Environmental Assessment
Passaic Valley Sewerage Authority
Floodwall and On-Site Power System Construction
Newark, Essex County, New Jersey

4086-DR-NJ
PW4701
June 2015

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

TABLE OF CONTENTS

Page No.

1.0 INTRODUCTION 1-1

2.0 PURPOSE AND NEED 2-1

3.0 BACKGROUND 3-1

4.0 ALTERNATIVES 4-1
4.1 No Action Alternative 4-1
4.2 Proposed Alternative: Floodwall and Centralized On-Site Standby Power System Construction 4-2
4.3 Other Action Alternative: Component Floodproofing and Distributed On-Site Standby Power Systems 4-2
4.4 Alternatives Considered and Dismissed 4-2
4.4.1 Elevate 4-3
4.4.2 Relocate 4-3
4.5 Summary of Alternatives 4-4

5.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS 5-1
5.1 Physical Resources 5-1
5.1.1 Geology and Soils 5-1
5.1.1.1 Existing Conditions 5-1
5.1.1.2 Potential Impacts and Proposed Mitigation 5-2
5.1.2 Air Quality 5-3
5.1.2.1 Existing Conditions 5-3
5.1.2.2 Potential Impacts and Proposed Mitigation 5-5
5.2 Water Resources 5-9
5.2.1 Wetlands 5-9
5.2.1.1 Existing Conditions 5-10
5.2.1.2 Potential Impacts and Proposed Mitigation 5-11
5.2.2 Floodplains 5-12
5.2.2.1 Existing Conditions 5-13
5.2.2.2 Potential Impacts and Proposed Mitigation 5-13
5.3 Coastal Resources 5-15
5.3.1 Coastal Resources 5-15
5.3.1.1 Existing Conditions 5-16
5.3.1.2 Potential Impacts and Proposed Mitigation 5-16
5.4 Biological Resources 5-17
5.4.1 Vegetation 5-17
5.4.1.1 Existing Conditions 5-17
5.4.1.2 Potential Impacts and Proposed Mitigation 5-18
5.4.2 Wildlife and Fish 5-18
5.4.2.1 Existing Conditions 5-18
5.4.2.2 Potential Impacts and Proposed Mitigation 5-20
5.4.3 Threatened and Endangered Species and Critical Habitat 5-22

5.4.3.1 Existing Conditions 5-22
5.4.3.2 Potential Impacts and Proposed Mitigation 5-23
5.5 Cultural Resources 5-24
5.5.1 Cultural Resources 5-24
5.5.1.1 Existing Conditions 5-25
5.5.1.2 Potential Impacts and Proposed Mitigation 5-28
5.6 Socioeconomic Resources 5-31
5.6.1 Environmental Justice 5-31
5.6.1.1 Existing Conditions 5-31
5.6.1.2 Potential Impacts and Proposed Mitigation 5-32
5.6.2 Noise 5-33
5.6.2.1 Existing Conditions 5-33
5.6.2.2 Potential Impacts and Proposed Mitigation 5-35
5.6.3 Traffic 5-39
5.6.3.1 Existing Conditions 5-39
5.6.3.2 Potential Impacts and Proposed Mitigation 5-39
5.6.4 Public Services and Utilities 5-39
5.6.4.1 Existing Conditions 5-40
5.6.4.2 Potential Impacts and Proposed Mitigation 5-40
5.6.5 Public Health and Safety 5-41
5.6.5.1 Existing Conditions 5-41
5.6.5.2 Potential Impacts and Proposed Mitigation 5-41
5.7 Hazardous Materials 5-41
5.7.1 Hazardous Materials 5-41
5.7.1.1 Existing Conditions 5-41
5.7.1.2 Potential Impacts and Proposed Mitigation 5-45
5.8 Climate Change 5-46
5.8.1 Climate Change 5-46
5.8.1.1 Existing Conditions 5-46
5.8.1.2 Potential Impacts and Proposed Mitigation 5-47
5.9 Cumulative Impacts 5-49

6.0 PERMITS AND PROJECT CONDITIONS 6-1

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT 7-1

8.0 CONCLUSION 8-1

9.0 LIST OF PREPARERS 9-1

10.0 REFERENCES 10-1

APPENDICES

Appendix A - Maps and Figures
Appendix B - Report Tables
Appendix C - EO 11988-11990 Floodplain Management and Wetlands Protection
Appendix D - Coastal Zone Consistency and Permit Correspondence
Appendix E - Cultural Resources
Appendix F - Boring Logs
Appendix G - Comments and Responses
Appendix H - Correspondence
Appendix I - Amended Mitigation Proposal

LIST OF ACRONYMS

AAQS - Ambient Air Quality Standards
AOC - Areas of Concern
APE - Area of Potential Effect
AST - Aboveground Storage Tank
BACT - Best Available Control Technology
BAD - Best Available Data
BMP - Best Management Practices
COC - Community of Concern
CSO - Combined Sewer Overflow
CZM - Coastal Zone Management
CZMA - Coastal Zone Management Act
DLN - Dry Low Nitrogen Oxides
EA - Environmental Assessment
EFH - Essential Fish Habitat
EIS - Environmental Impact Statement
EJ - Environmental Justice
EO - Executive Order
EPA - Environmental Protection Agency
ESA - Endangered Species Act
ESRI- Environmental Systems Research Institute
FEMA - Federal Emergency Management Agency
FHA - Flood Hazard Area
FONSI - Finding of No Significant Impact
FTA - Federal Transit Administration
GHG - Greenhouse Gas
HABS/HAER – Historic American Building Survey/Historic American Engineering Record
HAP - Hazardous Air Pollutant
HMP - Hazard Mitigation Proposal
IPCC - Intergovernmental Panel on Climate Change
IR - Incremental Risk
LAER - Lowest Achievable Emission Rate
LEED – Leadership in Energy and Environmental Design
LOI - Letter of Interpretation
LSRP - Licensed Site Remediation Professional
LWA - Liquid Waste Acceptance
MACT - Maximum Achievable Control Technology
MCC's - Motor Control Centers
NAAQS - National Ambient Air Quality Standards
NEPA - National Environmental Policy Act
NFA - No Further Action
NGVD - National Geodetic Vertical Datum
NHPA - National Historic Preservation Act
NJAC – New Jersey Administrative Code
NJDEP - New Jersey Department of Environmental Protection

