity. Southern tropical marine forms, such as butterflyfish (*Chaetodon* spp.) and lionfish (*Pterois volitans*), are transported northward in the Gulf Stream and enter the estuary during the summer. Several colder water fish species from the northern area of the Acadian province are along the southern shore of Long Island, which is the southern limit of colder water fish species habitat. Some of the more common fish species present in Hempstead Bay include: striped bass, bluefish, winter flounder (*Pleuronectes americanus*), summer flounder (*P. dentatus*), weakfish, gray snapper (*Lutjanus griseus*), scup (*Stenotomus chrysops*), striped searobin (*Prionotus evolans*), seaboard goby (*Gobiosoma ginsburgi*), oyster toadfish (*Opsanus tau*), grubby (*Myoxocephalus aenaeus*), spotted hake (*Urophycis regiustenuis*), northern pipefish (*Syngnathus fuscus*), and northern kingfish (*Menticirrhus saxatilis*) (USFWS 1997, ASA 2009). Several highly abundant, smaller-bodied fish species serve as food for larger fishes and wading birds that inhabit Hempstead Bay, including Atlantic silverside (Menidia spp.), Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli*), mummichog (*Fundulus heteroclitus*), and striped killifish (*F. majalis*) (USFWS 1997, ASA Analysis and Communication 2009).

Many fish species use the waters of the South Shore Estuary, including Hempstead Bay, as spawning habitat (ASA 2005). Bay anchovy eggs and larvae are abundant (Duguay et al 1989). Cunner (*Tautogolabrus adspersus*) and tautog are other abundant species that spawn in the bay. Common but less abundant species include windowpane flounder, searobin (*Prionotus* spp.), Atlantic menhaden, winter flounder, and American sand lance (*Ammodytes americanus*), naked goby (*Gobiosoma bosci*), Atlantic silverside and Atlantic menhaden (Duguay et al. 1989, ASA Analysis and Communication 2005).

3.7.8.4 Essential Fish Habitat

Fish species can be classified according to aquatic habitats. Diadromous species move freely between freshwater and marine habitats, and are further classified as either anadromous species, which typically live in salt water, but migrate into freshwater to spawn, and catadromous species, which are usually found in freshwater, but migrate into saltwater to spawn. Estuarine species are those capable of spending prolonged periods of time in either freshwater or saltwater. Freshwater species are fish usually restricted to areas with a salinity of less than 5.0 ppt. Fish species potentially found within this area of the were identified from a planning study completed in 2015.

The Hempstead Bay estuary has high fish species richness, with at least 80 species documented during various survey efforts (Duguay et al. 1989; ASA 2005, 2009). SAV habitat in the Great South Bay, just to

the east of Hempstead Bay, is known to support at least 49 species of estuarine and marine fish (NYS Seagrass Task Force 2009). Many of the fish species that occupy Hempstead Bay can be considered estuarine residents because they occur throughout a large portion of the estuary year-round and are generally euryhaline (i.e., tolerant of wide salinity ranges). A number of fish species found in Hempstead Bay are found in the estuary during a specific life stage, often as juveniles, or are marine transients that migrate between the estuary and the open waters of the Atlantic Ocean. The diversity of the South Shore Estuary is enhanced by its mid-latitude location on the Atlantic Coast. Southern tropical marine forms such as butterflyfish (Chaetodon spp.) and lionfish (Pterois volitans), transported northward in the Gulf Stream, enter the estuary during the summer, and a number of colder water fish species from more northern areas of the Acadian province are near their southern limit along the southern shore of Long Island.

The waters of Hempstead Bay and the Atlantic Ocean between the Bay Park STP are designated as Essential Fish Habitat[6] for 24 species of bony fishes, skates, sharks, and a squid (Table 4). Of these species, the most commonly found in Hempstead Bay during recent surveys were windowpane, winter flounder, scup, Atlantic mackerel, and Atlantic butterfish (ASA Analysis and Communication 2009).

Table 4: Fish of the Oceanic waters of the New York Bight with the Potential to Occur Near the Proposed Outfall (Source: USFWS, 1997, NOAA 2009)

Species	Eggs	Larvae	Juveniles	Adults
Atlantic butterfish (*Peprilus triacanthus*)	X	X	X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Atlantic salmon (*Salmo salar*)				X
Atlantic sea herring (*Clupea harengus*)			X	X
Black sea bass (*Centroppristis striata*)			X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Longfin inshore squid (*Loligo pealeii*)			X	
Pollock (*Pollachius virens*)			X	
Red hake (*Urophyis chuss*)	X	X	X	
Scup (*Stenotomus chrysops*)			X	X
Silver hake (*Merluccius bilinearis*)	X	X	X	
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Summer flounder (*Paralichthys dentatus*)			X	X
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Winter flounder (*Pleuronectes americanus*)	X	X	X	X
Blue shark (*Carcharhinus obscurus*)				X

[6] NOAA/NMFS 10' x 10' square with coordinates [north] 40°40.0' N, [east] 73°30.0' W, [south] 40°30.0' N, [west] 74°40.0' W

Species	Eggs	Larvae	Juveniles	Adults
Dusky shark (*Carcharhinus obscurus*)		X*		
Sandbar shark (*Carcharhinus plumbeus*)		X*	X	X
Sand tiger shark (*Carcharias taurus*)		X*		
Tiger shark (*Caleocerdo cuvien*)		X*		
Little skate (*Leucoraja erinacea*)			X	
Winter skate (*Leucoraja ocellata*)			X	X

Source: National Marine Fisheries Service. "Summary of Essential Fish Habitat (EFH) Designation" http://www.nero.noaa.gov/hcd/STATES4/conn_li_ny/40307330.html

Notes: *None of these species have a free-swimming larval stage; rather, they are live bearers that give birth to fully formed juveniles. For the purpose of this table, "larvae" for sand tiger and sandbar sharks refers to neonates and early juveniles.

3.7.8.5 Marine Mammals

The New York Bight has some of the highest diversity of marine mammals among the waters of the United States (USFWS, 1997). More than 25 species of marine mammals are known to occur in the Bight, some of which come into nearshore waters, while most others tend to use the deeper pelagic waters near the continental shelf, well beyond the state and federal territorial sea boundaries (USFWS, 1997; NYSDOS, 2013). The minke whale (*Balaenoptera acutorostrata*) and bottlenose dolphin (*Tursiops truncatus*) are among the most common marine mammal species that occur in nearshore waters along Long Beach Island (USFWS 1997, NOAA 2009). Table 5 lists other species that have the potential to occur in the project area. The Marine Mammal Protection Act of 1972 protects all marine mammals.

Table 5: Marine Mammals of the New York Bight

Common Name	Scientific Name
Antillean beaked whale	*Mesoplodon europeaus*
Atlantic spotted dolphin	*Lagenorhynchus acutus*
Atlantic white-sided dolphin	*Lagenorhynchus acutus*
Beluga	*Delphinapterus leucas*
Blue whale*	*Balaenoptera musculus*
Bottle-nosed dolphin	*Tursiops truncatus*
Dense-beaked whale	*Mesoplodon densirostris*
Finback whale*	*Balaenoptera physalus*
Goosebeaked whale	*Ziphius caviostris*
Risso's dolphin	*Grampus griseus*
Grey seal	*Halichoerus grypus*
Harbor porpoise	*Phocoena phocoena*
Harbor seal	*Phoca groenlandica*
Harp seal	*Phoca groenlandica*

Common Name	Scientific Name
Hooded seal	*Cystophora cristata*
Humpback whale*	*Megptera novaeangliae*
Killer whale	*Orcinus orca*
Long-finned pilot whale	*Globicephala melas*
Minke whale	*Balaenoptera acutorostrata*
Northern right whale*	*Eubalaena glacialis*
Pantropical spotted dolphin	*Stenella attenuata*
Pygmy sperm whale	*Kogia breviceps*
Ringed seal	*Phoca ispida*
Sei whale	*Baleanoptera borealis*
Short-beaked common dolphin	*Delphinus delphis*
Sperm whale*	*Physeter catadon*
Striped dolphin	*Senella coeruleoalba*
True's beaked whale	*Mesoplodon mirus*

Notes: Boldface indicates the species that are more apt to occur in nearshore waters off western Long Island and near the southern side of Long Island than the other species, which tend to occur in deeper, pelagic waters near the continental shelf.

*Federally Endangered species

Sources: Sadove and Morreale (1990), USFWS (1997), NOAA (2009), Coastal Research and Education Society of Long Island (CRESLI) (2003), Turner (2011), NYSDOS (2013).

3.7.9 Threatened and Endangered Species and Significant Habitats

Several federally-protected species could be present within the project area. Table 6 lists these species, and includes proposed, candidate, threatened, and endangered bird, mammal, and flowering plant species managed under the Endangered Species Program of the United States Fish and Wildlife Service (USFWS) and bird species protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. A field survey will be conducted to document the potential presence of any threated or endangered species nesting with the Hassocks.

The response to the County from NMFS highlighted potential presence of Atlantic sturgeon and sea turtles in proximity to the project area.

Table 6. Federally-Protected Species Occurring in Nassau County

Common Name	Scientific Name	Status
FLOWERING PLANTS		

Common Name	Scientific Name	Status
Sandplain	*Gerardia Agalinis acuta*	Endangered[7]
Seabeach Amaranth	*Amaranthus pumilus*	Threatened[8]
MAMMALS		
Northern Long-Eared Bat	*Myotis septentrionalis*	Threatened
BIRDS		
Piping Plover	*Charadrius melodus*	Threatened
Red Knot	*Calidris canutus rufa*	Threatened
Roseate Tern	*Sterna dougallii dougallii*	Endangered
MIGRATORY BIRDS		
American Oystercatcher	*Haematopus palliates*	Protected – Year-Round
Bald Eagle	*Haliaeetus leucocephalus*	Protected – Year-Round
Pied-billed Grebe	*Podilymbus podiceps*	Protected – Year-Round
Seaside Sparrow	*Ammodramus maritimus*	Protected – Year-Round
American Bittern	*Botaurus lentiginosus*	Protected – Breeding Season
Black Skimmer	*Rynchops niger*	Protected – Breeding Season
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Protected – Breeding Season
Blue-winged Warbler	*Vermivora pinus*	Protected – Breeding Season
Canada Warbler	*Wilsonia Canadensis*	Protected – Breeding Season
Gull-billed Tern	*Gelochelidon nilotica*	Protected – Breeding Season
Least Bittern	*Ixobrychus exilis*	Protected – Breeding Season
Least Tern	*Sterna antillarum*	Protected – Breeding Season
Prairie Warbler	*Dendroica discolor*	Protected – Breeding Season
Saltmarsh Sparrow	*Ammodramus caudacutus*	Protected – Breeding Season
Snowy Egret	*Egretta thula*	Protected – Breeding Season
Upland Sandpiper	*Bartramia longicauda*	Protected – Breeding Season
Willow Flycatcher	*Empidonax traillii*	Protected – Breeding Season
Wood Thrush	*Hylocichla mustelina*	Protected – Breeding Season
Worm Eating Warbler	*Helmitheros vermivorum*	Protected – Breeding Season
Fox Sparrow	*Passerella iliaca*	Protected – Wintering Season

[7] Endangered: A species in danger of extinction throughout all or a significant portion of its range

[8] Threatened: A species likely to become endangered within the foreseeable future throughout all or a significant portion of its range

Common Name	Scientific Name	Status
Horned Grebe	*Podiceps auritus*	Protected – Wintering Season
Marbled Godwit	*Limosa fedoa*	Protected – Wintering Season
Peregrine Falcon	*Falco peregrinus*	Protected – Wintering Season
Purple Sandpiper	*Calidris maritima*	Protected – Wintering Season
Red Knot	*Calidris canutus rufa*	Protected – Wintering Season
Rusty Blackbird	*Euphagus carolinus*	Protected – Wintering Season
Short-eared Owl	*Asio flammeus*	Protected – Wintering Season
Hudsonian Godwit	*Limosa haemastica*	Protected – Migrating Season

3.7.9.1 Piping Plover

The piping plover is a federally Threatened and New York State Endangered colonial shorebird that nests on wide, open expanses of unvegetated or sparsely vegetated oceanfront beach (Elliot-Smith and Haig 2004). The breeding range of the piping plover within New York State consists of the coastlines of Long Island, where plovers nest from Queens to eastern Suffolk County (Wasilco 2008a). Nesting colonies in the study area are limited to the extreme eastern and western ends of Long Beach Island (e.g., in Silver Point County Park and Nickerson Beach Park [USFWS 1997, Turner 2011, NCDPRM 2014]), where the beach is buffered by inland areas of coastal shrub/scrub, maritime dune, and other natural cover, rather than development. Such areas, that are maintained by storm overwash processes, provide beach-nesting plovers with important foraging habitat and protection from human disturbance (Elias et al. 2000, McIntyre and Heath 2011). The proposed project is not expected to intersect with any beach areas; however, beach areas in proximity to the project are developed and experience human activity, making the area unsuitable nesting habitat for piping plovers. The 2000-2005 Breeding Bird Atlas did not document piping plovers in the census blocks that span the area from the Bay Park STP to the Long Beach WPCP area.

3.7.9.2 Roseate Tern

The roseate tern is globally widespread, but has a highly localized distribution and is listed as federally Endangered in the U.S. More than 90 percent of New York State's breeding population of roseate terns is a single colony on Great Gull Island, off Long Island's eastern end (Hays 2007, Mitra 2008). The remainder of the State's roseate tern population occurs in small groups of often just one or two breeding pairs in variable locations on Long Island's south shore and east end (Mitra 2008, NYSDOS 2013). The 2000-2005 Breeding Bird Atlas did not document roseate terns in the census blocks that span the study area or in any neighboring census blocks. Although the uninhabited salt marsh islands of Hempstead Bay and South Oyster Bay seem to represent suitable nesting habitat, the closest known nesting site to the project area is on Goose Flat in Great South Bay (more than 20 miles east of the project site), where only a few pairs have nested in recent years (Mitra 2008, NYSDOS 2013). The potential for roseate terns to occur near the project site is extremely low and limited to individuals moving overhead en-route to nesting sites elsewhere in the region or to wintering grounds in the southern hemisphere.

3.7.9.3 Red Knot

The rufa subspecies of the red knot migrates up to 30,000 miles round trip between primary wintering grounds in South America and breeding grounds in the high arctic, with conditions for rest and feeding at staging areas along the Atlantic Coast being critical determinants of migration and reproductive success and overall survival (Baker et al. 2004; Morrison et al. 2007). Delaware Bay is the most significant migration staging area for rufa red knots, which time their springtime arrival in the bay to coincide with the peak horseshoe crab spawning period (Baker et al. 2004; Niles et al. 2009). Red knots are dependent on a superabundance of horseshoe crab eggs as a food source to almost double their body mass and fuel the remaining leg of their migration to the high arctic (Baker et al. 2004, Morrison and Hobson 2004). Delaware Bay is the only place in the Western Hemisphere where horseshoe crabs spawn in numbers that enable red knots to do so (Niles 1999). Steep declines in the number of horseshoe crabs spawning in Delaware Bay in recent decades, despite stricter harvest restrictions, has significantly hindered the ability of red knots to feed at sufficient rates, and in turn, led to rapid population declines (Niles et al. 2008, 2009). Monomoy National Wildlife Refuge in Cape Cod, Massachusetts appears to be among the most significant staging areas for red knots during their southbound autumn migration (Harrington et al. 2010; Burger et al. 2012).

In addition to these primary staging areas in Delaware Bay and Cape Cod, migrating red knots may commonly stage, albeit in much lower densities, elsewhere along the Atlantic coast (Harrington 2001, Burger et al. 2012). Although migrating red knots are known to occur along Long Island (e.g., Jamaica Bay [Tanacredi and Badger 1995, Fowle and Kerlinger 2001]), none of its beaches, bays, or estuaries are known to be high-use staging areas that support large concentrations of individuals. Instead, red knots are usually seen on Long Island individually, or in small groups (Wells 1996), relative to the tens of thousands of birds observed staging together in Delaware Bay and Cape Cod. On Long Beach Island, migrant red knots would be most likely to occur on the beaches at the eastern and western ends of the island where there is freedom from human disturbance provided by the protective roping around the piping plover colonies in these areas. Red knots are sensitive to human disturbance at staging sites (Burger et al. 2004, 2007), and given the heavy recreational use of the segment of each at Long Beach Island's, red knots are unlikely to occur in the vicinity of the overall project area.

3.7.9.4 Northern Long-eared Bat

The northern long-eared bat is a temperate, insectivorous bat that hibernates in caves or mines during winter, and then emerges in early spring, with males dispersing and remaining solitary until mating season at the end of the summer, and pregnant females forming maternity colonies in which to rear young. Summer habitat of the northern long-eared bat generally includes mature, closed-canopy, upland and riparian forest within heavily forested landscapes (Ford et al. 2005, Henderson et al. 2008). The long-eared bat is an interior forest-dependent species that is sensitive to fragmentation and requires large tracts of unbroken forest for both foraging and breeding (Foster and Kurta 1999, Broders et al. 2006, Henderson et al. 2008). Although they have been documented in urbanized areas (Whitaker et al. 2004, Johnson et al. 2008) and will occasionally utilize buildings and other artificial structures rather than trees for roosting (Timpone et al. 2010, USFWS 2013), urban northern long-eared bats tend to occur on the city's outskirts, near large, forested parks or other green spaces with extensive tree cover (Johnson et al. 2008). The overall project area is within an estuarine and maritime system, and there are no caves, mines, or small or large woodlands nearby, northern long-eared bats are not considered to have the potential to occur in the area during either the breeding or non-breeding period.

3.7.9.5 Seabeach Amaranth

Seabeach amaranth is a federally and state-listed threatened annual herbaceous plant thought to be extinct in New York State until it was rediscovered in 1990 (Stalter et al. 1996). It grows along sandy beaches of the Atlantic coast in areas of accreting shoreline, upper beach, foredune, or overwash flat, as well as beach nourishment sites (USFWS 2012). In the New York Natural Heritage Program, the weabeach amaranth requires wide beaches that are free from vehicle use and excessive trampling (2014). The closest beach to the project site is at Long Beach Island, and highly developed seabeach amaranth is unlikely to occur near, or within, the project site.

3.7.9.6 Whales

Six species of federally Endangered whales have been documented within the New York Bight, including the blue whale, finback whale, right whale, humpback whale, sei whale, and sperm whale (Sadove and Morreale 1990; USFWS 1997, CRESLI, 2003, Turner 2011). The distribution of these species within the Bight tends to be concentrated in pelagic waters near the continental shelf break rather than in the nearshore waters (NYSDOS 2013). Blue whales are particularly rare in coastal or nearshore waters, and instead tend to remain far offshore (NMFS 2014a). Blue whales are seldom seen off of Long Island (Turner 2011), and have low potential to occur in the vicinity of the project area. Finback whales in the New York Bight also tend to occur well offshore, beyond the state and federal territorial boundaries, except for nearshore areas along the eastern end of Long Island (NYSDOS 2013), where they are suspected of breeding (Turner 2011). Finback whales are considered to have low potential to occur as close to the shore of western Long Island as the location of the proposed project area. Right whales and humpback whales are among the species most likely to occur in coastal and nearshore waters, and both can be found close to shore off Long Island (CRESLI 2003, Turner 2011, NYSDOS 2013). Right whales, however, are seldom seen off Long Island because they are so rare; the North Atlantic population size is estimated to be only about 400 individuals (NMFS 2014b).

Additionally, occurrences of right whales in nearshore waters of Long Island tend to be limited to the island's eastern end (NYSDOS 2013). Therefore, right whales are unlikely to occur near the proposed Long Beach WPCP site, however considered during the environmental review process. Humpback whales, in contrast, frequent the nearshore waters of western Long Island (Turner 2011, NYSDOS 2013), and would have the potential to occur nearby, however, not on the side of the Long Beach plant. Sei whales and sperm whales prefer deep oceanic waters on the continental shelf edge, far from the coastline (NMFS 2014c, d), and as such, are unlikely to occur near the Long Beach site or in other nearshore areas of the New York Bight. Sperm whales in particular, are uncommon in waters less than 984 feet deep (NMFS 2014d).

3.7.9.7 Sea Turtles

Sea turtles known to occur in the New York Bight include the leatherback, loggerhead, green, and Kemp's ridley. Leatherback sea turtles are a pelagic species but will also occasionally use coastal waters (NMFS 2014e), and therefore have the potential to occur near the south shore of Long Island, not within the proposed project area. Loggerhead, green, and Kemp's ridley sea turtles are found in bays and coastal waters along the south shore of Long Island, although they are primarily limited to areas farther east than the Hempstead Bay-South Oyster Bay complex (NMFS 2013). Bays and shoreline areas of eastern Long Island (e.g., Peconic Bay) provide rich food sources for growth and development of young sea turtles

(Standora et al. 1989, Morreale and Standora 1998), and nearly all individuals in these waters are juveniles or subadults that arrive in June and July, and leave in October or November, when colder temperatures force them to migrate south (Morreale and Standora 1994).

Although the Hempstead Bay-South Oyster Bay complex appears to offer the shallow, sheltered waters that are preferred by these non-nesting loggerhead, green, and Kemp's ridley sea turtles, sea turtles in New York seldom occur this far west relative to their usage of waters off eastern Long Island. Mark-recapture and satellite tracking studies documented extensive usage of eastern Long Island Sound, the Atlantic Ocean off eastern Long Island's south shore, and Peconic Bay, but did not record any sea turtles in inshore or coastal waters as far west as Hempstead Bay and South Oyster Bay (Morreale and Standora 1994, Morreale and Standora 1998). Waters off western Long Island are of marginal quality or less as sea turtle habitat, and records of sea turtles occurring close to shore in these areas remain low despite extensive monitoring and sampling efforts (Shoop and Kenney 1992, Rben and Morreale 1999, USACE, 2001, NYSDOS 2013). For these reasons, loggerhead, green, and Kemp's ridley sea turtles are considered to have very low potential to occur in Hempstead Bay or in the oceanic waters within the Long Beach Island south shore area. Sea turtles would only occur in these areas as transients for very brief periods, rather than long-term occupation of the area for growth and development.

3.7.9.8 Atlantic Sturgeon

Atlantic sturgeon from the New York Bight Distinct Population Segment (DPS) spend much of their time in the coastal habitats of the Atlantic Ocean, moving into the freshwater reaches of the Hudson River to spawn during the spring and early summer months, and then returning to the Atlantic Ocean during summer and early fall where they overwinter off the south shore of Long Island and in Long Island Sound (Bain 1997, Savoy and Pacileo 2003, Waldman et al. 2006). Atlantic sturgeon is most abundant in these waters from late-September to late-March (Dunton et al. 2010). Dunton et al. identified the Atlantic Ocean waters off the southern shore of Rockaway Peninsula as a significant concentration area of sub-adult and adult atlantic sturgeon, and identified atlantic sturgeon wintering further to the east, off of Long Beach Island (2010), as such, atlantic sturgeon may be present in the oceanic portions of Long Island. Overwintering Atlantic sturgeon also have the potential to occur in Hempstead Bay, but such occurrences would likely be uncommon and very brief, as non-spawning Atlantic sturgeon are generally found in more open, marine waters and at greater depths (Hatin et al. 2002, Hatin et al. 2007, Savoy and Pacileo 2003, Dunton et al. 2010).

3.7.9.9 Harbor Porpoise

The harbor porpoise is a Species of Special Concern in New York State, and the Marine Mammal Protection Act of 1972 protects this species. In the New York Bight, harbor porpoises are most abundant in waters that are about midway between Long Island and the continental shelf, but they also occur in moderate abundance in coastal and nearshore waters of western Long Island, near Long Beach Island (NYSDOS 2013). As such, harbour porpoises are not likely to occur in the vicinity of the proposed project area in the bay.

3.7.9.10 Osprey

The osprey is a Species of Special Concern in New York State. Populations in the State have recovered significantly in recent decades following steep range-wide declines that occurred throughout the mid 1900's, and ospreys are currently particularly common on eastern Long Island (Nye 2008). Ospreys occur

in the Hempstead Bay-South Oyster Bay complex during spring, summer, and fall (NOAA 2009), where they likely hunt for fish over the Bays' open waters. Ospreys may also occur along the southern coastline of the project study area. Ospreys do not occur in New York State during winter. During a field visit on July 11, 2019, an Osprey nest was observed within the Hassocks.

3.7.9.11 Northern Harrier

The Northern harrier is a Species of Special Concern in New York State. Local populations have gradually declined in recent decades (Sauer et al. 2005), likely in response to habitat development and reversion of much of the State's former farmland back to forest. Northern harriers primarily occupy open areas such as grasslands, old fields, pastures, croplands, and salt marshes during both the breeding and non-breeding periods (MacWhirter and Bildstein 1996). They are present in New York year-round, but in the southern part of the State they are uncommon during the breeding season (Post 2008). The 2000-2005 Breeding Bird Atlas documents the northern harrier as a probable breeder within the census blocks that span the area between the Bay Park STP and in proximity to the Long Beach WPCP site, and are most likely to nest on the islands within Hempstead Bay. Northern harriers may also occur in the area during fall migration and winter (NOAA 2009).

3.7.9.12 Common Tern

The common tern is a state-threatened species that was documented by the 2000-2005 Breeding Bird Atlas in the census blocks that span the area between the Bay Park STP and the proposed project area in Long Beach. As of 1996, Long Island's common tern population stood at approximately 18,000 breeding pairs, with more than half of these pairs occurring on Great Gull Island, off the eastern end of Long Island (Nisbet 2002, Hays 2007, Richmond 2008). Common terns nest on islands and beaches, within patches of sand, gravel, shell, or cobble that have scattered vegetation. (Nisbet 2002), and as such, suitable nesting locations for common terns are present throughout Hempstead Bay. Migrants from nesting areas elsewhere may also pass through the bay during spring and fall. Common terns do not occur in New York State during winter.

3.7.9.13 Least Tern

The least tern is a colonial seabird that nests on open, sparsely vegetated sand beaches and dredge spoil sites. New York State's populations of least terns declined 21 percent during the 1980's and 1990's (Rosenberg and Burger 2008), but appear to have since stabilized at around 3,000 pairs (Wasilco, 2008b). Least terns nest throughout most of the southern bays of Long Island, including the Hempstead Bay-South Oyster Bay complex, and were documented by the 2000-2005 Breeding Bird Atlas in the census blocks that span the area between the Bay Park STP and the Long Beach Island (Wasilco, 2008b). Least terns are likely to occur within the study area during the breeding season, which, in Atlantic coast populations, is roughly from late April to the end of August (Sommers 2008). Least terns do not overwinter in New York.

3.7.10 Socio-Economic

Construction and related work, such as transport of vehicles and machinery, are expected to cause noise, traffic, and other short-term disruption to residential and commercial activities in and around the project area. Potential impacts to this route will be defined with construction methodology development.

Further agencies consultation will be factored into the final design. Field studies related to traffic, noise, or archaeology (Archaeological Phase 1A) are planned as part of GOSR's NEPA EA effort.

Once operational, the project will result in positive socio-economic impacts, such as improved beauty to public spaces, improved property values near to the Western Bays, increased and diverse job opportunities associated with the salt marsh, and associated community and marshland revitalization.

3.8 Long Beach Water Pollution Control Plant

3.8.1 Plant History and Capacity

The Long Beach WPCP is located on the northern shore of Long Beach, a barrier island off the southern shore of Long Island in Nassau County, New York. The plant is currently owned and operated by the City of Long Beach. Long Beach WPCP services a population of approximately 33,534 people according to the 2018 population estimate from the US Census (July 1, 2018 V2018). The plant was constructed in 1951 and is serviced by 51 miles of collection system pipeline and three (3) pump stations. The pump stations are not part of the scope of work for this proposal. Work has already begun or completed on some of the pump stations for restoration and mitigation.

Sources of the City's wastewater are a combination of both domestic and commercial. The facility is a secondary treatment facility and is comprised of the following unit processes for the liquid treatment train:

- Influent Screening
- Grit Removal
- Primary Clarification
- Trickling Filtration
- Secondary Clarificaiton
- Sand Filtration
- Chlorine Disinfection

The following unit processes are employed for the solids handling treatment train:

- Anaerobic Digestion
- Off-site Disposal

The Long Beach WPCP has a permitted design flow of 7.5 MGD. In the last five (5) years, the average flow was recorded at 4.63 MGD. The future estimated daily flow and current from the Cameron Report is listed as 4.7 MGD, which equates to 329,505.81 TN lbs/year. Treated effluent is discharged through an outfall into Reynolds Channel which eventually flows into Hempstead Bay. The Long Beach WPCP site layout is shown in Figure 13.

Figure 13: Existing Long Beach WPCP

3.8.2 Current and Planned Activities

The City since Hurricane Sandy has been actively trying to replace defective sections of the sewage collection line when performing road improvements. At the plant, as part of the emergency and flood repair efforts, a new flowmeter was installed in September 2014, replacing the damaged antiquated flowmeter for a more accurate reading.

The City's Department of Public Works (DPW) presented the Capital Improvement Plan for the next 5 years. For 2019 to 2020, based on the criteria for work selected, approximately $880,000 is identified for sewer work only.

The 2015 Comprehensive Plan and Local Waterfront Revitalization Program (LWRP) proposed mixed use with mixed income housing and improved recreational opportunities with access to the bay. Additionally, the LWRF which has been funded by the NYS DOS grants is *"expanding upon prior planning efforts and will identify opportunities to accelerate Long Beach's transition from post-Sandy recovery to a thriving and resilient community. The plans will contain a consistent set of visions, goals, polices, conditions, projected changes, community impacts, and cost effectiveness."* The 2009 Brownfield

Opportunity Areas Pre-Nomination Study (BOA) also identifies this seven-acre WPSP site as potential bayfront redevelopment when the consolidation project is implemented and completed.

3.9 Bay Park Sewage Treatment Plant

3.9.1 Plant History and Capacity

The Bay Park STP is located in Nassau County at the end of 4th Ave in East Rockaway, New York. The plant was originally constructed in 1950, at a design capacity of 30 MGD, and experienced major expansions and upgrades in the 1960's and the 1980's giving it a current permitted capacity of 70 MGD. The current State Pollution Discharge Elimination System (SPDES) permit issued to Bay Park by NYSDEC states that the monthly average effluent limit for flow is not to exceed 70 MGD at the plant. The plant is located adjacent to both Hewlett Bay and East Rockaway Channel and currently treats an average of approximately 50 MGD of wastewater, which it discharges through an outfall into Reynolds Channel (see Figure 16).

Today, the Bay Park STP system serves a population of about 550,000 residents within Nassau County. Figure 14 shows the Bay Park STP service area.

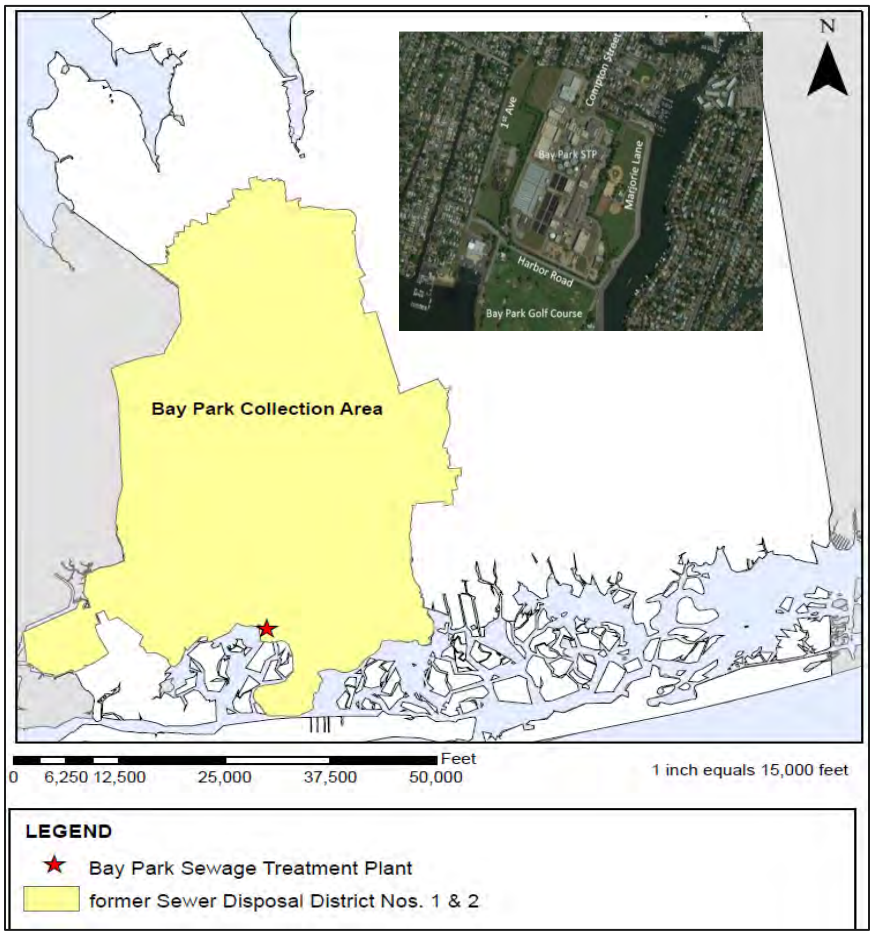


Figure 14: Bay Park Service Area

Bay Park STP provides preliminary, primary, and secondary treatment with sludge processing and disposal (see Figure 15).

- Preliminary Treatment: influent screening, raw sewage pumping and grit removal
- Primary Treatment: primary solids settling
- Secondary Treatment: activated sludge treatment and final solids settling
- Disinfection: disinfection with sodium hypochlorite (required disinfection contact time provided in outfall pipe), and subsequent dichlorination with sodium bisulfite
- Solids Handling: sludge thickening, anaerobic sludge digestion, sludge dewatering using centrifuges

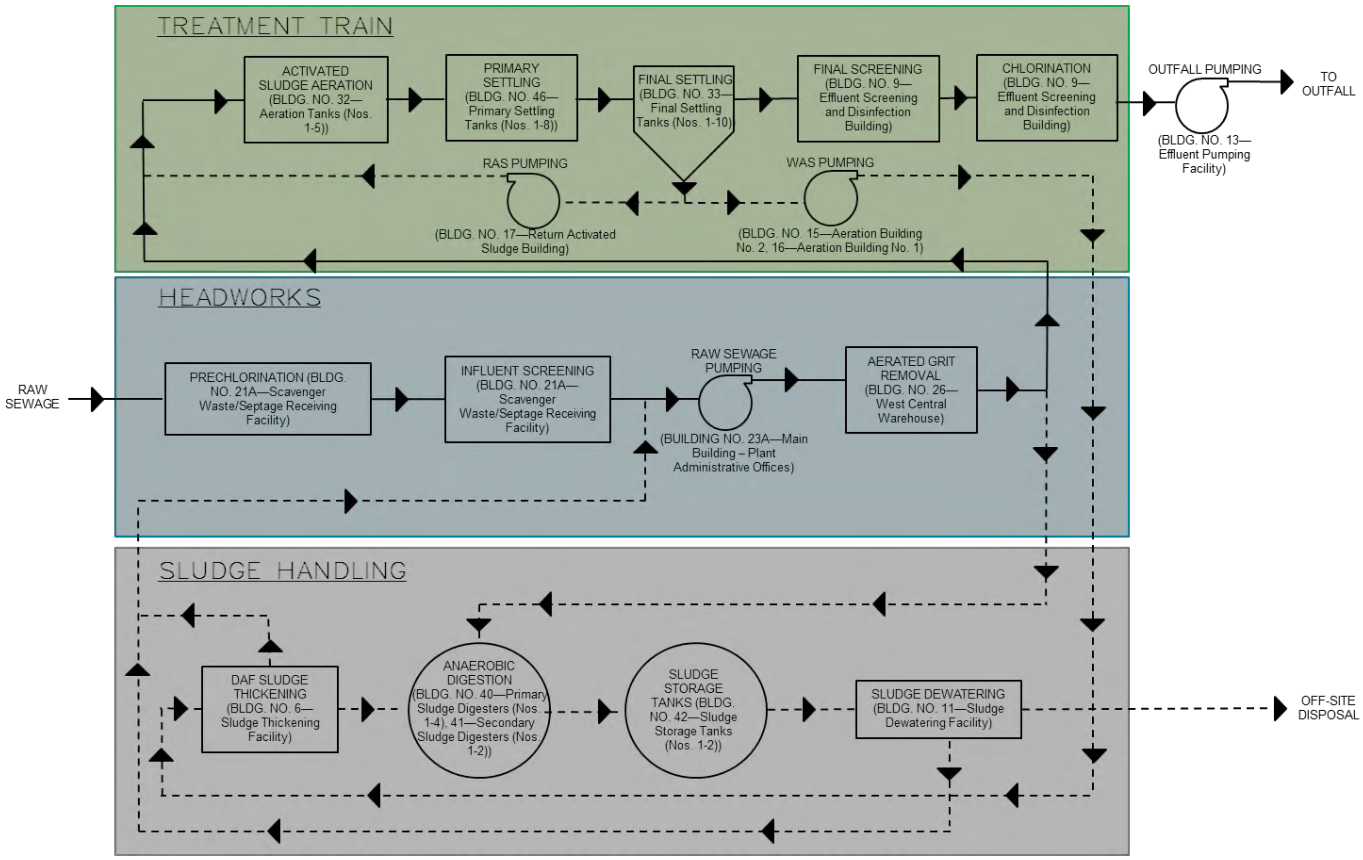


Figure 15: Bay Park STP Process Flow Diagram

Figure 16: Aerial View of Bay Park STP and Outfall Structure

3.9.2 Current Activities

Currently, the Bay Park STP is undergoing flood mitigation and repair/upgrade work under numerous contracts around the plant and its pumping stations as a result of Hurricane Sandy. Mitigation and repair are expected to continue for a few more years.

3.10 Nassau County Population Trends and Growth

Expected growth trends will impact the wastewater treatment facilities. According to the 2010 U.S. Census, the Nassau County population was 1,339,532 persons in 2010. The U.S. Census Bureau also provided a 2013 population estimate for Nassau County of 1,352,146 persons which shows a 0.9 percent population increase from 2010 to 2013. Population has grown since 2000, with a population of 1,337,935, and a growth of about .12 percent (U.S. Census Bureau 2017). Groundwater demand remained consistent through 2010, at about 190 million gallons per day (Nassau County Master Plan 2010).

Nassau County's sanitary sewer collection district, served by Bay Park STP (and Cedar Creek WPCP), serves about 1,018,209 residents total. As of 2010, about 350,000 households rely on Bay Park STP and Cedar Creek WPCP, with nearly 80 percent of those households being owner-occupied. The population did decrease about 6 percent from 2000 to 2010, with a population in 2000 of 1,083,387 (US Census Bureau 2017). Utilizing the interpolation method of population prediction utilizing historical population data, Nassau County can expect to have a population of about 2,119,423 in the year 2040, with a lower confidence bound of 1,684,917 and an upper confidence bound of 2,553,929 (Figure 17). From previous planning studies, it is expected that Bay Park STP, given its upgrades and design capacity, will be able to accommodate the additional growth.