NJOEM - New Jersey Office of Emergency Management
NJPDES - New Jersey Pollutant Discharge Elimination System
NJHPO - New Jersey Historic Preservation Office
NJSM - New Jersey State Museum
NMFS - National Marine Fisheries Service
NOAA - National Oceanic and Atmospheric Administration
NRCS - Natural Resources Conservation Service
NRHP - National Register of Historic Places
NSCR - Nonselective Catalytic Reduction
NSPS - New Source Performance Standards
NYCDEP - New York Department of Environmental Protection
Pb - Lead
OSHA - Occupational Safety and Health Administration
PCBs - Polychlorinated Biphenyls
PPMVD - Parts per Million by Volume, Dry basis
PPT - Parts per thousand
PM - Particulate Matter
PSD - Prevention of Significant Deterioration
PSE&G - Public Service Electric & Gas
PS&S - Paulus, Sokolowski, and Sartor
PTE - Potential to Emit
PVSC - Passaic Valley Sewerage Commission
RCRA - Resource Conservation and Recovery Act
SCR - Selective Catalytic Reduction
SIP - State Implementation Plan
SOTA - State of the Art
SRIA - Sandy Recovery Improvement Act
SRP - Site Remediation Program
SWPPP - Stormwater Pollution Prevention Plan
ULSD - Ultra Low Sulfur Diesel
URBHGB - Urban land, Bigapple substratum, 0 to 8 percent slopes
URDUNB - Urban land, Dunellen substratum, 0 to 8 percent slopes
USDUNB - Urban land, Dunellen complex, 0 to 8 percent slopes
URKTTB - Urban land, loamy fill substratum, 0 to 8 percent slopes
USACE - United States Army Corps of Engineers
USDA - United States Department of Agriculture
USDUNB - Urban land, Dunellen substratum – Dunellen complex
USEPA - United States Environmental Protection Agency
USFWS - United States Fish and Wildlife Service
UST - Underground Storage Tank
VOCs - Volatile Organic Compounds

1.0 INTRODUCTION

The Passaic Valley Sewerage Commission (Subgrantee) proposes the construction of a floodwall and an on-site standby power system at its 140+ acre regional wastewater treatment facility located at 600 Wilson Ave., Newark, Essex County, New Jersey. The purpose of the project is to mitigate against the future risk of storm damage and consequent service disruption. President Barack H. Obama declared Hurricane Sandy a major disaster on October 30, 2012. The declaration authorized federal public assistance to affected communities and certain nonprofit organizations per Federal Emergency Management Agency (FEMA) 4086-DR-NJ and in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (42 U.S.C. 5172), as amended; the Sandy Recovery Improvement Act (SRIA) of 2013; and the accompanying Disaster Relief Appropriations Act, 2013. The Subgrantee, through the New Jersey Office of Emergency Management (Grantee), requested public assistance funding from the Department of Homeland Security, FEMA for the proposed project. The project worksheet is 4086-DR-NJ-PW-4701.

During Hurricane Sandy a twelve-foot storm surge from Newark Bay inundated the facility, isolating and flooding buildings and destroying vehicles, inventory, and equipment. Both the main electrical power feed and back-up power feed to an on-site substation were lost during the storm. Floodwaters entered the facility's process galleries and utility/infrastructure tunnel system, damaging cabling, process equipment, dewatering pumps, maintenance equipment, mechanical equipment, process transmission piping, electrical equipment, and control equipment. The facility was inoperable for several weeks. The physical damages resulted in a loss of treatment capability and caused environmental, economic, and public health impacts to the region.

Emergency repair operations began immediately. The primary effort involved repairs to six of the facility's electrical distribution and motor control centers (substations) and associated cabling. A list of emergency and permanent repairs completed at the facility and funded by FEMA appears in Appendix B, Table 1. Each of the Project Worksheets listed in the Table represents a facility, critical wastewater treatment process or building that sustained damage to its structure, equipment, and conduits/piping or to material stored within.

The Hazard Mitigation Proposal (HMP) for construction of a floodwall and centralized on-site standby power system would mitigate against a future loss of

function from similar hazards as experienced during Hurricane Sandy. The proposed floodwall, which would be constructed around the perimeter of the facility, would protect critical facility infrastructure. The on-site standby power system would ensure that there was power to operate the facility in the event of a disruption to the electrical power grid. These two mitigation measures combined would protect the Subgrantee from storm surge from Newark Bay and the loss of the main and back-up utility power feeds to the main electrical distribution substation. By protecting the facility from these hazards, the proposed mitigation measures would reduce risk from a loss of function to the Subgrantee's treatment and process system construction during a future flood event.

After further evaluation and to address vulnerabilities that were not initially addressed, design and permitting work related to the floodwall and related on-site improvements were further incorporated. Additional proposed mitigation measures include the relocation of Critical Process Equipment Switchgear and Motor Control Centers (MCC's) in Appendix H; raising of the control panels and providing provisions for standby generators for sump pumps; use of utility tunnel bulkhead doors; and improving the onsite drainage to handle a 100-year rainfall event. This provides additional mitigation measures intended to protect the Subgrantee from flooding during a major rainfall and/or tidal event.

This Final Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality regulations to implement NEPA (40 Code of Federal Regulations (CFR) Parts 1500-1508), and the FEMA's regulations implementing NEPA (44 CFR Part 10).

FEMA is required to consider potential environmental impacts before funding federal undertakings. The purpose of this EA is to assess the potential environmental impacts of the proposed project. FEMA will use the findings in this EA to determine whether to prepare an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI).

2.0 PURPOSE AND NEED

The purpose of this project is to mitigate against the future risk of storm damage to the facility. The need is to ensure continuity of wastewater treatment to the Subgrantee's service area, thereby minimizing the potential for deleterious economic, public health and environmental impacts stemming from a service disruption.

3.0 BACKGROUND

The Subgrantee's regional wastewater treatment facility is located at the intersection of Wilson and Doremus Avenues in the City of Newark, New Jersey. The roughly 140+ acre facility is bisected by Doremus Avenue with the wet process portion of the facility (85 acres) located on the inland portion of the facility and the dry process portion of the facility (49 acres) located between Doremus Avenue and Newark Bay. A vehicle maintenance facility (roughly 6 acres) is also located on the west side of Avenue P. The facility is bounded by the New Jersey Turnpike to the west, Newark Bay to the east and industrial uses to the north and south (see Appendix A, Figures 10, 11 and 12).

The Subgrantee provides wastewater treatment and biosolids management services for approximately 1.4 million residents, more than 5,000 commercial entities and 200 significant industrial users within its service area. The Subgrantee's service area (Service District) encompasses approximately 155 square miles and includes 48 municipalities in parts of Bergen, Essex, Hudson, Passaic and Union Counties (see Appendix A, Figure 13). In addition, the Subgrantee provides biosolids (sludge) management and Liquid Waste Acceptance (LWA) services to municipal and industrial entities that transport sludge and waste to the facility by truck or barge. The Subgrantee's trucked-in waste also includes potable water sludge from New Jersey and New York. In total, the facility treats nearly 25% of the State of New Jersey's wastewater and/or sludge and approximately 15% of the sludge generated in New York City, a service population of over 3.4 million residents.

During Hurricane Sandy, the Subgrantee experienced a twelve-foot tidal storm surge from Newark Bay which inundated the facility. Failure of the direct power connections to the Public Service Electric and Gas (PSE&G) grid caused the Subgrantee to lose processes and dewatering capabilities. As a result, a majority of the process facility buildings and support service buildings, (including the Administrative and Security Buildings) were damaged by flooding. In addition, the tidal surge breached the lower level of the facility, causing massive flooding in the process and facility galleries and throughout the interconnecting utility tunnel system. The Subgrantee was forced to suspend LWA services for 45 days and damage to the facility was so severe that the Subgrantee could not accept influent for several days. When flow was resumed, this flow had to be pumped directly from the intake facilities to the outfall facilities, bypassing standard treatment processes and substituting a best effort attempt at disinfection. Following the storm, the salt water tidal surge and sewage mixture was trapped in the lower

levels of the facility for more than 10 days before it could be pumped out. Twenty-five days after the Hurricane, on November 23, 2012, enough of the Subgrantee's treatment systems had been re-activated for daily effluent quality to return to secondary treatment standards.

These circumstances caused a disruption to facility operations for several days, loss of secondary treatment function for over 20 days and a partial loss of secondary treatment function until July of 2013. It is estimated that during the first four days following the Hurricane, approximately 840 million gallons of raw sewage was discharged directly into the Passaic River and Newark Bay. When effluent pumps were brought back on line on November 3, 2012, untreated sewage (with only a best effort dosing with sodium hypochlorite) continued to be pumped to the outfall in New York Harbor for another 20 days. The facility has been in compliance with New Jersey Pollutant Discharge Elimination System (NJPDES) permit requirements since July of 2013.

4.0 ALTERNATIVES

NEPA requires the analysis of practicable alternatives as part of the environmental review process for the proposed project. Inclusion of a No Action Alternative in the environmental analysis and documentation is also required under NEPA. The No Action Alternative is used to evaluate the effects of not providing eligible assistance for the proposed project, thus providing a benchmark again which "action alternatives" may be evaluated.

In order to assure continuity of function, potential damage from flooding should be minimized and standby electrical power should be provided. The alternatives analysis began with separate review of both electrical and floodproofing options. Alternatives were evaluated within the context of the 500-year floodplain, since this facility houses critical actions that provide a public health function for which even the slightest chance of flooding is too great.

Three alternatives were identified to provide on-site standby electrical power: 1) Installation of a third utility feeder; 2) Use of individual standby electric power generators; and 3) Construction of an on-site standby power system. The facility is currently fed power from PSE&G. PSE&G's transmission and distribution system was damaged by the storm and the main substation providing power for the facility was lost during the storm. Installing a third utility feeder was dismissed as the viability of this alternative is dependent on the assumed reliability of the regional power distribution system in another unusually large storm event. A full analysis of the alternatives assessed for standby electrical power is provided in the *Passaic Valley Sewerage Mitigation Analysis*, (Benefit Cost Analysis, FEMA, 2013).