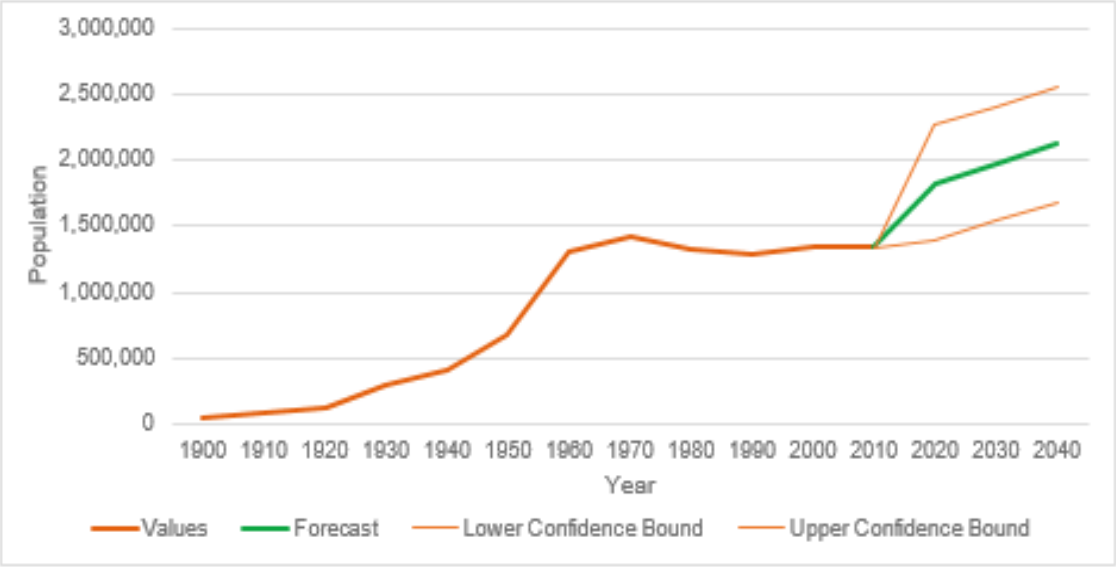


Figure 17. Nassau County Population Projection

4 DESIGN APPROACH FOR PROPOSED PROJECT

4.1 Introduction and Approach

As part of the initiative to improve the water quality of the Western Bays, the County in partnership with the City of Long Beach has initiated a task aimed at eliminating the Reynolds Channel outfall discharge of treated effluent from the Long Beach WPCP. The goal is to divert the flow from Long Beach WPCP to Bay Park STP for treatment. The Long Beach WPCP Consolidation Project includes the following primary components:

- conversion of the Long Beach WPCP into a pumping station (retrofitting existing influent building)
- connection of the retrofitted pump station to the force main
- construction of a force main to convey the wastewater, and
- connection of the new force main to the head of the Bay Park STP

The PM-JV has been tasked with developing a design strategy and design documents to accomplish this goal. The PM-JV is evaluating various alternatives for constructing a pumping system and force main construction method. **Pending further geotechnical investigation, design and technical feasibility review, this section of the document describes the current design process and approach. Final design will include a geotechnical investigation to verify or supplement the existing studies and analysis presented or referenced in this report. The design approach presented herein for the purpose of the WQIP application(s) may be subject to change during the design process.**

4.1.1 Site Reconnaissance

The PM-JV visited the Long Beach WPCP and the Hassocks to understand the facility and the conveying methods proposed for the flow diversion. The pump building and associated equipment were examined in detail. The site visits resulted in proposing three alternatives for the conversion of the treatment plant into a pump station. These three alternatives were further evaluated for cost and engineering feasibility.

The PM-JV team inspected the building's façade, interior, roof, and equipment, including the screening mechanisms and the pumping units. The following are the observations recorded during the site inspection:

- Main Building/Pumping Building
  - Exterior
    - Several cracks throughout the façade of the building
    - Spalling bricks and joints missing mortar observed
    - Windows were deteriorated and in need of repair
    - Lintels were rusted and expanded; they will need replacement
  - Roof

- It was stated by operator personnel that there are several leaks throughout the roof; replacement is recommended
- Roof is membrane type with brick/block parapet. Membrane and all appurtenances will need to be replaced throughout. A new flashing system will need to be installed to protect the structure from water intrusion.

o Interior

- Structure was generally in good condition and may not need immediate attention
- Fire protection system was not identified at the time of the visit
- Pump system layout may need to be altered if the dimension of the new pumps exceeds the dimensions of the existing pumping units

Figure 18: Existing Influent Pumping Facility Exterior façade

- Equipment

o HVAC

- Boiler was observed to be in good condition; however, it was a new unit recently installed below the design flood elevation (DFE)

o Pumping units and force main

- Only three out of four pumps were observed operable at the time of the visit. All of the pumps in operations were dry-pit submersible type.
- All operating pumps were in optimal condition
- Suction sections of piping for all pumps were rusted and deteriorated

o Mechanical bar screen

- Equipment operating and in good condition. Two parallel mechanical bar screens present at the time of the visit.

o Others

- Miscellaneous and electrical equipment observed operating in good condition.

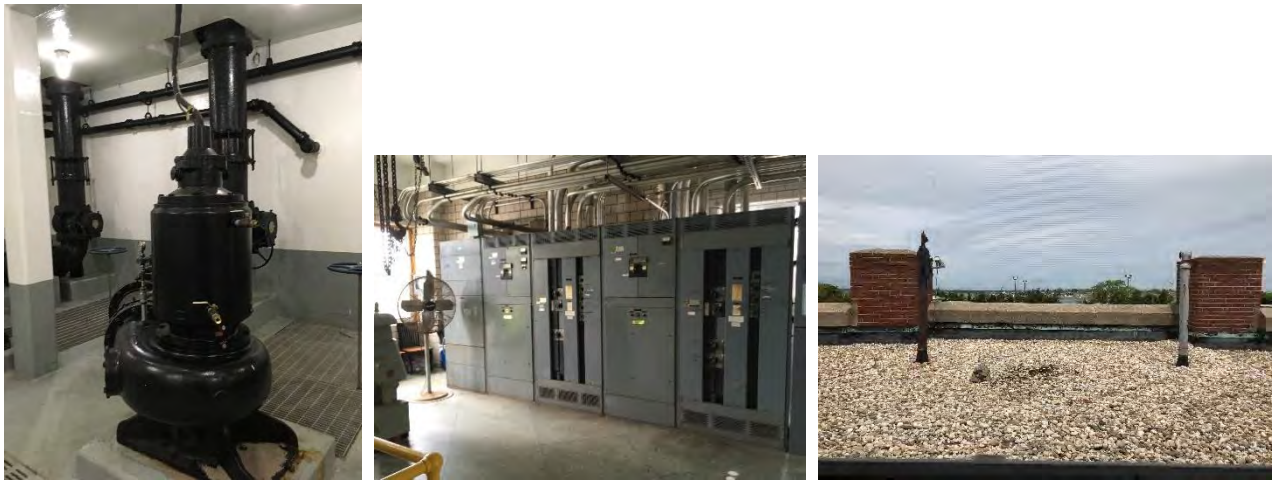


Figure 19: (left to right) Influent pump, electrical room, roof level of Influent Pump Building

- Structural
  - One of the primary concerns regarding the structural integrity of the existing pumping facility at the WPCP is the ability of the exterior walls to resist hydrostatic pressure. As described in the "Engineering Report for the City of Long Beach Flow Diversion Pump Station & Force Main" of July 2017 by Cameron Engineering and Associates, the recommend alternative (Section 4 of the report) to improve and/or protect the water quality of the Western Bays is to divert the flow from discharging into the Reynolds Channel. Based on this report, the building could be retrofitted and reused to house the new pumping units and screening equipment. To do this, the building will have to be hardened to the DFE of 20 feet (NAVD88). The existing building currently sits at an elevation of approximately 10 feet (NAVD88); therefore, the hardening measures would have to be installed to an elevation approximately 10 feet above existing grade. However, as observed during the visits, the building does not appear to be structurally equipped to withstand the expected hydrostatic pressure from flooding during 500-year storm events. The masonry walls of the existing pump station are constructed of 2- or 3-wythe bricks, which can generally resist lateral, wind, and seismic loads, but not capable of resisting any hydrostatic pressure. The building's concrete columns and basement walls are supported on a combination of a mat foundation and spread footings. These structural elements may not be able to resist the uplift pressures due to a 500-year flood event.
  - One of the assumed advantages of reusing the existing pumping facility would be to repurpose the second floor of the building from office space to an electrical room. The finished height of the second floor sits at elevation +/-22 feet, above the DFE of 20 feet, thus providing adequate space (dry) for the installation of the electrical equipment needed to run the pumps. However, the floor may not be structurally suitable to support the dead load of the electrical equipment. The area may need new structural supports if reused as the new electrical room.

4.2 Pump Station Design Alternatives

Based on site observations, discussion with plant staff and review of existing contract drawings and experiences, the following design options were considered for costs and engineering evaluations.

4.2.1 Alternative 1 – New Pump Station

This method involves constructing a new pump station with submersible pumps and grinder units and installing electrical equipment above the 20.00-feet (NAVD88) DFE in a separate assembly. The new pump station will be equipped with four (4) pumping units, each rated at approximately 350 HP. The facility will have a wet well and an aboveground elevated structure that would house the electrical equipment, including a new generator. The pump station is preliminary location would be the southwest corner of the Long Beach WPCP property. See Figure 20 and Figure 21 below for schematics of plan and section views, respectively.

4.2.2 Alternative 2 – Retrofit Existing Influent Building (reuse wet well/dry pit)

Demolish the existing pump station superstructure in its entirety and preserve the existing wet well and dry well layout. The existing pumps will be removed and replaced with four (4) new pumping units each rated at approximately 350 HP. A new light frame building would be installed above the 20.00-feet DFE (NAVD88) and supported on a separate foundation to house the electrical equipment and generator. See Figure 22 and Figure 23 below for schematics of plan and section views, respectively.

4.2.3 Alternative 3 – Hardening and Repair of Existing (build perimeter wall)

Construction of a concrete flood wall around the perimeter of the existing pump station. The existing building would have a variety of needed repairs, including brick façade repair and replacement, door and window replacement, roof replacement, and demolition of an attached CMU work shed.

The existing pumps and screening equipment would be replaced. The electrical equipment would not be raised to the 20.00 feet (NAVD88) DFE, but upgraded to work with the new pumps. The existing generator would be replaced to match the demand of the new pumping equipment. See Figure 24 below for the schematic plan view of the alternative.

4.2.4 Pump Station Alternatives Analysis

Table 7 below explains the advantages and disadvantages of each alternative design described above.

Figure 20: Alternative 1 - Plan View

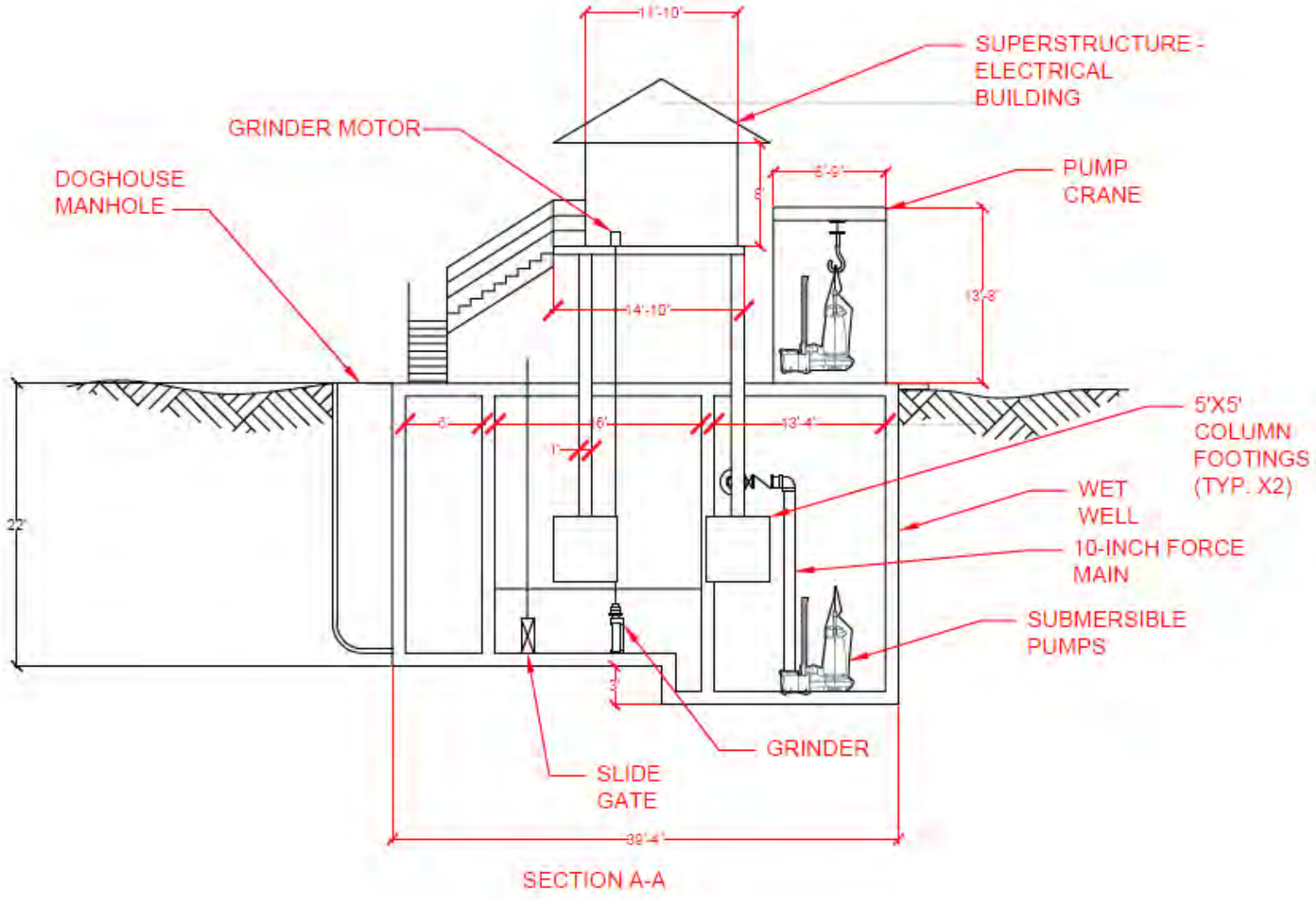


Figure 21: Alternative 1 - Section View

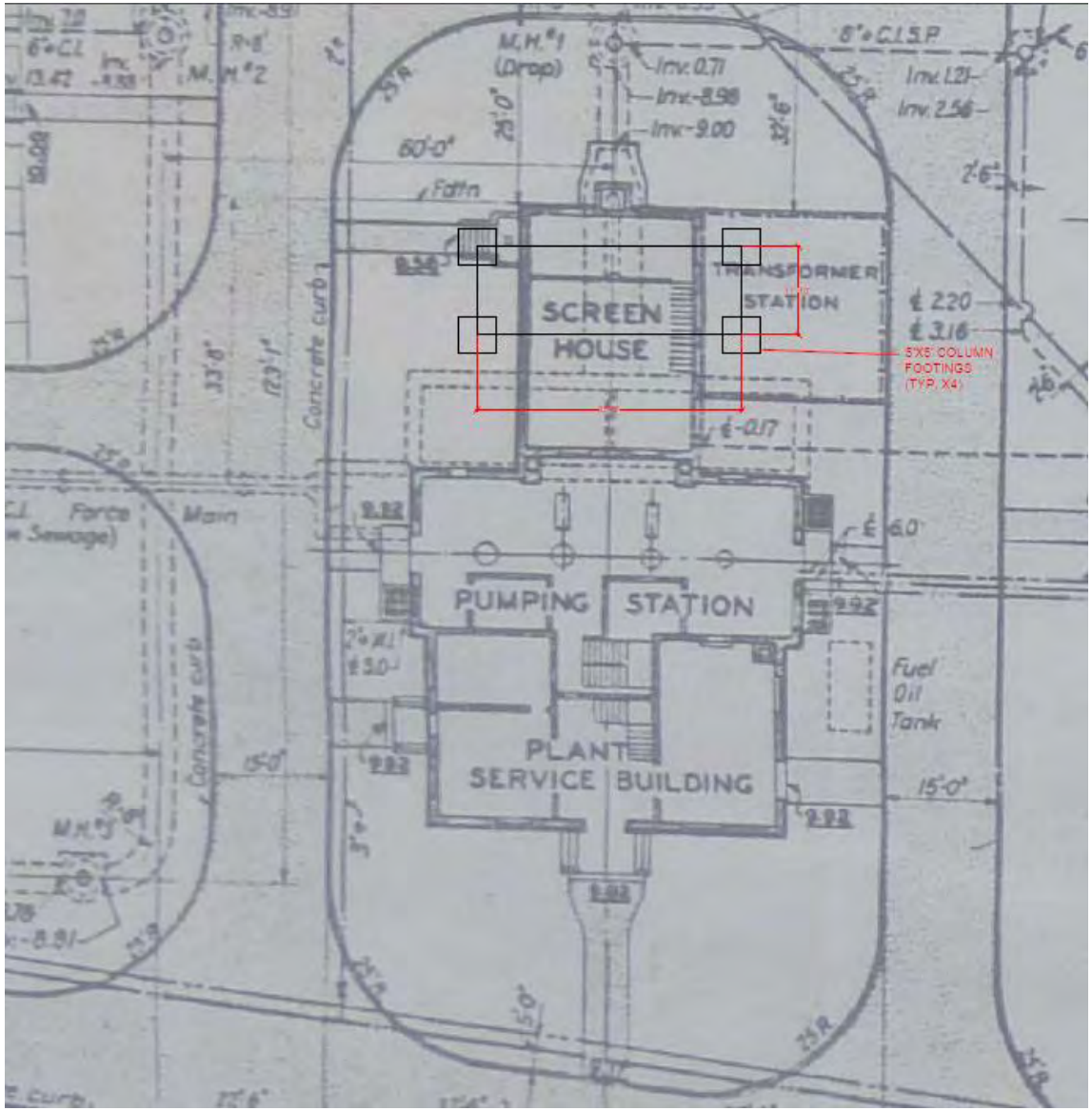


Figure 22:Alternative 2 – Plan View

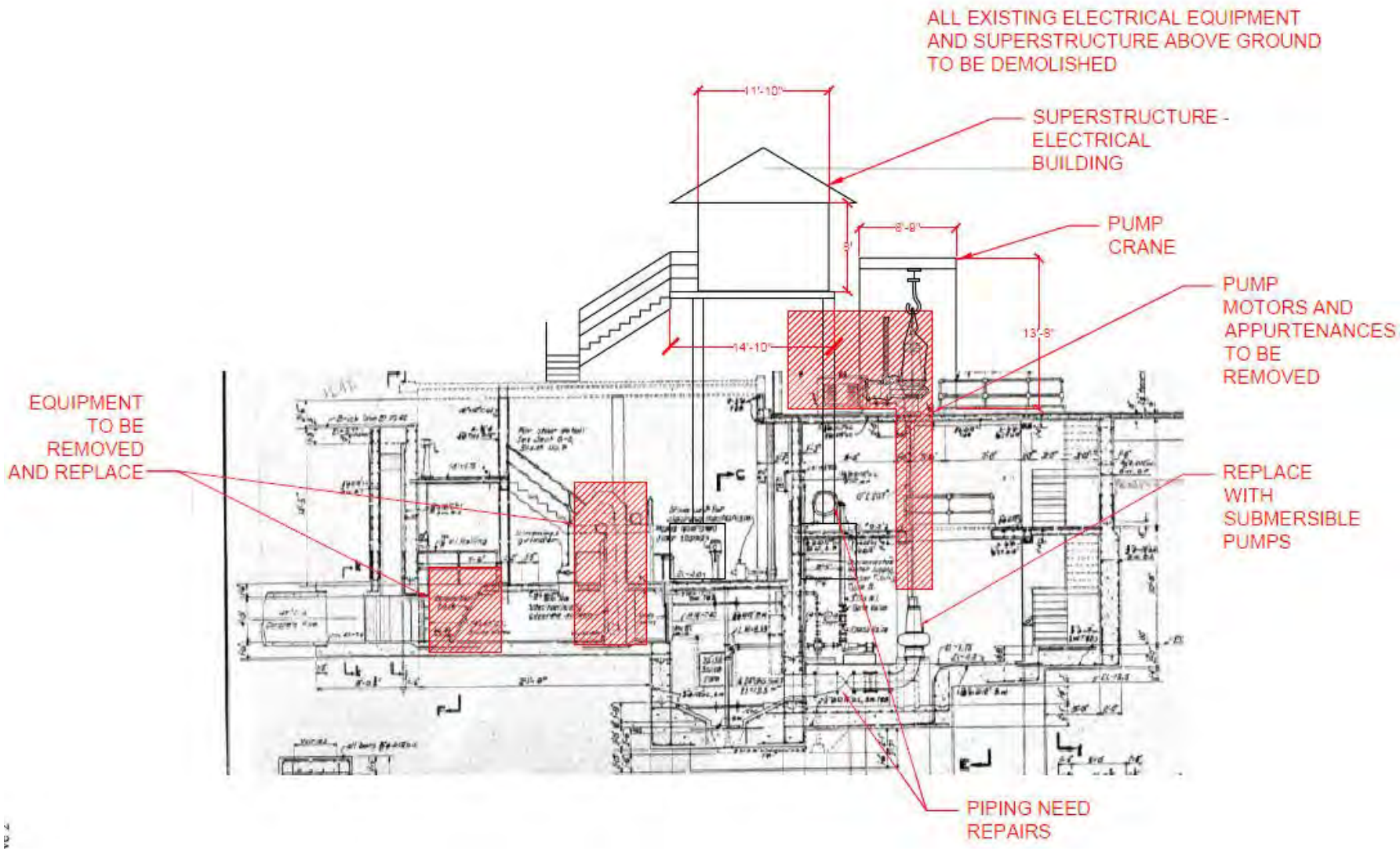


Figure 23: Alternative 2 - Section View

Figure 24: Alternative 3 - Plan View

Table 7: Pump station alternatives evaluation

	Alternative 1 (New PS)	Alternative 2 (Reuse wet well/dry pit)	Alternative 3 (Build perimeter wall)
Real Estate	Advantageous. This alternative offers the most advantages regarding the available usable space within the property. Since the treatment plant is scheduled for decommissioning, it is assumed that the property will become available for other purposes. The existing pumping facility is located along the south and towards the middle from east to west, becoming a potential disruption for future development. The proposed pump station would be located in the southwest corner of the property, presenting minimum interference with the potential repurposing of the site.	Unfavorable. Since the location of the pumping station will remain the same, the structure will be located along the south of the property and towards the middle from east to west, becoming a potential disruption for future development. Considering the location of the Long Beach WPCP, adjacent to the train station and to the Reynolds Channel, the potential of becoming a valuable real estate reinforces the need to relocate the structure from its current location.	Least Benefits. Similar to Alternative 2, the perimeter wall proposes disadvantages regarding reusing the area for other purposes. Since the entire existing pumping facility would remain the same and a new wall would be built around the facility, this is the least desirable alternative since it uses the most square footage of property of all three alternatives.
Structural	Advantageous. Although a geotechnical investigation is needed to define the details for building the foundation of the new facility, the design and construction of a new wet well offers the most advantages in terms of structural stability. It is known that the existing structure was built in a spread footing foundation, which may indicate that the new wet well will have similar characteristics. Ultimately, since the facility will be built new from beginning to end, the designers will apply current technology to ensure a minimum life span equivalent to 50 years.	Unfavorable. The existing pumping facility was built approximately 70 years ago, suggesting that the life span of the material is approaching its ceiling. Additionally, preliminary calculations have shown that once the superstructure is removed, the wet well and dry pit will experience buoyant forces that may be large enough to push the entire structure off the ground. In order to mend this issue, concrete would have to be poured in and around the structure. In this scenario, the concrete, old and new, will need to act together, as one element, which may be challenging due to the age of the existing concrete. This option will also need a geotechnical investigation to determine the conditions of the soil and existing foundation.	Unfavorable. The construction of a wall around the facility proposes an engineering challenge due to the height and depth of the wall. To avoid groundwater intrusion from underneath, the wall will need to extend to a sufficient depth (approximately 30 feet) into the ground and be impermeable. On the other hand, the height of the structure needs to reach at least 20.0 feet (NAVD 88) to match the DFE. A geotechnical study would need to be performed to determine the conditions of the soil around the area. The existing facility will also need to be analyzed in depth to determine if major structural repairs are needed to ensure a suitable life span for the pumping station.
Risk	Advantageous. With this alternative, the station would be built new and the existing structure will be abandoned. This minimizes the risk since all components would be known at the time of construction.	Least Benefits. This alternative carries the most risk since the conditions of the existing components of the structure will not be known until excavation around the facility starts.	Unfavourable. Although the perimeter wall will be built new, the existing structure will remain the same. Since the conditions of the existing structure are not known, the risk of finding unexpected problems increases.

Bypass Strategy / Operation During Construction	Advantageous. With Alternative 1, the bypass needed will be kept to a minimum. The existing facility would operate normally while the new station is built on-site. It is estimated that one month may be needed for the final connection of the existing 48-inch sewer to the new wet well.	Unfavourable. With Alternative 2, the bypass is anticipated to last throughout construction, 14 months. The existing pumping facility will need to be retrofitted and as this occurs, a bypass strategy will need to be installed permanently.	Unfavourable. Similar to Alternative 2, the bypass is anticipated to last throughout construction, 14 months. The existing pumping facility will need to be retrofitted and as this occurs, a bypass strategy will need to be installed permanently.
Diversion Pump Station Operation	Advantageous. Since the new pump station will be unmanned, the maintenance of the facility needs to be as simply as possible. Building a new pump station with all submersible equipment in one wet well simplifies operation and maintenance.	Unfavorable. Since the existing layout of the current facility will remain the same (dry well and wet well), facility operations and the cost of maintaining the pump station will increase. HVAC will need to be upgraded inside the dry well to maintain the area unclassified per code. Since the dry well shall remain accessible, a minimum temperature of 50F and ventilation shall be kept at all times.	Least Benefits. In addition to the HVAC and ventilation requirements needed for Alternative 2, this option requires that the entire existing building remain heated and ventilated. This will increase the cost and escalate the need for operations.
Flood Protection	Advantageous. Since the pumps and grinders are installed within the wet well and are submersible equipment, and the sensitive electrical gear is to be installed above the DFE, this option ensures operations throughout a 500-year storm event.	Advantageous. Similar to Alternative 1, since the pumps and grinders are installed within the wet well and are submersible equipment, and the sensitive electrical gear is to be installed above the DFE, this option ensures operations throughout a 500-year storm event.	Advantageous. As per the other two alternatives, this options also offers to be functional through a 500-year storm event. The perimeter wall will be built to contain the water in the outskirts of the facility.
Funding Restriction	Yes	No	No
Cost	$10.1 million	$11.4 million	$13.9 million
Schedule	Advantageous. All alternatives are expected to be built within the same time frame.		

4.3 Force Main Design Alternatives

In-water construction will occur to build the force main marine crossing under Reynolds Channel to connect Long Beach WPCP to Bay Park STP. Three in-water construction techniques could be utilized: 1) weighted/collared pipe, 2) trenching, or 3) horizontal direction drilling (HDD).

1. The weighted pipe alignment would follow the contour of the marine floor and would be weighted in place using concrete collars or mats. This technique is cost-effective, but unfeasible for Reynolds Channel because of the high susceptibility to tidal scour and disruption of marine traffic during construction.
2. Trenching involves dredging a channel in the marine floor, installing the pipe, and backfilling the trench. This technique is labor intensive and disruptive, and scour is likely because the trenches are often not at a suitable depth.
3. HDD involves drilling a pilot hole through the alignment, reaming the hole to a slightly larger diameter, and pulling the pipe through the hole. This technique involves minimal disruption to the marine environment and marine traffic as well as reduced tidal scour because sufficient depths are reached for the pipe.

Prior to Hassocks crossing route and the HDD construction method for the force main, the County's PM-JV performed a planning study that identified other potential routes and associated impacts and costs of those routes. The decision to construct the force main through the Hassock Islands was based on the results and discussion of the impact to local residents using extensive cut and cover methods for alternate force main routes. Constructability is not a concern using the cut and cover method, but the potential cost for dewatering would be a major concern given the extensive depth that much be trenched to avoid existing utilities and infrastructure. Construction through the Hassock Islands will eliminate the impact to local residents and businesses on the inland.

HDD is therefore the preferred recommendation for the marine force main crossing (Cameron Engineering & Malcolm Pirnie, 2006). Environmental factors will be accounted for in the geotechnical investigation program, design and construction specifications.

4.4 Recommended Design

4.4.1 Retrofit Existing Influent Building (Alternative 2)

At this time, due to property easements and pending discussion on the final disposition of the property, the recommended design is Alternative 2, retrofit the existing pump building into a pump station.

4.4.2 Force Main

A 24-inch force main is proposed to be installed in pipe lengths ("segments") via horizontal directional drilling (HDD) method through the Hassock Islands (northwest of Long Beach WPCP). The existing Long Beach WPCP will be converted into a pumping station and the plant, including all buildings, equipment and appurtenances will be decommissioned (the decommissioning of the plant is not included as part of this project) and turned over to the County. Figure 25 below shows the routing, broken into five (5) HDD segments with directional flow arrows.

The total pipe length is approximately 16,100-feet, originating from the Long Beach WPCP to the existing 66-inch sewer main located along the park area west at Bay Park STP. Figures 26 to 28 show the conceptual connection to Long Beach Pumping Station, locations of HDD receiving/jacking pits, the HDD routing through the islands with detailed segment lengths, and the tie-in to Bay Park STP respectively. The primary assumptions for the HDD routing through the islands are that a contractor team and equipment (including pipe lengths) can commute to the island (via a barge) and that the islands are capable and have space for construction staging as expected of launch sites. Parts of the connection to the Long Beach Pumping Station and tie-in connection at Bay Park STP are to be performed using open-cut construction method. For both plant sites, design is ongoing to determine where the cut and cover section will meet the HDD. For the Long Beach site, it will be south of the Long Beach Skatepark in order to achieve the depth required to go under the sheet pile wall. Tentatively, the excavation/equipment or contractor's staging area will be limited to the road and the parking lot.

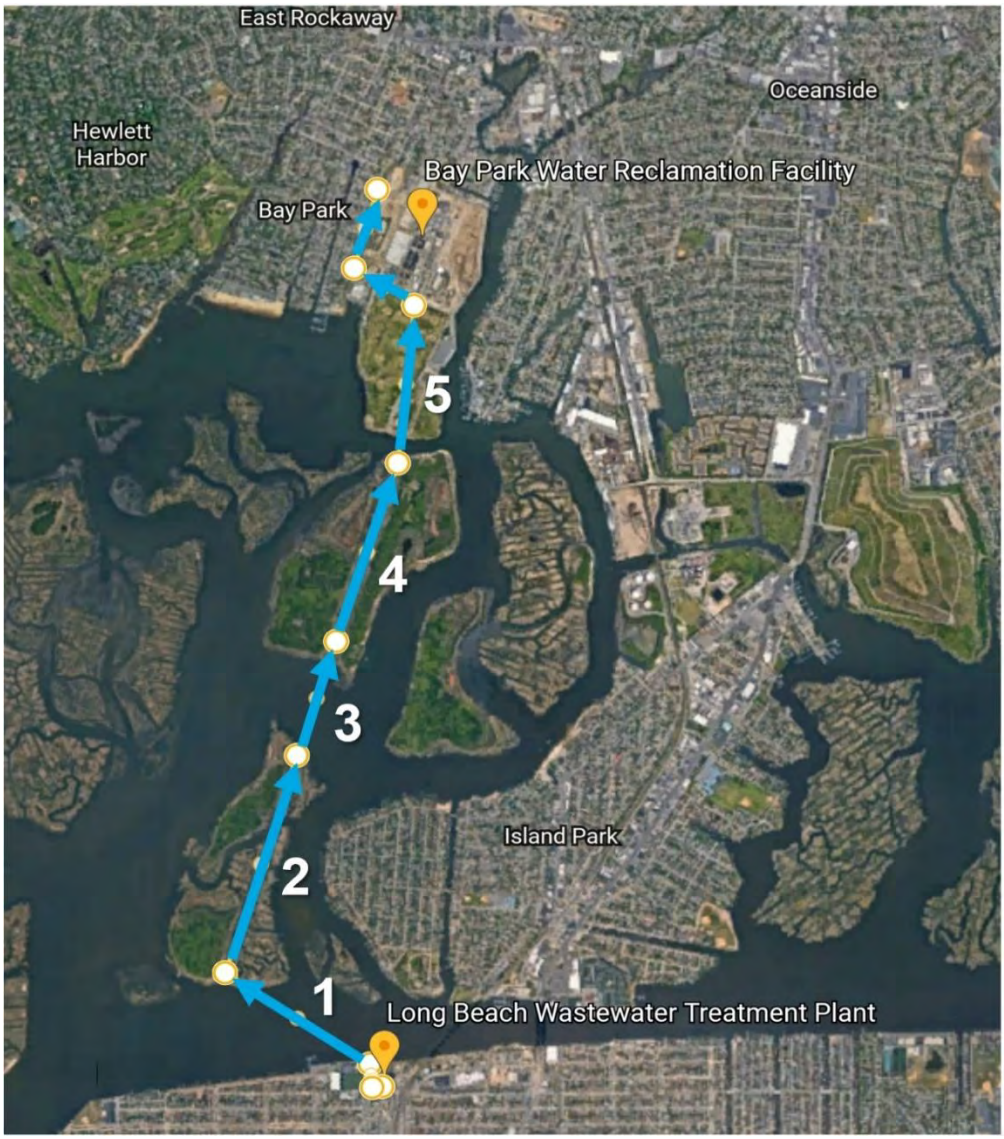


Figure 25: Segments of force main via HDD

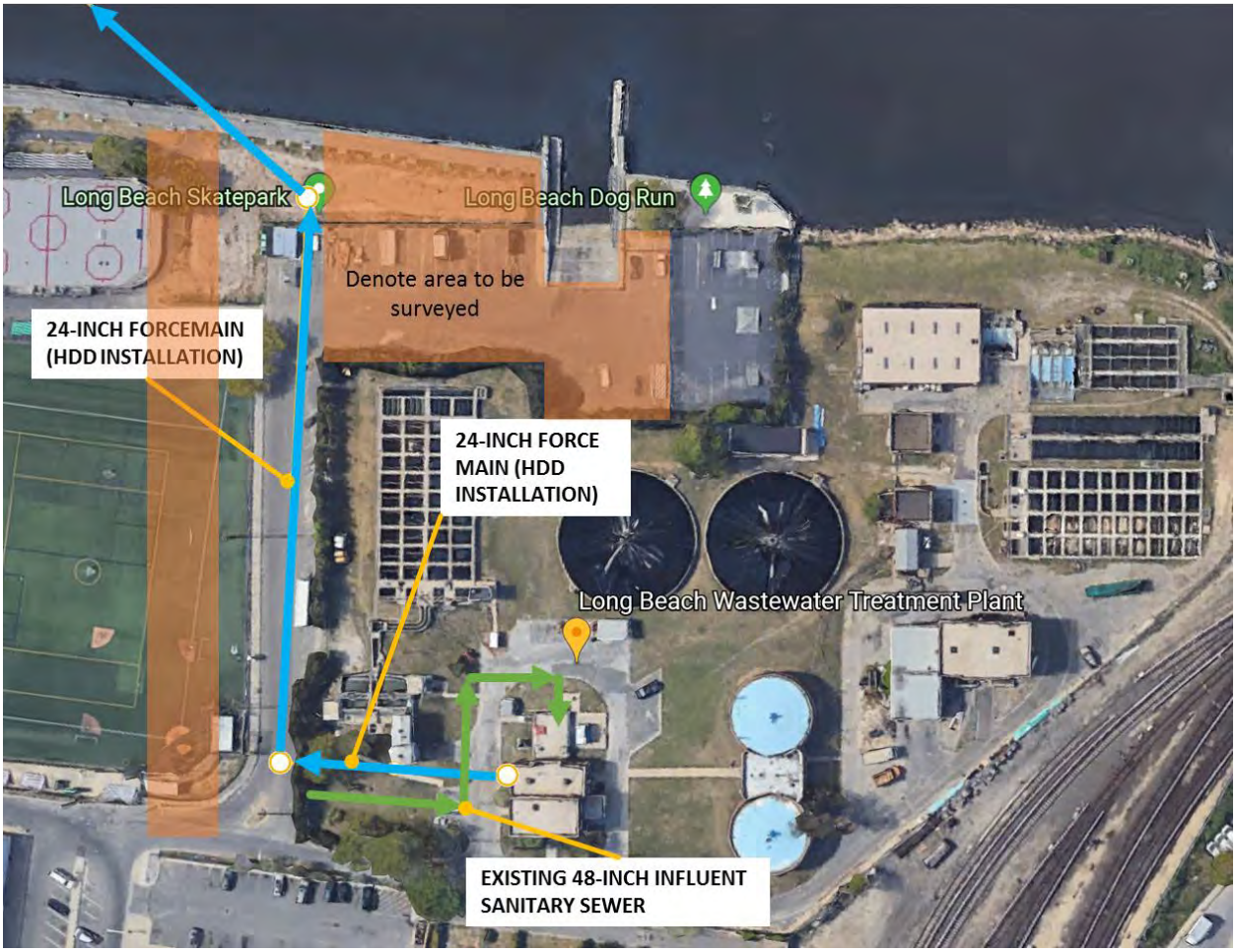


Figure 26: Connection to Long Beach new pumping station

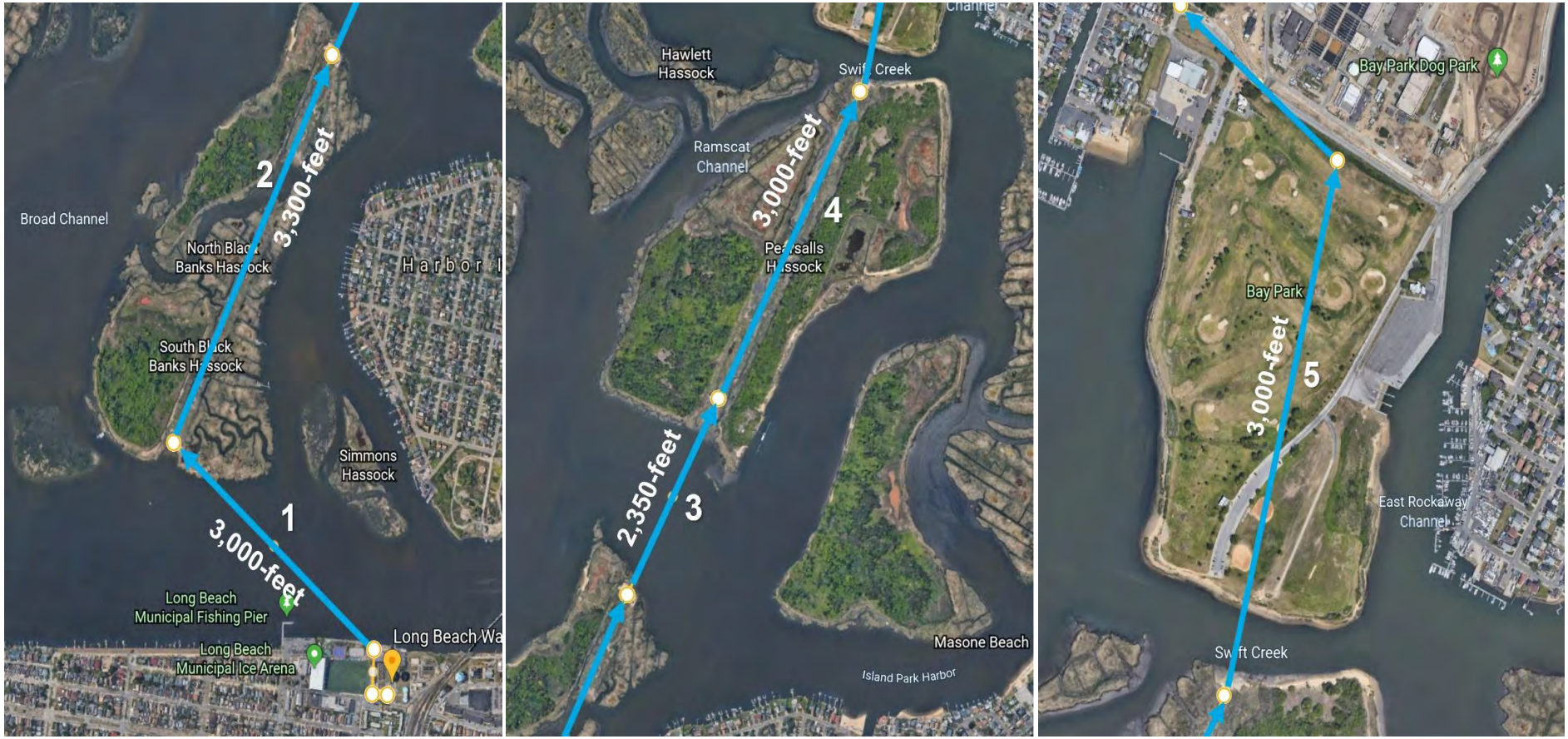


Figure 27: HDD Routing

Figure 28: Tie-in Connection at Bay Park STP

4.5 Environmental Impact and Permitting

Environmental specialists conducted a review of the conceptual design alignment, available mapping, information collected during site reconnaissance of the project areas, and applicable Federal, State, and local regulations to identify regulatory and permitting requirements of Federal, State, and local agencies. Table 8 provides a summary of Federal and New York State Legislation, Executive Orders and Regulatory Programs that may apply to activities in and adjacent to the project area.