Four alternatives were identified to minimize potential damage from flooding: 1) Specific component floodproofing; 2) Elevating the entire facility; 3) Relocating the facility outside the floodplain; and 4) Constructing a perimeter floodwall around critical facility infrastructure. Floodproofing and remaining standby electrical power alternatives were combined in a rational manner and supplemented with a No Action alternative for further analysis.

4.1 No Action Alternative

Under the No Action Alternative no federal funding would be available, and the Subgrantee would likely not upgrade the facility with flood damage risk reduction measures or would not have the funding to install an on-site standby power system.

The No Action Alternative would not meet the project purpose and need.

4.2 Proposed Alternative: Floodwall and Centralized On-Site Standby Power System Construction

The Proposed Alternative is to construct a floodwall around the facility's critical infrastructure, re-work site drainage, construct two stormwater control pump stations and install a centralized standby power system to run the facility in the event of a disruption to the electrical power grid. The proposed floodwall would be constructed at a height of six to twelve feet using cast-in-place concrete supported by piles and underlain with a sheet steel cut-off pile wall. There would be eight floodgates within the floodwall. These gates would remain open during normal conditions and close as floodwaters rise. The floodwall would be designed to mitigate the impact of a 500-year flood event. Three natural gas fired turbines would be installed to provide standby electrical power. These turbines would be installed inside a 200 feet by 160 feet building constructed on a pile-supported structural slab with a standby power system stack (100 feet high). Construction details are shown in Appendix A, Figures 1- 9. Additional mitigation measures include relocation of the Critical Process Equipment Switchgear and MCC's, raising of control panels and providing provisions for standby generators for the sump pumps, installation of bulkhead door in the utility tunnels and improving the onsite drainage system to handle a 100-year rainfall event.

4.3 Other Action Alternative: Component Floodproofing and Distributed On-Site Standby Power Systems

The facility would be protected from significant flood events and continue to operate through a combination of raising critical processes and equipment using the 500-year flood event as a design standard, selectively implementing strategies to reduce flood loss potential to 40 process areas and 56 buildings, installing a distributed stand-by power system comprised of 34 individual generators located at 16 sites and modifying utility infrastructure as required. See Appendix A, Figure 31 for generator locations. Flood protection of individual process areas and buildings would limit access within the treatment facilities during a major storm event.

4.4 Alternatives Considered and Dismissed

The Subgrantee identified two additional alternatives that would potentially meet

the purpose and need of the project to protect the facility from future flood damages and allow treatment operations during an interruption of the electrical grid power supply. The two alternatives are:

4.4.1 Elevate

The entire facility would be elevated by raising the grades of the site and adjacent roads around the facility with fill in order to prevent the site from flooding. The effectiveness of this alternative in reaching the mitigation goal would largely depend on developing a design to effectively retrofit critical buildings and processes so they could continue to function with a dramatic change in site grade.

There are significant design challenges related to the elevation of 40 process areas and associated above-grade process equipment while maintaining functionality with and connection to lower-level process equipment. There is no single solution to these design challenges as most of these buildings and processes perform unique functions and must remain fully operable during the retrofit activities necessary to implement this alternative. A similar design challenge is presented by required modifications to the adjacent roadways, which would also have to be accessible during construction to ensure ongoing facility functioning. Obtaining sufficient fill material at reasonable cost to complete the elevation would be difficult.

As each building and process is unique, there would be no economies of scale with the retrofits to the buildings and processes. Retrofitting the Subgrantee's buildings and processes as well as raising all site/roadway grades would be extremely disruptive to daily operations. During construction, important access points to treatment processes, galleries and buildings would be closed, main thoroughfares for equipment and personnel would be disrupted and conflicts between maintenance, storm repairs and construction activities could occur. In addition, the cost associated with raising site grades to protect on-site facilities from flooding (which is estimated at roughly $1 billion) greatly exceeds the estimated cost of the Proposed Alternative.

The alternative to elevate the facility site grades was dismissed based upon design considerations, operational factors, access issues and costs.

4.4.2 Relocate

The alternative to relocate the entire facility to a location outside the 500-year

floodplain would have the benefit of allowing the existing facility to continue operations while a new facility is being constructed, thereby avoiding any loss of function associated with the mitigation.

The primary issues with this alternative are finding a suitable location, acquiring the property, and project costs. The existing facility cost roughly $1 billion to construct in 1979. Using basic cost escalation, a new facility is estimated to cost approximately $3 billion. This cost estimate does not include process improvements incorporated in the facility since 1979 or additional costs associated with infrastructure extensions to the new location. All District collection and interceptor infrastructure would have to be reworked/redirected and new pumping and metering stations would have to be built. Large scale disruption to local roadways would result from new infrastructure construction. Finding a suitable parcel of land to construct the 140+ acre facility would be difficult in this densely populated area. In addition, there would be significant environmental regulatory issues to be addressed during the development process. Relocating the facility could meet the project purpose and need, but this alternative is dismissed because of factors associated with location identification, regulatory compliance and projected cost.

4.5 Summary of Alternatives

Four alternatives meet the purpose and need of the project. Of these, two - Elevate and Relocate, are dismissed (see above). The two remaining alternatives are: 1) Component Floodproofing and Distributed On-Site Standby Power Systems and 2) Floodwall and Centralized On-Site Standby Power System Construction. The latter alternative is the proposed alternative. This alternative achieves the purpose and need of the project at the lowest cost, with the least complexity and with no, negligible or minor and mitigatable adverse environmental impacts. Appendix B, Table 2 provides a summary of the alternatives and their impacts in addition to economic aspects and legal constraints.

5.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

Appendix B, Table 3 lists resources and summarizes impacts related to alternatives subject to further analysis.

5.1 Physical Resources

5.1.1 Geology and Soils

5.1.1.1 Existing Conditions

The proposed project site lies within the Piedmont physiographic Province in Essex County, New Jersey. Coastward, lower elevations consist of siltstone and shale deposits of the Passaic formation. The upper elevations in the northwest corner consist of sandy mudstone facies deposits of the Passaic Formation: Mudstone Facies (NJ GeoWeb). The project site has a nearly level topography with slight undulations and localized areas of higher elevation. The elevation change across the site is roughly 20 feet; generally from west to east. The United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) has prepared a soil survey for Essex County, New Jersey (see Appendix A, Figure 14). This survey indicates that there are two soil-mapping units in the vicinity of the proposed project site. These are:

- **Rikers loamy sand, 0 to 3 percent slopes (RkkcA) –** This loamy sand component is found on tidal flats and fills. The parent material consists of Sandy-skeletal material derived from coal ash. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer (limiting zone) is high. There is no zone of saturation within a depth of 72 inches. This soil does not frequently flood or pond. This soil series does not meet the hydric criteria defined by the NRCS.

- **Urban Land, 0 to 8 percent slopes (URBHGB, URDUNB, USDUNB)** – The Urban Land mapping unit consists of areas where industrial plants, shopping and business centers and other structures cover more than 80 percent of the surface. These areas are nearly all in highly populated areas. Most are nearly level to moderately sloping, but there are some areas that are steep. Fill material has been used in some places to build up wet soils. Most areas have been excavated or filled with material that is now totally paved or impervious.

These soils are not classified as prime or protected farmland soils and the surrounding area is an urban area, thus none of the alternatives would be expected to impact prime or protected farmland in accordance with the Farmland Protection Policy Act.

5.1.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have no impacts on Geology and Soil resources.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

The Proposed Alternative would have negligible short-term and long-term impacts on soil resources. There would be incidental soil disturbance necessary to construct the floodwall, stormwater management structures (pipes and pump stations), and the standby power system. Construction activities disturbing soils would include excavation for foundation elements, grading and other associated earthwork. As the excavation activities would be limited to the proposed improvements mentioned above, general topographic features of the project site would be maintained and topographical impacts from the project components would be minimal. The potential for substantial soil erosion impacts from construction or indirectly via wind and water would be reduced with the implementation of localized Best Management Practices (BMPs). These soil erosion control measures are identified in the New Jersey Department of Environmental Protection's (NJDEP) *Storm Water Best Management Practices Manual*, and the NJ Department of Agriculture *Standards for Soil Erosion and Sedimentation Control in New Jersey*. As it is anticipated that the project would disturb more than one acre of land, a construction stormwater permit would be required. This approval requires the preparation of a stormwater pollution prevention plan (SWPPP), which would include measures to minimize soil erosion and loss.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Elevating facilities and constructing floodwalls around specific buildings would disturb soils and require implementation of BMPs such as soil erosion and

sedimentation control to minimize temporary impacts during construction (See detail under Alternative 2). Floodproofing the facility would have impacts similar to the Proposed Alternative.

5.1.2 Air Quality

5.1.2.1 Existing Conditions

National and New Jersey Ambient Air Quality Standards (AAQS) have been adopted in accordance with requirements of the federal Clean Air Act for specific air pollutants to protect "public health" (primary standards) with an adequate margin of safety and to protect "public welfare" (secondary standards) from the adverse effects associated with pollutants in the ambient air. The current National and New Jersey AAQS applicable to the project site are presented in Appendix B Table 4.

The existing background ambient air quality of the project site can be characterized by air quality monitoring data collected by the NJDEP. The maximum levels monitored during 2010, 2011 and 2012 at NJDEP monitoring locations in the vicinity of the project site and representative of the project site are presented in Appendix B, Table 5. The concentrations of the air contaminants measured at these locations were below (i.e., in compliance with) all of the applicable National and New Jersey AAQS except for ozone. Ozone is a photochemical oxidant that is formed in the atmosphere from volatile organic compounds (VOCs) and nitrogen oxides (NO_x) called ozone precursors in the presence of sunlight.

Lead (Pb) concentrations were previously monitored by the NJDEP at North Brunswick (source-oriented monitor). Operation of this monitor was discontinued after the second quarter of 2005 because monitored concentrations were well below the applicable 1.5 µg/m3 National AAQS.

Areas meeting the National AAQS for a criteria pollutant are designated as being in attainment of the standards; areas where a criteria pollutant level exceeds the applicable National AAQS are designated as being in non-attainment of the standards. A non-attainment area may be re-designated to attainment based on monitoring data demonstrating attainment of the applicable standards. In these cases the state must implement a maintenance plan to assure continuing attainment.

The project site is classified as in attainment for sulfur dioxide (SO_2), PM_{10}

(Particulate Matter, particle size 10 micrometers), $PM_{2.5}$, carbon monoxide (CO), nitrogen dioxide (NO_2) and Lead (Pb). Maintenance plan requirements apply to CO and $PM_{2.5}$. The project site is currently classified as marginal non-attainment for ozone. The existing facility is a Title V major facility under N.J.A.C. 7:27-22, Operating Permits. Existing equipment emitting air contaminants includes: 15 boilers, two hot water heaters and one air heater, sewerage processing, dewatering, and odor control equipment; bulk solids material handling and storage equipment, 2 gasoline tanks, and a paint spray booth.