Table 8: Legislation, Executive Orders, and Regulatory Programs that may apply to the Project

Activity	Federal Regulatory Program / Agency	New York Regulatory Program / Agency
Federal activity that may affect essential	Sections 401, 404 of Clean Water Act/ USACE, New York District	Protection of Waters, Article 15, Title 5 of the Environmental Conservation Law,

Activity	Federal Regulatory Program / Agency	New York Regulatory Program / Agency
fish habitat (authorizations such as Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act (permit from USACE), funding, or direct actions)		Implementing Regs. 6 NYCRR Part 608/NYSDEC Region 1
	Section 305(b) (2)-(4), Magnuson-Stevens Act---Essential Fish Habitat/NOAA, National Marine Fisheries Service, Northeast Regional Office	
	Section 10 of the Rivers and Harbors Act of 1899/USACE New York District	Protection of Waters, Article 15, Title 5 of the ECL, Implementing Regs. 6 NYCRR Part 608/NYSDEC
	Federal Coastal Zone Management Act of 1972	New York State Coastal Zone Management Program/New York State Department of State
Construction in the 100-year floodplain	Floodplain Management Executive Order 11988 (42 FR 26951)	
Federally authorized/ funded activities with potential to affect drinking water supplies	Section 1424€ of the Safe Drinking Water Act, USEPA, Region 2	
Actions with the Potential to Affect Threatened or Endangered Species	Endangered Species Act of 1973/NMFS Northeast Regional Office for marine fish, mammals and sea turtles; USFWS Long Island Field Office for terrestrial wildlife and plants (Incidental Take)	Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern, ECL, Sections 11-0535[1]-[2], 11-0536 [2], [4], Implementing Regs. 6NYCRR Part 182/NYSDEC Region 1 (Incidental Take)
Activities with the potential to affect marine mammals	Marine Mammal Protection Act of 1972/NMFS Northeast Regional Office (Incidental Harassment Authorization)	Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern, ECL, Sections 11-0535[1]-[2], 11-0536 [2], [4], Implementing Regs. 6NYCRR Part 182/NYSDEC Region 1
Activities with potential to affect migratory birds	Migratory Bird Treaty Act [50 CFR 10, 20, 21, Executive Order 13186], USFWS Long Island	
Activities that affect wetlands and wetland adjacent areas	Section 404 of Clean Water Act/USACE NY District for activities in wetlands Executive Order 11990, “Protection of Wetlands,” USEPA Reg. 2	Tidal Wetlands Act, Article 25, ECL, Implementing Regs. 6NYCRR Part 661/NYSDEC Region 1 Freshwater Wetlands Act, Article 24, ECL, Implementing Regs 6 NYCRR Part 661
Stormwater discharges to surface waters		State Pollution Discharge Elimination
Discharges to surface waters (e.g., groundwater recovered during dewatering activities,		SPDES Article 17 Title 8, ECL, Implementing Regs. 6 NYCRR Part 750, Coverage under Individual SPDES NYSDEC Region 1

Table 9 provides a list of federal and state agencies and local governments that would issue potential permits and approvals for the project.

Table 9: Expected permits for the Project

Agency	Agency Type	Permit / Approval	Submit Application	Permit Issuance
NOAA National Marine Fisheries Service	Federal	Essential Fish Habitat Consultation	6/20/2019	8/__/19
US Fish & Wildlife Service	Federal	ESA Informal Consultation Letter	-	-
US Army Corps of Engineers (USACE)	Federal	Nationwide Permit 6 Authorization	6/6/2019	8/30/2019
US Coast Guard	Federal	Notice to Mariners (Contractor)		
NYS Office of Parks Recreation & Historic Preservation (NYSOPRHP)	State	Consultation & No Effects Letter (Rec'd)	6/25/2019	7/__/19
NYS Department of State (DOS)	State	Coastal Consistency Concurrence	6/25/2019	8/26/2019
NYS Department of Environmental Conservation (NYSDEC)	State	Tidal Wetland Permit	6/6/2019	8/26/2019
		Excavation & Fill in Navigable Waters		
		401 Water Quality Certification		
NYS Office of General Services (NYSOGS)	State	No Jurisdiction; Town Ownership	-	-
Nassau County Police Marine Bureau	Local	Notifications – Surveys, Borings	-	-
Nassau County Parks Department	Local	Permit	7/29/2019	8/8/2019

4.5.1 Environmental Review

To support issuance of permits, the Environmental Assessment (EA) would include objective data and information about the project and design, identify a range of possible impacts that may occur from the design concept, and evaluate whether impacts are significant.

4.5.1.1 National Environmental Policy Act (NEPA)

Environmental documentation under NEPA is required for this project as federal funding is expected from FEMA. Additionally, the potential funding support from HUD's Living with the Bay required a NEPA EA to

be performed. GOSR is preparing a NEPA EA to secure a Finding of No Significant Impact (FONSI) from HUD for the project. An Amended Action Plan is needed as part of the Living with the Bay project for funding reallocation. Furthermore, negative perspective on environmental impacts are expected as a result of the project, therefore the EA can be bypassed of an EIS. FEMA, as lead federal agency, would need to file a Notice of Intent in the Federal Register, with assistance from GOSR (and the County or PM-JV) as the first step. This step would both inform the public of the project's NEPA EIS process and initiate the scoping process. The EIS will be in compliance with FEMA regulations for implementing NEPA. FEMA would not take action in furtherance of a proposed action that would limit the choice of reasonable alternatives until the NEPA process is complete and public feedback is solicited for the draft EIS. As described by FEMA in its instructions for implementing NEPA, reasonable alternatives include all feasible and practical actions from a technical and economic standpoint. Therefore, the final alignment alternative may need to be evaluated in the NEPA EIS if they are deemed by FEMA to be reasonable alternatives. The EIS must also evaluate the impacts of a No Action alterative. The NEPA process would conclude when FEMA issues a Record of Decision (ROD) for the EIS, including the agency's decision, the alternatives assessed, and the agency's mitigation and monitoring plan for significant impacts resulting from the project. Following completion of the NEPA process, FEMA can authorize the release of federal funds for construction of the project.

4.5.1.2 NYS Environmental Quality Review Act (SEQRA)

The proposed project is exempt from SEQRA. GOSR recent discussions with NYSDEC confirmed that the Consent Order will be revised to reflect the project as proposed to meet the requirement of a Type II action under SEQRA.

4.5.2 Regulatory Consultations

To comply with Federal, State, and local statutes and regulations, several consultations and determinations would also be required for the project. The consultations with the USFWS, under Section 7 of the Endangered Species Act, and the NYSDEC NYS Natural Heritage Program (NYCRR part 182) review the potential presence of threatened and endangered species and/or habitat within the project area and vicinity of the site. Additionally, consultations with the NYSOPRHP would be required, in compliance with Section 106 of the National Historic Preservation Act and Section 110 of the New York State historic Preservation Act, regarding the presence or potential presence of historic and/or archaeological resources within the vicinity of the sites and force main route.

4.5.2.1 Agency Consultations

The JV conducted a preliminary desktop environmental study to evaluate the environmental and regulatory feasibility of the proposed project elements. The study was based on readily available information from federal and state agency databases, including GIS data. Initial agency consultations with National Marine Fisheries Service (NMFS), New York State Office of General Services (NYSOGS), and New York State Offices of Parks, Recreation and Historic Preservation OPRHP were also undertaken. Responses are as follows:

- NYS Office of General Services (OGS)
    - Inquiry made on signed letter to agency dated June 24, 2019
    - OGS response email dated July 16, 2019

- NOAA National Marine Fisheries Service (NMFS)
  - Inquiry made on signed letter to agency dated June 25, 2019
  - NMFS response email dated July 9, 2019
- NYS Department of Environmental Conservation (DEC)
  - Met with DEC Region 1 office on July 24, 2019
- NYS Office of Parks, Recreation and Historic Preservation, Division of Historic Preservation (SHPO)
  - Inquiry made on signed letter to agency dated June 28, 2019
  - SHPO's response letter dated July 9, 2019

4.5.3 Water Discharge Permits and Approvals

4.5.3.1 Construction Dewatering Discharges

It is anticipated that groundwater will be encountered during construction, which will require different methods of dewatering. During construction of the pump station the dewatered groundwater would likely need to be discharged to the nearby channels via the storm sewer system. Groundwater dewatered during HDD construction of the force main would likely need to be discharged to nearby channels. Agency consultations is being conducted with the appropriate agencies to determine appropriate action and limit of discharge. Groundwater will be sampled as part of the geotechnical investigation program and analyzed to identify the presence and level of any contaminants within the groundwater and to determine if treatment prior to discharge would be necessary.

4.5.3.2 Stormwater Discharge from Construction Activity

Soil disturbance of at least one acre will require a NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) and will require preparation of a Stormwater Pollution Prevention Plan (SWPPP). A Notice of Intent will be transmitted to the NYSDEC prior to the start of construction activities.

5 CONCLUSIONS

Nassau County has successfully consolidated other municipally-owned wastewater treatment infrastructure including most recently, the Villages of Lawrence and Cedarhurst. The two facilities were originally constructed in the 1950s and were upgraded to secondary treatment in the 1960s by installation of trickling filters, similar to the City of Long Beach WPCP. Wastewater from the two villages were transferred via the County's updated Inwood Pump Station along approximately three (3) miles of force main to the Bay Park STP for treatment. In adherence to the provisions of the Consent Order, on Wednesday October 21, 2015 at 11:15 A.M, all flow form the Lawrence WPCP was diverted to the Bay Park STP. Similarly, the next day, all flow from the Cedarhurst WPCP was diverted to Bay Park STP on Thursday, October 22, 2015 at 7:00 A.M. The land from the decommissioned wastewater treatment plants are left, available for alternative use.

In discussions with the NYSDEC and given the agency plan to revise and expand its nutrient criteria program, the NYS Nutrient Standards Plan (NYSDEC, 2019) for estuaries stated that the draft criteria will be proposed for public comments after internal review and approval of regulatory impact. The estimated timeframe for this process is expected to begin in 2019 (NYSDEC, 2019). The criteria are expected to be adopted one year after the criteria is proposed for public comment.

Table 10 below show that continued operation of the Long Beach WPCP will require capital funding of about $246 million for the plant to comply with anticipated regulatory changes and climate resiliency efforts. Retrofitting a pump station and installing force main crossings to convey flow to the Bay Park STP is estimated to cost $77 million. Once the consolidation project is completed, the County will assume ownership and operation of the pump station, and the City of Long Beach will no longer be responsible for a wastewater treatment plant.

The estimated amount of pollutants removed per year by the conveyance project is approximately 292,000 lbs of Total Nitrogen. This equivalent to 100% Total Nitrogen Removal. The projected cost to upgrade the Long Beach WPCP to achieve 85% Total Nitrogen removal is $3.2 million/year, not including the capital costs of upgrading the facility. The cost saving from the Total Nitrogen Removal is estimated to be $13 per pound of Total Nitrogen removed annually.

Evaluating the financial implications of remaining as a stand-alone entity versus consolidating, the overall current and future costs of both scenarios need to be considered. All costs are projected over the next 20 years and then discounted in value to the present. The present value of remaining as a treatment plant is approximately $335 million over the next 20 years. In comparison, consolidating with the County's wastewater infrastructure represents a present value of $105 million, a difference of $230 million (see Table 10 below). In addition, this project will bring up opportunities for changes to the Western Bays, allowing more discussions and a new model for marshland restoration to be created, modeling after the successful Hempstead Harbor Protection Committee. Furthermore, with the inter-municipal agreement (IMA) signed, the project is a true collaborative effort between the County and the City. Refer to Appendix E for a copy of the IMA and City's landownership of the Long Beach WPCP site.

For the 2019 WQIP applications, the City and the County will be applicant as separate applicant for the various phases as identified in Section 5.1.1 and Section 5.1.2 below.

5.1 Cost

The studies and results presented in this report thus far, in addition to the cost estimate, are intended to aid the County and the City of Long Beach as it advances the project into design and construction. Total project cost is approximately $77 million. Since the County will have its own spending plan for wastewater treatment and sewer maintenance, the estimated capital cost excludes anticipated operating costs associated with the power and operating of the new equipment. Refer to Appendix C for a detailed cost estimate and the basis of estimate memo for the pump station alternatives. A summary cost table for the project is also included in Appendix C. As previously mentioned, the project current status is still very much early in the design stage. A more detailed estimate is to be completed within the next few months.

The values shown are considered an AACE Class 5 Level estimate, which have a typical accuracy of -20 percent to -50 percent on the low side and +30 percent to +100 percent on the high side. Future design iterations at the 30 percent, 90 percent, and 100 percent details will provide more accurate cost breakdowns. Construction costs were estimated using information contained in historical drawings and specifications. Takeoffs represent approximately 5 percent of the estimate, whereas 95 percent is assumed costs. Additional assumptions for the construction soft costs include:

- Contractor Overhead – 10 percent
- Contractor Profit – 10 percent
- Subcontractor Overhead & Profit – 21 percent
- GC Profit on Subcontracted Work – 5 percent
- Escalation is calculated to an assumed midpoint of construction - 8.5 percent based on historical average at 4 percent annually
- Material/Equipment Escalation to Midpoint of Construction – 4.0 percent based on historical average at 2 percent per year
- Bond and Insurance – 2.2 percent
- Design Contingencies – 40 percent

5.1.1 Financing Plan and Considerations

For the purpose of requesting funding support under the WQIP program, Appendix B provides the current financial status for the project. Furthermore, due to the total cost of the project, the County and the City seek to implement the project in a phased approach to allow for smaller capital financing to reduce risk and allow for better management of funds. The County and the City of Long Beach has identified over $100 million in grant and loan funding for various project elements and anticipates it will need approximately $63 million in addition to the $15M currently committed for construction.

- Design
- **Phase 1 – Plant conversion to pump station (City of Long Beach – applying under 2019 WQIP)**
- Phase 2 – Construction Inspection/ Site Control
- **Phase 3 – New PS connection to HDD force main (County – applying under 2019 WQIP, Watershed Plan Implementation)**

- **Phase 4 – HDD Drill Segment 1 (County – applying under 2019 WQIP, Watershed Plan Implementation)**
- **Phase 5 – HDD Drill Segment 2 (County – applying under 2019 WQIP, Watershed Plan Implementation)**
- Phase 6 – HDD Drill Segment 3
- **Phase 7 – HDD Drill Segment 4 (County – applying under 2019 WQIP, Wastewater Treatment Facility Nitrogen Abatement for Shellfishing Waters)**
- Phase 8 – HDD Drill Segment 5
- Phase 9 – Force main connection to 66-inch interceptor at Bay Park STP
- Phase 10 – Power disconnect & pump station activation
- Phase 11 – Construction contingency (Owner Reserve)
- Phase 12 – NC PM-JV Program Management
- Phase 13 – Force Account Labor
- Phase 14 – Permits
- Decommission/Redevelopment (considered independent, not part of the project's scope or financing strategy).

5.1.2 City's Application under 2019 WQIP Program

Appendix B shows that the City is apply for funding of Phase 1 – Plant Conversion to Pump Station. The cost of this phase is approximately $10 million, more than the current fund (CWIA WIIA from 2017 and WQIP in 2017) available to the City to cover the cost of this work. The City is applying for this funding to cover the differences in construction cost for the pump station portion of the overall project scope.

5.1.3 County's Application under 2019 WQIP Program

Appendix B shows that the County is applying for two different priority categories to maximize the funding support needed for this important project.

- 2019A – Watershed with maximum fund of $10 million: The phase of work that will be under this funding scope is the Phases 3, 4 and 5. Phase 3 is the connection from the retrofitted (new) pump station to the HDD force main. Phase 4 and Phase 5 are the HDD force main segments 1 and 2, respectively. Therefore,
- 2019B – Shell fishing with maximum fund of $5 million: The phase of work cover under this application scope is the Phase 7 which is the HDD force main segment 4.

Table 10: Present Value Analysis – Existing (Mitigation and Nitrogen Upgrades) versus Consolidation

Long Beach WPCP - Mitigation and Nitrogen Upgrades
Long Beach WPCP: Avg. Daily Flow: 7.0 MGD / 4.5 MGD Actual

Estimated Annual Operating Costs

(Year 0)	Sewer Maintenance (2017 data)	$	883,722
(Year 0)	WPCP Maintenance (2017 data)	$	1,676,182
(Year 5)	Nitrogen Removal (Yr 0 = 4,000,000)	$	5,352,902
(Year 5)	Future w/ N Removal (Sewer + WPCP + Nitrogen)	$	8,320,533

Rate per period (discount) = 1.06
Growth rate (inflation) = 1.03

Year 0-4: Sewer+WPCP

Year	Annual Cost	Present Value
0	$ 2,559,904	$ 2,559,904
1	$ 2,636,701	$ 2,487,454
2	$ 2,715,802	$ 2,417,054
3	$ 2,797,276	$ 2,348,647
4	$ 2,881,195	$ 2,282,176

Year 5 and future: Sewer+WPCP+Nitrogen Removal

Year	Annual Cost	Present Value
5	$ 8,320,533	$ 6,217,586
6	$ 8,570,149	$ 6,041,617
7	$ 8,827,253	$ 5,870,627
8	$ 9,092,071	$ 5,704,478
9	$ 9,364,833	$ 5,543,030
10	$ 9,645,778	$ 5,386,152
11	$ 9,935,151	$ 5,233,714
12	$ 10,233,206	$ 5,085,590
13	$ 10,540,202	$ 4,941,658
14	$ 10,856,408	$ 4,801,800
15	$ 11,182,100	$ 4,665,900
16	$ 11,517,563	$ 4,533,846
17	$ 11,863,090	$ 4,405,530
18	$ 12,218,983	$ 4,280,845
19	$ 12,585,552	$ 4,159,689
Subtotal PV of Annual Costs	***$***	***88,967,294***

Future Capital Projects

Mitigation (Yr 0 = 43,000,000)	$	43,000,000
UV Disinfectant (Yr 0 = 5,000,000)	*$*	*5,000,000*
Nitrogen (4mg/l) (Yr 0 = 198,000,000*)	*$*	*198,000,000*
Subtotal PV of Future Capital Costs	***$***	***246,000,000***
Total PV	***$***	***335,000,000***

*updated from 2014 base cost estimate of $125 million.

Long Beach WPCP - Consolidation of Wastewater Services
Long Beach WPCP: Avg. Daily Flow: 7.0 MGD / 4.5 MGD Actual

Estimated Annual Operating Costs

(Year 0)	Sewer Maintenance (2017 data)	$	883,722
(Year 0)	WPCP Maintenance (2017 data)	$	1,676,182
(Year 5)	As Pump Station (Yr 0 = 500,000)	$	669,113
(Year 5)	Future w/ Pump Station (Sewer + Pump Station)	$	1,693,589

Rate per period (discount) = 1.06
Growth rate (inflation) = 1.03

Year 0-4: Sewer+WPCP

Year	Annual Cost	Present Value
0	$ 2,559,904	$ 2,559,904
1	$ 2,636,701	$ 2,487,454
2	$ 2,715,802	$ 2,417,054
3	$ 2,797,276	$ 2,348,647
4	$ 2,881,195	$ 2,282,176

Year 5 and future: Sewer+Pump Station

Year	Annual Cost	Present Value
5	$ 1,693,589	$ 1,265,548
6	$ 1,744,396	$ 1,229,731
7	$ 1,796,728	$ 1,194,927
8	$ 1,850,630	$ 1,161,108
9	$ 1,906,149	$ 1,128,247
10	$ 1,963,334	$ 1,096,315
11	$ 2,022,234	$ 1,065,287
12	$ 2,082,901	$ 1,035,138
13	$ 2,145,388	$ 1,005,841
14	$ 2,209,749	$ 977,374
15	$ 2,276,042	$ 949,713
16	$ 2,344,323	$ 922,834
17	$ 2,414,653	$ 896,716
18	$ 2,487,092	$ 871,337
19	$ 2,561,705	$ 846,677
Subtotal PV of Annual Costs	***$***	***27,742,029***

Future Capital Projects

Conversion to PS & FM (Yr 0 = 77,000,000)	$	77,000,000
Subtotal PV of Future Capital Costs	***$***	***77,000,000***
Total PV	***$***	***105,000,000***

5.2 Constructability and Schedule

Industry outreach was first made in Q2 2019 to solicit interests in the tunneling firms to allow for better competitive pricing and innovative construction approach. Thus far, a few firms have reached out expressing interests in the project.

The overall schedule of the project is as follow. A detailed schedule is being updated to reflect the latest information regarding geotechnical work and agencies consultation. This schedule can be provided upon further request, if necessary.

- 30 percent submittal: October 2019
- 90 percent submittal: December 2019
- 100 percent submittal: January 2020
- Bid preparation/advertisement/NTP: February 2020 – November 2020
- Construction: November 2020 – December 2022

There are some specific tasks which will impact the overall schedule of the Project.

- No further delay with the geotechnical investigation
- Permitting
- GOSR's NEPA EA efforts

5.3 Next Steps

The County is seeking the balance of funding required for construction, approximately $63 million ($15 million secured in funding). This funding is required to ensure that the project moves forward and able to capitalize on the identified community, economic, and environmental benefits expeditiously.

5.3.1 PM-JV

Next steps for the County and/or PM-JV generally include:

- Geotechnical investigation permits
- Pre-application meeting with NYSDEC Region 1 and USACE on Design
- Geotechnical investigation and evaluation
- Surveys: topographic, bathymetric, wetland delineation of Hassocks
- Prepare permit applications for design and authorization to construct
- 30 percent, 90 percent, 100 percent Contract Documents

5.3.2 GOSR and WSP

Next steps for GOSR and its consultant, WSP include, in no particular order:

- Communication with DEC, USACE, DOS, SHPO, OGS, NMFS on geotechnical schedule/expedited review/permit issuance

- Marine archaeological, other studies to support NEPA
- Environmental Impact Analysis (NEPA EA)

5.3.3 City of Long Beach and County

The City of Long Beach and the County have signed the IMA. Next steps would be to perform more public and industry outreach and notification about the project.

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APPENDIX A

Letters of Support

Nassau County Legislator
Denise Ford
Alternate Deputy Presiding Officer
1550 Franklin Avenue
Mineola, New York 11501

(516) 571-6204 · Facsimile: (516) 571-6264

Chairperson
Public Safety
Vice-Chair
Government Services & Operations
Member
Economic & Community Development, Labor & Transportation
Minority Affairs
Planning, Development & The Environment

July 24, 2019

To Whom it May Concern:

I, Nassau County Legislator Denise Ford is in full support of Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

I strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Denise Ford

Denise Ford
Legislator, LD4

ALBANY OFFICE
ROOM 307
LEGISLATIVE OFFICE BUILDING
ALBANY, NEW YORK 12247
TEL: (518) 455-3401
FAX: (518) 426-6914

DISTRICT OFFICE
55 FRONT STREET, ROOM 1
ROCKVILLE CENTRE, NEW YORK 11570
TEL: (516) 766-8383
FAX: (516) 766-8011

WEBSITE
KAMINSKY.NYSENATE.GOV

E-MAIL
KAMINSKY@NYSENATE.GOV

THE SENATE
STATE OF NEW YORK
ALBANY

SENATOR TODD KAMINSKY
9TH SENATE DISTRICT

CHAIRMAN MAJORITY MEMBER
ENVIRONMENTAL CONSERVATION

COMMITTEES:
CODES
CIVIL SERVICE AND PENSIONS
HEALTH
INVESTIGATIONS AND GOVERNMENT OPERATIONS
TRANSPORTATION

July 25, 2019

NYS Department of Environmental Conservation
Water Quality Improvement Program
625 Broadway,
Albany, NY 12233

To Whom it May Concern,

I am writing to express my strong support for the interrelated grant applications by both Nassau County and the City of Long Beach to the New York State Department of Environmental Conservation's ("DEC") Water Quality Improvement Program. If awarded this grant, the County and City will be able to use the funds to help implement the Long Beach Water Pollution Control Plant ("WPCP") Consolidation Project. This project is a collaboration between the City and County to convert Long Beach's current water plant into a pump station that will allow sewage to be transported via pipeline across Reynolds Channel to a county owned facility.

Implementation of this project will have direct environmental benefits by stemming and reversing the build-up of nitrogen in the Western Bays. Under the current system, waste from Long Beach is pumped out from the WPCP and into the Western Bays in Reynolds Channel. The DEC has determined that this system has contributed to a build-up of nitrogen in the Western Bays, which has resulted in a decline in water quality and has threatened marine life in the area. It has also led to harmful algae blooms, which further degrade the water quality of the area. By pumping the waste across the bay to the County owned Bay Park Sewage Treatment Plant, and then to the Cedar Creek Water Pollution Control Plant, the effluent will be removed from the Western Bays ecosystem. Instead, waste will be pumped through an existing pipeline three miles out into the ocean, where the treated waste will be able to be safely disbursed. This will help stem the build-up of nitrogen in the Western Bays, greatly benefiting the local ecosystem.

Sending Long Beach's waste to the larger Nassau County waste treatment plant will also ensure that waste is being properly treated in accordance with the State's standards. With a larger and newer facility, the County is better equipped to properly handle Long Beach's waste.

Additionally, the positive environmental impacts of removing effluent from the Western Bays will help create new economic opportunities for development and strengthen the region's vibrant tourism and recreation industries. Reynolds Channel and the Western Bays are important natural ecosystems that our residents should be able to safely enjoy and admire. The many people that live, work, and travel in close proximity to Reynolds Channel deserve the opportunity to interact with this environment without fear of disease or illness. For these reasons, the successful implementation of this project will have positive benefits for generations to come.

Awarding this funding to Nassau County and the City of Long Beach is vital to the advancement of this necessary project. If awarded this funding, I have no doubt that the City and County will be able to implement the WPCP consolidation project successfully, which would have a significant positive environmental impact on the region. Thank you in advance for your assistance with this matter and I look forward to hearing from you soon.

Sincerely,

Todd Kaminsky

Todd Kaminsky
Senator, 9th District

TK/am

MELISSA MILLER
Assemblywoman 20th District
Nassau County

THE ASSEMBLY
STATE OF NEW YORK
ALBANY

RANKING MINORITY MEMBER
Mental Health Committee

COMMITTEES
Alcoholism and Drug Abuse
Children and Families
Education
Environmental Conservation

MEMBER
Legislative Women's Caucus

July 23, 2019

To Whom It May Concern:

My name is Melissa Miller and I am the Assemblywoman for the 20th district. I am writing to express my support for Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

We strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Melissa Miller, Assemblywoman 20th District

ALBANY OFFICE: Room 426, Legislative Office Building, Albany, New York 12248 • 518-455-3028, FAX: 518-455-5769
DISTRICT OFFICE: 2001 Park Street, Atlantic Beach, New York 11509 • 516-431-0500, FAX: 516-431-0412
EMAIL: millerml@nyassembly.gov

INCORPORATED

Village of Atlantic Beach

GEORGE J. PAPPAS
MAYOR

EDWARD A. SULLIVAN
ANDREW J. RUBIN
LINDA BAESSLER
DANAE A. MUDDIMAN
TRUSTEES

65 THE PLAZA
P.O. BOX 189
ATLANTIC BEACH, N.Y. 11509
(516) 371-4600 FAX (516) 371-4631
email: plaza65@aol.com
www.villageofatlanticbeach.com

CHARLES S. KOVIT
VILLAGE ATTORNEY

HERBERT A. KLIBANOFF
TREASURER

EMILY SINISCALCHI
CLERK

July 24, 2019

To Whom it May Concern:

The Incorporated Village of Atlantic Beach supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

We strongly support this grant application and its focus on improving the health of the estuary and near shore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

George J. Pappas
Mayor

LAURA A. GILLEN
SUPERVISOR

OFFICE OF THE SUPERVISOR
TOWN OF HEMPSTEAD
ONE WASHINGTON STREET • HEMPSTEAD, NEW YORK 11550-4923
516-812-3296 • LGILLEN@TOHMAIL.ORG • @LAURAAGILLEN • HEMPSTEADTOWNSUPERVISOR

July 26, 2019

RE: Letter of Support -
Long Beach Water Pollution Control Plant (WPCP) Consolidation Project

To Whom It May Concern:

This letter is being submitted in support of the Nassau County's and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center and aesthetic asset to Nassau County. Unfortunately, it has suffered from several decades of water quality decline, which has led to hypoxic conditions that threaten marine plants and animals. This decline is linked to the "nitrogen loading" of the bays from, among other causes, the effluent discharge of wastewater treatment plants.

The proposed project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded Nassau County South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). The County facility is in the midst of transformation with several projects that provide new and/or improved treatment processes for the reduction of nitrogen within the plant effluent. The consolidation of the Long Beach WPCP will result in a more resilient wastewater treatment system for our region and an overall reduction in nitrogen loading into the Western Bays.

I wholeheartedly support this grant application and its focus on improving the health of the estuary and nearshore waters, and reducing the risk to public health. This coordinated effort between the City and the County will unquestionably benefit the region as a whole.

Regards,

LAURA A. GILLEN
Supervisor

CITIZENS CAMPAIGN FOR THE ENVIRONMENT
www.citizenscampaign.org

225A Main Street • Farmingdale, NY 11735
516-390-7150
744 Broadway • Albany, NY 12207
518-772-1862
733 Delaware Road, Box 140 • Buffalo, NY 14223
716-831-3206
2000 Teall Avenue, Suite #204 • Syracuse, NY 13206
315-472-1339
2404 Whitney Avenue, 2nd Fl. • Hamden, CT 06518
203-821-7050

Empowering Communities, Advocating Solutions.

July 24, 2019

RE: Support Letter for Nassau County and the City of Long Beach's funding proposal for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

To Whom it May Concern,

Citizens Campaign for the Environment (CCE) is an 80,000-member non-profit, non-partisan advocacy organization that works to protect public health and our environment. CCE has been working to protect water quality on Long Island since our inception in 1985 and fighting to restore the Western Bays for over fifteen years. CCE strongly supports Nassau County and the City of Long Beach's funding proposal for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays are home to the largest concentration of salt marshes in the South Shore Estuary Reserve. This system of bays and marshes provides critical habitat for wildlife and was once home to productive fishing and shellfishing grounds. In addition, the salt marshes serve as a critical natural buffer, protecting our coastal communities from extreme weather events and sea level rise. However, nitrogen loading into the bays from our sewage treatment plants has depleted fisheries, weakened salt marshes, harmful algal blooms, degraded water quality, and left our coastal communities vulnerable.

The South Shore Water Reclamation Facility (formerly the Bay Park sewage treatment plant) and Long Beach WPCP outfall pipes contribute 79.4% of the nitrogen to the entire western bays complex. Despite significant improvements to the SSWRF after Superstorm Sandy and investments in state-of-the-art treatment technologies, nitrogen pollution continues to threaten water quality, public health, and the local economy on the south shore of Nassau County. **The only way we can restore water quality and habitat is to stop discharging effluent from the SSWRF and Long Beach WPCP into the western bays**.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station and send effluent to the newly upgraded South Shore Water Reclamation Facility for advanced treatment to reduce nitrogen by 50%. When combined with the Bay Park Conveyance project, this treated effluent from Bay Park and Long Beach will be sent through an aqueduct under Sunrise Highway to an existing ocean outfall pipe at the Cedar Creek WPCP. These two projects will result the cleanest effluent in the NY/NJ area.

Nassau County and the City of Long Beach are creating a comprehensive, cutting edge regional approach to wastewater treatment that will divert the waste over half a million Long Islanders out of the western bays. Once the waste is diverted to an ocean outfall pipe, the western bays are expected to make a full and speedy ecological recovery.

This project not only has bipartisan support but it also has **tremendous public support**. CCE, in collaboration with our partners at The Nature Conservancy and Operation Splash, have organized numerous public forums to educate and update the public on this effort. These events are well attended and public interest in the topic is substantial.

CCE urges New York State to award Nassau County and City of Long Beach the funding needed to complete the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

Sincerely,

Adrienne Esposito
Executive Director

To whom it may concern:

Operation SPLASH supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

We strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Rob Weltner
President
Operation Splash
202 Woodcleft Ave,
Freeport, NY 11520

The Nature Conservancy
Protecting nature. Preserving life.

July 23, 2019

To Whom it May Concern:

I'm writing to express The Nature Conservancy's support for Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Nature Conservancy has been an active member of the South Shore Estuary Council and the Western Bays Coalition since their inception. Nassau's Western Bays salt marsh ecosystem is an important wildlife habitat, recreational, and aesthetic asset to Nassau County, but has suffered from several decades of water quality decline. This decline, which causes hypoxia and algae blooms that threaten marine life, has been linked to nitrogen loading of the bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation to come from wastewater treatment plants.

Through impressive coordination and cooperation since Super Storm Sandy, New York State and Nassau County have worked together to identify regional waste water solutions that, when implemented, will simultaneously improve environmental conditions and improve resiliency of essential infrastructure as well as the densely populated neighboring coastal communities. Specifically, this project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

We strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely

Stu Gruskin
Chief Conservation and External Affairs Officer
The Nature Conservancy New York
322 Eighth Ave, New York, NY 10001

The Long Beach Chamber of Commerce

350 National Blvd • Long Beach • New York 11561-3312
(516) 432-6000 • info@theLongBeachChamber.com

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Ian Danby (Chair)
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Amanda Moore
Lenney Peters
Steve Rohinsky
Kelly Sullivan
Kim Takal
Leah Tozer (V. Chair)

Wednesday, July 24, 2019

To Whom it May Concern:

The Long Beach Chamber of Commerce supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

We strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Ian G Danby, Chairman

The Long Beach Chamber of Commerce

Stony Brook University

School of Marine and Atmospheric Sciences
Paul B. Shepson, Dean
145 Endeavour Hall
Stony Brook, NY 11794-5000
Paul.shepson@stonybrook.edu
TEL: 631-632-8781

July 25, 2019

Sean Sallie, AICP
Deputy Commissioner
Nassau County Planning Department
1194 Prospect Avenue
Westbury, NY 11590

Patricia Bourne
Director of Economic Development and Planning
City of Long Beach
1 West Chester Street, 5th Floor
Long Beach, NY 11561

Dear Mr. Sallie and Ms. Bourne,

The Stony Brook University School of Marine and Atmospheric Sciences (SoMAS) supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has a number of significant environmental challenges. Among them are many water quality impacts that threaten public health as well as marine plants and animals. These impacts have been linked primarily to sewage treatment plant (STP) effluent. In fact, the NYS DEC and U.S. EPA considered the Western Bays impaired.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park STP). When combined with the Bay Park Conveyance Project, the pump station will transport the treated water from the Bay Park STP to the Cedar Creek WPCP for discharge through an existing pipeline about three miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in treated sewage and thus nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

It is largely because of the research undertaken and recommendations made by SoMAS investigators over the last decade that the Consolidation and Bay Park Conveyance Project were developed. Thus, we strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the

risk to public health. Further, it will assist in reducing acidification in our estuarine waters, a New York State goal. This coordinated effort between the City and the County will benefit Long Island and the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Paul B. Shepson
Dean, SoMAS

July 25, 2019

To Whom it May Concern:

Skudin Surf Inc. supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

We strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Cliff Skudin

President - Skudin Surf

218 E Park Ave # 552 516-318-3993 skudinsurf.com

July 23, 2019

To Whom it May Concern:

Sludge Stoppers Task Force supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

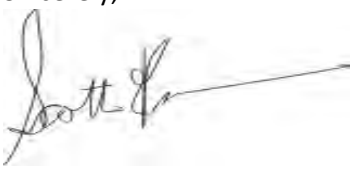
The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

This project will convert the storm-vulnerable Long Beach WPCP into a pumping station with connection to the newly upgraded South Shore Water Reclamation Facility (Bay Park Sewage Treatment Plant). When combined with the Bay Park Conveyance project, the pump station will convey the treated water from Bay Park Sewage Treatment Plant to Cedar Creek Water Pollution Control Plant for discharge through an existing pipeline 3 miles out in the ocean. This will result in a truly comprehensive and innovative regional wastewater management approach that will service close to one million residents. The outcome will contribute to the overall reduction in nitrogen loading into the Western Bays. The project will also create numerous economic opportunities by strengthening tourism and recreation in the region. When completed, these projects will represent a truly significant and lasting investment in bringing the water infrastructure in New York State into the 21st century.

We strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,



Scott Bochner
Sludge Stoppers Task Force
Co Founder
345 West Pine Street
Long Beach, NY 11561

LAND USE LAW CENTER
PACE LAW

JESSICA A. BACHER, ESQ.
ADJUNCT PROFESSOR OF LAW
EXECUTIVE DIRECTOR
E-MAIL: JBACHER@LAW.PACE.EDU

78 NORTH BROADWAY
WHITE PLAINS, NEW YORK 10603-3796
(914) 422-4103
FAX (914) 422-4011

July 24, 2019

To Whom It May Concern:

Pace University Land Use Law Center supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

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We strongly support this grant application and its focus on improving the health of the estuary and nearshore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Jessica Bacher

Jessica Bacher

LONG BEACH HOUSING AUTHORITY

500 Centre Street
Long Beach, New York 11561

Tel. (516) 431-2444 Fax (516) 431-2179 Email lbhany@aol.com

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Orlando Ariza Vice Chairman
Karen Adamo Treasurer
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Brett Dondi
Orlando Garcia
Natasha Nurse

Mike Cruz
Executive Director

July 24, 2019

To Whom it May Concern:

The Long Beach Housing Authority supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

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We strongly support this grant application and its focus on improving the health of the estuary and near shore waters as well as reducing the risk to public health. This coordinated effort between the City and the County will benefit the region as a whole.

Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Mike Cruz
Executive Director

LONG BEACH
MLK CENTER INC.
615 Riverside Boulevard, Long Beach, N.Y. 11561 Phone: (516) 889-6300 Fax: (516) 897-7642
www.facebook.com/Long Beach Martin Luther King Center

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Executive Director
Monique Powell

Community Advisory Council

Phillip Andrews, President
LI African American Chamber of Commerce

Legal Advisor
Frederick K. Brewington, Esq.

July 24, 2019

To Whom it May Concern:

The Long Beach Martin Luther King Center supports the Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

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Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Monique Powell
Executive Director
Long Beach Martin Luther King Center

The Long Beach Martin Luther King Center, Inc. is a nonprofit, tax-exempt publicly supported 501(c)3 organization. All donations are tax deductible to the extent allowed by law.

Latino Civic Association, Inc.

Asociación Cívica De Latinos

52 East Park Ave. 2nd Floor. Long Beach, NY 11561

July 25, 2019

Executive Director
Helen Dorado Alessi, MPA

Director of Programs
Nelly Romero

Program Associate
Sheila Machicado

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Domifer Rodriguez
George Diaz, DSS
Rafael Almonte Pratts

To Whom it May Concern:

Long Beach Latino Civic Association supports Nassau County and the City of Long Beach's funding proposals for the implementation of the Long Beach Water Pollution Control Plant (WPCP) Consolidation Project.

The Western Bays salt marsh ecosystem is an important wildlife habitat, recreational center, and aesthetic asset to Nassau County, but it has suffered from several decades of water quality decline. This decline, which causes hypoxic conditions that threaten marine plants and animals, has been linked to nitrogen loading of the Bays, the vast majority of which is estimated by the New York State Department of Environmental Conservation (NYSDEC) to come from the effluent discharge of wastewater treatment plants.

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Thank you for your consideration to grant the necessary funding to implement this project to fruition.

Sincerely,

Helen Dorado Alessi

Helen Dorado Alessi, MPA
Executive Director
Latino Civic Association

Tel: 516-889-4912 Fax: 516-897-6499 Email: lblatinocivic@yahoo.com Website: www.lblatinocivic.org

APPENDIX B

Financial Plan

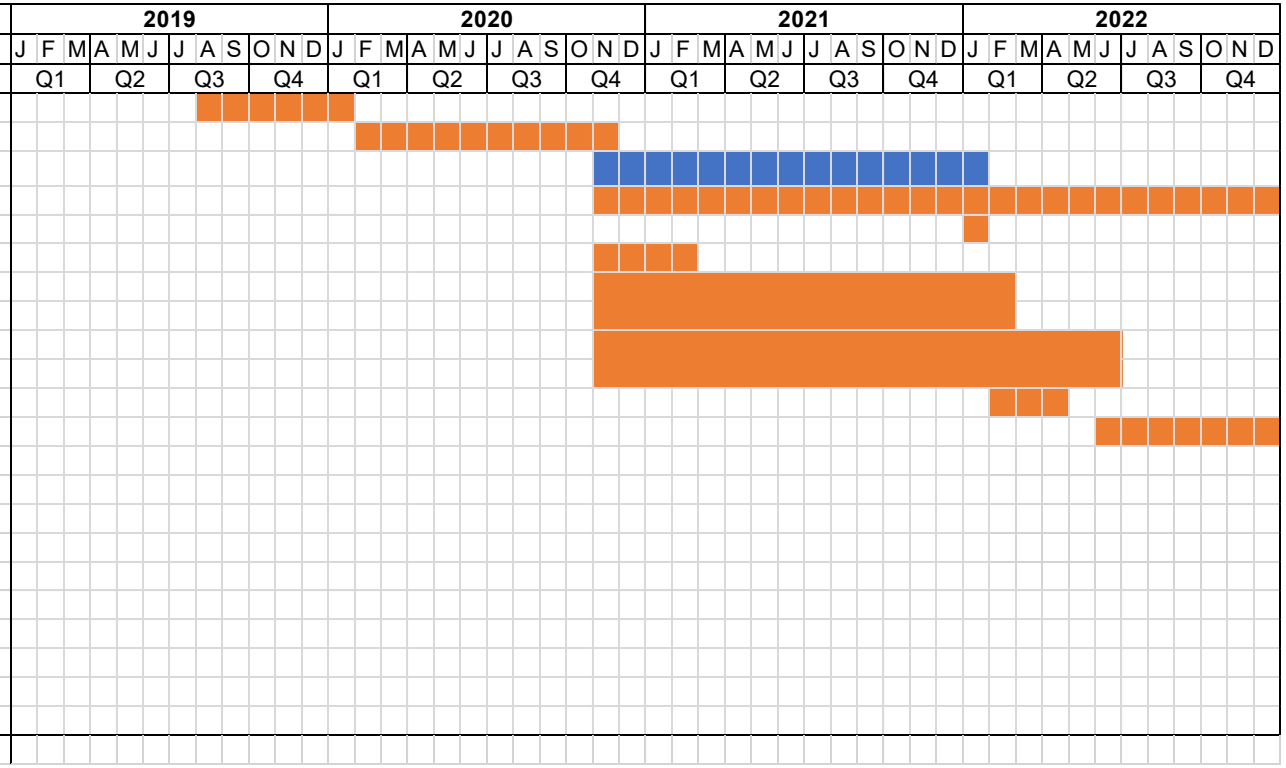
Hazen ARCADIS
A JOINT VENTURE

Last update: 7/26/19

LONG BEACH WPCP CONSOLIDATION PROJECT

	NYS EFC SMLP (25/75% cost share)	CWIA - WIIA ($5M or 25% net eligible project cost)	ESD Grant Funds - WQIP (85/15% cost share)	ESD Grant Funds - WQIP (75/25% cost share unless noted)	ESD Grant Funds - WQIP (75/25% cost share unless noted)	ESD Grant Funds - WQIP (75/25% cost share unless noted)	CWIA - IMG ($10M or 40% net eligible project cost)	ESD Grant Funds - WQIP (75/25% cost share unless noted)	ESD Grant Funds - WQIP (75/25% cost share unless noted)	Total Funding Available	GOSR Living with the Bays (in dicussion with GOSR and HUD)	FEMA PA 406 Mitigation (In discussion with DHSES and City of Long Beach)	EFC SMLP
		2017 (LB)	2017 (LB)	**2019 (LB)**	2018 (NC)	**2019A (NC)**	2019 (NC)	**2019B (NC)**	2020 (NC)				
NC/LB	$2,793,750	$ -	$ 375,000	$ 1,250,000	$ 1,250,000	$ 2,500,000	$ 15,000,000	$ 1,250,000	$ 1,250,000	**$25,668,750**			$ 18,000,000
Grant	$931,250	$ 4,500,000	$ 2,125,000	$ 5,000,000	$ 3,750,000	$ 10,000,000	$ 10,000,000	$ 5,000,000	$ 5,000,000	**$46,306,250**	$18M - $24M	$10 - $20M	$ -
Total	$3,725,000	$ 4,500,000	$ 2,500,000	$ 6,250,000	$ 5,000,000	$ 12,500,000	$ 25,000,000	$ 6,250,000	$ 6,250,000	**$71,975,000**			$ 18,000,000
	Design	Phase 1	Phase 1	Phase 1	Phase 2	Phase 3,4,5	Phase 6, 8, 11,12,13,14	Phase 7	Phase 9, 10		TBD	TBD	Decommission/ Redevelopment
Comment						Phasing/scope must be over $20M				range $65-$70M, pending the two WQIP applications from NC			

	Services	Project Cost
1	Design Services & Permitting (Preliminary and Bid-Ready Construction Documents)	$ 2,500,000
2	County Construction Procurement and Approval Process	
3	Phase 1 - Plant Conversion to Pump Station	$ 10,100,000
4	Phase 2 - Construction Management (Construction Inspection/Site Control)	$ 5,200,000
5	Phase 3 - New PS connection to HDD force main	$ 8,360,000
6	Phase 4 - HDD Drill Segment 1	$ 7,760,000
7	Phase 5 - HDD Drill Segment 2	$ 8,200,000
8	Phase 6 - HDD Drill Segment 3	$ 9,320,000
9	Phase 7 - HDD Drill Segment 4	$ 6,450,000
10	Phase 8 - HDD Drill Segment 5	$ 8,810,000
11	Phase 9 - Force main connection to 66-in interceptor at BPSTP	$ 3,600,000
12	Phase 10 - Power Disconnect & PS Activation	$ 2,300,000
13	Phase 11 - Construction Contingency (Owner Reserve)	$ 3,000,000
14	Phase 12 - NC JV PgM	$ 650,000
15	Phase 13 - Force Account Labor	$ 500,000
16	Phase 14 - Permits	$ 250,000
17	Decommission/ Redevelopment (TBD)	
18	**External Projects/ Activities that may have an Impact**	
18a	GOSR NEPA	
19	**Other Funding Opportunities**	
19a	GOSR Living with the Bays - in discussion with HUD and GOSR	
19b	FEMA PA 406 Mitigation - in discussion with DHSES	
		$ 77,000,000



APPENDIX C

Cost Estimate

Hazen ARCADIS
A JOINT VENTURE

Client: Nassau County Department of Public Works
Project: Western Bays Resiliency Initiative: Long Beach WPCP Consolidation Project
Last update: 7/23/2019

No.	**Services**	**Cost**
1	Design Services & Permitting	$ 2,500,000.00
2	County Construction Procurement and Approval Process	
3	Phase 1 - Plant Conversion to Pump Station	$ 10,100,000.00
4	Phase 2 - Construction Management	$ 5,200,000.00
5	Phase 3 - New Pump Station Connection to HDD Force Main	$ 8,360,000.00
6	Phase 4 - HDD Drill Segment 1	$ 7,760,000.00
7	Phase 5 - HDD Drill Segment 2	$ 8,200,000.00
8	Phase 6 - HDD Drill Segment 3	$ 9,320,000.00
9	Phase 7 - HDD Drill Segment 4	$ 6,450,000.00
10	Phase 8 - HDD Drill Segment 5	$ 8,810,000.00
11	Phase 9 - Force Main Connection to 66-in Interceptor at BPSTP	$ 3,600,000.00
12	Phase 10 - Power Disconnect & PS Activation	$ 2,300,000.00
13	Phase 11 - Construction Contingency (Owner Reserve)	$ 3,000,000.00
14	Phase 12 - NC JV PgM	$ 650,000.00
15	Phase 13 - Force Account Labor	$ 500,000.00
16	Phase 14 - Permits	$ 250,000.00
	TOTAL PROJECT COST	$ 77,000,000.00

Hazen ARCADIS
A JOINT VENTURE

Nassau County Department of Public Works
Long Beach WPCP Consolidation - Force Main thru Hassock via HDD
Conversion of Long Beach WPCP to Pumping Station
Conceptual Estimate

CSI #	Description		Alternative 1	Alternative 2	Alternative 3
Div 01	General Conditions	10.0%	$ 518,700	$ 584,756	$ 704,832
Div 01S	Special Conditions		$ 187,549	$ 1,617,357	$ 1,617,357
Div 02	Sitework		$ 1,029,663	$ 169,076	$ 175,336
Div 03	Concrete		$ 560,437	$ 569,724	$ 48,379
Div 04	Masonry				$ 97,400
Div 05	Metals		$ 125,072	$ 125,072	$ 30,000
Div 06	Wood & Plastics		$ 21,800	$ 20,000	$ 20,000
Div 07	Thermal & Moisture Protection				$ 81,000
Div 08	Openings		$ 34,900	$ 15,900	$ 4,550
Div 09	Finishes		$ 195,000	$ 205,000	$ 205,000
Div 10	Specialties		$ 5,469	$ 5,469	$ 5,469
Div 11	Equipment		$ 1,369,588	$ 1,347,588	$ 1,347,588
Div 13	Special Construction		$ 76,900	$ 76,900	$ 1,985,000
Div 15	Mechanical		$ 285,164	$ 300,718	$ 300,718
Div 15	Plumbing		$ 21,127	$ 27,431	$ 125,601
Div 15	HVAC		$ 144,000	$ 250,000	$ 273,000
Div 16	Electrical		$ 941,332	$ 932,604	$ 572,604
Div 17	Instrumentation & Control		$ 188,998	$ 184,720	$ 159,320
	Subtotal:		**$ 5,705,699**	**$ 6,432,315**	**$ 7,753,154**
	Value of Subcontracted Work		*$ 1,275,617*	*$ 1,440,245*	*$ 1,181,585*
	Subcontractor Overhead & Profit	21.0%	$ 267,880	$ 302,451	$ 248,133
	Subtotal:		**$ 5,973,578**	**$ 6,734,766**	**$ 8,001,287**
	Prime Contractor Overhead	10.0%	$ 443,008	$ 499,207	$ 657,157
	Subtotal:		**$ 6,416,587**	**$ 7,233,973**	**$ 8,658,444**
	Prime Contractor Profit	10.0%	$ 487,309	$ 549,128	$ 722,873
	Subtotal:		**$ 6,903,896**	**$ 7,783,101**	**$ 9,381,317**
	Prime Contractor Profit On Subcontracted Work	5.0%	$ 77,175	$ 87,135	$ 71,486
	Subtotal:		**$ 6,981,070**	**$ 7,870,236**	**$ 9,452,802**
	Labor Escalation at 4% annually	8.2%	$ 62,137	$ 120,534	$ 149,427
	Material/Equipment Escalation at 2% annually	4.0%	$ 356	$ 58,157	$ 66,902
	Subtotal:		**$ 7,043,563**	**$ 8,048,927**	**$ 9,669,132**
	Bond and Insurance	2.2%	$ 154,958	$ 177,076	$ 212,721
	Subtotal (rounded):		**$ 7,200,000**	**$ 8,200,000**	**$ 9,900,000**
	Design Contingency	40.0%	$ 2,880,000	$ 3,280,000	$ 3,960,000
	Subtotal (rounded):		**$ 10,100,000**	**$ 11,400,000**	**$ 13,900,000**
	Contract Allowances		TBD	TBD	TBD
	Unit Price Items		TBD	TBD	TBD
	Total:		**$ 10,100,000**	**$ 11,400,000**	**$ 13,900,000**

Notes:
1) Project Assumptions NTP: 11/13/20, 419 CCD (14 months) for all three alternatives

Dwg/Item #	Sub (*)	Alternative 1 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		New Pumping Facility					
Div 01S		**Special Conditions**					
		Temporary Bypass Pumping:	***1***	***mnth***	*For making the final connection between influent sewer and new PS*		
		Setup:					
		Delivery of pump sets	4	each	*Budget quote from Godwin*	$ 1,075.00	$ 4,300
		Install pump sets	4	each		$ 1,400.00	$ 5,600
		Operation:					
		Pump set rental (including pump, piping & check valve), Godwin Dri-Prime DPC-300 twelve-inch diesel engine pump set, 3250 gpm @ 53' TDH, 2200 rpm	4	each	*Budget quote from Godwin; plus 8.625% sales tax*	$ 11,764.00	$ 47,056
		Fuel, assume 1 pump, 30 days at 24 hrs/day	1	each	*Fuel cost from Godwin, based on high average diesel price per gallon*	$ 13,824.00	$ 13,824
		Fuel, assume 1 pump, 30 days at 8 hrs/day (to capture diurnal flows)	1	each		$ 4,608.00	$ 4,608
		Fuel, assume 1 pump, 24 hours for a storm event	1	each		$ 461.00	$ 461
		Maintenance Engineer: 24/7	1	mnth		$ 101,800.00	$ 101,800
		Remove:					
		Remove pump sets	4	each		$ 1,400.00	$ 5,600
		Pickup pump sets	4	each	*Budget quote from Godwin*	$ 1,075.00	$ 4,300
		Div 01S Subtotal					**$ 187,549**
Div 02		**Sitework**					
		Erosion & Sedimentation Control:			*Allow*		
		Construction Entrance	1	each		$ 2,500.00	$ 2,500
		Silt Fence	50	lf	*Allow quantity*	$ 8.00	$ 400
		Storm Drain Inlet Protection	1	each	*Allow quantity*	$ 810.00	$ 810
		Pavement & Curb Removal:					
		Sawcut Pavement	41	lf		$ 1.00	$ 41
		Remove Pavement	83	sy		$ 16.00	$ 1,328
		Remove Curb	78	lf		$ 12.00	$ 936
		Haul & Dispose Pavement & Curb	31	cy		$ 70.00	$ 2,170
		Walkway Removal:					
		Remove Walkway	420	sf		$ 10.00	$ 4,200
		Haul & Dispose Walkway	8	cy		$ 70.00	$ 560
		Earthwork for Wet Well:					
		Excavation	1,479	cy		$ 8.00	$ 11,832
		Disposal of Spoil - suitable material	740	cy	*Assume 50%*	$ 70.00	$ 51,765
		Disposal of Spoil - unsuitable material	740	cy	*Assume 50%*	$ 170.00	$ 125,715
		Backfill, plus 15% compaction	933	cy	*Assume new material*	$ 34.00	$ 31,722
		Support of Excavation:			*Assumed depth = excavation depth+25%*		
		Steel Sheeting	4,477	sf		$ 85.00	$ 380,545
		Whalers: lower level	152	lf		$ 210.00	$ 31,920
		Whalers: upper level	152	lf		$ 210.00	$ 31,920
		Braces: both levels, based on 5' width 8' oc	190	lf		$ 210.00	$ 39,900
		Vibration and Movement Monitoring	1	ls		$ 20,000.00	$ 20,000
		Earthwork for Footings & Stems:			*2 are partly included with wet well above*		
		Excavation	19	cy		$ 8.00	$ 152
		Disposal of Spoil - suitable material	10	cy	*Assume 50%*	$ 70.00	$ 665
		Disposal of Spoil - unsuitable material	10	cy	*Assume 50%*	$ 170.00	$ 1,615
		Backfill, plus 15% compaction	15	cy	*Assume new material*	$ 34.00	$ 510
		Support of Excavation:			*Assumed depth = excavation depth+25%*		
		Wood Sheeting	430	sf		$ 20.00	$ 8,600
		Doghouse Manhole:					
		Excavation	54	cy		$ 8.00	$ 432
		Disposal of Spoil - suitable material	27	cy	*Assume 50%*	$ 70.00	$ 1,890
		Disposal of Spoil - unsuitable material	27	cy	*Assume 50%*	$ 170.00	$ 4,590
		Backfill, plus 15% compaction	58	cy	*Assume new material*	$ 34.00	$ 1,972
		Support of Excavation:			*Assumed depth = excavation depth+25%*		
		Steel Sheeting	630	sf		$ 85.00	$ 53,550
		Whalers: lower level	24	lf		$ 210.00	$ 5,040
		Whalers: upper level	24	lf		$ 210.00	$ 5,040
		Braces: both levels, based on 5' width 8' oc	30	lf		$ 210.00	$ 6,300
		Vibration and Movement Monitoring	1	ls	*Included w/ wet well*		
		Doghouse Manhole:					
		6' Dia. Doghouse Manhole	1	each	*21 VLF*	$ 13,300.00	$ 13,300
		Manhole Frame & Cover	1	each		$ 1,300.00	$ 1,300
		Yard Piping:					
		Extend 4" domestic water service to existing building:					
		Trench Excavation	125	cy		$ 17.00	$ 2,125
		Disposal of Spoil	125	cy	*Assume suitable material*	$ 70.00	$ 8,750
		Trench Box	3	days		$ 112.00	$ 336
		Pipe Bedding, assume 6" thick	13	cy		$ 47.00	$ 611

		Alternative 1 Conversion of Long Beach WPCP to Pump Station	Quantity	Unit	Notes	Total Unit Cost	Total Cost
Dwg/Item #	Sub (*)	Item Description					
		4" Type K Copper Tubing	200	lf		$ 107.00	$ 21,400
		Backfill, plus 15% compaction	143	cy	*Assume new material*	$ 34.00	$ 4,862
		Dewatering:					
		Dewatering	36	days		$ 4,000.00	$ 144,000
		Site Restoration:					
		Restore Walkway	420	sf		$ 10.00	$ 4,200
		Landscaping	1,590	sf		$ 0.10	$ 159
		Div 02 Subtotal					**$ 1,029,663**
Div 03		**Concrete**			*Existing Grade = +/- 10.0*		
		Section 1 Bottom Slab, 3.5' thick (BOC -15.0):					
		Formwork	490	sf		$ 11.00	$ 5,390
		Rebar, plus 15% waste	26,000	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 52,000
		Pour Concrete	130	cy		$ 203.00	$ 26,390
		Concrete Finish	496	sf		$ 4.00	$ 1,984
		Section 2 Bottom Slab, 3.5' thick (BOC -12.0):					
		Formwork	156	sf		$ 11.00	$ 1,716
		Rebar, plus 15% waste	5,400	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 10,800
		Pour Concrete	27	cy		$ 203.00	$ 5,481
		Concrete Finish	152	sf		$ 4.00	$ 608
		Section 3 Bottom Slab, 3.5' thick (BOC -12.0):					
		Formwork	133	sf		$ 11.00	$ 1,463
		Rebar, plus 15% waste	2,400	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 4,800
		Pour Concrete	12	cy		$ 203.00	$ 2,436
		Concrete Finish	36	sf		$ 4.00	$ 144
		Section 1 Wall, bottom, 3' thick (BOC -11.5):			*10.5' tall*		
		Formwork	1,491	sf		$ 14.00	$ 20,874
		Rebar, plus 15% waste	16,600	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 33,200
		Pour Concrete	83	cy		$ 203.00	$ 16,849
		Concrete Finish	1,782	sf		$ 4.00	$ 7,128
		Section 1 Wall, top, 2' thick (BOC -5.0):			*9' tall*		
		Formwork	1,368	sf		$ 14.00	$ 19,152
		Rebar, plus 15% waste	10,200	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 20,400
		Pour Concrete	51	cy		$ 203.00	$ 10,353
		Concrete Finish	0	sf		$ 4.00	$ -
		Section 1 Wall, 3' thick (BOC -11.5):			*2' tall*		
		Formwork	136	sf		$ 14.00	$ 1,904
		Rebar, plus 15% waste	1,600	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 3,200
		Pour Concrete	8	cy		$ 203.00	$ 1,624
		Concrete Finish	62	sf		$ 4.00	$ 248
		Section 1 Interior Wall, 2' thick (BOC -11.5):	***3***	***each***	*19.5' tall*		
		Formwork	1,170	sf		$ 14.00	$ 16,380
		Rebar, plus 15% waste	8,600	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 17,200
		Pour Concrete	43	cy		$ 203.00	$ 8,729
		Concrete Finish	1,170	sf		$ 4.00	$ 4,680
		Section 2 Wall, bottom, 3' thick (BOC -8.5):			*10' tall*		
		Formwork	740	sf		$ 14.00	$ 10,360
		Rebar, plus 15% waste	8,200	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 16,400
		Pour Concrete	41	cy		$ 203.00	$ 8,323
		Concrete Finish	340	sf		$ 4.00	$ 1,360
		Section 2 Wall, top, 2' thick (BOC -2.0):			*8.5' tall*		
		Formwork	646	sf		$ 14.00	$ 9,044
		Rebar, plus 15% waste	4,800	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 9,600
		Pour Concrete	24	cy		$ 203.00	$ 4,872
		Concrete Finish	306	sf		$ 4.00	$ 1,224
		Section 2 Wall, bottom, 3' thick (BOC -8.5):	***2***	***each***	*10' tall*		
		Formwork	60	sf		$ 14.00	$ 840
		Rebar, plus 15% waste	450	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 900
		Pour Concrete	3	cy		$ 203.00	$ 609
		Concrete Finish	30	sf		$ 4.00	$ 120
		Section 2 Wall, top, 2' thick (BOC -2.0):	***2***	***each***	*8.5' tall*		
		Formwork	86	sf		$ 14.00	$ 1,204
		Rebar, plus 15% waste	450	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 900
		Pour Concrete	3	cy		$ 203.00	$ 609
		Concrete Finish	42	sf		$ 4.00	$ 168
		Section 2 Interior Wall, 2' thick (BOC -8.5):	***2***	***each***	*18.5' tall*		
		Formwork	1,332	sf		$ 14.00	$ 18,648
		Rebar, plus 15% waste	8,800	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 17,600
		Pour Concrete	44	cy		$ 203.00	$ 8,932
		Concrete Finish	1,332	sf		$ 4.00	$ 5,328

		Alternative 1 Conversion of Long Beach WPCP to Pump Station	Quantity	Unit	Notes	Total Unit Cost	Total Cost
Dwg/Item #	Sub (*)	Item Description					
		Section 3 Wall, 3' thick (BOC -8.5):			*10' tall*		
		Formwork	440	sf		$ 14.00	$ 6,160
		Rebar, plus 15% waste	1,600	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 3,200
		Pour Concrete	8	cy		$ 203.00	$ 1,624
		Concrete Finish	160	sf		$ 4.00	$ 640
		Section 3 Wall, 2' thick (BOC -2.0):			*8.5' tall*		
		Formwork	340	sf		$ 14.00	$ 4,760
		Rebar, plus 15% waste	1,200	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 2,400
		Pour Concrete	6	cy		$ 203.00	$ 1,218
		Concrete Finish	136	sf		$ 4.00	$ 544
		Section 1 Top Slab, 2' thick (TOC +10.0):					
		Formwork	280	sf		$ 25.00	$ 7,000
		Rebar, plus 15% waste	14,800	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 29,600
		Pour Concrete	74	cy		$ 203.00	$ 15,022
		Concrete Finish	496	sf		$ 5.00	$ 2,480
		Section 2 Top Slab, 2' thick (TOC +10.0):					
		Formwork	89	sf		$ 25.00	$ 2,225
		Rebar, plus 15% waste	3,000	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 6,000
		Pour Concrete	15	cy		$ 203.00	$ 3,045
		Concrete Finish	152	sf		$ 5.00	$ 760
		Section 3 Top Slab, 2' thick (TOC +10.0):					
		Formwork	48	sf		$ 25.00	$ 1,200
		Rebar, plus 15% waste	1,000	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 2,000
		Pour Concrete	5	cy		$ 203.00	$ 1,015
		Concrete Finish	24	sf		$ 5.00	$ 120
		Footings, 1.5' thick (BOC +6.0):	***4***	***each***			
		Formwork	120	sf		$ 11.00	$ 1,320
		Rebar, plus 15% waste	1,200	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 2,400
		Pour Concrete	6	cy		$ 203.00	$ 1,218
		Footing Stems, 2'x2' (TOC +7.5):	***4***	***each***	*2.5' tall*		
		Formwork	80	sf		$ 14.00	$ 1,120
		Rebar, plus 15% waste	800	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 1,600
		Pour Concrete	4	cy		$ 203.00	$ 812
		Concrete Deck, 1' thick:					
		Formwork	154	sf		$ 25.00	$ 3,850
		Rebar, plus 15% waste	5,600	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 11,200
		Pour Concrete	28	cy		$ 203.00	$ 5,684
		Concrete Finish	24	sf		$ 5.00	$ 120
		Additional Valve Vault Slab, 1' thick:					
		Formwork	114	sf		$ 11.00	$ 1,254
		Rebar, plus 15% waste	2,600	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 5,200
		Pour Concrete	13	cy		$ 203.00	$ 2,639
		Concrete Finish	350	sf		$ 4.00	$ 1,400
		Additional Valve Vault Wall, 1' thick:			*6' tall*		
		Formwork	600	sf		$ 14.00	$ 8,400
		Rebar, plus 15% waste	2,200	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 4,400
		Pour Concrete	11	cy		$ 203.00	$ 2,233
		Concrete Finish	600	sf		$ 4.00	$ 2,400
		Div 03 Subtotal					**$ 560,437**
Div 05		**Metals**					
		Columns, W12x40	40	lf		$ 73.00	$ 2,920
		Long Beams, W18x119	130	lf		$ 192.00	$ 24,960
		Short Beams, W12x40	60	lf		$ 73.00	$ 4,380
		K-Bracings, 2L4x4x3/8	104	lf		$ 78.00	$ 8,112
		X-Bracings, L4x4x3/8	150	lf		$ 78.00	$ 11,700
		Connections	1	ls		$ 18,000.00	$ 18,000
		Stairs, Landings & Handrails	1	ls		$ 35,000.00	$ 35,000
		Raised platform for exterior generator	1	ls		$ 20,000.00	$ 20,000
		Div 05 Subtotal					**$ 125,072**
Div 06		**Wood, Plastics & Composites**					
		Ladder in wet well, 20' tall	1	each	*Assume FRP*	$ 1,800.00	$ 1,800
		Misc wood framing	1	ls		$ 20,000.00	$ 20,000
		Div 06 Subtotal					**$ 21,800**
Div 08		**Openings**					
		Hatches for pumps and valves, 4'x5'	8	each		$ 3,100.00	$ 24,800
		Hatches for grinders, 4'x3'	3	each		$ 2,200.00	$ 6,600

Dwg/Item #	Sub (*)	Alternative 1 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		Door	1	each	*Assume AL*	$ 3,500.00	$ 3,500
		Div 08 Subtotal					**$ 34,900**
Div 09		**Finishes**					
		Painting	1	ls	*Allow*	$ 40,000.00	$ 40,000
		Specialty coating to all concrete surfaces to prevent the decomposition of concrete due to contact with hydrogen sulfide	1	ls	*Allow*	$ 125,000.00	$ 125,000
		Aesthetic acoustical enclosure/fencing around generator	1	ls	*Allow around the enclosure provided by generator manufacturer*	$ 30,000.00	$ 30,000
		Div 09 Subtotal					**$ 195,000**
Div 10		**Specialties**					
		Fire Extinguisher, CO2	1	each	*Allow*	$ 469.00	$ 469
		Signage	1	ls	*Allow*	$ 5,000.00	$ 5,000
		Div 10 Subtotal					**$ 5,469**
Div 11		**Equipment**					
		New Pumps (N+1):					
		Furnish pumps, submersible dry-pit type, Flygt Model NP 3231/776, 335 HP, 480 V, 3 phase, 1780 RPM (including explosion proof construction, MAS 801 Monitoring And Status control relay, abrasion resistant Hard Iron impeller, 25 feet of power cable, tests, freight and start-up services)	4	each	*Budget quote from GA Fleet Associates, 6/12/19*	$ 163,000.00	$ 652,000
		Install pumps at wet well	4	each		$ 50,000.00	$ 200,000
		Startup/Testing	8	cd		$ 4,000.00	$ 32,000
		Grinders (N+1):			*8.5 MGD each for a total flow at 17 MGD*		
		Furnish Grinders, CMF3630-M2.0E Channel Monster Flex (including 5 HP Immersible grinder motor with 40' cord, 1 HP Immerisble solids diverter motor with 40' cord, and PC2222 NEMA 4X FRP standard control panel)	2	each	*Budget quote from JWC Environmental, 6/7/19*	$ 90,394.00	$ 180,788
		Install Grinders in Influent Channel	2	each		$ 30,000.00	$ 60,000
		Startup/Testing	4	cd		$ 4,000.00	$ 16,000
		Stop Logs:			*Assume SS*		
		Furnish Stop Logs	4	each	*Per frame basis, assume 3'x5'*	$ 3,000.00	$ 12,000
		Furnish Stop Log Guide Frames	4	each		$ 5,200.00	$ 20,800
		Install Stop Logs Guide Frames in Influent Channel	4	each		$ 6,000.00	$ 24,000
		Sluice Gates:					
		Furnish Sluice Gates	2	each	*Assume cast iron, 36"x36"*	$ 72,000.00	$ 144,000
		Install Sluice Gates	2	each		$ 14,000.00	$ 28,000
		Div 11 Subtotal					**$ 1,369,588**
Div 13		**Special Construction**					
		Superstructure - Electrical Building	769	sf		$ 100.00	$ 76,900
		Div 13 Subtotal					**$ 76,900**
Div 15		**Mechanical**					
		24" Piping:					
		24" DIP	24	lf		$ 684.00	$ 16,416
		24X16 DI Wye	2	each		$ 11,000.00	$ 22,000
		24X20 DI Reducer	1	each		$ 4,700.00	$ 4,700
		24x18 DI Reducer	2	each		$ 4,600.00	$ 9,200
		24x16 DI Reducer	1	each		$ 4,400.00	$ 4,400
		24x14 DI Reducer	1	each		$ 4,200.00	$ 4,200
		20" Piping:					
		20" DIP	18	lf		$ 444.00	$ 7,992
		20X14 DI Wye	1	each		$ 6,500.00	$ 6,500
		18" Piping:					
		18" DIP	8	lf		$ 440.00	$ 3,520
		18" Plug Valve	2	each		$ 11,200.00	$ 22,400
		16" Piping:					
		16" DIP	22	lf		$ 376.00	$ 8,272
		16" DI 45 Deg. Elbow	2	each		$ 1,600.00	$ 3,200
		16" Plug Valve	1	each		$ 7,600.00	$ 7,600
		Additional 16" Piping:					
		16" DIP	39	lf		$ 376.00	$ 14,664
		16" DI 90 Deg. Elbow	2	each		$ 3,300.00	$ 6,600
		16" DI 11.25 Deg. Elbow	4	each		$ 1,900.00	$ 7,600
		16x18 DI 90 Deg. Base Elbow	4	each		$ 3,600.00	$ 14,400

Dwg/Item #	Sub (*)	Alternative 1 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		16x20 DI Reducer	1	each		$ 1,800.00	$ 1,800
		16" Gate Valve	5	each		$ 7,300.00	$ 36,500
		16" Check Valve	4	each		$ 20,800.00	$ 83,200
		Div 15 Subtotal					**$ 285,164**
Div 15		**Plumbing**			*Demo will be part of decommissioning*		
		Extend Domestic Water Service to Building:			*See yard piping in Div 02*		
	*	4" core drill	1	each		$ 74.00	$ 74
	*	4" sleeve & link seal at building exterior wall	1	each		$ 347.00	$ 347
		RPZ backflow preventer in heated, interior space:					
	*	2" backflow prevention device and water meter	1	each		$ 2,200.00	$ 2,200
	*	2" gate valves	3	each		$ 652.00	$ 1,956
	*	2" type L copper tubing with insulation & supports	15	lf		$ 44.00	$ 660
		Yard Post Hydrant:					
	*	1-1/4" post hydrant	1	each		$ 2,317.00	$ 2,317
	*	1-1/4" type L copper tubing	10	lf		$ 30.00	$ 300
		Storm/Roof Drain for New Electrical Building:			*Allow*		
	*	Roof Drains	2	each		$ 567.00	$ 1,134
	*	No-hub cast-iron piping	45	lf		$ 53.00	$ 2,385
		Storm/Roof Drain for New Electrical Building:			*Allow*		
	*	4" Floor Drains, Cast Iron	2	each		$ 697.00	$ 1,394
	*	4" P-traps, Cast Iron	2	each		$ 275.00	$ 550
	*	No-hub cast-iron piping	20	lf		$ 53.00	$ 1,060
	*	Sprinkler Coverage of Building	675	sf	*Approx. sprinkler floor area covered at ordinary hazard*	$ 10.00	$ 6,750
		Div 15 Subtotal					**$ 21,127**
Div 15		**HVAC**					
	*	A/C (ductless split system system units)	4	each	*Outdoor components will have a corrosion protection coating due to location of the PS*	$ 30,000.00	$ 120,000
	*	Electric Unit Heater, 5kW	4	each		$ 4,000.00	$ 16,000
	*	Portable Fans	4	each	*Allow quantity*	$ 2,000.00	$ 8,000
		Div 15 Subtotal					**$ 144,000**
Div 16		**Electrical**					
		Grounding System:			*Allow*		
	*	SS Ground Rods	4	each	*Allow quantity*	$ 295.00	$ 1,180
	*	#4/0 AWG Ground Conductor	100	lf	*Allow quantity*	$ 8.00	$ 800
		Lightning Protection System:			*Allow*		
	*	48" Air Terminals	4	each	*Allow quantity*	$ 357.00	$ 1,428
	*	Cable	100	lf	*Allow quantity*	$ 32.00	$ 3,200
	*	Conductor connecting to grounding system	4	each	*Allow quantity*	$ 80.00	$ 320
		Exterior Generator:					
	*	Furnish generator, including enclosure	1	each		$ 450,000.00	$ 450,000
	*	Install generator	1	each		$ 17,000.00	$ 17,000
	*	Startup/Testing	4	cd		$ 2,000.00	$ 8,000
		GC Support: Crane & Operator	1	cd		$ 2,000.00	$ 2,000
		MCC in Electrical Building:					
	*	Furnish MCC	1	each		$ 250,000.00	$ 250,000
	*	Install Sections	5	each	*Allow quantity*	$ 17,000.00	$ 85,000
	*	Startup/Testing	4	cd		$ 2,000.00	$ 8,000
		GC Support: Crane & Operator	1	cd		$ 2,000.00	$ 2,000
		Panel:					
	*	Install grinders panel	1	each	*Material cost included w/ grinder quote, see Div 11*	$ 1,800.00	$ 1,800
		Lighting:					
	*	LED Light Fixtures	16	each	*Allow quantity*	$ 614.00	$ 9,824
	*	LED Exit Sign	1	each	*Allow quantity*	$ 264.00	$ 264
	*	Receptacles	2	each	*Allow quantity*	$ 88.00	$ 176
	*	Light Switch	2	each	*Allow quantity*	$ 170.00	$ 340
	*	Conduit, Wiring, Terminations, Junction Boxes	1	ls		$ 30,000.00	$ 30,000
	*	Misc electrical items	1	ls		$ 70,000.00	$ 70,000
		Div 16 Subtotal					**$ 941,332**

		Alternative 1 Conversion of Long Beach WPCP to Pump Station	Quantity	Unit	Notes	Total Unit Cost	Total Cost
Dwg/Item #	Sub (*)	Item Description					
Div 17		**Instrumentation & Control**					
		Main Control Panel (Redundant PLC):	***1***	***each***			
	*	Furnish Enclosure 72x60x20 NEMA 12	1	each		$ 8,800.00	$ 8,800
	*	Furnish Programmable Logic Controller (Redundant RX3i)	2	each		$ 3,300.00	$ 6,600
	*	Furnish Profinet Module (Redundancy)	3	each		$ 1,650.00	$ 4,950
	*	Furnish 7-Slot I/O Chassis	2	each		$ 1,000.00	$ 2,000
	*	Furnish 16-Slot I/O Chassis	1	each		$ 1,100.00	$ 1,100
	*	Furnish Analog Output Modules (8 channels isolated)	2	each		$ 2,805.00	$ 5,610
	*	Furnish Analog Input Modules (12 channels isolated)	2	each		$ 3,245.00	$ 6,490
	*	Furnish Digital Input Modules (16 channels 120 vac)	5	each		$ 605.00	$ 3,025
	*	Furnish Digital Output Modules (16 channels dry contact)	3	each		$ 385.00	$ 1,155
	*	Furnish Ethernet Communication Modules	2	each		$ 2,200.00	$ 4,400
	*	Furnish PLC Power Supplies	3	each		$ 770.00	$ 2,310
	*	Furnish PLC Blank Filler Module	5	each		$ 55.00	$ 275
	*	Furnish Indicating Lights	2	each		$ 110.00	$ 220
	*	Furnish Ethernet Switch	1	each		$ 330.00	$ 330
	*	Furnish 24 Volt DC Power Supplies	3	each		$ 550.00	$ 1,650
	*	Furnish Relays	40	each		$ 38.50	$ 1,540
	*	Furnish UPS	1	each		$ 577.50	$ 578
	*	Furnish 120 VAC TVSS on mains	1	each		$ 440.00	$ 440
	*	Furnish 4-20 mA Surge Suppressor	1	each		$ 440.00	$ 440
	*	Furnish Operator Interface Terminal (incl. Software) NEMA 4X	1	each		$ 5,500.00	$ 5,500
	*	Furnish Horn/Strobe NEMA 4X	1	each		$ 462.00	$ 462
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	2	each		$ 1,732.50	$ 3,465
	*	Assemble Main Control Panel	105	ch		$ 100.00	$ 10,500
	*	Install Main Control Panel	21	ch		$ 100.00	$ 2,100
		Engineering/ Programming	80	hrs		$ 165.00	$ 13,200
		Pump Local Control Stations:	***4***	***each***			
	*	Furnish Enclosure 16"x12"x8" NEMA 12	4	each		$ 400.00	$ 1,600
	*	Furnish Indicating Lights	8	each		$ 110.00	$ 880
	*	Furnish Push Buttons	8	each		$ 110.00	$ 880
	*	Furnish 3 Position Switch	4	each		$ 137.50	$ 550
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 433.00	$ 433
	*	Assemble LCS	20	ch		$ 100.00	$ 2,000
	*	Install LCS	20	ch		$ 100.00	$ 2,000
		Engineering/ Programming	4	hrs		$ 165.00	$ 660
		Grinder Local Control Stations:	***2***	***each***			
	*	Furnish Enclosure 16"x12"x8" NEMA 12	2	each		$ 400.00	$ 800
	*	Furnish Indicating Lights	4	each		$ 110.00	$ 440
	*	Furnish Push Buttons	4	each		$ 110.00	$ 440
	*	Furnish 3 Position Switch	2	each		$ 137.50	$ 275
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 433.00	$ 433
	*	Assemble LCS	10	ch		$ 100.00	$ 1,000
	*	Install LCS	10	ch		$ 100.00	$ 1,000
		Engineering/ Programming	2	hrs		$ 165.00	$ 330
		Sluice Gate Local Control Stations:	***2***	***each***			
	*	Furnish Enclosure 16"x12"x8" NEMA 12	2	each		$ 400.00	$ 800
	*	Furnish Indicating Lights	4	each		$ 110.00	$ 440
	*	Furnish 3 Position Switch	2	each		$ 137.50	$ 275
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 433.00	$ 433
	*	Assemble LCS	10	ch		$ 100.00	$ 1,000
	*	Install LCS	10	ch		$ 100.00	$ 1,000
		Engineering/ Programming	2	hrs		$ 165.00	$ 330
		Communications Cabinet:	***1***	***each***			
	*	Furnish Enclosure 24x24x20 NEMA 12	1	each		$ 1,278.00	$ 1,278
	*	Furnish Radio MDS SD Series (cellular Radio)	1	each		$ 2,208.00	$ 2,208
	*	Furnish Indicating Lights	2	each		$ 110.00	$ 220
	*	Furnish 24 Volt DC Power Supplies	1	each		$ 550.00	$ 550
	*	Furnish UPS	1	each		$ 577.50	$ 578
	*	Furnish 4-20 mA Surge Suppressor	1	each		$ 440.00	$ 440
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 866.00	$ 866
	*	Assemble Communications Cabinet	21	ch		$ 100.00	$ 2,100
	*	Install Communications Cabinet	7	ch		$ 100.00	$ 700
		Engineering/ Programming	8	hrs		$ 165.00	$ 1,320
		Instruments:					
	*	Submersible Level Probe (Dwyer PBLTX, 80 ft PFTE cable, 2yr wrty)	1	each		$ 2,000.00	$ 2,000
	*	Bubbler System for Channel Level	1	each	*Reduntant of level probe*	$ 10,900.00	$ 10,900
	*	Float for Doghouse Manhole	1	each	*High high level alarm*	$ 1,400.00	$ 1,400
	*	Magnetic Flow Meter 24"	1	each		$ 25,400.00	$ 25,400
	*	Gas Detection System	1	each		$ 26,900.00	$ 26,900
	*	Contact switch (Security)	5	each		$ 1,400.00	$ 7,000
		Div 17 Subtotal					**$ 188,998**
		TOTAL					**$ 5,186,999**

Dwg/Item #	Sub (*)	Alternative 2 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		Retrofit the Existing Influent Building					
Div 01S		**Special Conditions**					
		Temporary Bypass Pumping:	***14***	***mnths***	*Assume for the duration of construction as the Contractor replaces one pump at a time*		
		Setup:					
		Delivery of pump sets	1	each	*Budget quote from Godwin*	$ 1,075.00	$ 1,075
		Install pump sets	1	each		$ 1,400.00	$ 1,400
		Operation:					
		Pump set rental (including pump, piping & check valve), Godwin Dri-Prime DPC-300 twelve-inch diesel engine pump set, 3250 gpm @ 53' TDH, 2200 rpm	1	each	*Budget quote from Godwin; plus 8.625% sales tax*	$ 11,764.00	$ 11,764
		Fuel, assume 10 times for 24 hrs each	1	each	*Fuel cost from Godwin, based on high average diesel price per gallon*	$ 4,608.00	$ 4,608
		Maintenance Engineer: 24/7	14	mnths		$ 101,800.00	$ 1,425,200
		Remove:					
		Remove pump sets	1	each		$ 1,400.00	$ 1,400
		Pickup pump sets	1	each	*Budget quote from Godwin*	$ 1,075.00	$ 1,075
		Temporary Bypass Pumping:	***1***	***mnth***	*For making the final connection between PS & new force main*		
		Setup:					
		Delivery of pump sets	3	each	*Budget quote from Godwin*	$ 1,075.00	$ 3,225
		Install pump sets	3	each		$ 1,400.00	$ 4,200
		Operation:					
		Pump set rental (including pump, piping & check valve), Godwin Dri-Prime DPC-300 twelve-inch diesel engine pump set, 3250 gpm @ 53' TDH, 2200 rpm	3	each	*Budget quote from Godwin; plus 8.625% sales tax*	$ 11,764.00	$ 35,292
		Fuel, assume 1 pump, 30 days at 24 hrs/day	1	each	*Fuel cost from Godwin, based on high average diesel price per gallon*	$ 13,824.00	$ 13,824
		Fuel, assume 1 pump, 30 days at 8 hrs/day (to capture diurnal flows)	1	each		$ 4,608.00	$ 4,608
		Fuel, assume 1 pump, 24 hours for a storm event	1	each		$ 461.00	$ 461
		Maintenance Engineer: 24/7	1	mnth		$ 101,800.00	$ 101,800
		Remove:					
		Remove pump sets	3	each		$ 1,400.00	$ 4,200
		Pickup pump sets	3	each	*Budget quote from Godwin*	$ 1,075.00	$ 3,225
		Div 01S Subtotal					**$ 1,617,357**
Div 02		**Sitework**					
		Erosion & Sedimentation Control:			*Allow*		
		Construction Entrance	1	each		$ 2,500.00	$ 2,500
		Silt Fence	200	lf	*Allow quantity*	$ 5.00	$ 1,000
		Storm Drain Inlet Protection	1	each	*Allow quantity*	$ 810.00	$ 810
		Demolition:					
		Remove existing pump station superstructure in its entirety	1	ls	*Careful not to damage below grade screening and pumping structure*	$ 28,000.00	$ 28,000
		Disposal	50	cy	*Allow quantity*	$ 70.00	$ 3,500
		Earthwork for Columns & Footings:			*2 are partly included with wet well above*		
		Excavation	19	cy		$ 8.00	$ 152
		Disposal of Spoil - suitable material	10	cy	*Assume 50%*	$ 70.00	$ 665
		Disposal of Spoil - unsuitable material	10	cy	*Assume 50%*	$ 170.00	$ 1,615
		Backfill, plus 15% compaction	15	cy	*Assume new material*	$ 34.00	$ 510
		Support of Excavation:			*Assumed depth = excavation depth+25%*		
		Wood Sheeting	280	sf		$ 20.00	$ 5,600
		Earthwork for Outer Wall Extensions:					
		Excavation, SOE & backfill	1	ls		$ 15,000.00	$ 15,000
		Yard Piping:					
		Extend 4" fire protection water service to existing building:					
		Trench Excavation	125	cy		$ 17.00	$ 2,125
		Disposal of Spoil	125	cy	*Assume suitable material*	$ 70.00	$ 8,750
		Trench Box	3	days		$ 112.00	$ 336
		Pipe Bedding, assume 6" thick	13	cy		$ 47.00	$ 611
		4" DIP	300	lf		$ 36.00	$ 10,800
		4" DI 90 Deg. Elbow	4	each		$ 310.00	$ 1,240
		Backfill, plus 15% compaction	143	cy	*Assume new material*	$ 34.00	$ 4,862
		Dewatering:					
		Dewatering	4	days		$ 4,000.00	$ 16,000

Dwg/Item #	Sub (*)	Alternative 2 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		Remediation of HazMats:					
	*	Asbestos abatement, lead removal, etc.	1	ls		$ 65,000.00	$ 65,000
		Div 02 Subtotal					**$ 169,076**
Div 03		**Concrete**			*Existing Grade = +/- 10.0*		
		Footings, 1.5' thick (BOC +6.0):	***4***	***each***			
		Formwork	120	sf		$ 11.00	$ 1,320
		Rebar, plus 15% waste	1,200	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 2,400
		Pour Concrete	6	cy		$ 203.00	$ 1,218
		Footing Stems, 2'x2' (TOC +7.5):	***4***	***each***	*2.5' tall*		
		Formwork	80	sf		$ 14.00	$ 1,120
		Rebar, plus 15% waste	800	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 1,600
		Pour Concrete	4	cy		$ 203.00	$ 812
		Concrete Deck, 1' thick:					
		Formwork	154	sf		$ 25.00	$ 3,850
		Rebar, plus 15% waste	5,600	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 11,200
		Pour Concrete	28	cy		$ 203.00	$ 5,684
		Concrete Finish	24	sf		$ 5.00	$ 120
		Wall Extension:	***700***	***cy***	*See earthwork for outer walls in Div 02*		
		CIP concrete, including formwork, rebar, and pouring concrete	700	cy	*Required to resist buoyancy, assuming Normal Ground Water is 5' below grade*	$ 772.00	$ 540,400
		Div 03 Subtotal					**$ 569,724**
Div 05		**Metals**					
		Columns, W12x40	40	lf		$ 73.00	$ 2,920
		Long Beams, W18x119	130	lf		$ 192.00	$ 24,960
		Short Beams, W12x40	60	lf		$ 73.00	$ 4,380
		K-Bracings, 2L4x4x3/8	104	lf		$ 78.00	$ 8,112
		X-Bracings, L4x4x3/8	150	lf		$ 78.00	$ 11,700
		Connections	1	ls		$ 18,000.00	$ 18,000
		Stairs, Landings & Handrails	1	ls		$ 35,000.00	$ 35,000
		Raised platform for exterior generator	1	ls		$ 20,000.00	$ 20,000
		Div 05 Subtotal					**$ 125,072**
Div 06		**Wood, Plastics & Composites**					
		Misc wood framing	1	ls		$ 20,000.00	$ 20,000
		Div 06 Subtotal					**$ 20,000**
Div 08		**Openings**					
		Door	1	each	*Assume AL*	$ 3,500.00	$ 3,500
		Hatches for pumps, 4'x5'	4	each		$ 3,100.00	$ 12,400
		Div 08 Subtotal					**$ 15,900**
Div 09		**Finishes**					
		Painting	1	ls	*Allow*	$ 50,000.00	$ 50,000
		Specialty coating to all concrete surfaces to prevent the decomposition of concrete due to contact with hydrogen sulfide	1	ls	*Allow*	$ 125,000.00	$ 125,000
		Aesthetic acoustical enclosure/fencing around generator	1	ls	*Allow around the enclosure provided by generator manufacturer*	$ 30,000.00	$ 30,000
		Div 09 Subtotal					**$ 205,000**
Div 10		**Specialties**					
		Fire Extinguisher, CO2	1	each	*Allow*	$ 469.00	$ 469
		Signage	1	ls	*Allow*	$ 5,000.00	$ 5,000
		Div 10 Subtotal					**$ 5,469**
Div 11		**Equipment**					
		Demolition:					

Dwg/Item #	Sub (*)	Alternative 2 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		Remove existing mechanically cleaned bar screens (each rated 11 MG	2	each		$ 36,000.00	$ 72,000
		Remove existing Pump No. 1 (Fairbanks Morse Centrifugal Pump, 6,300 gpd @34' TDH, 75 HP)	1	each	*Installed 2012*	$ 20,000.00	$ 20,000
		Remove existing Pump No. 2 & 4 (Fairbanks Nijhuis Dry Pit Submersible Pump, 5,800 gpd @34' TDH, 71.1 HP)	2	each	*Installed 2014 post Superstorm Sandy*	$ 20,000.00	$ 40,000
		Remove existing Pump No. 3 (Fairbanks Nijhuis Dry Pit Submersible Pump, 4,800 gpd @34' TDH, 50 HP)	1	each	*Installed 2014 post Superstorm Sandy*	$ 20,000.00	$ 20,000
		Haul & store equipment at County's warehouse	1	ls		$ 4,000.00	$ 4,000
		New Pumps (N+1):					
		Furnish pumps, submersible dry-pit type, Flygt Model NP 3231/776, 335 HP, 480 V, 3 phase, 1780 RPM (including explosion proof construction, MAS 801 Monitoring And Status control relay, abrasion resistant Hard Iron impeller, 25 feet of power cable, tests, freight and start-up services)	4	each	*Budget quote from GA Fleet Associates, 6/12/19*	$ 163,000.00	$ 652,000
		Install pumps at wet well	4	each		$ 50,000.00	$ 200,000
		Startup/Testing	8	cd		$ 4,000.00	$ 32,000
		Grinders (N+1):			*8.5 MGD each for a total flow at 17 MGD*		
		Furnish Grinders, CMF3630-M2.0E Channel Monster Flex (including 5 HP Immersible grinder motor with 40' cord, 1 HP Immerisble solids diverter motor with 40' cord, and PC2222 NEMA 4X FRP standard control panel)	2	each	*Budget quote from JWC Environmental, 6/7/19*	$ 90,394.00	$ 180,788
		Install Grinders in Influent Channel	2	each		$ 30,000.00	$ 60,000
		Startup/Testing	4	cd		$ 4,000.00	$ 16,000
		Stop Logs:			*Assume SS*		
		Furnish Stop Logs	2	each	*Per frame basis, assume 3'x5'*	$ 3,000.00	$ 6,000
		Furnish Stop Log Guide Frames	4	each		$ 5,200.00	$ 20,800
		Install Stop Logs Guide Frames in Influent Channel	4	each		$ 6,000.00	$ 24,000
		Div 11 Subtotal					**$ 1,347,588**
Div 13		**Special Construction**					
		Superstructure - Electrical Building	769	sf		$ 100.00	$ 76,900
		Div 13 Subtotal					**$ 76,900**
Div 15		**Mechanical**					
		Demolition:					
		Remove 24" piping	50	lf		$ 51.00	$ 2,550
		Remove 20" piping	22	lf		$ 40.00	$ 880
		Remove 18" piping	8	lf		$ 40.00	$ 320
		Remove 16" piping	26	lf		$ 40.00	$ 1,040
		Remove 14" piping	42	lf		$ 37.00	$ 1,554
		Remove 12" piping	30	lf		$ 37.00	$ 1,110
		Remove 18" Gate Valve	2	each		$ 1,500.00	$ 3,000
		Remove 16" Gate Valve	1	each		$ 1,500.00	$ 1,500
		Remove 14" Gate Valve	3	each		$ 400.00	$ 1,200
		Remove 14" Check Valve	2	each		$ 400.00	$ 800
		Remove 12" Gate Valve	2	each		$ 400.00	$ 800
		Remove 12" Check Valve	2	each		$ 400.00	$ 800
		24" Piping:					
		24" DIP	24	lf		$ 684.00	$ 16,416
		24X16 DI Wye	2	each		$ 11,000.00	$ 22,000
		24X20 DI Reducer	1	each		$ 4,700.00	$ 4,700
		24x18 DI Reducer	2	each		$ 4,600.00	$ 9,200
		24x16 DI Reducer	1	each		$ 4,400.00	$ 4,400
		24x14 DI Reducer	1	each		$ 4,200.00	$ 4,200
		20" Piping:					
		20" DIP	18	lf		$ 444.00	$ 7,992
		20X14 DI Wye	1	each		$ 6,500.00	$ 6,500
		18" Piping:					
		18" DIP	8	lf		$ 440.00	$ 3,520
		18" Plug Valve	2	each		$ 11,200.00	$ 22,400
		16" Piping:					
		16" DIP	22	lf		$ 376.00	$ 8,272
		16" DI 45 Deg. Elbow	2	each		$ 1,600.00	$ 3,200
		16" Plug Valve	1	each		$ 7,600.00	$ 7,600
		Additional 16" Piping:					
		16" DIP	39	lf		$ 376.00	$ 14,664
		16" DI 90 Deg. Elbow	2	each		$ 3,300.00	$ 6,600

Dwg/Item #	Sub (*)	Alternative 2 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		16" DI 11.25 Deg. Elbow	4	each		$ 1,900.00	$ 7,600
		16x18 DI 90 Deg. Base Elbow	4	each		$ 3,600.00	$ 14,400
		16x20 DI Reducer	1	each		$ 1,800.00	$ 1,800
		16" Gate Valve	5	each		$ 7,300.00	$ 36,500
		16" Check Valve	4	each		$ 20,800.00	$ 83,200
		Div 15 Subtotal					**$ 300,718**
Div 15		**Plumbing**			*Demo will be part of decommissioning*		
		Extend Fire Protection Water Service to Building:			*See yard piping in Div 02*		
	*	4" core drill	1	each		$ 74.00	$ 74
	*	4" link seal	1	each		$ 347.00	$ 347
	*	4" double check detector assembly backflow prevention device	1	each		$ 5,110.00	$ 5,110
	*	Tamper Switch	5	each		$ 380.00	$ 1,900
	*	Sprinkler Coverage of Building	2,000	sf	*Approx. sprinkler floor area covered at ordinary hazard*	$ 10.00	$ 20,000
		Div 15 Subtotal					**$ 27,431**
Div 15		**HVAC**					
		Demolition:					
	*	Remove existing HVAC equipment	1	ls		$ 15,000.00	$ 15,000
		New HVAC Equipment:					
	*	A/C (ductless split system system units)	4	each	*Outdoor components will have a corrosion protection coating due to location of the PS*	$ 30,000.00	$ 120,000
	*	Electric Unit Heater, 5kW	6	each	*Assuming that HVAC room will be provided w/ HV unit*	$ 4,000.00	$ 24,000
	*	Portable Fans	4	each	*Allow quantity*	$ 2,000.00	$ 8,000
		Continous ventilation to the dry well:					
	*	HV Unit	1	each		$ 10,000.00	$ 10,000
	*	Exhaust Fan	1	each		$ 10,000.00	$ 10,000
	*	Ductwork & registers	1	ls		$ 10,000.00	$ 10,000
		Ventilation to the Screening Area:					
	*	X-proof roof mounted supply fan	1	each	*Manually controlled via an ON/OFF switch mounted outside the Screening Room area*	$ 14,000.00	$ 14,000
	*	X-proof roof mounted exhaust fan	1	each		$ 14,000.00	$ 14,000
	*	Ventilation monitoring system per NFPA 820	1	each		$ 25,000.00	$ 25,000
		Div 15 Subtotal					**$ 250,000**
Div 16		**Electrical**					
		Exterior Generator:					
	*	Furnish generator, including enclosure	1	each		$ 450,000.00	$ 450,000
	*	Install generator	1	each		$ 17,000.00	$ 17,000
	*	Startup/Testing	4	cd		$ 2,000.00	$ 8,000
		GC Support: Crane & Operator	1	cd		$ 2,000.00	$ 2,000
		MCC in Electrical Building:					
	*	Furnish MCC	1	each		$ 250,000.00	$ 250,000
	*	Install Sections	5	each	*Allow quantity*	$ 17,000.00	$ 85,000
	*	Startup/Testing	4	cd		$ 2,000.00	$ 8,000
		GC Support: Crane & Operator	1	cd		$ 2,000.00	$ 2,000
		Lighting:					
	*	LED Light Fixtures	16	each	*Allow quantity*	$ 614.00	$ 9,824
	*	LED Exit Sign	1	each	*Allow quantity*	$ 264.00	$ 264
	*	Receptacles	2	each	*Allow quantity*	$ 88.00	$ 176
	*	Light Switch	2	each	*Allow quantity*	$ 170.00	$ 340
	*	Conduit, Wiring, Terminations, Junction Boxes	1	ls		$ 30,000.00	$ 30,000
	*	Misc electrical items	1	ls		$ 70,000.00	$ 70,000
		Div 16 Subtotal					**$ 932,604**

		Alternative 2 **Conversion of Long Beach WPCP to Pump Station**	**Quantity**	**Unit**	**Notes**	**Total Unit Cost**	**Total Cost**
Dwg/Item #	**Sub (*)**	**Item Description**					
Div 17		**Instrumentation & Control**					
		Main Control Panel (Redundant PLC):	***1***	***each***			
	*	Furnish Enclosure 72x60x20 NEMA 12	1	each		$ 8,800.00	$ 8,800
	*	Furnish Programmable Logic Controller (Redundant RX3i)	2	each		$ 3,300.00	$ 6,600
	*	Furnish Profinet Module (Redundancy)	3	each		$ 1,650.00	$ 4,950
	*	Furnish 7-Slot I/O Chassis	2	each		$ 1,000.00	$ 2,000
	*	Furnish 16-Slot I/O Chassis	1	each		$ 1,100.00	$ 1,100
	*	Furnish Analog Output Modules (8 channels isolated)	2	each		$ 2,805.00	$ 5,610
	*	Furnish Analog Input Modules (12 channels isolated)	2	each		$ 3,245.00	$ 6,490
	*	Furnish Digital Input Modules (16 channels 120 vac)	5	each		$ 605.00	$ 3,025
	*	Furnish Digital Output Modules (16 channels dry contact)	3	each		$ 385.00	$ 1,155
	*	Furnish Ethernet Communication Modules	2	each		$ 2,200.00	$ 4,400
	*	Furnish PLC Power Supplies	3	each		$ 770.00	$ 2,310
	*	Furnish PLC Blank Filler Module	5	each		$ 55.00	$ 275
	*	Furnish Indicating Lights	2	each		$ 110.00	$ 220
	*	Furnish Ethernet Switch	1	each		$ 330.00	$ 330
	*	Furnish 24 Volt DC Power Supplies	3	each		$ 550.00	$ 1,650
	*	Furnish Relays	40	each		$ 38.50	$ 1,540
	*	Furnish UPS	1	each		$ 577.50	$ 578
	*	Furnish 120 VAC TVSS on mains	1	each		$ 440.00	$ 440
	*	Furnish 4-20 mA Surge Suppressor	1	each		$ 440.00	$ 440
	*	Furnish Operator Interface Terminal (incl. Software) NEMA 4X	1	each		$ 5,500.00	$ 5,500
	*	Furnish Horn/Strobe NEMA 4X	1	each		$ 462.00	$ 462
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	2	each		$ 1,732.50	$ 3,465
	*	Assemble Main Control Panel	105	ch		$ 100.00	$ 10,500
	*	Install Main Control Panel	21	ch		$ 100.00	$ 2,100
		Engineering/ Programming	80	hrs		$ 165.00	$ 13,200
		Pump Local Control Stations:	***4***	***each***			
	*	Furnish Enclosure 16"x12"x8" NEMA 12	4	each		$ 400.00	$ 1,600
	*	Furnish Indicating Lights	8	each		$ 110.00	$ 880
	*	Furnish Push Buttons	8	each		$ 110.00	$ 880
	*	Furnish 3 Position Switch	4	each		$ 137.50	$ 550
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 433.00	$ 433
	*	Assemble LCS	20	ch		$ 100.00	$ 2,000
	*	Install LCS	20	ch		$ 100.00	$ 2,000
		Engineering/ Programming	4	hrs		$ 165.00	$ 660
		Grinder Local Control Stations:	***2***	***each***			
	*	Furnish Enclosure 16"x12"x8" NEMA 12	2	each		$ 400.00	$ 800
	*	Furnish Indicating Lights	4	each		$ 110.00	$ 440
	*	Furnish Push Buttons	4	each		$ 110.00	$ 440
	*	Furnish 3 Position Switch	2	each		$ 137.50	$ 275
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 433.00	$ 433
	*	Assemble LCS	10	ch		$ 100.00	$ 1,000
	*	Install LCS	10	ch		$ 100.00	$ 1,000
		Engineering/ Programming	2	hrs		$ 165.00	$ 330
		Communications Cabinet:	***1***	***each***			
	*	Furnish Enclosure 24x24x20 NEMA 12	1	each		$ 1,278.00	$ 1,278
	*	Furnish Radio MDS SD Series (cellular Radio)	1	each		$ 2,208.00	$ 2,208
	*	Furnish Indicating Lights	2	each		$ 110.00	$ 220
	*	Furnish 24 Volt DC Power Supplies	1	each		$ 550.00	$ 550
	*	Furnish UPS	1	each		$ 577.50	$ 578
	*	Furnish 4-20 mA Surge Suppressor	1	each		$ 440.00	$ 440
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 866.00	$ 866
	*	Assemble Communications Cabinet	21	ch		$ 100.00	$ 2,100
	*	Install Communications Cabinet	7	ch		$ 100.00	$ 700
		Engineering/ Programming	8	hrs		$ 165.00	$ 1,320
		Instruments:					
	*	Submersible Level Probe (Dwyer PBLTX, 80 ft PFTE cable, 2yr wrty)	1	each		$ 2,000.00	$ 2,000
	*	Bubbler System for Channel Level	1	each	*Redundant of level probe*	$ 10,900.00	$ 10,900
	*	Float for Doghouse Manhole	1	each	*High high level alarm*	$ 1,400.00	$ 1,400
	*	Magnetic Flow Meter 24"	1	each		$ 25,400.00	$ 25,400
	*	Gas Detection System	1	each		$ 26,900.00	$ 26,900
	*	Contact switch (Security)	5	each		$ 1,400.00	$ 7,000
		Div 17 Subtotal					**$ 184,720**
		TOTAL					**$ 5,847,559**

Dwg/Item #	Sub (*)	Alternative 3 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		Retrofit the Existing Influent Building & Provide Flood Hardening					
Div 01S		**Special Conditions**					
		Temporary Bypass Pumping:	***14***	***mnths***	*Assume for the duration of construction as the Contractor replaces one pump at a time*		
		Setup:					
		Delivery of pump sets	1	each	*Budget quote from Godwin*	$ 1,075.00	$ 1,075
		Install pump sets	1	each		$ 1,400.00	$ 1,400
		Operation:					
		Pump set rental (including pump, piping & check valve), Godwin Dri-Prime DPC-300 twelve-inch diesel engine pump set, 3250 gpm @ 53' TDH, 2200 rpm	1	each	*Budget quote from Godwin; plus 8.625% sales tax*	$ 11,764.00	$ 11,764
		Fuel, assume 10 times for 24 hrs each	1	each	*Fuel cost from Godwin, based on high average diesel price per gallon*	$ 4,608.00	$ 4,608
		Maintenance Engineer: 24/7	14	mnths		$ 101,800.00	$ 1,425,200
		Remove:					
		Remove pump sets	1	each		$ 1,400.00	$ 1,400
		Pickup pump sets	1	each	*Budget quote from Godwin*	$ 1,075.00	$ 1,075
		Temporary Bypass Pumping:	***1***	***mnth***	*For making the final connection between PS & new force main*		
		Setup:					
		Delivery of pump sets	3	each	*Budget quote from Godwin*	$ 1,075.00	$ 3,225
		Install pump sets	3	each		$ 1,400.00	$ 4,200
		Operation:					
		Pump set rental (including pump, piping & check valve), Godwin Dri-Prime DPC-300 twelve-inch diesel engine pump set, 3250 gpm @ 53' TDH, 2200 rpm	3	each	*Budget quote from Godwin; plus 8.625% sales tax*	$ 11,764.00	$ 35,292
		Fuel, assume 1 pump, 30 days at 24 hrs/day	1	each	*Fuel cost from Godwin, based on high average diesel price per gallon*	$ 13,824.00	$ 13,824
		Fuel, assume 1 pump, 30 days at 8 hrs/day (to capture diurnal flows)	1	each		$ 4,608.00	$ 4,608
		Fuel, assume 1 pump, 24 hours for a storm event	1	each		$ 461.00	$ 461
		Maintenance Engineer: 24/7	1	mnth		$ 101,800.00	$ 101,800
		Remove:					
		Remove pump sets	3	each		$ 1,400.00	$ 4,200
		Pickup pump sets	3	each	*Budget quote from Godwin*	$ 1,075.00	$ 3,225
		Div 01S Subtotal					**$ 1,617,357**
Div 02		**Sitework**					
		Erosion & Sedimentation Control:			*Allow*		
		Construction Entrance	1	each		$ 2,500.00	$ 2,500
		Silt Fence	200	lf	*Allow quantity*	$ 5.00	$ 1,000
		Storm Drain Inlet Protection	1	each	*Allow quantity*	$ 810.00	$ 810
		Yard Piping:					
		Extend 4" fire protection water service to existing building:					
		Trench Excavation	125	cy		$ 17.00	$ 2,125
		Disposal of Spoil	125	cy	*Assume suitable material*	$ 70.00	$ 8,750
		Trench Box	3	days		$ 112.00	$ 336
		Pipe Bedding, assume 6" thick	13	cy		$ 47.00	$ 611
		4" DIP	300	lf		$ 36.00	$ 10,800
		4" DI 90 Deg. Elbow	4	each		$ 310.00	$ 1,240
		Backfill, plus 15% compaction	143	cy	*Assume new material*	$ 34.00	$ 4,862
		Dewatering:					
		Incidental Dewatering	3	days		$ 4,000.00	$ 12,000
		Demolition for Flood Wall:					
		Remove Tree	1	each		$ 604.00	$ 604
		Curb Removal:					
		Remove Curb	132	lf		$ 12.00	$ 1,584
		Haul & dispose curb	2	cy		$ 70.00	$ 140
		Pavement Removal:					
		Sawcut pavement	250	lf		$ 1.00	$ 250
		Remove pavement	184	sy		$ 16.00	$ 2,944
		Haul & dispose pavement	66	cy		$ 70.00	$ 4,620
		Walkway Removal:					
		Remove Walkway	138	sf		$ 10.00	$ 1,380
		Haul & Dispose Walkway	3	cy		$ 70.00	$ 210
		Pavement:			*Assume grassy area outside of flood wall will be paved*		

Dwg/Item #	Sub (*)	Alternative 3 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
	*	8" (2-4" Lifts) Asphalt Concrete Dense Base Course (NCDPW Item 22C)	70	sy		$ 31.00	$ 2,170
	*	Tack Coat	70	sy		$ 1.00	$ 70
	*	3" Asphalt Binder Course, Type 1AC (NCDPW Item 36DRA)	70	sy		$ 13.00	$ 910
	*	Tack Coat	70	sy		$ 1.00	$ 70
	*	2" Asphalt Top Course, Type 1A (NCDPW Item 36DRA)	70	sy		$ 5.00	$ 350
		Remediation of HazMats:					
	*	Asbestos abatement, lead removal, etc.	1	ls		$ 65,000.00	$ 65,000
		Demolition:					
		Selective demo of architectural & structural items	1	ls		$ 50,000.00	$ 50,000
		Div 02 Subtotal					**$ 175,336**
Div 03		**Concrete**					
		Additional Concrete Supports:	*10*	*each*	*Allow quantity*		
		Formwork	640	sf		$ 11.00	$ 7,040
		Rebar	3,400	lbs	*Allow 200 lbs/cy*	$ 2.00	$ 6,800
		Pour Concrete	17	cy		$ 203.00	$ 3,451
		Concrete Finish	740	sf		$ 4.00	$ 2,960
		Concrete Pad for Pumps in Dry Well Area:	*4*	*each*	*Assume dimensions 6'x3'x0.5'*		
		Formwork	36	sf		$ 11.00	$ 396
		Dowels	72	each		$ 19.00	$ 1,368
		Rebar, plus 10% waste	106	lbs		$ 2.00	$ 212
		Concrete, handmix	36	cf		$ 20.00	$ 720
		Concrete Finish	108	sf		$ 4.00	$ 432
		Structural Repair	1	ls		$ 25,000.00	$ 25,000
		Div 03 Subtotal					**$ 48,379**
Div 04		**Masonry**					
		Demolition:					
		Remove attached CMU shed	1	ls		$ 6,000.00	$ 6,000
		Disposal	20	cy	*Allow quantity*	$ 70.00	$ 1,400
		Masonry repairs and replacement	1	ls		$ 85,000.00	$ 85,000
		Scaffolding	1	ls		$ 5,000.00	$ 5,000
		Div 04 Subtotal					**$ 97,400**
Div 05		**Metals**					
		Msc steel (lintels, angles, repairs)	1	ls		$ 10,000.00	$ 10,000
		Raised platform for exterior generator	1	ls		$ 20,000.00	$ 20,000
		Div 05 Subtotal					**$ 30,000**
Div 06		**Wood, Plastics & Composites**					
		Misc wood framing	1	ls		$ 20,000.00	$ 20,000
		Div 06 Subtotal					**$ 20,000**
Div 07		**Thermal & Moisture Protection**					
		Replace Roof:					
		Remove existing roof	1	ls		$ 20,000.00	$ 20,000
		Disposal	50	cy	*Allow quantity*	$ 70.00	$ 3,500
		New Roof, including accesories	1	ls		$ 50,000.00	$ 50,000
		Caulking	1	ls		$ 7,500.00	$ 7,500
		Div 07 Subtotal					**$ 81,000**
Div 08		**Openings**					
		Replace Door & Window:					
		Demolition:					
		Remove Door	1	each	*Allow quantity*	$ 120.00	$ 120
		Remove Window	1	each	*Allow quantity*	$ 90.00	$ 90
		New Door & Window:					
		Door	1	each	*Assume AL*	$ 3,500.00	$ 3,500