Air Conformity

Federal actions in nonattainment and maintenance areas are subject to United States Environmental Protection Agency (USEPA) conformity regulations 40 CFR Part 93. The air conformity analysis process ensures that emissions of air pollutants from planned federal activities would not affect the state's ability to achieve the Clean Air Act goal of meeting the National Ambient Air Quality Standards (NAAQS). Section 176(c) of the Clean Air Act requires that federal projects conform to the purpose of the State Implementation Plan (SIP), meaning that federal activities would not cause new violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone.

Federal highway and transit projects are subject to Transportation Conformity under Subpart A of 40 CFR Part 93. Other types of federal actions are subject to General Conformity under Subpart B, unless exempted. Certain actions and activities are exempted from General Conformity review, including the following:

- Stationary source emissions regulated under major or minor New Source Review (air permitting) programs.
- Alteration and additions of existing structures as specifically required by new or existing applicable environmental legislation or environmental regulations.
- Actions where the emissions are not reasonably foreseeable.
- Actions that have been defined by the federal agency or by the state as "presumed to conform."
- Activities with total direct and indirect emissions (not including stationary source emissions regulated under New Source Review programs) below *de minimis* (negligible) levels. For the Newark area, the applicable *de minimis* levels are as follows:
    - NO_x - 100 tons per year

- VOC - 50 tons per year
- CO - 100 tons per year
- $PM_{2.5}$- 100 tons per year
- SO_2 ($PM_{2.5}$precursor) - 100 tons per year

The *de minimis* levels for NO_x and VOC are applicable to moderate and marginal ozone nonattainment areas inside the ozone transport region. The *de minimis* levels for $PM_{2.5}$ and SO_2 are applicable to $PM_{2.5}$ nonattainment and maintenance areas, and the *de minimis* levels for CO are applicable to CO nonattainment and maintenance areas.

If the total direct and indirect emissions from a proposed federal action (not including stationary source emissions regulated under New Source Review programs) are projected to exceed an applicable *de minimis* level, conformity may be demonstrated by one of the following methods:

- Obtain a statement from the state agency that the emissions from the proposed federal action, along with all other emissions in the area, do not exceed the budget for those emissions in the SIP;
- Have the state agency agree to include the emissions in the SIP; or
- Mitigate or offset the increase in emissions.

The stationary source emissions shown in Appendix B Table 7 are exempt from air conformity review, but emissions from construction activities are subject to air conformity review, unless they are shown to be below the applicable *de minimis* levels.

5.1.2.2 Potential Impacts and Proposed Mitigation

<u>Alternative 1: No Action</u>

During routine operation the No Action alternative would have no impact on current air quality levels. In the event of a major storm and power outage, additional emissions would occur from temporary generators, pumps and equipment used at the facility.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

Stationary Source Emissions

The current design for the Proposed Alternative includes an on-site standby power system consisting of three 19 MW (mega-watt) natural gas turbines (with one or two operating at any time and one spare) and a 1,250 kW (kilo-watt) diesel black start engine. A "black start" engine is a generator used to start the standby power system generators when there is a power outage. Under normal conditions, electrical power would be used to start the turbines "spinning" prior to engaging the natural gas fuel source.

For permitting purposes, annual operation of the turbines would be limited to the equivalent of 1,000 hours per year for each of two turbines at 19 MW rated output. Maximum annual operation of the black start engine is estimated at 250 hours per year (100 hours for testing and maintenance, 150 hours for emergency operation). Emission controls for the turbines would include use of Dry Low NO_x (DLN) Combustion Technology to achieve an initial NO_x emission rate of 15 ppmvd (parts per million by volume, dry basis), "Selective Catalytic Reduction" (SCR) for providing an additional reduction of NO_x emissions to achieve a final NO_x emission rate of 2.5 ppmvd, and an oxidation catalyst which would reduce emissions of CO, VOCs, particulate matter (PM_{10}/$PM_{2.5}$) and organic hazardous air pollutants (HAP). Ammonia emissions, ammonia slip, from injection of excess ammonia to react with NO_x in the SCR system would be limited to 5 ppmvd at 3% O_2.

Projected emissions from the turbines and black start engine are shown in Appendix B, Table 7. Controlled emission levels from the turbines would comply with all applicable requirements. Based on the maximum proposed annual operation of the on-site standby power system, the annual potential to emit (PTE) for all air pollutants would be below the applicability thresholds for NJDEP "State of The Art" (SOTA) requirements, N.J.A.C. 7:27-18 Emission Offset requirements, and USEPA "Prevention of Significant Deterioration" (PSD) permitting, and the proposed on-site standby power system would not require an air quality impact analysis (dispersion modeling) under NJDEP or USEPA rules. In addition, facility-wide emissions for the Subgrantee's site would remain below the applicability thresholds for USEPA "Maximum Achievable Control Technology" (MACT) standards for HAPs. The proposed on-site standby power system would require a modification of the facility's Title V Operating Permit

(N.J.A.C. 7:27-22). PS&S presented the recommended Title V Air Permitting strategy for the proposed on-site standby power system to the NJDEP Bureau of Air Permitting at a meeting with the NJDEP, PVSC and FEMA on June 25, 2013, and a meeting summary included in a February 11, 2015 email correspondence is provided in Appendix H. The recommended air permitting strategy is as described above in this EA. The Title V Air Operating Permit Modification Application will be completed and submitted after completion of the design for the project as also described in the meeting summary in Appendix H. Further to the email summary, PVSC has recently been awarded a contract for the provision of Program Management Services which includes the completion of the preliminary design.

Net Air Quality Benefit

A net air quality benefit is projected for the proposed on-site standby power system, based on the premise that electrical power generated by the facility on-site standby power system would replace power otherwise purchased from the electric utility grid and that emissions from the on-site standby power system, on a lb/MWh basis, are projected to be significantly lower than the corresponding average emissions from the utility grid.

Appendix B, Table 8 compares emissions of NO_x, $SO_{2.5}$ and greenhouse gases (GHGs) from the proposed on-site standby power system with utility grid emissions on a lb/MWh basis and in tons per year, based on operation of two turbines at the equivalent of 1000 hours per year at their rated output (19 kW each). Utility emissions of NO_x, SO_2 and GHGs were calculated using data from the USEPA EGRID database. Emissions of other pollutants are not included in the EGRID database.

HAP Emissions and Risk Screening

As shown in Appendix B, Table 7, controlled emissions of HAPs from the on-site standby power system are less than the NJDEP *de minimis* reporting thresholds specified in N.J.A.C. 7:27-22, Operating Permits, and a “Risk Assessment” for HAPs is therefore not required. However, HAP emissions have been calculated and listed in Appendix B, Table 9, and a risk screening analysis has been performed using the NJDEP risk screening worksheet, shown in Appendix B, Table 10.

As shown in Appendix B. Table 10, the projected total incremental risk (IR) and total hazard index are below NJDEP risk screening criteria, indicating that HAP emissions from the Proposed Alternative would not cause significant risks to

human health.

Construction Emissions

The Proposed Alternative includes the construction of floodwalls, new storm sewers, two new stormwater pumping stations and an on-site standby power system. The duration of construction is expected to range between two to five years. Construction activities would require use of backhoes, loaders, cranes, concrete trucks, delivery trucks, and air compressors. Pile driving would be required for the construction of the floodwalls, the foundations of the stormwater pumping stations, and the on-site standby power system.

Emissions of fugitive dust during construction would be controlled by BMPs. Construction vehicles and nonroad equipment would comply with applicable standards and would use ultra-low sulfur diesel (ULSD) fuel as required by USEPA regulations.

Estimated emissions from construction activities for the Proposed Alternative are shown in Appendix B, Table 11. The emissions shown in this table include exhaust and crankcase emissions from nonroad construction equipment. Exhaust and crankcase emissions from truck trips to and from the project site are implicitly included, based on the truck operating hours for construction activities (7AM to 3:30PM). Emissions from construction employee commuting trips were assumed to be negligible relative to nonroad equipment emissions.

Emissions of NO_x are projected to be below the applicable *de minimis* levels, and emissions of VOC, CO, $PM_{2.5}$ and SO_2 are projected to be well below the applicable *de minimis* levels, based on calculations of exhaust emissions from nonroad engines. Based on these calculated emissions, the proposed federal action for the Proposed Alternative is exempt from air General Conformity review.

Overall air quality impacts of the operation of the on-site standby power system are expected to be beneficial. The impacts of the short term construction of the floodwall and on-site power system construction would be temporary and are also projected to be insignificant, i.e., the emissions are below the *de minimis* levels for air General Conformity review.

Alternative 3: Component Floodproofing and Distributed On-Site Standby

Power Systems

Stationary Source Emissions

The Floodproofing Alternative includes 34 diesel standby generators at 16 locations throughout the facility. Emergency diesel engines must be certified by the manufacturer to meet applicable emissions standards (New Source Performance Standards (NSPS), 40 CFR 60 Subpart IIII); fuel sulfur content must be limited to 15 ppmw (parts per million by weight).

Projected emissions from the standby generators are shown in Appendix B, Table 6. In accordance with NJDEP guidance, the calculation of annual PTE is based on annual operating hours for testing and maintenance only, and does not include emergency operation. Annual NO_x emissions from the 34 diesel standby generators without add-on controls would exceed the applicable major modification thresholds under both NJAC 7:27-18 and PSD regulations, which would trigger the following requirements:

- Best Available Control Technology (BACT)/Lowest Achievable Emission Rate (LAER) analysis for NO_x;
- Emission offsets for NO_x in the ratio of 1.3:1 or more, as required by N.J.A.C. 7:27-18;
- Air quality modeling for NO_2, as required by the PSD rule and NJDEP requirements; and
- Air quality modeling for other pollutants, as required by NJDEP.

BACT/LAER review would probably result in the requirement of add-on NO_x emission controls, e.g., SCR or nonselective catalytic reduction (NSCR) (three way catalyst). Add-on NO_x emission controls could reduce the annual NO_x emissions to below the N.J.A.C. 7:27-18 and PSD applicability thresholds. In this case, the emission offset and air quality modeling requirements would not apply.

The impacts of this alternative would be minor for construction emissions, and although not specifically quantified, would be expected to be below the *de minimis* level.

5.2 Water Resources

5.2.1 Wetlands

Executive Order (EO) 11990 Wetlands Management requires Federal agencies to avoid funding activities that directly or indirectly support occupancy, modification, or development of wetlands whenever there are practicable alternatives. FEMA uses the National Wetlands Inventory, state specific mapping tools and on-site surveys to identify wetlands. Federal actions within wetlands require the Federal agency to conduct an Eight-Step Review Decision-Making Process. This process, like NEPA, requires the evaluation of alternatives prior to funding the action. Regulations for conducting the Eight-Step Review Process are contained in 44 CFR Part 9. The Eight-Step Review completed for this project can be found in Appendix C.