Dwg/Item #	Sub (*)	Alternative 3 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		Window	1	each	*Assume AL*	$ 840.00	$ 840
		Div 08 Subtotal					**$ 4,550**
Div 09		**Finishes**					
		Painting	1	ls	*Allow*	$ 50,000.00	$ 50,000
		Specialty coating to all concrete surfaces to prevent the decomposition of concrete due to contact with hydrogen sulfide	1	ls	*Allow*	$ 125,000.00	$ 125,000
		Aesthetic acoustical enclosure/fencing around generator	1	ls	*Allow around the enclosure provided by generator manufacturer*	$ 30,000.00	$ 30,000
		Div 09 Subtotal					**$ 205,000**
Div 10		**Specialties**					
		Fire Extinguisher, CO2	1	each	*Allow*	$ 469.00	$ 469
		Signage	1	ls	*Allow*	$ 5,000.00	$ 5,000
		Div 10 Subtotal					**$ 5,469**
Div 11		**Equipment**					
		Demolition:					
		Remove existing mechanically cleaned bar screens (each rated 11 M	2	each		$ 36,000.00	$ 72,000
		Remove existing Pump No. 1 (Fairbanks Morse Centrifugal Pump, 6,300 gpd @34' TDH, 75 HP)	1	each	*Installed 2012*	$ 20,000.00	$ 20,000
		Remove existing Pump No. 2 & 4 (Fairbanks Nijhuis Dry Pit Submersible Pump, 5,800 gpd @34' TDH, 71.1 HP)	2	each	*Installed 2014 post Superstorm Sandy*	$ 20,000.00	$ 40,000
		Remove existing Pump No. 3 (Fairbanks Nijhuis Dry Pit Submersible Pump, 4,800 gpd @34' TDH, 50 HP)	1	each	*Installed 2014 post Superstorm Sandy*	$ 20,000.00	$ 20,000
		Haul & store equipment at County's warehouse	1	ls		$ 4,000.00	$ 4,000
		New Pumps (N+1):					
		Furnish pumps, submersible dry-pit type, Flygt Model NP 3231/776, 335 HP, 480 V, 3 phase, 1780 RPM (including explosion proof construction, MAS 801 Monitoring And Status control relay, abrasion resistant Hard Iron impeller, 25 feet of power cable, tests, freight and start-up services)	4	each	*Budget quote from GA Fleet Associates, 6/12/19*	$ 163,000.00	$ 652,000
		Install pumps at wet well	4	each		$ 50,000.00	$ 200,000
		Startup/Testing	8	cd		$ 4,000.00	$ 32,000
		Grinders (N+1):			*8.5 MGD each for a total flow at 17 MGD*		
		Furnish Grinders, CMF3630-M2.0E Channel Monster Flex (including 5 HP Immersible grinder motor with 40' cord, 1 HP Immerisble solids diverter motor with 40' cord, and PC2222 NEMA 4X FRP standard control panel)	2	each	*Budget quote from JWC Environmental, 6/7/19*	$ 90,394.00	$ 180,788
		Install Grinders in Influent Channel	2	each		$ 30,000.00	$ 60,000
		Startup/Testing	4	cd		$ 4,000.00	$ 16,000
		Stop Logs:			*Assume SS*		
		Furnish Stop Logs	2	each	*Per frame basis, assume 3'x5'*	$ 3,000.00	$ 6,000
		Furnish Stop Log Guide Frames	4	each		$ 5,200.00	$ 20,800
		Install Stop Logs Guide Frames in Influent Channel	4	each		$ 6,000.00	$ 24,000
		Div 11 Subtotal					**$ 1,347,588**
Div 13		**Special Construction**			*Div 02 & 03*		
		Flood Hardening:					
		Concrete T-wall with Slurry & Formliner	365	lf	*Go-by: Bay Park STP Flood Wall, escalated unit cost*	$ 5,000.00	$ 1,825,000
		Flood Gate, 15' wide	2	each		$ 80,000.00	$ 160,000
		Div 13 Subtotal					**$ 1,985,000**
Div 15		**Mechanical**					
		Demolition:					
		Remove 24" piping	50	lf		$ 51.00	$ 2,550
		Remove 20" piping	22	lf		$ 40.00	$ 880
		Remove 18" piping	8	lf		$ 40.00	$ 320
		Remove 16" piping	26	lf		$ 40.00	$ 1,040
		Remove 14" piping	42	lf		$ 37.00	$ 1,554
		Remove 12" piping	30	lf		$ 37.00	$ 1,110
		Remove 18" Gate Valve	2	each		$ 1,500.00	$ 3,000

Dwg/Item #	Sub (*)	Alternative 3 Conversion of Long Beach WPCP to Pump Station Item Description	Quantity	Unit	Notes	Total Unit Cost	Total Cost
		Remove 16" Gate Valve	1	each		$ 1,500.00	$ 1,500
		Remove 14" Gate Valve	3	each		$ 400.00	$ 1,200
		Remove 14" Check Valve	2	each		$ 400.00	$ 800
		Remove 12" Gate Valve	2	each		$ 400.00	$ 800
		Remove 12" Check Valve	2	each		$ 400.00	$ 800
		24" Piping:					
		24" DIP	24	lf		$ 684.00	$ 16,416
		24X16 DI Wye	2	each		$ 11,000.00	$ 22,000
		24X20 DI Reducer	1	each		$ 4,700.00	$ 4,700
		24x18 DI Reducer	2	each		$ 4,600.00	$ 9,200
		24x16 DI Reducer	1	each		$ 4,400.00	$ 4,400
		24x14 DI Reducer	1	each		$ 4,200.00	$ 4,200
		20" Piping:					
		20" DIP	18	lf		$ 444.00	$ 7,992
		20X14 DI Wye	1	each		$ 6,500.00	$ 6,500
		18" Piping:					
		18" DIP	8	lf		$ 440.00	$ 3,520
		18" Plug Valve	2	each		$ 11,200.00	$ 22,400
		16" Piping:					
		16" DIP	22	lf		$ 376.00	$ 8,272
		16" DI 45 Deg. Elbow	2	each		$ 1,600.00	$ 3,200
		16" Plug Valve	1	each		$ 7,600.00	$ 7,600
		Additional 16" Piping:					
		16" DIP	39	lf		$ 376.00	$ 14,664
		16" DI 90 Deg. Elbow	2	each		$ 3,300.00	$ 6,600
		16" DI 11.25 Deg. Elbow	4	each		$ 1,900.00	$ 7,600
		16x18 DI 90 Deg. Base Elbow	4	each		$ 3,600.00	$ 14,400
		16x20 DI Reducer	1	each		$ 1,800.00	$ 1,800
		16" Gate Valve	5	each		$ 7,300.00	$ 36,500
		16" Check Valve	4	each		$ 20,800.00	$ 83,200
		Div 15 Subtotal					**$ 300,718**
Div 15		**Plumbing**					
		New Plumbing for Replacement:			*Demo will be part of decommissioning*		
	*	Emergency shower	1	each		$ 1,000.00	$ 1,000
	*	Water heater	1	each		$ 6,100.00	$ 6,100
	*	Shower	3	each		$ 840.00	$ 2,520
	*	Water closet	3	each		$ 440.00	$ 1,320
	*	Urinal	3	each		$ 1,100.00	$ 3,300
	*	Trough sink with three faucets	1	each		$ 2,000.00	$ 2,000
	*	Lab sink	1	each		$ 1,700.00	$ 1,700
	*	Service sink	1	each		$ 950.00	$ 950
	*	1-1/4" tubing	300	lf		$ 35.00	$ 10,500
	*	2" hub and spigot cast iron pipe	400	lf		$ 34.00	$ 13,600
	*	4" hub and spigot cast iron pipe	200	lf		$ 53.00	$ 10,600
	*	Emergency shower	1	each		$ 1,000.00	$ 1,000
		Repair and replace existing water service and storm piping as required to accommodate new flood wall:					
	*	Remove 6" no-hub cast-iron piping	20	lf		$ 20.00	$ 400
	*	New 6" no-hub cast-iron piping	20	lf		$ 75.00	$ 1,500
	*	Type K copper tubing	10	lf		$ 168.00	$ 1,680
		Extend Fire Protection Water Service to Building:			*See yard piping in Div 02*		
	*	4" core drill	1	each		$ 74.00	$ 74
	*	4" link seal	1	each		$ 347.00	$ 347
	*	4" double check detector assembly backflow prevention device	1	each		$ 5,110.00	$ 5,110
	*	Tamper Switch	5	each		$ 380.00	$ 1,900
	*	Sprinkler Coverage of Building	6,000	sf	*Approx. sprinkler floor area covered at ordinary hazard*	$ 10.00	$ 60,000
		Div 15 Subtotal					**$ 125,601**
Div 15		**HVAC**					
	*	Replace all HVAC equipment	1	ls		$ 150,000.00	$ 150,000

		Alternative 3 **Conversion of Long Beach WPCP to Pump Station**	**Quantity**	**Unit**	**Notes**	**Total Unit Cost**	**Total Cost**
Dwg/Item #	**Sub (*)**	**Item Description**					
	*	A/C (ductless split system system units)	4	each	*Outdoor components will have a corrosion protection coating due to location of the PS*	$ 22,000.00	$ 88,000
	*	Exhaust Fan	1	each	*To tie in with HV-1 for exhausting drywell*	$ 10,000.00	$ 10,000
	*	Ventilation monitoring system per NFPA 820	1	each		$ 25,000.00	$ 25,000
		Div 15 Subtotal					**$ 273,000**
Div 16		**Electrical**					
		Exterior Generator:					
	*	Furnish generator, including enclosure	1	each		$ 450,000.00	$ 450,000
	*	Install generator	1	each		$ 17,000.00	$ 17,000
	*	Startup/Testing	4	cd		$ 2,000.00	$ 8,000
		GC Support: Crane & Operator	1	cd		$ 2,000.00	$ 2,000
		Lighting:					
	*	LED Light Fixtures	16	each	*Allow quantity*	$ 614.00	$ 9,824
	*	LED Exit Sign	1	each	*Allow quantity*	$ 264.00	$ 264
	*	Receptacles	2	each	*Allow quantity*	$ 88.00	$ 176
	*	Light Switch	2	each	*Allow quantity*	$ 170.00	$ 340
	*	Conduit, Wiring, Terminations, Junction Boxes	1	ls		$ 15,000.00	$ 15,000
	*	Misc electrical items	1	ls		$ 70,000.00	$ 70,000
		Div 16 Subtotal					**$ 572,604**
Div 17		**Instrumentation & Control**					
		Main Control Panel (Redundant PLC):	***1***	***each***			
	*	Furnish Enclosure 72x60x20 NEMA 12	1	each		$ 8,800.00	$ 8,800
	*	Furnish Programmable Logic Controller (Redundant RX3i)	2	each		$ 3,300.00	$ 6,600
	*	Furnish Profinet Module (Redundancy)	3	each		$ 1,650.00	$ 4,950
	*	Furnish 7-Slot I/O Chassis	2	each		$ 1,000.00	$ 2,000
	*	Furnish 16-Slot I/O Chassis	1	each		$ 1,100.00	$ 1,100
	*	Furnish Analog Output Modules (8 channels isolated)	2	each		$ 2,805.00	$ 5,610
	*	Furnish Analog Input Modules (12 channels isolated)	2	each		$ 3,245.00	$ 6,490
	*	Furnish Digital Input Modules (16 channels 120 vac)	5	each		$ 605.00	$ 3,025
	*	Furnish Digital Output Modules (16 channels dry contact)	3	each		$ 385.00	$ 1,155
	*	Furnish Ethernet Communication Modules	2	each		$ 2,200.00	$ 4,400
	*	Furnish PLC Power Supplies	3	each		$ 770.00	$ 2,310
	*	Furnish PLC Blank Filler Module	5	each		$ 55.00	$ 275
	*	Furnish Indicating Lights	2	each		$ 110.00	$ 220
	*	Furnish Ethernet Switch	1	each		$ 330.00	$ 330
	*	Furnish 24 Volt DC Power Supplies	3	each		$ 550.00	$ 1,650
	*	Furnish Relays	40	each		$ 38.50	$ 1,540
	*	Furnish UPS	1	each		$ 577.50	$ 578
	*	Furnish 120 VAC TVSS on mains	1	each		$ 440.00	$ 440
	*	Furnish 4-20 mA Surge Suppressor	1	each		$ 440.00	$ 440
	*	Furnish Operator Interface Terminal (incl. Software) NEMA 4X	1	each		$ 5,500.00	$ 5,500
	*	Furnish Horn/Strobe NEMA 4X	1	each		$ 462.00	$ 462
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	2	each		$ 1,732.50	$ 3,465
	*	Assemble Main Control Panel	105	ch		$ 100.00	$ 10,500
	*	Install Main Control Panel	21	ch		$ 100.00	$ 2,100
		Engineering/ Programming	80	hrs		$ 165.00	$ 13,200
		Pump Local Control Stations:	***4***	***each***			
	*	Furnish Enclosure 16"x12"x8" NEMA 12	4	each		$ 400.00	$ 1,600
	*	Furnish Indicating Lights	8	each		$ 110.00	$ 880
	*	Furnish Push Buttons	8	each		$ 110.00	$ 880
	*	Furnish 3 Position Switch	4	each		$ 137.50	$ 550
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 433.00	$ 433
	*	Assemble LCS	20	ch		$ 100.00	$ 2,000
	*	Install LCS	20	ch		$ 100.00	$ 2,000
		Engineering/ Programming	4	hrs		$ 165.00	$ 660
		Grinder Local Control Stations:	***2***	***each***			
	*	Furnish Enclosure 16"x12"x8" NEMA 12	2	each		$ 400.00	$ 800
	*	Furnish Indicating Lights	4	each		$ 110.00	$ 440
	*	Furnish Push Buttons	4	each		$ 110.00	$ 440
	*	Furnish 3 Position Switch	2	each		$ 137.50	$ 275
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 433.00	$ 433
	*	Assemble LCS	10	ch		$ 100.00	$ 1,000
	*	Install LCS	10	ch		$ 100.00	$ 1,000
		Engineering/ Programming	2	hrs		$ 165.00	$ 330
		Communications Cabinet:	***1***	***each***			

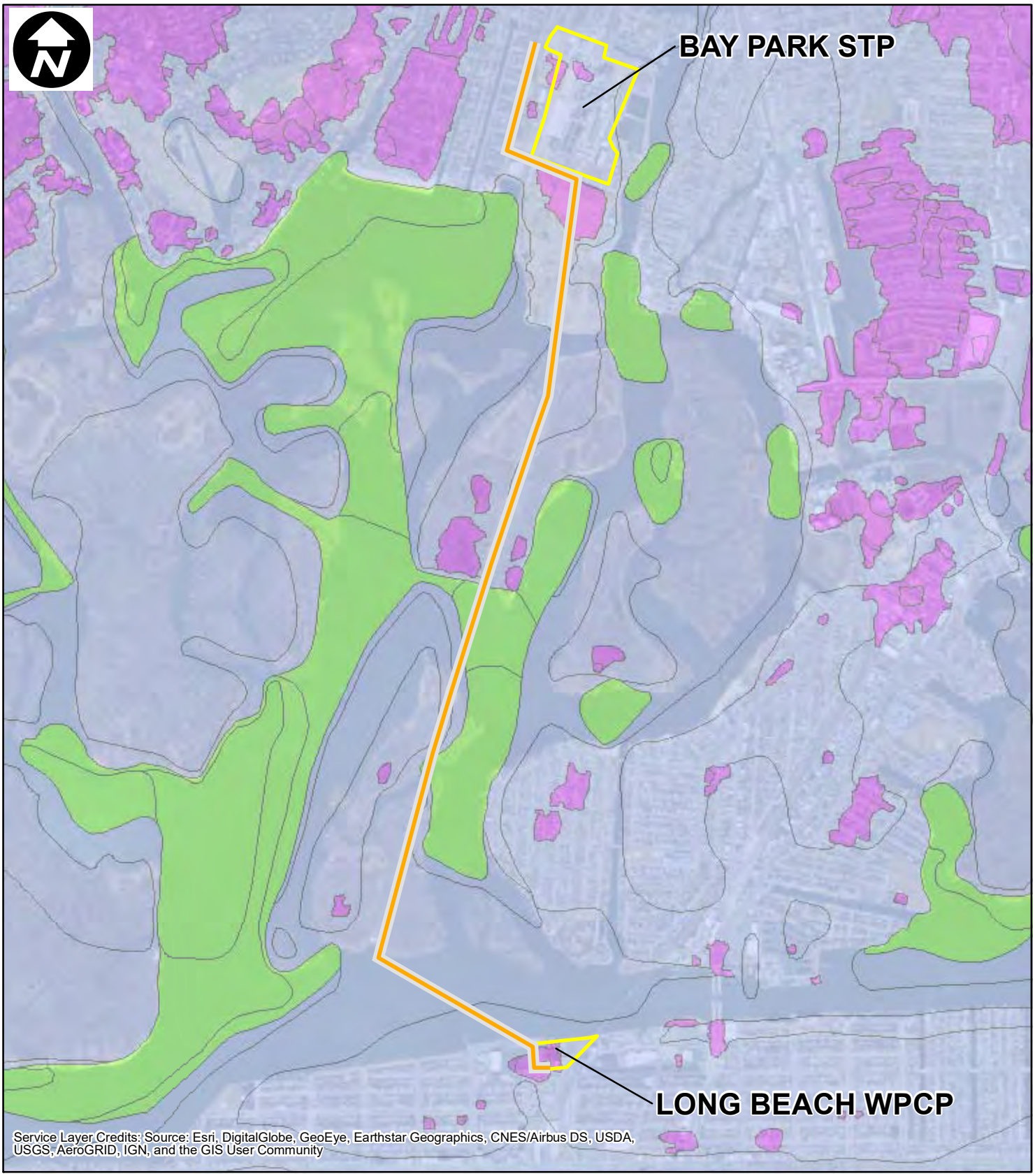
		Alternative 3 **Conversion of Long Beach WPCP to Pump Station**	**Quantity**	**Unit**	**Notes**	**Total Unit Cost**	**Total Cost**
Dwg/Item #	**Sub (*)**	**Item Description**					
	*	Furnish Enclosure 24x24x20 NEMA 12	1	each		$ 1,278.00	$ 1,278
	*	Furnish Radio MDS SD Series (cellular Radio)	1	each		$ 2,208.00	$ 2,208
	*	Furnish Indicating Lights	2	each		$ 110.00	$ 220
	*	Furnish 24 Volt DC Power Supplies	1	each		$ 550.00	$ 550
	*	Furnish UPS	1	each		$ 577.50	$ 578
	*	Furnish 4-20 mA Surge Suppressor	1	each		$ 440.00	$ 440
	*	Furnish miscellaneous items (ducts, wiring, terminal blocks)	1	ls		$ 866.00	$ 866
	*	Assemble Communications Cabinet	21	ch		$ 100.00	$ 2,100
	*	Install Communications Cabinet	7	ch		$ 100.00	$ 700
		Engineering/ Programming	8	hrs		$ 165.00	$ 1,320
		Instruments:					
	*	Submersible Level Probe (Dwyer PBLTX, 80 ft PFTE cable, 2yr wrty)	1	each		$ 2,000.00	$ 2,000
	*	Bubbler System for Channel Level	1	each	*Reduntant of level probe*	$ 10,900.00	$ 10,900
	*	Float for Doghouse Manhole	1	each	*High high level alarm*	$ 1,400.00	$ 1,400
	*	Gas Detection System	1	each		$ 26,900.00	$ 26,900
	*	Contact switch (Security)	5	each		$ 1,400.00	$ 7,000
		Div 17 Subtotal					**$ 159,320**
		TOTAL					**$ 7,048,322**

Escalation Calculation

	Labor Escalation	Material/Equip Escalation
Date of Estimate Pricing	6/20/2019	6/20/2019
Expected Start of Construction	11/13/2020	11/13/2020
(a) Construction Duration (months)	14	14
(b) Annual Rate of Escalation	4.00%	2.00%
(c) # Months from Estimate to Start of Construction	17	17
(d) # Months to Midpoint of Construction	7	7
(c) + (d) Total # Months	24.0	24.0
(e) /12 months X (b) Escalation	8.160%	4.040%
Input the fields in YELLOW to calculate Total Escalation		

APPENDIX D

FEMA Flood Zone Map



LEGEND:

FORCE MAIN

LONG BEACH WPCP AND BAY PARK STP

FEMA FLOOD ZONE TYPE:

AE

VE

X

0 2,000 4,000

SCALE IN FEET

NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS
LONG BEACH WATER POLLUTION CONTROL
PLANT CONSOLIDATION PROJECT
CITY OF LONG BEACH AND TOWN OF HEMPSTEAD

FLOOD ZONE MAP

Hazen ARCADIS
A JOINT VENTURE

DIV/GROUP: ENV/IMDV DB: jrapp LD: PIC: PM: TM:
PROJECT: JBMDL PATH: Z:\GISProjects_ENV\Nassau County DPW\MXDs\FloodZoneMap.mxd DATE: 7/23/2019 3:36:44 PM

APPENDIX E

Inter Municipal Agreement

The City of Long Beach Ownership Information

APPENDIX E

Inter Municipal Agreement

The City of Long Beach Ownership Information

AGREEMENT BETWEEN THE COUNTY OF NASSAU, NEW YORK, AND THE CITY OF LONG BEACH, NEW YORK, FOR THE CONSOLIDATION OF SEWER TREATMENT RESOURCES AND SERVICES

THIS INTERMUNICIPAL AGREEMENT (this "**Agreement**") made and entered as of the Effective Date, by and between the COUNTY OF NASSAU, a municipal corporation, having its principal offices at 1550 Franklin Avenue, Mineola, New York 11501 (hereinafter referred to as the "**County**") and the CITY OF LONG BEACH, a municipal corporation, having offices at 1 West Chester Street, Long Beach, New York 11561 (hereinafter referred to as the "**City**") concerning consolidation of infrastructure and services.

RECITALS

WHEREAS, Article 5-G of the New York General Municipal Law ("**GML**") authorizes municipal corporations and districts to perform their functions, duties and powers on a cooperative basis with other municipal corporations and districts pursuant to municipal cooperation agreements;

WHEREAS both the County and the City are municipal corporations, as defined in Article 1 of the GML;

WHEREAS, the City owns and operates the Long Beach Water Pollution Control Plant (the "LBWPCP") which serves the City of Long Beach and a portion of the unincorporated area of Lido Beach;

WHEREAS, the County owns and operates the Bay Park Water Pollution Control Plant (the "BPWPCP") which serves a portion of western Nassau County;

WHEREAS, both the LBWPCP and the BPWPCP outfalls are located in Reynolds Channel, which is part of the waterbody known as the Western Bays. The Western Bays is considered an impaired waterbody due to low ocean water turnover and high nutrient loads from LBWPCP and BPWPCP;

WHEREAS, on or about October 29, 2012, Superstorm Sandy impacted the Long Island region causing significant flooding, damage and destruction to real property throughout the region;

WHEREAS, Superstorm Sandy also caused considerable damage to the LBWPCP and the BPWPCP and their collection systems;

WHEREAS, both the City and the County are eligible for receipt of funds for repair, restoration and mitigation costs from the Federal Emergency Management Agency ("FEMA") and the Department of Housing and Urban Development ("HUD") through the New York State Department of Homeland Security and Emergency Services ("DHSES") and the New York State Governor's Office of Storm Recovery ("GOSR") to address the damage caused to the LBWPCP and the BPWPCP and their collection systems by Superstorm Sandy and to protect and improve

the resiliency of their infrastructure against future hazardous weather conditions; ;

WHEREAS, from and after Superstorm Sandy, the City has diligently engaged in recovery efforts and sought funding to repair and upgrade the LBWPCP against future hazardous weather conditions;

WHEREAS, high nutrient loads adversely impacts not only the waters of the Western Bays, but also contribute to the degradation and loss of marsh islands. Marsh islands reduce storm surge and tidal inundation, so their loss makes the County and the City more vulnerable to the effects of powerful storms;

WHEREAS, in June 2017, the City entered into and Administrative Consent Order with the New York State Department of Environmental Conservation ("DEC") ("City ACO"). The City ACO requires, among other things, the City to address the water quality standard violations caused by nitrogen in the LBWPCP's discharge into Reynolds Channel. The City ACO recognizes that the most cost effective and feasible means of addressing nitrogen discharge violations is to eliminate the discharge by connecting the City's collection system to the County's BPWPCP. Accordingly, the City ACO requires the City to execute an Intermunicipal Agreement with the County for the connection of the City to the BPWPCP, or to upgrade the LBWPCP based on the limit of technology for nitrogen;

WHEREAS, in January 2018, the County and the DEC entered into an Agreement ("County Agreement"). The County Agreement requires, among other things, the County to address the water quality standard violations caused by nitrogen in the BPWPCP effluent. The County Agreement recognizes that the most cost effective and feasible means of addressing nitrogen discharge violations is to eliminate the discharge into Reynolds Channel by diverting the water treated at BPWCP to the County's existing ocean outfall. As part of the County Agreement, the County agreed to enter into an Intermunicipal Agreement with the City for the connection of the City to the BPWPCP;

WHEREAS, consolidation of sewage treatment and disposal facilities will reduce overlapping services and duplicative responsibilities resulting in more efficient allocation of government resources and cost savings for County and City residents;

WHEREAS the City and the County agree to separately and jointly to seek federal and New York State funding for the repurposing certain LBWPCP influent structures and construction of a pump station and construction of a new force mains by the County to connect the City's collection system to the BPWPCP;

WHEREAS, on December 10, 2015 the State of New York awarded the County $3.72 million to pay for an Engineering and Design Report to evaluate the diversion of wastewater from the City to the BPWPCP;

WHEREAS, the City and the County submitted a joint Intent to Propose form with supporting documents for consideration by the New York State Department of State 2016-17 Municipal Consolidation and Efficiency Competition for a joint project proposed by the

County and the City for the consolidation of wastewater services;

WHEREAS, the joint Intent to Propose was not selected for funding by the Department of State;

WHEREAS, the County and the City intend to jointly work together to submit Consolidated Funding Applications, to the Long Island Regional Economic Development Council and involved state agencies for consideration under grant programs supporting consolidation of wastewater .treatment systems;

WHEREAS, the County and the City are jointly working together to pursue grants for the Project through grant programs administered by DEC, GOSR, DHSES and the New York state Environmental Facilities Corporation ("EFC");

WHEREAS, the elimination of the LBWPCP outfall and the connection of the City's Collection System to the rebuilt and improved BPWPCP will, along with other Western Bays projects, yield significant improvements in water quality- supporting community health, ecosystem improvement, recreational opportunities, and storm resiliency;

WHEREAS, the County and the City wish to enter into an agreement that will provide for, according to the terms of this Agreement: (i) the repurposing of certain LBWPCP influent structures and construction of a pump station by the County, (ii) the construction and installation of all necessary force mains and appurtenances to convey City sewage to the BPWPCP; (iii) the County ownership, operation and maintenance of the City's sanitary sewer system and infrastructure and consolidation of the area of the City in the District (as hereinafter defined) and (iv) collection, treatment and disposal of the City sewage by the County at the BPWPCP;

WHEREAS, the County and the City each represent that the respective municipalities are authorized, pursuant to both Article 9, Section 1 of the New York State Constitution and the GML to enter into intergovernmental cooperative agreements;

WHEREAS, the County and the City, believing it to be in the best interest of the taxpayers of their respective municipalities, do hereby mutually authorize inter-municipal cooperation and assistance with and between each other for the consolidation of infrastructure and services.

NOW, THEREFORE, in consideration of the above recitals and the agreements and mutual covenants set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby mutually acknowledged and agreed upon, the Parties hereto do agree as follows:

I. Definitions

1.1 Defined Terms. In addition to terms defined in the Act, and elsewhere herein, the following terms shall have the following meanings in this Agreement, unless the context requires otherwise.

(a) **"Act"** shall mean Chapter 685 of the Laws of New York of 2003, as it may be amended from time to time.

(b) **"BPWPCP"** shall have the same meaning as in the recitals above.

(c) **"Collection System"** shall mean the existing main and public laterals, intermediate pump station and manholes and all other associated components owned by the City, apart from its separate storm water collection system, as described in Appendix A attached hereto and hereby made a part hereof, including all existing easements and access rights relating thereto. The Collection System does not include the private sewer laterals, and the obligations of the City pursuant to the settlement of *Thomas v. City of Long Beach*, Ordinance 2086/14, and the Agreement for Private Sewer Line Service Plan between the City and Michael Thomas, Docket No. 12-cv-06413, dated as of June 5, 2014.

(d) **"Connection"** shall have the meaning provided in Section 7.1.

(e) **"Connection Date"** shall have the meaning provided in Section 7.2.

(f) **"Construction Phase"** shall mean the period from the date of the Notice to Proceed to the Connection Date.

(g) **"Contract Administration Memorandum"** shall have the meaning provided in Section 8.19.

(h) **"Debt Statement"** shall have the meaning provided in Section 3.1(g)(i).

(i) **"District"** shall mean the Nassau County Sewer and Storm Water Resources District, as established by the Act.

(j) **"Effective Date"** shall mean the date this Agreement is fully executed.

(k) **"Event of Default"** shall have the meaning provided in Section 8.12.

(l) **"Funding Plan"** shall mean a plan agreed upon by the Parties to provide, at the appropriate time, all necessary funding to complete the project. The Funding Plan shall be attached to and made part hereof at Appendix H.

(m) **"Interim Operating Term"** shall have the meaning provided in Section 6.1(a).

(n) **"Law"** shall have the meaning provided in Section 8.9(a).

(o) **"LBWPCP"** shall have the same meaning as in the recitals above.

(p) **"Notice to Proceed"** shall have the meaning provided in Section 5.1.

(q) **"Party"** or **"Parties"** shall mean a party or parties to this Agreement.

(r) **"Plant"** shall mean the LBWCPC including all buildings, appurtenances, equipment, structures, foundations, treatment units, fixtures, improvements above or below the surface and all other associated components, including, but not limited to, process tanks, sewer lines, the sewage outfall pipe, pumps, blowers and site drainage owned by the City and described in Appendix C attached hereto which contains the parcel of land shown in Appendix B attached hereto, but shall not include the "Plant Site," as defined herein.

(s) **"Plant Site"** shall mean the parcel of land owned by the City and shown in Appendix B attached hereto and hereby made a part hereof. .

(t) **"Pre-Construction Phase"** shall be the period from the Effective Date until the County issues the Notice to Proceed and shall include the actions set forth in Article IV hereof.

(u) **"Project"** shall have the meaning provided in Section 2.1.

(v) **"Phase"** shall be a component of the project as described in Appendix G.

(w) **"Phased Project Schedule"** shall be the schedule of Phases of the Project as set forth in Appendix G.

(x) **"Pump Station"** shall mean that facility which the Parties propose to have repurposed certain LBWPC influent structures and constructed a Pump Station on the Pump Station Lot to pump sewage from the Collection System to the BPWPCP.

(y) **"Pump Station Lot"** shall mean the parcel of land owned by the City, to be transferred to the County, containing the Plant influent structures to be repurposed, the newly constructed pumping facilities and other structures and appurtenances necessary to convey, after the Connection Date, sewage from the Sewer System to the BPWPCP, all as shown in Appendix B attached hereto and hereby made a part hereof

(z) **"Sewerage Services"** shall mean the collection, treatment and disposal of sewage collected by the Sewer System,

(aa) **"Sewer Use Fee Schedule"** shall mean the current schedule of sewer use fee imposed and collected in the City. A copy of the Sewer Use Fee Schedule in effect as of the Commencement Date is annexed hereto and hereby made a part hereof as Appendix D.

(bb) **"Sewer System"** prior to the Connection Date, shall mean the entire Plant and the publicly-owned Collection System comprising the City's sanitary sewage collection and disposal system, collectively including, but not limited to, the material components, any plants, structures and other real and personal property acquired, rehabilitated or constructed or planned for the purpose of collecting, conveying, pumping, treating, neutralizing, storing and disposing of sanitary sewage (but excluding the Plant Site). After the Connection Date, the Plant shall be excluded from this definition, and the Pump Station shall be added.

(cc) **"State"** shall mean the State of New York and all state agencies and authorities relevant to the Project.

II. The Project

2.1 The Project.

(a) In accordance with the terms and conditions contained in this Agreement, and the phased schedule in Appendix G annexed here to and made part hereof, the County, or the City as applicable shall (i) repurpose a portion of the LBWPCP influent structures and construct a Pump Station on the Pump Station Lot, (ii) have force main(s) installed to connect the Pump Station and the Sewer System to the BPWPCP, (iii) at the Connection Date as set forth in Section 7.2, acquire from the City the Sewer System and Pump Station Lot; (iv) at the Connection Date as set forth in Section 7.2, own, operate, and maintain the Sewer System or any portion thereof, (v) at the Connection Date as set forth in Section 7.2, provide Sewerage Services to City residents and property owners connected to the Sewer System; (vi) assume responsibility for operation and management of the Sewer System by transitioning and consolidating the City into one or more County zones of assessment within the District, including changing the boundaries of the applicable uniform zone(s) of assessment for collection and disposal services in the District to include the area of the City; (vii) at the Connection Date as set forth in Section 7.2, the City shall convey the Collection System and Pump Station Lot to the County, and (viii) the City shall collect the Sewer Use Fees from its residents, and, at the Connection Date as set forth in Section 7.2, pay the collected fees to the County less the agreed upon administrative costs to collect the fees until such time as the area of the City is consolidated into one or more County zones of assessment within the District, including changing the boundaries of the applicable uniform zone(s) of assessment for collection and disposal services in the District to include the area of the City, all in accordance with applicable Laws and in any and all events subject to the agreement of the Parties and in accordance with, and to facilitate the purposes of, this Agreement. All of the obligations enumerated in clauses (i) through (viii) above are hereinafter collectively referred to as the **"Project."**

(b) In accordance with the receipt of funding which is necessary to carry out the phase of the Project but prior to the issuance of the Notice to Proceed for each Phase pursuant to Section 5.1 of this Agreement, the Parties shall meet and confer and use good faith efforts to identify the duties and obligations of the County and the City in connection with the development of the Project Phase and shall confirm such duties and obligations in writing through the Contract Administration Memorandum process as such is described and defined in 8.19. The County and the City shall perform their respective duties and obligations in connection with the development of the Project in accordance with applicable Laws, including, but not limited to, the bidding and letting of contracts for all labor and materials in a manner consistent with all applicable Laws, the administration of all Project contracts and more generally, the management and supervision of the construction activities for the Project including obtaining all requisite approvals.

III. Representations and Warranties

3.1 Representations and Warranties of the City. The City represents and warrants that to the best of its knowledge, as of the Effective Date hereof and at all times during the term of this Agreement, the following:

(a) Municipal Corporation. The City is a municipal corporation of the State, constituting a political subdivision thereof, duly created and validly existing under the Constitution and Laws of the State.

(b) Authority and Power. The City has the right, power and lawful authority and power to execute and deliver this Agreement, to perform the obligations and covenants contained herein and to consummate the transactions contemplated hereby.

(c) Authorization. The City has duly authorized, by all necessary actions, the execution and delivery hereof and the performance of its obligations and covenants hereunder and the consummation of the transactions contemplated hereby.

(d) Enforceability. This Agreement constitutes a legal, valid and binding obligation of the City, enforceable against the City in accordance with its terms, except as enforcement may be limited by bankruptcy, insolvency, reorganization or other Laws relating to the enforcement of creditors' rights generally or the availability of any particular remedy.

(e) No Conflicts. This Agreement, the execution and delivery hereof and the consummation of the transactions contemplated hereby do not and will not in any material respect conflict with, or constitute on the part of the City a breach of or default under (i) any existing Law, administrative regulation, judgment, order, decree or ruling by or to which it or its revenues, properties or operations are bound or subject or (ii) any agreement, bond or other instrument to which the City is a party or by which it or any of its revenues, properties or operations are bound or subject.

(f) Ownership.

(i) The City has, to its knowledge, good and marketable title to all real and personal property comprising the Sewer System and will transfer and convey, as may be required pursuant to this Agreement, such right, title and interest in and to the Sewer System and the Pump Station Lot to the County, free and clear of all liens other than liens permitted by the County. The Parties agree to grant any easements, permits, permissions and/or licenses on, in and over property owned by other Party to the other Party necessary to effectuate the purposes of this Agreement.

(g) City Financing.

(i) Set forth in Appendix E attached hereto and hereby made a part hereof, is a true and complete statement of all indebtedness of the City (the **"Debt Statement"**) issued in connection with the Sewer System, including, but not limited to, a statement of outstanding principal balances, scheduled payments and maturities, interest rates and payment status.

(ii) No default has occurred under any of the bonds, notes, bond indentures or other financing agreements evidencing the indebtedness, and, to the knowledge of the City, there is no existing condition that with the passage of time, the giving of notice, or both, may become a default or event of default by any party under any bond, note, bond indentures or other financing agreements.

(iii) This Agreement, the execution and delivery hereof and the consummation of the transactions contemplated hereby, do not and will not in any material respect conflict with, or constitute on the part of the City a breach of or default under any agreement or other instrument to which the City is a party or by which it or any of its revenues, properties or operations are bound or subject, including, without limitation, any bond indentures or other financing agreements.

(h) Sewer Use Fee Schedule. The Sewer Use Fee Schedule, as set forth in Appendix D attached hereto and made part hereof, is a true and complete statement of the sewer charges imposed in connection with the Sewer System as of the Effective Date.

(i) Possession. The City (i) has not received notice that any other person is in possession of the Sewer System or any part thereof, and (ii) has not granted anyone any license, lease or other right or interest relating to the use or possession of the Sewer System, or any part thereof, except that the City has granted properties located in the City the right, license and power to connect to and use the Sewer System;

(j) Condemnation. The City has received no notice of and has no other knowledge or information of any pending or contemplated condemnation action with respect to the Sewer System or any part thereof;

(k) Environmental Conditions.

(i) With the exception of a Notice of Violation from the DEC dated April 24, 2017, the City has not received notice of any pending or threatened environmental action, claim, complaint, summons, violation, or citation from any third party (including any governmental agency or authority) ("Environmental Action") relating to the Sewer System;

(ii) The City has not received any notice from any governmental authority or agency indicating that the Sewer System or any real property adjacent thereto has been or may be placed on any federal, state or local list as a result of the presence of hazardous materials or due to historic or existing environmental conditions;

(iii) The City has provided the County with access to its records to inspect, and copy at the County's expense, all reports, audits, studies or analyses of any kind whatsoever known by the City to be in its possession relating to environmental conditions affecting the Sewer System;

(iv) To the knowledge of the City, no hazardous materials have been used, manufactured, generated, sold, handled, treated, transported, stored or disposed of at the Sewer System by the City except in accordance with applicable Laws; and

(v) To the knowledge of the City, no hazardous materials have spilled, discharged, released, emitted, injected or leaked from, in, or migrated to or from the Sewer System in violation of applicable Laws.

(l) Certificates and Licenses. To the extent they are in the City's possession and not conspicuously posted at the Plant, the City has to its knowledge provided to the County any and all certificates, licenses, permits, authorizations or approvals issued in connection with Sewerage Services and the Sewer System.

(m) Repairs and Improvements. With the exception of a Notice of Violation from the DEC dated April 24, 2017, the City has not received any notice from any governmental authority or agency indicating that repairs or modification must be made to the Sewer System or any component thereof in order to comply with all applicable Laws, rules and regulations.

(n) Discharge Permit Requirements. Supplementing Section 3.1(k) and Section 3.1(m), the City will provide to the County certain notices of required actions and other correspondence between the City and the NYSDEC regarding discharge permits.

3.2 Representations and Warranties of the County. The County represents and warrants to the best of its knowledge, as of the Effective Date hereof and at all times during the term of this Agreement, the following:

(a) Municipal Corporation. The County is a municipal corporation of the State, constituting a political subdivision thereof, duly created and validly existing under the Constitution and Laws of the State.

(b) Authority and Power. The County has the right, power and lawful authority and power to execute and deliver this Agreement, to perform the obligations and covenants contained herein and to consummate the transactions contemplated hereby.

(c) Authorization. The County has duly authorized, by all necessary actions, the execution and delivery hereof and the performance of its obligations and covenants hereunder and the consummation of the transactions contemplated hereby.

(d) Enforceability. This Agreement constitutes a legal, valid and binding obligation of the County, enforceable against the County in accordance with its terms, except as enforcement may be limited by bankruptcy, insolvency, reorganization or other Laws relating to the enforcement of creditors' rights generally or the availability of any particular remedy.

(e) No Conflicts. This Agreement, the execution and delivery hereof and the consummation of the transactions contemplated hereby do not and will not in any material respect conflict with, or constitute on the part of the County a breach of or default under (i) any existing Law, administrative regulation, judgment, order, decree or ruling by or to which it or its revenues, properties or operations are bound or subject or (ii) any agreement or other instrument to which the County is a party or by which it or any of its revenues, properties or operations are bound or subject.

(f) Ownership. The County has, to its knowledge, good and marketable title to all real and personal property comprising the BPWPCP and, as of the Effective Date, has sufficient capacity to provide sewer services to the City.

(i) The County represents and covenants that it has now, or will obtain, all necessary easements, rights-of-way, and/or good and marketable title (from any and all public or private owners) needed to construct the force mains and appurtenances which will convey City sewage to the BPWPCP. The County further represents and covenants that it will obtain all necessary permits and/or licenses, from all applicable jurisdictions, needed to construct the force mains and appurtenances which will convey City sewage to the BPWPCP.

IV. Pre-Construction Phase

4.1 Pump Station Lot, Access, Due Diligence and Transfer.

(a) Beginning on the Effective Date, or sooner as agreed to by the City, the County and its authorized representatives and agents shall be entitled to enter upon the Sewer System, including, without limitation, the Pump Station Lot, at reasonable hours upon reasonable prior notice to the City in order to conduct such reasonable and customary inspections, studies, tests and reviews with respect to the Sewer System and the Project, which are necessary in connection with an assessment of (i) the structural integrity and physical condition of the Sewer System (the "**Engineering Review**") and (ii) the environmental condition of the Sewer System, including, without limitation, a Phase I environmental assessment of the Sewer System (the "**Environmental Review**"; which, together with the Engineering Review, is hereinafter collectively referred to as the "**Due Diligence Review**"). Subject to the following sentence, prior to any such entry by the County's authorized representatives and/or agents, the County shall submit, or cause to have submitted, to the City proof satisfactory to the City of insurance coverages in accordance with City requirements, including, but not limited to, a certificate of insurance naming the City as an additional insured. The City acknowledges and agrees that the County is self-insured and, as such, shall not be required to provide such certificates of insurance but shall provide proof of such self-insurance if and when requested by the City. Prior to performing any sampling or testing that disturbs the Sewer System or any City property, including, but not limited to, any so-called "Phase II" environmental assessment, the County must obtain the City's prior written consent. The City shall cooperate with the County and its authorized representatives and agents in every reasonable way in connection with the Due Diligence Review. Copies of all studies, samplings, reports and data obtained by or for the benefit of the County, or any of its agencies or consultants, through the Due Diligence Review shall be provided promptly to the City without charge. The City shall have the right, but not the obligation, to have one or more officers, employees, agents and/or representatives present during any entry upon the Sewer System by the County, its authorized representatives and/or agents. The County will make, and will cause its representatives and agents to make, all commercially reasonable efforts not to interfere with or interrupt the City's use or operation of the Sewer System and shall comply with the reasonable requests and requirements of the City with respect to any such entry. The County shall be responsible for, and shall indemnify, defend with such legal counsel as the City may approve, and hold harmless the City and all its successors and

assigns, and each of its officers, officials, employees, representatives and agents, from and against, any and all expenses, claims, demands, penalties, fines, awards, judgments, liabilities, settlements, damages, losses or any other expenses or costs (including without limitation, reasonable legal fees), caused by the exercise by the County of its rights under this Section 4.1(a), except to the extent caused by the negligence or willful misconduct of, or uncured breach of this Agreement by, the City. The provisions of the foregoing indemnification provision shall survive the expiration or sooner termination of this Agreement.

(b) In the event that the County determines from the Due Diligence Review that the Sewer System, or any component thereof, including, without limitation, the Pump Station Lot is not acceptable, then the County shall provide written notice to the City thereof (and set forth the reasons for such determination) and either (i) the Parties will mutually agree on an alternate location for the Pump Station Lot and amend Appendix B accordingly or (ii) the County or the City may terminate this Agreement upon written notice to the other. Prior to the County exercising any rights under this provision, the City may - by giving written notice to the County within ten (10) calendar days following its receipt of the County's notice referenced above – give notice of the City's intention to cure or correct the reasons cited by the County in its notice that the Pump Station Lot is not acceptable. The City shall, for a period of not more than six (6) months following the date it gives such notice to the County as hereinbefore set forth, have the right to attempt to cure or correct such reasons cited by the County. If the City is able to cure or correct the reasons cited by the County, as determined in the sole discretion of the County, within such time period, the Parties shall continue to proceed towards the Construction Phase without penalty to the City, as if there were no defects requiring remediation. In the event the City is unable to cure or correct such reasons within such six month time period, then in such event either (i) the Parties will mutually select an alternate location for the Pump Station Lot and amend Appendix B accordingly or (ii) the County or the City may terminate this Agreement upon written notice to the other.

(c) In accordance with the Representations and Warranties contained in this Agreement at section III, at the Connection Date as set forth in Section 7.2, the Sewer System and the Pump Station Lot shall be conveyed by the City to the County.

4.2 Conditions Precedent. The following are all conditions precedent to the Parties' right and obligation to proceed to the Construction Phase (as described in Article V below). If any of the conditions below are not waived or modified by both Parties, or if the Parties have not satisfied such conditions within two (2) years of the Effective Date, the County or the City may terminate this Agreement upon written notice to the other. If this Agreement is terminated pursuant to the provisions of this Section, each Party shall use reasonable efforts to restore any property of the City and the Sewer System for which they were responsible to the condition in which it existed prior to the Effective Date, reasonable wear and tear, natural deterioration and obsolescence excepted.

(a) Approvals. The Parties shall have obtained, at the appropriate time, all necessary approvals, consents, and permits from all applicable Federal, State and Local boards, bodies, agencies and authorities, and obtained all access, easement, ownership and control rights, as may be required to carry out the Project.

(b) Funding. The funding of the Project as set forth in Funding Plan, Appendix H attached hereto and made part hereof, shall have materialized, or, in the event that any component of the Funding Plan fails to materialize, the Parties shall have agreed on a substitute component for the Funding Plan.. The Parties shall cooperate in seeking that the Federal and New York State funding is received by the appropriate Party or Parties. If such funding cannot be secured, the County or the City may terminate this Agreement upon written notice to the other party. It is understood and agreed that the City's contribution to the funding of the Project shall not exceed the authorization provided in Resolution 66/17 of the City of Long Beach, dated June 23, 2017. Notwithstanding the above, it is understood and agreed that the City may utilize funding for the Project and/or to decommission, demolish and/or repurpose the Plant.

(c) Plans and Specifications. Following the Effective Date, the County shall have procured and let contracts with architects, engineers and other design professionals in connection with the preparation of plans and specifications for the Pump Station and the force mains and such plans and specifications shall have been prepared and shall be acceptable to the County in all respects. Copies of such plans and specifications shall be provided promptly to the City for its review and comments.

(d) Construction Contracts. Following the procurement and letting of contracts with architects, engineers and other design professionals, the County shall have bid and entered into appropriate agreements with contractors to do the work and furnish all labor, materials, equipment, tools and appliances that may be necessary to perform and complete the construction of the County's Project components. Copies of such construction contracts shall be provided promptly to the City for its review and comments prior to any bids and/or awards.

(e) Condition of Sewer System. The Sewer System shall be substantially in the same condition as it was on the Effective Date at the time construction of the Pump Station commences, subject to ordinary wear and tear, natural deterioration, and obsolescence.

(f) Subdivisions. The Parties shall, at the appropriate time, have obtained all requisite approvals for and completed any subdivisions required by applicable Laws and agreed to by the Parties in connection with this Agreement.

(g) Delivery of Documents. (i) all existing surveys, all existing subdivisions, existing easements and access agreements and all requisite approvals (other than those approvals for which the County is obligated pursuant to this Agreement) so that the City will be in a position, once the area of the City is to be consolidated into the District pursuant to this Agreement, to transfer title to, [or if required by this Agreement lease], to the County the Sewer System; (ii) a list of all service contracts, insurance policies, certificates, permits, approvals and other documents in connection with the Sewer System and the delivery of Sewerage Services which are then in effect and assignable by the City; if any (iii) such other documentation as the Parties reasonably determine to be necessary to consummate the transactions contemplated in this Agreement; and (iv) If the Parties agree that the County must own the Pump Station Lot during construction, the City shall have delivered to the County a duly-executed Bargain and Sale Deed with covenants against grantor's acts for the Pump Station Lot, subject to exceptions of record

(provided the same do not prohibit or materially interfere with the proposed development, use and operation of the Pump Station Lot for the purposes intended by this Agreement) and such other exceptions as are reasonably approved by counsel for the County (collectively, the **"Permitted Exceptions"**) so as to convey good and insurable title to the reasonable satisfaction of the County; The Deed for the Pump Station Lot shall include the covenant set forth in Appendix F annexed hereto and made a part hereof. .

4.3 Withdrawal. Subject to Section 4.1(b) above A Party may withdraw from this Agreement during the Pre-Construction Phase only on the following terms:

(i) The Parties have not agreed upon a Funding Plan;

(ii) Force majeure conditions;

(iii) A Party that wishes to withdraw from this Agreement shall give written notice to the other Party of its intent to withdraw from the Agreement at least 60 days prior to its proposed withdrawal date;

(iv) The withdrawing Party shall remain responsible to pay for the reasonable costs incurred by the non-withdrawing Party in connection with the work it performed towards the satisfaction of the conditions set forth in Section 4.2 herein by reason of such withdrawal

(v) The withdrawing Party shall cooperate with the non-withdrawing Party to minimize potential disruption caused by the withdrawing Party's withdrawal. The withdrawing Party's cooperation includes executing assignments of agreements and facilitating an orderly transition to termination of this Agreement;

(vi) A Party's withdrawal from this Agreement has no bearing on the continued requirements and obligations of each Party under any Consent Order with the NYSDEC or other governmental entity.

V. Construction Phase

5.1 Commencement of Construction. Following the satisfaction or waiver of the conditions set forth in Section 4.2 above, the County shall issue a notice to the City that the Construction Phase of the Project shall commence in accordance with this Agreement (the **"Notice to Proceed"**) The County shall, in accordance with the Phased Project Schedule, thereupon commence the construction of the Pump Station and force main(s) and appurtenances to convey City sewage to the BPWPCP and shall complete same with diligence and continuity in substantial conformance with the approved plans and specifications all in accordance with applicable Laws; unless the parties agree to revise such plans and specifications, in which case, the County shall proceed in conformance with same. Notwithstanding any other provision of this Agreement, the County assumes no obligation, and the City shall, to the extent permitted by applicable laws, hold the county harmless for remediation of environmental conditions (except for those caused by the County) that exist on the Pump Station Lot before the date which is six

(6) months after the County issues the Notice to Proceed.

5.2 Access. As necessary and appropriate, the City shall grant to the County, at no cost to the County, a license to use and occupy the Sewer System as necessary to perform and complete all County construction work in connection with the Project, including, but not limited to, reasonable access to and use of the Plant and the Collection System as needed. Prior to any such use, occupancy and/or access by the County, its authorized representatives and/or agents, 6the County shall submit, or cause to have submitted, to the City proof satisfactory to the City of insurance coverages by the County's contractors in accordance with City requirements, including, but not limited to, a certificate of insurance naming the City as an additional insured. The County will make, and will cause its representatives and agents to make, all commercially reasonable efforts not to interfere with or interrupt the City's use or operation of the Sewer System and shall comply with the reasonable requests and requirements of the City. Should it become necessary to interrupt use or operation of the Sewer System due to construction work, the County and/or its agents shall provide reasonable advance notice to the City, of not less than twenty (20) days, so as to allow the City to inform residents accordingly. The County shall be responsible for any reasonable costs and expenses incurred by the City as a direct result of any negligent acts or omissions by the County, its subcontractors, agents and/or assigns in connection with any interruption to the sewer system.

5.3 Standards. In order to ensure timely and professional completion of such work, the County shall obtain performance and payment bonds from its general contractor in an amount and in a form acceptable to the City, with the City listed as beneficiary thereunder. The County shall, upon the City's request, provide the City with evidence that all contractors engaged to work on the Project maintain insurance reasonably satisfactory to the City and in accordance with the County's customary insurance requirements and all such policies shall name the City as an additional insured.

VI. Interim Operation

6.1 Continued City Operation of Plant.

(a) Effective during the period commencing on the Effective Date and expiring on the Connection Date (such period, the **"Interim Operating Term"**), the City shall continue, and the County shall have no responsibility for, the operation and maintenance of the Sewer System and the delivery of Sewerage Services.

(b) Notwithstanding anything contained in Section 6.1(a) above, at any time during the Interim Operating Term, the County may, but is not obligated, to assume ownership, operation, maintenance and control (including, but not limited to, by lease if and to the extent required by this Agreement) of all or part of the Sewer System if the Parties agree that the exercise of such authority is in the best interest of the Parties, provided, however, that the City shall pay to the County the sewer use fees and all other revenues of the Sewer System as provided in Sections 7.4 7.9, and 7-a.1 herein if and when the County operates the Sewer System, including but not limited to, prior to the Connection Date, without set-off or reduction of any kind other than as expressly permitted by this Agreement and/or any written amendment

thereto. In the event that the Parties agree that the County may accept this responsibility prior to the Connection Date, the Parties will agree upon the extent of ownership, maintenance and control of the Sewer System as is necessary and in the best interest of the Project. Such ownership, maintenance and control shall be agreed upon by the County Executive and the City Manager.

6.2 City Indebtedness. Unless the Parties mutually agree that the County shall assume responsibility for ownership, operation, maintenance and control of all or part of the Sewer System, pursuant to Sections 6.1(b) of this Agreement, the City shall continue to pay debt service on, and otherwise comply with all covenants, terms and conditions in connection with, any outstanding bonds or indebtedness relating to the Sewer System as shown on the Debt Statement until, pursuant to and in accordance with Section 7.7 of this Agreement, the Connection Date. In the event the County assumes control of the entire Sewer System pursuant to Section 6.1(b) hereof, the County and the City shall proceed as if the Connection Date had occurred, with the exception that the Plant will be consider part of the Sewer System.

6.3 Standard of Operations. Throughout the Interim Operating Term, the Party operating the Sewer System shall exercise the same care in providing Sewerage Services and maintaining the Sewer System as previously exercised by the City. During the Construction Phase, the Parties agree to use good faith best efforts to allow for the continued operation of the Sewer System in the full and ordinary course as more fully set forth in Section 5.2 and 5.3 of this Agreement.

6.4 Adjustments to Sewer Use Fee Schedule. Throughout the Interim Operating Term, the City shall adjust the Sewer Use Fee Schedule as appropriate to accurately reflect increases in the costs of operating the Sewer System (including, but not limited to, the cost of debt service), and shall impose any such additional charges to the City users. In no event shall the Sewer Use Fee Schedule be less than the amount needed to pay all costs actually incurred by the City and/or the County associated with providing Sewerage Services to the City (including, but not limited to, the cost of debt service). In furtherance of the forgoing, the City shall promptly notify the County of any adjustments to the Sewer Use Fee Schedule. A surplus, if any, will be applied toward indebtedness.

6.5 Costs and Expenses. All costs and expenses in connection with the provision of Sewage Services prior to the Connection Date shall be borne by the Party operating the Sewer System, except as may otherwise be provided herein, provided, however, that the City shall pay to the County the sewer use fees and all other revenues of the Sewer System as provided in Section 7.4 and 7.7 herein if and when the County operates the Sewer System, including but not limited to, prior to the Connection Date without set-off or reduction of any kind other than as expressly permitted by this Agreement and/or any amendment thereto.

6.6 Notification of Claims. Prior to the Connection Date, the City shall promptly notify the County of any claims made against the City in connection with the Sewer System and the County shall promptly notify the City of any claims made against the County in connection with the Sewer System.

6.7 Release. Notwithstanding the foregoing and to the extent permitted by applicable Laws, rules and regulations, (i) the Parties are not responsible for and the Parties hereby release one another and each's officers, employees, and agents, assigns, vendors, partners, affiliates, predecessors, successors, servants, officers, employees, and/or independent contractors from any and all claims, demands, causes of actions, losses, damages, liabilities, costs and expenses (including reasonable attorney's fees), whether known or unknown, liquidated or contingent, in connection with the Sewer System, arising prior to the Connection Date, unless the same are due to the negligence or willful acts or omissions of the other Party and each's officers, employees, and agents, assigns, vendors, partners, affiliates, predecessors, successors, servants, officers, employees, and/or independent contractors during the Interim Operating Term. The provisions of this Section shall survive the expiration or sooner termination of this Agreement. Nothing in this section shall alter or affect, in any manner whatsoever, the parties' respective rights and/or obligations set forth under Section 8.7 of this Agreement.

6.8 No Transfers, Further Indebtedness or Modifications. The City agrees that, prior to the Connection Date, it will not, without the prior written consent of the County, which will not unreasonably be withheld, conditioned or delayed (i) sell, lease, license, mortgage or otherwise encumber or give up any portion of the Sewer System to anyone other than the County, (ii) except in connection with any required repairs or replacements of any portion of Sewer System prior to the Connection Date, incur any additional indebtedness on or secured by the Sewer System other than such indebtedness listed on the Debt Statement except as may otherwise be provided herein, or (iii) make any modifications to the terms and conditions of any bond indebtedness or other financing agreements in connection with the Sewer System, except (iv) to the extent such modification results in a reduction of the amount of such indebtedness or in the debt service payable thereunder, and (v) as otherwise permitted by this Agreement. Nothing contained in this Section 6.8 shall be deemed to prohibit or limit the City's ability and lawful exercise of its rights to renew any bond anticipation notes upon the scheduled maturity thereof or to convert any such notes to bonds.

6.9 Required Repairs and Improvements. Any capital funds required by State permitting agencies or governmental authorities during the Interim Operating Term to be expended by the City to make major repairs or modifications to the Plant (other than those contained in the consent order entered into between the City and the DEC) shall be added to an amended Debt Statement and paid in accordance with the terms and conditions contained in Sections 6.2 or 7.7, as the case may be, of this Agreement, provided, that: (i) the City gives the County advance notice of the requirements of and the opportunity to participate in all discussions with the State permitting agencies or governmental authorities concerning the required repairs or modifications, (ii) the County is afforded the opportunity to propose to State permitting agencies or governmental authorities alternative means of completing the repairs or modifications in a manner that reduces or eliminates the required capital expenditure and (iii) the City works cooperatively and in good faith to give full consideration to any alternatives proposed by the County, subject to review and approval by State permitting agencies or governmental authorities.

VII. Connection Phase

7.1 Connection. Effective on the Connection Date, (i) the County shall connect the Pump Station to the Sewer System and the BPWCP (the "**Connection**"), (ii) unless already done pursuant to Section 6.1(b) of this Agreement, the County shall own operate and maintain the Sewer System and provide Sewerage Services within the City and the City shall pay to the County the sewer use fees and all other revenues as provided in Sections 7.4,7.6, 7.7, 7.9 or otherwise herein.

7.2 The Connection Date. The "**Connection Date**" shall mean that date which is the earlier of (i) the first business day after all conditions precedent to the Connection set forth in Section 7.3 have been satisfied to satisfaction of the Parties or waived by both Parties or (ii) such other date as mutually agreed to by the Parties in writing. Notwithstanding, the foregoing, if the Connection Date has not occurred by the five (5) year anniversary of the date of issuance of the Notice to Proceed, then (1) this Agreement may be terminated by the County or the City, whereupon the Parties agree to execute any documents necessary to unwind the transactions contemplated by this Agreement, all real property interests transferred by the City to the County shall be transferred by the County back to the City and/or its designee(s) pursuant to the same instruments by which such interests were transferred to the County (or, in the event the City has leased all or any portion of the Sewer System to the County pursuant to this Agreement, such lease(s) shall be terminated), and all rights and responsibilities in connection with the provision of Sewerage Services and payment of City indebtedness shall revert back to the City and (2) to the extent the failure to connect is due to the negligent acts or omissions, willful misconduct or breach of performance under this Agreement by either Party, its agents, employees, contractors or representatives, the offending Party shall (A) be responsible for restoring the Pump Station Lot to its substantially similar condition on the Commencement Date and (B) shall pay any fines incurred during the pendency of this Agreement that would not have been incurred but for this Agreement, it being understood that the offending Party shall have the right to contest any fines prior to making payment. In the event that this Agreement is terminated pursuant to this Section, then, to the extent the failure to connect is due to the negligent acts or omissions, willful misconduct or breach of performance under this Agreement by either Party, its agents, employees contractors or representatives, the responsible Party shall reimburse the other Party for any reasonable costs and expenses the Party has incurred in connection with its performance under this Agreement, including, without limitation, reasonable legal fees. In the event this Agreement is terminated pursuant to this paragraph, and to the extent the County has previously assumed ownership, operation, maintenance and/or control of all or part of the Sewer System pursuant to Section 6.1, above, all sewer use fees and other revenues will immediately become the sole and exclusive property of the City, and all previous obligations to remit same to the County, under any part of this Agreement, shall expire simultaneously.

7.3 Conditions Precedent to Connection. The following are all conditions precedent to the Parties' respective right and obligation to proceed with the Connection. In the event that any of the conditions below are not satisfied within 60 days prior to the Connection Date, or waived by the Parties, the Parties may terminate this Agreement upon 90 days' written notice to the other.

(a) Accuracy of Representations and Warranties. All respective representations and warranties made by the City and the County shall be true, complete and correct in all material respects on the Connection Date.

(b) Construction of Pump Station, Force Main and Sewer Connection Complete. Construction of the Pump Station, force main and appurtenances shall have been completed in accordance with the approved or revised plans and specifications and applicable Law and the Pump Station shall be fully operational and capable of collecting and conveying of the City sewage in accordance with applicable Laws.

(c) Approvals. The Parties shall have obtained all necessary approvals, consents and permits from all applicable Federal, State and Local boards, bodies, agencies and authorities as may be required to carry out the Project.

(d) Reserved.

(e) Condition of Sewer System. The Sewer System shall be substantially in the same condition on the Connection Date as it was on the Effective Date subject to ordinary wear and tear.

(f) Subdivisions. The Parties shall have obtained all requisite approvals for and completed any subdivisions required by applicable Law and agreed to by the Parties in connection with this Agreement.

(g) Delivery of Documents by City. The City shall have delivered to the County all necessary documentation evidencing transfer of all of its right, title and interest, if any, to the Sewer System, including, but not limited to, (i) if not previously delivered pursuant to Section 4.2, duly-executed Bargain and Sale Deed(s) with covenants against grantor's acts with respect to the Pump Station Lot and, in any event, duly-executed quit claim deeds with respect to the Sewer System, (ii) easements or access rights to City-owned property(ies) in connection therewith, (iii) an assignment of all of the interest the City has in any service contracts, insurance policies, certificates, permits, approvals and other documents in connection with the Sewer System which are then in effect to the extent, if any, the same are assignable by the City and are accepted by the County and (iv) such other documentation as is necessary to consummate the transactions contemplated in this Agreement. Any deeds delivered to the County pursuant to this subsection shall include the covenant set forth in Appendix F annexed hereto and made a part hereof.

(h) Delivery of Documents by County. The County shall have delivered to the City all necessary documentation evidencing the County's assumption of all right, title, interest, of and for the Collection System, including, but not limited to, (i) duly-executed Bargain and Sale Deed(s) with covenants against grantor's acts with respect to the Pump Station Lot and duly-executed quit claim deeds with respect to the Sewer System, evidencing the County's agreement to be bound by the terms of the covenant set forth in Appendix F annexed hereto and made a part hereof, and (ii) such other documentation as is necessary to consummate the transactions contemplated in this Agreement.

7.4 Collection of Sewer Use Fees by the City and Payment of User Fees to the County. As a condition of the County's obligation to maintain and operate the Sewer System, commencing on the Connection Date the City, subject to the City Council's annual obligation, if any, to approve fees and fee ordinances within its budget processes, covenants that it shall impose, collect, enforce and pay over to the County in accordance with 7.9, and in a time and manner to be memorialized in a Contract Administration Memorandum pursuant to Section 8.19, sewer user fees in the aggregate in an amount no less than the County's total costs and expenses of operating, maintaining and managing the Sewer System, including, but not limited to allocated debt service of the County and the City and ongoing operational costs until the area of the City is consolidated into the District as provided for in Section 7-a.2. The Parties acknowledge that if the City fails to honor its covenant as provided above to impose, collect and remit sewer user fees promptly to the County, the County's ability to operate the sewer system will be irreparably harmed and the County may seek injunctive relief to compel the turnover of the fees to the County.

7.5 Standards of Service. The County covenants to maintain and operate the Sewer System so as to be capable of providing Sewerage Services in compliance with this Agreement, and in accordance with all professionally accepted standards (as amended), the Act and all applicable Laws, rules and regulations. The Parties acknowledge that if the County fails to honor its covenant to maintain and operate the Sewer System after the Connection Date, the City shall be entitled injunctive relief to compel the County to operate and maintain the Sewer System.

7.6 Costs and Expenses. All costs and expenses incurred after the Connection Date in connection with the provision of Sewerage Services shall be borne by the County, provided, however, that the City shall pay to the County the sewer use fees and other revenues of the Sewer System as provided in Section 7.4,7.7 and 7a-1 herein if and when the County operates the Sewer System without set-off or reduction of any kind other than as expressly permitted by this Agreement.

7.7 City Debt.

(a) Commencing on the Connection Date as long as the City pays to the County the sewer use fees and other revenues of the Sewer System as provided in this Agreement herein if and when the County operates the Sewer System, including but not limited to, prior to the Connection Date, without set-off or reduction of any kind other than as expressly permitted by this Agreement, the County shall pay in full all outstanding indebtedness of the City with respect to the Sewer System (including but not limited to bonds, bond anticipation notes indebtedness to the City's general fund. All as identified and included in Appendix E. Such debt service payments shall be made directly to the City or its designee, or as so instructed by the County Treasurer in consultation with the City, at least ten (10) business days prior to the Connection Date, subject to the City's full compliance with all County voucher and payment procedures.

(b) In the event that, prior to the Connection Date, the City intends to incur any additional indebtedness on or secured by the Sewer System which is not included on the Debt Statement, the City shall notify the County of such fact and the Parties shall confer to consider the

terms under which the County would become responsible for the payment of such additional indebtedness upon the Connection Date. If the County becomes responsible for such additional debt in accordance with Section 7.7(a), the Debt Statement shall be amended accordingly by the Parties and the Debt Statement as so amended shall replace the Debt Statement attached to this Agreement. Notwithstanding the foregoing, if the City reasonably determines that repairs and/or replacements to the Sewer System are required in order that the same may continue to fully operate in the ordinary course and in accordance with applicable Laws, the City may, upon notice to (but without the need for the consent of) the County, incur such additional indebtedness in connection with such repairs and/or replacements. Nothing contained in this Section 7.7(b) shall deemed to prohibit or limit the ability of the City to renew any bond anticipation notes upon the scheduled maturity thereof or to convert any such notes to bonds but only if such conversion is required under the Local Finance Law of the State of New York. In no event shall the County have any responsibility to pay any such City debt unless the City pays to the County the sewer use fees and other revenues of the Sewer System as provided in Sections 7.4 and 7.6 herein.

7.8 Transfer of City Employees. The Parties acknowledge and agree that no City employees will be transferred to the County as a result of this Agreement. Nothing herein precludes a Long Beach employee from accepting employment with a County contractor.

7.9 Sewer System Billing. The City shall continue to perform all aspects of imposition, billing, collection, maintenance and enforcement of Sewer System user fees and retain as an offset against Sewer System revenue the cost of doing so in an amount that corresponds to its actual costs, including salaries, benefits and retirement expenses ("administrative costs"). This expense may be retained at such intervals as billing occurs.

VII-a. Transition and Consolidation

7-a.1 Transition Period. Commencing on the Connection Date for as long as the City's sewer debt is outstanding, the County shall provide sewer disposal services to the City until consolidation of the area of the City receiving sewer disposal and/or collection services from the County and the City shall provide to the County sewer user fees imposed, collected and enforced by the City as set forth in Section 7.4 of this Agreement without set off or deduction other than as provided in such section.

7-a.2 Consolidation. At the conclusion of the transition period set forth in Section 7-a.1, the County shall pursuant to the Act or other applicable law consolidate the area of the City into one or more County zones of assessment within the District, including, changing the boundaries of the applicable uniform zone(s) of assessment for sewer collection and disposal services in the District.

VIII. General

8.1 Term. This Agreement shall commence on the Effective Date and shall expire at the consolidation the area of the City receiving sewer collection and/or disposal services into the District as provided in Section 7-a.2 of this Agreement unless sooner terminated as herein provided.

8.2 Cooperation. The Parties shall coordinate and cooperate in a reasonable manner with respect to completing the Project, including, without limitation, obtaining or authorizing (i) surveys, (ii) subdivisions to the extent required by applicable Law, (iii) easements and access agreements, and (iv) all requisite approvals so that the City will be in a position to transfer good and insurable title to the Pump Station Lot, such title, if any, as the City may have to the Sewer System (or any part thereof), or lease as may be required pursuant to this Agreement, to the County, subject to Permitted Exceptions, on or before the Connection Date and that the Parties will be in a position to transition the area of the City into the District in accordance with the terms and conditions contained in this Agreement. It is the intention of the City to transfer to the County the Pump Station Lot and the Sewer System, and any material components of same. The storm water system currently serving the City and all other real property located in the City will be retained by the City, and, in the event that this Agreement infers otherwise, then this Agreement shall be deemed amended accordingly to exclude such components.

8.3 Notices. Any Notice required to be given or made in connection with this Agreement shall be (a) in writing, (b) delivered or sent (i) by hand delivery, evidenced by a signed, dated receipt, or (ii) postage prepaid via certified mail, return receipt requested, or (iii) overnight delivery via a nationally recognized courier service, (c) deemed given or made on the date the delivery receipt was signed, or three (3) business days after it is mailed or one (1) business day after it is released to a courier service, as applicable, and (d) if to a Party or the Parties, to the attention of the persons who executed this Agreement on behalf of the respective Parties at the addresses first above written, or in each case to such other persons or addresses as shall be designated by written notice.

8.4 Bond Status. Neither Party shall take any action, or omit to take any action, the result of which act or omission shall have an adverse impact on the tax exempt status of any note or bond issued by, or on behalf of, the County, specifically including but not limited to, Federal Laws, rules and regulations regarding private activity and arbitrage. The City and the County shall consult with the other and their respective bond counsel when appropriate to ensure compliance with such Laws, rules and regulations.

8.5 [Reserved]

8.6 [Reserved]

8.7 Indemnification; Defense; Cooperation.

(a) To the extent permitted by Law, each Party shall be solely responsible for and shall indemnify and hold harmless the other Party, and their respective officers, employees, and agents (the "**Indemnified Party**") from and against any and all liabilities, losses, costs, expenses (including, without limitation, claims, losses, damages, penalties, fines, and judgments; associated investigation and administrative expenses; defense costs, including but not limited to reasonable attorney's fees; court costs; and costs of alternative dispute resolution) and damages, directly arising out of the negligence or willful acts or omissions of the indemnifying Party or its respective agents, assigns, vendors, partners, affiliates, predecessors, successors, servants,

officers, employees, and/or independent contractors. The indemnifying Party's indemnification obligations shall include, without limitation, the payment and satisfaction of any judgment, decree, award, loss or settlement in connection therewith. The Parties indemnities provided in this Section 8.7 are for the exclusive benefit of the parties and its indemnities and will not inure to the benefit of any other person.

(b) The indemnifying Party shall, upon the appropriate Indemnified Party's demand and at the Indemnified Party's direction, promptly and diligently defend, at the indemnifying Party's own risk and expense, any and all suits, actions, or proceedings which may be brought or instituted against the Indemnified Party for which the indemnifying Party is responsible under this Section, and, further to the indemnifying Party's indemnification obligations, the indemnifying Party shall pay and satisfy any judgment, decree, loss or settlement in connection therewith. (b) Liabilities subject to the duties to defend and indemnify include, without limitation, all claims, losses, damages, penalties, fines, and judgments; associated investigation and administrative expenses; defense costs, including but not limited to reasonable attorneys' fees; court costs; and costs of alternative dispute resolution. Additionally, indemnifying Party shall be obligated to defend, in all legal, equitable, administrative, or special proceedings, with counsel who is approved by the indemnified Party, immediately upon tender to indemnifying party of the claim in any form or at any stage of an action or proceeding, whether or not liability is established. An allegation or determination that persons other than the indemnifying Party are responsible for the claim does not relieve indemnifying Party from its separate and distinct obligation to defend under this section. The obligation to defend extends through final judgment, including exhaustion of any appeals. The defense obligation includes an obligation to provide independent defense counsel indemnifying Party asserts that liability is caused in whole or in part by the negligence or willful misconduct of the indemnified Party. In order for the indemnifying Party to be relieved of the duty to defend, there must be no possible factual or legal basis on which indemnifying Party's duty to indemnify, under any provision of this indemnity agreement, could be held to attach.

(c) Each Party shall, and shall cause its agents, assigns, vendors, partners, affiliates, predecessors, successors, servants officers, employees and/or independent contractors to cooperate with the other Party in connection with the investigation, defense or prosecution of any action, suit or proceeding in connection with this Agreement.

(d) The provisions of this Section shall survive the expiration or sooner termination of this Agreement.

8.8 Independent Contractor. The City shall not, nor shall any officer, director, employee, servant, agent or independent contractor of the City (a "**City Agent**"), (i) be deemed a County employee, (ii) commit the County to any obligation, or (iii) hold itself, himself, or herself out as a County employee or Person (as hereinafter defined) with the authority to commit the County to any obligation. The County shall not, nor shall any officer, director, employee, servant or agent (a "**County Agent**"), (i) be deemed a City employee, (ii) commit the City to any obligation, or (iii) hold itself, himself or herself out as a City employee or Person (as hereinafter

defined) with the authority to commit the City to any obligation. As used in this Agreement the word "**Person**" means any individual person, entity (including partnerships, corporations and limited liability companies), and government or political subdivision thereof (including agencies, bureaus, offices and departments thereof).

8.9 Compliance With Law.

(a) Generally. The Parties shall comply with any and all applicable Federal, State and local Laws, and those Laws relating to conflicts of interest, discrimination, and disclosure of information, in connection with its performance under this Agreement. As used in this Agreement the word "**Law**" includes any and all statutes, local laws, ordinances, rules, regulations, applicable orders, and/or decrees, as the same may be amended from time to time, enacted, or adopted.

(b) Records Access. The Parties acknowledge and agree that all records, information, and data ("**Information**") acquired in connection with performance or administration of this Agreement shall be used and disclosed solely for the purpose of performance and administration of the contract or as required by Law. The Parties acknowledge that Information in the County's or City's possession may be subject to disclosure under Section 87 of the New York State Public Officer's Law. In the event that such a request for disclosure is made, the County or City shall make good faith efforts to notify the other Party of such request prior to disclosure of the Information so that the Parties may take such action as it deems appropriate.

8.10 Accounting. The Parties shall maintain and retain, for a period of six (6) years following the expiration or earlier termination of the Agreement, complete and accurate records, documents, accounts and other evidence, whether maintained electronically or manually ("**Records**"), pertinent to performance under this Agreement. Records shall be maintained in accordance with Generally Accepted Accounting Principles to the extent applicable. Such Records shall at all times be available for audit and inspection by the County Comptroller, the City Clerk, and any other governmental authority with jurisdiction over this Agreement, and any of their duly designated representatives. The provisions of this Section shall survive the termination of this Agreement.

8.11 Consent to Jurisdiction and Venue; Governing Law; Jury Trial. Unless otherwise specified in this Agreement or required by Law, exclusive original jurisdiction for all claims or actions with respect to this Agreement shall be in the Supreme Court in Nassau County in the State, and the Parties expressly waive any objections to the same on any grounds, including venue and forum non conveniens. This Agreement is intended as a contract under, and shall be governed and construed in accordance with, the Laws of the State, without regard to the conflict of laws provisions thereof.

8.12 Events of Default. The following events shall be Events of Default (whether any such event shall be voluntary or involuntary or come about or be effected by operation of law or pursuant to or in compliance with any judgment, decree or order of any court or any order, rule or regulation of any administrative or governmental body).

(a) Subject to Section 4.1 (b), above either Party shall fail to perform or observe any covenant, condition or agreement to be performed or observed by it hereunder, and such failure shall continue unremedied for a period of sixty (60) days after Notice thereof from the non-defaulting Party or, with respect to defaults not reasonably capable of cure, within sixty (60) days, fails to commence to cure such default within such 60-day period and thereafter fails to diligently prosecute such cure; or

(b) Any representation or warranty made by a Party herein proves to be false or misleading in any material respect, and such condition shall impair the ability of the non-defaulting Party to perform any obligation hereunder and shall continue unremedied for a period of sixty (60) days after written notice thereof by the defaulting Party or, with respect to defaults not reasonably capable of cure within sixty (60) days, fails to commence to cure such default within such 60-day period and thereafter fails to diligently prosecute such cure; or

(c) Either Party shall file any petition for dissolution or liquidation of such Party, or a Party shall commence a case under any applicable bankruptcy, insolvency or other similar Law now or hereafter in effect, or a Party shall have consented to the entry of an order for relief in a case under any such Law, or a Party generally shall fail to pay its debts as such debts become due, or a Party shall fail promptly to satisfy or discharge any execution, garnishment or attachment of such consequences as may impair its ability to carry out its obligations under this Agreement, or a receiver, custodian or trustee (or other similar official) for a Party or any substantial part of its property shall have been appointed or taken possession thereof, or a Party shall make a general assignment for the benefit of its creditors, or a Party shall enter into an agreement or composition with its creditors, or a Party shall take any action in furtherance of any of the foregoing; or there shall be filed against a Party a petition in bankruptcy which results in an order for relief being entered or, notwithstanding that an order for relief has not been entered, the petition is not dismissed within ninety (90) days of the date of the filing of the petition, or there shall be filed under any federal or State Law relating to bankruptcy, insolvency or relief of debtors of a petition against a Party for reorganization, composition, extension or arrangement with creditors which either (i) results in a finding or adjudication of insolvency of such Party or (ii) is not dismissed within ninety (90) days of the date of the filing of such petition. Any action by the Nassau County Interim Finance Authority shall not trigger an event of default under this Agreement.

8.13 Remedies.

(a) Remedies. If either Party shall fail to observe or perform any covenant, condition or agreement on its part to be observed or performed, the non-defaulting Party shall, if such default has not been cured or waived in writing by the non-defaulting Party, have the right to institute any action at law or in equity deemed by the non-defaulting Party to be necessary or desirable to collect any amounts then due under this Agreement or thereafter to become due or to enforce performance and observance of any obligation, agreement or covenant of the defaulting Party hereunder.

(b) Remedies Cumulative. The rights and remedies under this Agreement shall be cumulative and shall not exclude any other rights and remedies allowed by Law, provided there

is no duplication of recovery. The failure to insist upon a strict performance of any of the obligations of the County or the City or to exercise any remedy for any violation thereof shall not be taken as a waiver for the future of the right to insist on strict performance by the County or the City or of the right to exercise any remedy for the violation.

8.14 All Legal Provisions Deemed Included; Severability; Supremacy; Construction.

(a) Every provision required by Law to be inserted into or referenced by this Agreement is intended to be a part of this Agreement. If any such provision is not inserted or referenced or is not inserted or referenced in correct form then (i) such provision shall be deemed inserted into or referenced by this Agreement for purposes of interpretation and (ii) upon the application of any Party to this Agreement shall be formally amended to comply strictly with the Law, without prejudice to the rights of either Party.

(b) In the event that any provision of this Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

(c) Unless the application of this subsection will cause a provision required by Law to be excluded from this Agreement, in the event of an actual conflict between the terms and conditions set forth above the signature page to this Agreement and those contained in any schedule, exhibit, appendix, or attachment to this Agreement, the terms and conditions set forth above the signature page shall control. To the extent possible, all the terms of this Agreement should be read together as not conflicting.

(d) Each Party has cooperated in the negotiation and preparation of this Agreement, so if any construction is made of the Agreement it shall not be construed against any Party as drafter.

8.15 Successors and Assigns. The covenants and agreements herein contained shall be binding upon and inure to the benefit of the Parties and their respective permitted successors and assigns.

8.16 No Arrears or Default. No Party is in arrears to any other Party to this Agreement upon any debt or contract and no Party is in default as surety, contractor, or otherwise upon any obligation to another Party, including any obligation to pay taxes to, or perform services for or on behalf of, another Party.

8.17 Assignment; Amendment; Waiver; Subcontracting. This Agreement and the rights and obligations hereunder may not be in whole or part (i) assigned, transferred or disposed of, (ii) amended, (iii) waived, or (iv) subcontracted, without the prior written consent of the Nassau County Executive or his or her duly-designated deputy (the "County Executive") and the City Manager, or, if required, the City Council or its duly designated representative, and any purported assignment, other disposal or modification without all such prior written consents shall be null and void. The failure of any Party to assert any of its rights under this Agreement, including the right to demand strict performance, shall not constitute a waiver of such rights.

8.18 [Reserved]

8.19 Contract Administration Memoranda.

(a) Administrative Communications. The Parties recognize that a variety of contract administrative matters may arise throughout the term of this Agreement. These matters will by their nature involve requests, notices, questions, assertions, responses, objections, reports, claims, and other communications made personally, in meetings, by phone, by mail and by electronic and computer communications. The purpose of this Section is to set forth a process by which the resolution of the matters at issue in such communications (except to the extent that the resolution of any such matter requires legislative approval and an amendment to this Agreement pursuant to subsection (d) of this Section), once resolution is reached, can be formally reflected in the respective records of the Parties so as to permit the orderly and effective administration of this Agreement.

(b) Contract Administration Memorandum. The principal formal tool for the administration of matters arising under this Agreement among the Parties shall be a Contract Administration Memorandum. A Contract Administration Memorandum shall be prepared, once all preliminary communications have been concluded, to evidence the resolution reached by the County and the City as to matters of interpretation and application arising during the course of the performance of their obligations hereunder.

(c) Procedures. The County or the City may request the execution of a Contract Administration Memorandum. When resolution of the matter is reached, a Contract Administration Memorandum shall be prepared by or at the direction of the County reflecting the resolution. The Contract Administration Memorandum shall be numbered, dated, and signed by the Commissioner of Public Works and the City Manager. The County and the City each shall maintain a parallel, identical file of all Contract Administration Memoranda, separate and distinct from all other documents relating to the administration and performance of this Agreement.

(d) Effect. Executed Contract Administration Memoranda shall serve to guide the ongoing interpretation, application and performance of this Agreement in accordance with the terms hereof. Any material change, alteration, revision or modification of this Agreement, however, shall be effectuated only through a formal amendment to the Agreement authorized , in accordance with the Law.

8.20 Section and Other Headings. The section and other headings contained in this Agreement are for reference purposes only and shall not affect the meaning or interpretation of this Agreement.

8.21 Entire Agreement. This Agreement represents the full and entire understanding and agreement between the Parties with regard to the subject matter hereof and supersedes all prior agreements (whether written or oral) of the parties relating to the subject matter of this Agreement.

8.22 Third Party Claims. Nothing in this Agreement shall create or give to third parties any claim or right of action against any Party beyond such as may legally exist irrespective of this Agreement.

8.23 Executory Clause. Notwithstanding any other provision of this Agreement:

(a) Approval and Execution. No Party shall have any liability under this Agreement (including any extension or other modification of this Agreement) to any Person unless (i) all approvals have been obtained, including, but not limited to, approval by the County Legislature, and the City Council, and (ii) this Agreement has been executed by the County Executive and the City Manager.

(b) Availability of Funds. No Party shall have any liability under this Agreement (including any extension or other modification of this Agreement) to any Person beyond funds appropriated or otherwise lawfully available for this Agreement, and, if any portion of the funds for this Agreement are from the state and/or federal governments, then beyond funds available to the Parties from the state and/or federal governments.

[The rest of this page is intentionally left blank]

IN WITNESS WHEREOF, the Parties hereto have duly executed this Agreement as of the date this Agreement is last executed by the Parties hereto.

COUNTY OF NASSAU

By: _____
Name: Helena Williams
Title: CDCE
Date: 7/26/19

CITY OF LONG BEACH

By: _____
Name: Robert Agostis;
Title: Acting City Manager
Date: 7/25/19

County of Nassau's Acknowledgement:

STATE OF NEW YORK)
)ss.:
COUNTY OF NASSAU)

On the 26 day of July in the year 2019 before me personally came Hefrie Williams, to me personally known, who, being by me duly sworn, did depose and say that he or she resides in the County of Nassau; that he or she is CDCE of the County of Nassau, the municipal corporation described herein and which executed the above instrument; and that he or she signed his or her name thereto pursuant to Section 205 of the County Government Law of Nassau County.

NOTARY PUBLIC

LAURA J VIGLIOTTI
NOTARY PUBLIC STATE OF NEW YORK
LIC. #01VI6190782
COMM. EXP. 08/04/2012 20
COMMISSIONED IN NASS COUNTY

City's Acknowledgement

STATE OF NEW YORK)
)ss.:
COUNTY OF NASSAU)

On the 25 day of July, in the year 2019 before me personally came Robert Agostis to me personally known, who, being by me duly sworn, did depose and say that he resides in the County of NASSAU; that he is the A/City Manager of the Incorporated City of Long Beach, the corporation described herein and which executed the above instrument and that he signed his name pursuant to the authority of ~~the New York State~~ _____ ~~Law and the Code of the~~ City Council Resolution 48/19

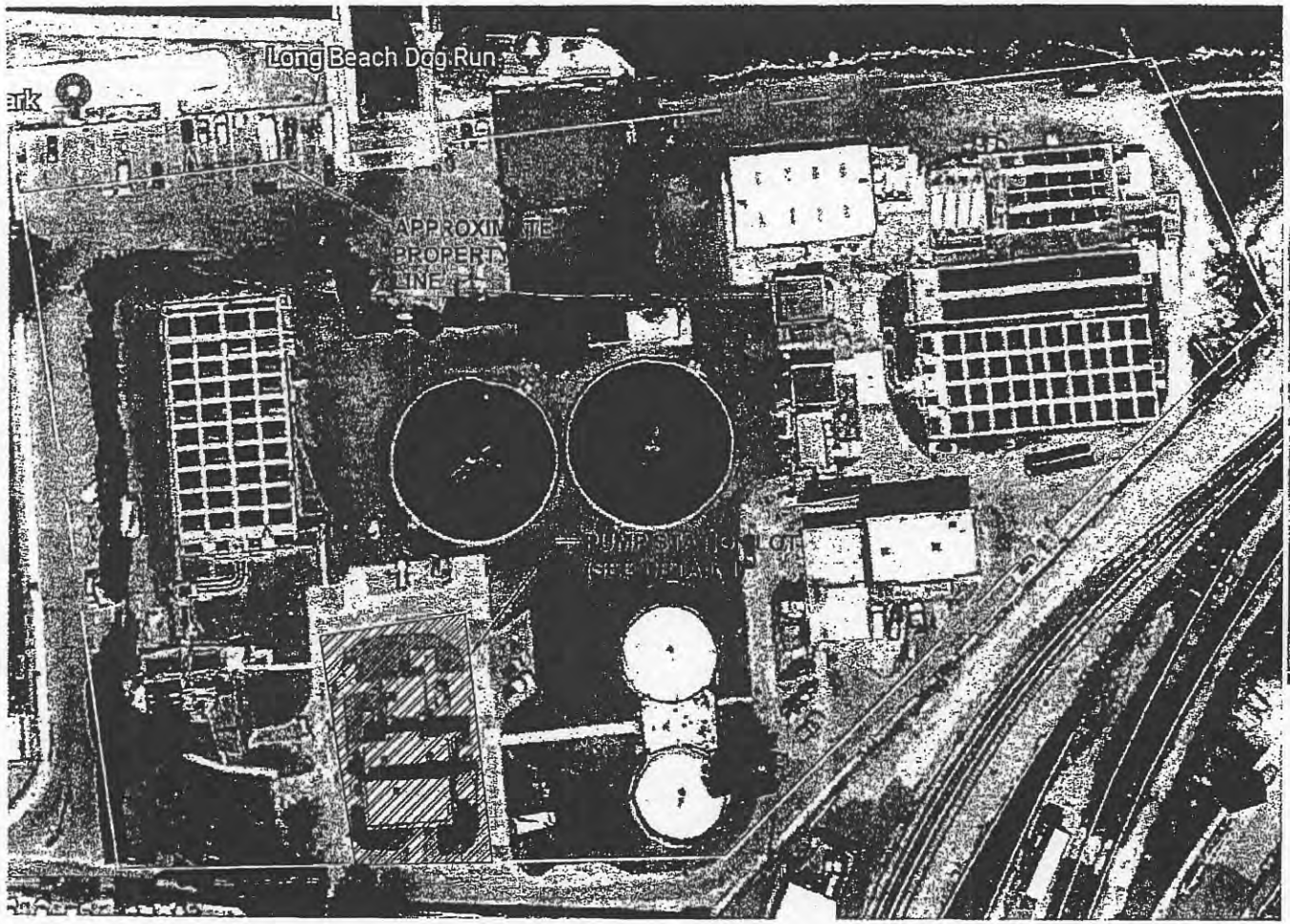
NOTARY PUBLIC

SCOTT A. KEMINS
NOTARY
My Comm. Expires
Nov. 25, 20 22
No. 01KE5069233
PUBLIC
NASSAU COUNTY, NY

Appendix A
Collection System Description

The Long Beach WPCP's collection system is comprised of 51 miles of pipe, which range in size from 6 in. to 48 in. The collection system includes three pump stations - Roosevelt Avenue, which serves the eastern portion of the city, and Indiana Avenue and New York Avenue which serves the west.

Appendix B
Plant Site and Pump Station Lot



DETAIL 1

APPENDIX B: EXISTING PLANT SITE

LONG BEACH WATER POLLUTION CONTROL PLANT

Appendix C
Plant Description

The City of Long Beach Water Pollution Control Plant ("WPCP") is located on the north shore of the barrier bar, northeast of National Boulevard and discharges effluent into Reynolds Channel, which is a component of Hempstead Bay. The Long Beach WPCP serves a population of approximately 34,000 residents.

The Long Beach WPCP was constructed in 1951, with an original design treatment flow of 6.36 MGD, and had several improvements. The first improvement was completed in 1966, with no increase in the plant capacity. In 1987, the trickling filter distribution arms were replaced and plastic media was installed. The second upgrade was done in 1989, costing over $9 million, and increased the design flow to the present 7.50 MGD. In 1995, the chlorine contact tank was completed and placed into service. Another upgrade was completed in 1997, which consisted of updating the controls and automation.

The City of Long Beach WPCP has a permitted design flow capacity of 7.50 MGD. The facility provides secondary treatment process employing sedimentation, fixed aerobic biological stabilization utilizing the trickling filter process, sand filters, anaerobic digestion and disinfection through a chlorine contact tank.

Preliminary treatment consists of two 1 HP vertical comminutors. Each comminutor has a flow range of 7.9 MGD and has a 21 in. wide overflow bar screen. There are four influent sewage pumps that operate alternately. Wastewater flow is measured by a 24 in. Venturi meter, which is located in the influent pump discharge. This meter is not operating properly due to grease and is calibrated every 3 months. There are two grit chambers, which are 20 ft. by 20 ft. with a flow depth of approximately 2.5 ft., provided for the removal of grit. The solids are pumped to a cyclone separator and onto a grit screw conveyor. Grit is manually removed for off-site disposal.

Secondary treatment is accomplished by three parallel rectangle primary sedimentation tanks that receive the combined pre-treated wastewater and secondary sludge return flow. Each tank is 138 ft. long, 32 ft. wide and an average depth of water of 14 ft. Settled sludge is manually discharged to a well and pumped to the digester tank. There are two parallel high-rate filters that are 96 ft. in diameter, with a depth of 5 ft. Wastewater is applied to each filter by four distributor arms that are 48 ft. long.

For optimal efficiency, approximately 8 MGD of trickling filter effluent is recirculated back to the trickling filters. Recirculation is provided by two constant single-speed vertical centrifugal pumps. The recirculation station is designed to accommodate four recirculation pumps. Only two pumps are needed to operate continuously. This station also houses two centrifugal pumps designed to return the secondary sludge to the primary clarifiers. Disinfection is accomplished by three sodium hypochlorite pumps capable of 50 gallons per hour. Sodium hypochlorite, at 15% strength, is stored in two storage containers, each holding 3,000 gallons. Sodium hypochlorite is injected into the wastewater prior to entering the chlorine contact tanks.

The plant has three parallel rectangular final clarifiers, with each tank being 133 ft. long, 30 ft. wide with a depth of 9 feet. Each clarifier contains eight 14 ft. effluent troughs.

This facility has two sand filter beds which are 16 ft. wide, 56 ft. long and 4 ft. deep. Each unit has an automatic backwash filter system, with 11 in. of filter sand.

Sludge handling is accomplished by two anaerobic digestion units. The system is used in series with a primary digester providing high-rate anaerobic stabilization of sewage solids and the secondary digester providing thickening through solids waste separation.

There are three pump stations which are presently being reviewed for updating. They are located at Roosevelt Avenue and Park Avenue, Indiana Avenue and Park Avenue and New York Avenue and Park Avenue. Each station has two sewage pumps with Roosevelt Ave and New York Ave running both, and Indian Ave running one with the second as a backup. Roosevelt Ave and New York Ave each have their own generator. Indian Ave is hooked up to the generator at the neighboring fire house.

The Long Beach WPCP has 13 permanent staff, with 11 certified operators and two trainee operators. Normal operation of the plant is from 8am to 4pm. There is a 4pm to 12am shift and a 12am to 8am shift.

There are 11 sewer maintenance personnel, who are also responsible for cleaning storm drains. There are five operators who check the three pump stations regularly.

The effluent flow meter is accurate and shows the plant is operating at 5.55 MGD. Every 2 weeks for a 5 day duration, the drinking water plant cleans out its filters and pumps iron sludge into the Long Beach WPCP.

The grit hopper is cleaned out by hand, accumulating approximately 1 cubic yard of grit per week. The Plant finds that there is far less grit now that lateral pipes have been repaired. There are 51 miles of lateral pipe.

The laboratory is not certified. Laboratory tests for State Pollution Discharge Elimination System (SPDES) permit requirements are contracted out to Ecotest Labs.

Muffin Monsters caused backups in the system and were replaced with automatically cleaned bar screens. The sand filters are maintained every Friday, consisting of draining and cleaning to help maintain the effluent.

There are several service contracts in effect for the diesel generator, flow meters and the methane monitoring system. The plant uses the City of Long Beach plumber and electrician personnel.

The four chlorine contact tanks are cleaned out every Thursday.

Appendix D
Sewer Use Fee Schedule

Appendix D
Sewer Use Fee Schedule

May 21, 2019

Item No. 3
Ordinance No. 3031/19

The following Ordinance was moved by Pres. Eramo and seconded by Mr. Bendo :

ORDINANCE TO AMEND THE CODE OF ORDINANCES OF THE CITY OF LONG BEACH RE: WATER AND WATER DISTRIBUTION.

BE IT ENACTED, by the City Council of the City of Long Beach, New York, as follows:

Sec.1. Chapter 25, Article II, Division 2, Section 25-26 (a) and (b) of the Code of Ordinances of the City of Long Beach, as heretofore amended, shall be and the same are hereby amended, to read as follows:

"**Sec. 25-26. Water charges and sewer rents.**

(a) *Water rates:*

(1) On and after **July 1, 2019**, the charge for water furnished by the city shall be **four dollars and fifty cents ($4.50)** for each one thousand (1,000) gallons used or consumed upon each parcel of real estate in the city, as recorded by water meters or as estimated by the water/sewer administration at the city's discretion, and bills shall be rendered on the basis of said rate and shall be billed quarterly.

(2) A minimum charge per quarter will be based on twelve thousand (12,000) gallons and a fee of **fifty three dollars and ninety-eight cents ($53.98)**.

(3) The following rates are applied to water usage per quarter:

Usage:	Water Rate:
12,001-150,000 gallons	$4.81
150,001--300,000 gallons	$4.89
300,001--600,000 gallons	$5.11
600,001 and above	$5.61

(b) *Charges for firematic systems:* On or after **July 1, 2019**, the charges for firematic systems shall be billed quarterly in advance, shall be due and payable when billed and entered, and shall be computed as follows:

Size of Firematic Supply	Monthly Charge
Up to and including 2"	$110.49
Over 2" but not over 3"	$202.17
Over 4"	$711.55
Each standpipe not connected to a firematic system	$212.14"

...

Sec. 2. This Ordinance shall take effect immediately.

May 21, 2019

Item No. 3
Ordinance No. 3031/19

APPROVED:

Acting City Manager

APPROVED AS TO FORM & LEGALITY:

Corporation Counsel

VOTING:

Council Member Bendo	- AYE
Council Member Mandel	- AYE
Council Member Moore	- AYE
Vice President Diamond	- AYE
President Eramo	- AYE

please note there is a typographical error in Ordinance 3031/19 [City Code Section 25-26(b)] where the reference to "Monthly Charges" should read "Quarterly Charges."

May 21, 2019

Item No. 4
Local Law No. II/19

The following Local Law was moved by Mr. Mandel
and seconded by Ms. Moore :

Introductory No. 356
Introduced by: Mr. Mandel

CITY OF LONG BEACH

CHAPTER II LAWS OF 2019

A LOCAL LAW

AMENDING THE CHARTER OF THE CITY OF
LONG BEACH RE: SEWER RENTS.

BE IT ENACTED, by the City Council of the City of Long Beach, New York as follows:

Sec. 1. Article 6, Section 122(b)(2) of the Charter of the City of Long Beach, New York as set forth in Chapter 635 of the Laws of 1922, as heretofore amended, shall be and the same is hereby amended to read as follows:

"Sec. 122. Sewer rents.

(a) *Sewer system, defined.* As used in this section, the term sewer system shall mean and include the sewers, manholes, intercepting sewers, sewage pumping, treatment and disposal works, and any other plants, works or equipment and accessories, which are used or useful in connection with the collection, treatment or disposal of sewage and waste, and which are owned, operated or maintained by the city as part of the public sewer system. This definition is intended to include the sewer system both within and without the city.

(b) *Imposition and computation of sewer rents.*

1. In addition to any other fees or charges provided by law, the owner of any parcel of real property connected with the sewer system, including but not limited to real property connected with the sewer system by means of a private sewer or drain emptying into the sewer system, shall pay a sewer rent for the use of the sewer system.

2. Sewer rents applicable to premises within city limits. On and after July 1, 1975, the annual sewer rent for real property located within the city limits is hereby fixed at an amount equal to sixty-seven (67) per cent of the water charges and rents for any such real property.

On and after July 1, 1976, the sewer rents for real property located within the city limits is hereby fixed at an amount equal to eighty-four (84) per cent of the water charges for any such real property, to be billed and paid simultaneously with such water charges and to bear like penalties for nonpayment thereof.

On and after July 1, 1978, the sewer rents for real property located within the city limits is hereby fixed at an amount equal to seventy-five (75) per cent of the water charges for any such real property, to be billed and paid simultaneously with such water charges and to bear like penalties for nonpayment thereof, and bills shall be rendered on the basis of said rate on and after October 1, 1978.

On and after July 1, 1989, the sewer rents for real property located within the city limits is hereby fixed at an amount equal to one hundred (100) per cent of the water charges for any such real property, to be billed and paid simultaneously with such water charges and to bear like penalties for nonpayment thereof, and bills shall be rendered on the basis of said rate on and after October 1, 1989.

On and after July 1, 2016, the sewer rents for real property located within the city limits is hereby fixed at an amount equal to one hundred eight (108) per cent of the water charges for any such real property, to be billed and paid simultaneously with such water charges and to bear like penalties for nonpayment thereof, and bills shall be rendered on the basis of said rate on and after October 1, 2016.

On and after July 1, 2017, the sewer rents for real property located within the city limits is hereby fixed at an amount equal to one hundred fifteen (115) per cent of the water charges for any such real property, to be billed and paid simultaneously with such water charges and to bear like penalties for nonpayment thereof, and bills shall be rendered on the basis of said rate on and after October 1, 2017.

On and after July 1, 2018, the sewer rents for real property located within the city limits is hereby fixed at an amount equal to one hundred twenty (120) per cent of the water charges for any such real property, to be billed and paid simultaneously with such water charges and to bear like penalties for nonpayment thereof, and bills shall be rendered on the basis of said rate on and after October 1, 2018.

On and after July 1, 2019, the sewer rents for real property located within the city limits is hereby fixed at an amount equal to one hundred thirty (130) per cent of the water charges for any such real property, to be billed and paid simultaneously with such water charges and to bear like penalties for nonpayment thereof, and bills shall be rendered on the basis of said rate on and after October 1, 2019."

...

Sec. 2. This Local Law shall take effect immediately upon being filed in the Office of the New York Secretary of State.

May 21, 2019

Item No. 4
Local Law No. II/19

APPROVED:

Acting City Manager

APPROVED AS TO FORM & LEGALITY:

Corporation Counsel

VOTING: AS AMENDED

Council Member Bendo	- AYE
Council Member Mandel	- AYE
Council Member Moore	- AYE
Vice President Diamond	- AYE
President Eramo	- AYE

Appendix E
Debt Statement

City of Long Beach
Summary of Sewer Debt Payable at 6/30/19

As of 6/30/2019						
Description		**Principal**		**Interest**		**Totals**	
Serial Bonds	$	12,585,889	$	2,368,242	$	14,954,132	
BANs		3,260,761		54,237		3,314,998	See **Notes**
Interfund Payables		1,248,327		-		1,248,327	
Totals	**$**	**17,094,977**	**$**	**2,422,480**	**$**	**19,517,457**	

Notes: $2,975,000 of the outstanding BANs, with interest payable of $48,295, comes due 9/6/2019
The balance comes due February 2020, with interest payable of $5,942

Maturity Schedule-Serial Bonds			
Fiscal Year	Principal	Interest	Total
2020	1,325,487.16	373,299.87	1,698,787.02
2021	1,360,674.49	353,686.12	1,714,360.61
2022	1,204,643.56	316,103.41	1,520,746.97
2023	1,207,573.97	274,794.98	1,482,368.95
2024	1,254,267.60	232,449.11	1,486,716.70
2025	1,038,847.11	192,980.16	1,231,827.27
2026	859,626.00	160,640.10	1,020,266.10
2027	891,451.00	130,918.51	1,022,369.51
2028	743,637.00	103,639.95	847,276.95
2029	767,309.00	80,579.31	847,888.31
2030	791,458.50	57,473.34	848,931.84
2031	594,862.00	33,380.56	628,242.56
2032	101,254.00	18,727.60	119,981.60
2033	104,871.00	15,436.84	120,307.84
2034	108,487.00	11,897.44	120,384.44
2035	113,309.00	8,100.40	121,409.40
2036	118,131.00	4,134.60	122,265.60
Totals	**12,585,889.38**	**2,368,242.29**	**14,954,131.67**

0.01 -

Appendix F
Covenant

"The Grantee, by the acceptance of this Indenture, covenants and agrees for itself and its successors and assigns that the premises will be used solely for municipal or governmental purposes of collecting, treating and disposing of sanitary sewage of Grantor. In the event that there is a breach of the above covenant herein by Grantee or its successors and assigns, the Grantor may provide written notice to Grantee, its successors and assigns, of said breach, which notice shall provide Grantee with a ninety (90) day period to cure its breach, and in the absence of such cure, at the option of the Grantor, all right, title and interest in and to all of the said premises shall revert to the Grantor and the Grantor shall have the right to enter upon said premises. Grantor's failure to assert any of its rights under this Indenture, including, without limitation, the right of reversion, shall not constitute a waiver of such rights. In the event that any of the conditions or covenants herein shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining conditions or covenants shall not in any way be affected or impaired thereby.

It is the intention of the Grantor and Grantee that these covenants and conditions shall run with the land and shall be binding upon its Grantee and its successors and assigns."

Appendix G
Phased Project Schedule

(To be developed by County's engineering consulting firm and modified in response to meetings with State agencies to reflect grant eligibility)

Appendix H

Project Funding Plan

Municipality	Source Name	Total	Local Funds	Grants
NC	WQIP 2018 CFA Round VIII	$ 5,000,000	$ 1,250,000	$ 3,750,000
NC	C1-5146-40-75 Nassau County SMLP Financing/Grant	$ 3,726,250	$ 2,794,688	$ 931,562
LB	WQIP 2017 CFA Round VII	$ 2,500,000	$ 375,000	$ 2,125,000
	Total Funding Available	**$ 11,226,250**	$ 4,419,688	$6,806,562
	Total Estimated Project Cost*	**$ 77,000,000**		* – Doesn't include Plant decommissioning/Demo
	Unsecured Funding Need	**$ 65,773,750**		
	Funding Opportunities			
NC	WQIP 2020 CFA Round X	$5,000,000	$1,250,000	$3,750,000
NC/LB	2019 IMG Programs	25,000,000	$15,000,000	$10,000,000
NC/LB	WQIP 2019 CFA Round IX	$10,000,000	$2,500,000	$7,500,000
NC	**GOSR Funding	≤$24,000,000		
LB	FEMA PA 406 Mitigation	$10 mil to $20 Mil		

CITY OF LONG BEACH

1 WEST CHESTER STREET
LONG BEACH, N.Y. 11561
(516) 431-1001
FAX: (516) 431-1389

OFFICE OF
ROBERT AGOSTISI
ACTING CITY MANAGER

Letter of Authorization

Pursuant to the terms of an Intermunicipal Agreement between the City of Long Beach and the County of Nassau authorizing inter-municipal cooperation and assistance for the consolidation of wastewater infrastructure and services, through which the City and County will jointly perform a project to repurpose the existing City of Long Beach Water Pollution Control Plant to a pump station, enabling the conveyance of sewage from the City of Long Beach to the County's Bay Park Sewage Treatment Plant, the City of Long Beach authorizes Nassau County to submit a Consolidated Funding Application under the 2019 Water Quality Improvement Program Grant Program for project funding activities to take place on real property owned by the City of Long Beach.

Robert Agostisi
Acting City Manager

Dated:

APPENDIX F

Smart Growth Assessment Form

NEW YORK STATE OF OPPORTUNITY. | Department of Health | Environmental Facilities Corporation

Smart Growth Assessment Form

This form should be completed by the applicant's project engineer or other design professional.[1]

Applicant Information

Applicant: Nassau County Department of Public Works Project No.: 90607

Project Name: Long Beach WPCP Consolidation Project

Is project construction complete? ☐ Yes, date: ☑ No

Project Summary: (provide a short project summary in plain language including the location of the area the project serves)

This project proposes to convert a portion of the existing WPCP into a Pump Station,and convey wastewater to the Bay Park Sewage Treatment Plant (STP) via a force main and eventually discharge to the Atlantic Ocean once the Bay Park Conveyance project is complete.

Section 1 – Screening Questions

1. Prior Approvals

1A. Has the project been previously approved for Environmental Facilities Corporation (EFC) financial assistance? ☑ Yes ☐ No

1B. If so, what was the project number(s) for the prior approval(s)? Project No.: C1-5146-40-75

Is the scope of the project substantially the same as that which was approved? ☐ Yes ☑ No

IF THE PROJECT WAS PREVIOUSLY APPROVED BY EFC'S BOARD AND THE SCOPE OF THE PROJECT HAS NOT MATERIALLY CHANGED, THE PROJECT IS **NOT** SUBJECT TO SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

2. New or Expanded Infrastructure

2A. Does the project add new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant? ☑ Yes ☐ No

Note: A new infrastructure project adds wastewater collection/water mains or a wastewater treatment/water treatment plant where none existed previously

2B. Will the project result in either: ☐ Yes ☑ No

An increase of the State Pollutant Discharge Elimination System (SPDES) permitted flow capacity for an existing treatment system;

OR

An increase such that a Department of Environmental Conservation (DEC) water withdrawal permit will need to be obtained or modified, or result in the Department of Health (DOH) approving an increase in the capacity of the water treatment plant?

Note: An expanded infrastructure project results in an increase of the SPDES permitted flow capacity for the wastewater treatment system, or an increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system.

[1] If project construction is complete and the project was not previously financed through EFC, an authorized municipal representative may complete and sign this assessment.

IF THE ANSWER IS "NO" TO BOTH "2A" and "2B" ON THE PREVIOUS PAGE, THE PROJECT IS NOT SUBJECT TO FURTHER SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

3. Court or Administrative Consent Orders

3A. Is the project expressly required by a court or administrative consent order? ☑ Yes ☐ No

3B. If so, have you previously submitted the order to EFC or DOH? If not, please attach. ☑ Yes ☐ No

Section 2 – Additional Information Needed for Relevant Smart Growth Criteria

EFC has determined that the following smart growth criteria are relevant for EFC-funded projects and that projects must meet each of these criteria to the extent practicable:

1. Uses or Improves Existing Infrastructure

1A. Does the project use or improve existing infrastructure? ☑ Yes ☐ No

Please describe:

The project will be using the existing pump station at the plant. The pump station will be equipped with submersible equipment. Floodproof doors and windows will also be installed. The electrical equipment will be installed above the design flood elevation (+20-ft NAVD88).

2. Serves a Municipal Center

Projects must serve an area in either 2A, 2B or 2C to the extent practicable.

2A. Does the project serve an area **limited** to one or more of the following municipal centers?

i. A City or incorporated Village ☑Yes ☐No

ii. A central business district ☐Yes ☑No

iii. A main street ☐Yes ☑No

iv. A downtown area ☐Yes ☑No

v. A Brownfield Opportunity Area ☐Yes ☑No
(for more information, go to www.dos.ny.gov & search "Brownfield")

vi. A downtown area of a Local Waterfront Revitalization Program Area ☐Yes ☑No
(for more information, go to www.dos.ny.gov and search "Waterfront Revitalization")

vii. An area of transit-oriented development ☐Yes ☑No

viii. An Environmental Justice Area ☐Yes ☑No
(for more information, go to www.dec.ny.gov/public/899.html)

ix. A Hardship/Poverty Area ☐Yes ☑No
Note: Projects that primarily serve census tracts and block numbering areas with a poverty rate of at least twenty percent according to the latest census data

Please describe all selections:

Long Beach WPCP serves the City of Long Beach. By diverting the flow to Bay Park STP for treatment, it allow for a cost effective solution to meet future DEC discharge regulations. Together with a bigger scale project that's underway (Bay Park Conveyance Project), the total nitrogen in the Hempstead Bay area will significantly be reduced, allowing the natural regeneration of the marshland. In turns, it will help provide a natural barrier against future flooding in the area. Likewise, the City's resident and

2B. If the project serves an area located outside of a municipal center, does it serve an area located adjacent to a municipal center which has clearly defined borders, designated for concentrated development in a municipal or regional comprehensive plan and exhibit strong land use, transportation, infrastructure and economic connections to an existing municipal center? ☐Yes ☑No

Please describe:

2C. If the project is not located in a municipal center as defined above, is the area designated by a comprehensive plan and identified in zoning ordinance as a future municipal center? ☐Yes ☑No

Please describe and reference applicable plans:

3. Resiliency Criteria

3A. Was there consideration of future physical climate risk due to sea-level rise, storm surge, and/or flooding during the planning of this project? ☑Yes ☐No

Please describe:

Existing site of the WPCP was inundated by Superstorm Sandy. Proposed project will construct a new pump station at an elevation of 20 ft NAVD 88. The elevation accounts for 500 year flood event (13.1 ft), plus wave action (3.6 ft), plus climate change (2.93 ft). Consolidating the flow eliminates hardening (and process upgrades for DEC compliance) of the entire site, resulting in significant savings to the community.

Signature Block: By entering your name in the box below, you agree that you are authorized to act on behalf of the applicant and that the information contained in this Smart Growth Assessment is true, correct and complete to the best of your knowledge and belief.

Applicant: Nassau County Department of Public Works	Phone Number: (347) 203-1562
Peter Glus, P.E (Arcadis, Joint-Venture Program Managers for Nassau County DPW)	
(Name & Title of Project Engineer or Design Professional or Authorized Municipal Representative)	
	7/25/2019
(Signature)	(Date)

2B. If the project serves an area located outside of a municipal center, does it serve an area located adjacent to a municipal center which has clearly defined borders, designated for concentrated development in a municipal or regional comprehensive plan and exhibit strong land use, transportation, infrastructure and economic connections to an existing municipal center? ☐Yes ☑No

Please describe:

2C. If the project is not located in a municipal center as defined above, is the area designated by a comprehensive plan and identified in zoning ordinance as a future municipal center? ☐Yes ☑No

Please describe and reference applicable plans:

3. Resiliency Criteria

3A. Was there consideration of future physical climate risk due to sea-level rise, storm surge, and/or flooding during the planning of this project? ☑Yes ☐No

Please describe:

Existing site of the WPCP was inundated by Superstorm Sandy. Proposed project will construct a new pump station at an elevation of 20 ft NAVD 88. The elevation accounts for 500 year flood event (13.1 ft), plus wave action (3.6 ft), plus climate change (2.93 ft). Consolidating the flow eliminates hardening (and process upgrades for DEC compliance) of the entire site, resulting in significant savings to the community.

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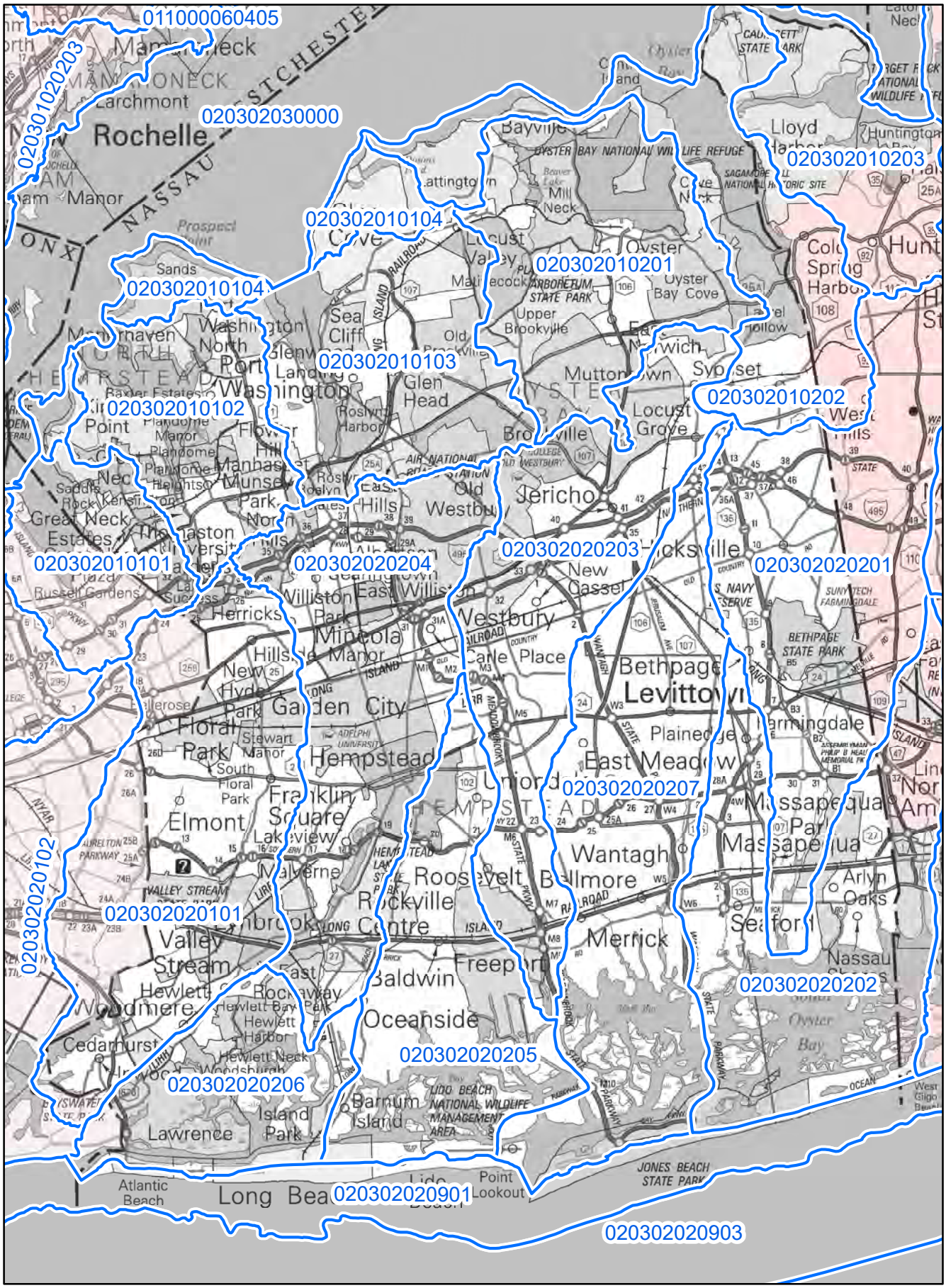
(Name & Title of Project Engineer or Design Professional or Authorized Municipal Representative)	
	7/25/2019
(Signature)	(Date)

APPENDIX G

HUC Watershed Boundary Map

WATERSHED BOUNDARIES - 12 Digit HUC

Nassau County



New York State Department of Agriculture & Markets

NORTH

0 5 10 Miles