5.2.1.1 Existing Conditions

A wetland delineation was conducted on the site in the spring and early summer of 2013 using the wetlands delineation methodology enumerated in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetlands Delineation. 1989). A freshwater wetland Letter of Interpretation (LOI) – Line Verification has been approved by the NJDEP (see Appendix C). The freshwater wetlands are regulated under New Jersey's assumption of the USACE's Section 404 program who issued a Freshwater Wetlands permit on December 23, 2014 (Permit #0714-09-0004.4) along with a Flood Hazard area permit (FHA 140001 and 140002). See Appendix A. Figure 17 for mapped surface waters and riparian zones and Appendix A, Figure 18 for NJDEP mapped wetlands.

Small areas of estuarine (E2EM5P-Estuarine, Intertidal Emergent, Phragmites australis, Irregularly Flooded) and palustrine wetlands (PSS1R-palustrine Scrub-Shrub Broad-Leaved Deciduous, Seasonal Tidal) are present along the southern and southwestern perimeters of the site. The majority of the wetlands on the site appear to have formed on top of or within excavations within previously filled lands.

The eastern boundary of the site is formed by Newark Bay. Along the site boundary, estuarine intertidal flats (E2FL) and estuarine subtidal open waters (E1OW) are present. Fringes of estuarine intertidal emergent (E2EM) wetlands are present in a man-made drainage ditch along the bayfront. These E2EM wetlands are characterized as a nearly monotypic stand of common reed (*Phragmites australis*). In July 2013, salinity in the estuarine wetlands varied between 15 and 22 parts per thousand (ppt). These wetlands are under the jurisdiction of the

NJDEP and the USACE under their Section 404 program. Application has been made to the USACE for a Section 404 permit.

Palustrine wetlands were observed in and adjacent to two man-made ditches on the site. The largest of these wetlands are located in the southwestern corner of the site along a man-made ditch known as Jasper Creek. These wetlands include approximately 1 acre of open water, 1.2 acres of emergent wetlands, and 0.4 acre of forested wetlands. The emergent wetlands adjacent to Jasper Creek contain a dense stand of common reed with patches of dense stands of Japanese knotweed (*Fallopia japonica*). The forested wetlands are located between Jasper Creek and the western site boundary. Dominant trees in the forested wetlands include cottonwood (*Populus deltoides*), red maple (*Acer rubrum*) and ashes (*Fraxinus spp.*). The understory contains a dense stand of Japanese knotweed and arrowwood (*Viburnum dentatum*). In July 2012, salinity in the palustrine wetlands was 0 ppt. Much of Jasper Creek is below elevation 4.0 feet National Geodetic Vertical Datum of 1929 (NGVD); however, tide gates at the confluence with Newark Bay restrict the tide so that the wetlands are not subject to tidal influence. The primary source of water for these wetlands appears to be stormwater runoff and groundwater discharge into the stormwater management system.

Review of early aerial photography and U.S. Geological Survey maps indicates that in the beginning of the 20th century much of the site was occupied by wetlands. However, by the middle of the 20th century, the majority of the site was filled and the wetlands were eliminated. Currently, the majority of the 140+ acre site is upland.

5.2.1.2 Potential Impacts and Proposed Mitigation

<u>Alternative 1: No Action</u>

The No Action alternative would have no direct impacts on wetland resources. However, the No Action alternative would not prevent the discharge of untreated wastewater to the wetlands on site and surrounding areas in the event of another storm's impact on treatment operation potentially creating a negative, temporary impact, depending on the size of the storm.

<u>Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction</u>

The project would require the filling or permanent alteration of less than one-tenth of an acre of emergent wetlands (see Eight Step Review Documentation in Appendix C). Vegetation in the impacted wetlands consists of a dense nearly monotypic stand of common reed. Additionally, these wetlands do not appear to be subject to regular inundation by surface waters. The functional value of these wetlands is low. NJDEP has confirmed on-site wetlands to be of intermediate and ordinary resource value; therefore, the loss of the wetlands would not be anticipated to have a significant impact on wildlife habitat, water quality improvement or flood control. For these reasons, impacts are minor and in the context of remaining wetlands in the region, inconsequential and able to be fully offset by mitigation.

The NJDEP issued a Freshwater Wetlands Individual Permit (#0714-09-0004.4 FWW140001) and Water Quality Certificate for the project on December 23, 2014. The permit authorizes the permanent disturbance of 0.07 acres of Intermediate Resource Value wetlands and 0.186 acres of wetlands Transition Area. The NJDEP permits require that PVSC mitigate for the loss of freshwater wetlands, State open water and riparian zones. Mitigation must be performed before or concurrent with project construction. The NJDEP has given the option to purchase credits from an established wetlands mitigation bank to offset the 0.07 acres of wetlands disturbance. Alternatively, there are opportunities on-site to provide in-kind wetlands mitigation to offset impacts to wetlands. For example approximately 450 feet of Jasper Creek will be stabilized with rip rap placed to allow natural vegetation to re-establish itself in the creek bed. Any mitigation plan would be subject to FEMA review and approval. The project would be a benefit to wetlands due to reduction of the uncontrolled release of wastewater from future flood events.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Floodproofing the facility would have no negative consequence on wetland resources. Raising processes and constructing walls around specific buildings would avoid direct impacts to wetlands. The project would have a positive impact on wetlands due to reduction of the uncontrolled release of wastewater from future flood events.

5.2.2 Floodplains

EO 11988 Floodplain Management requires that Federal agencies avoid funding activities that directly or indirectly support occupancy, modification, or development of the floodplain whenever there are practicable alternatives. Federal actions within the 100-year floodplain (a.k.a. Special Flood Hazard Area) and, in this case, the 500-year floodplain require the Federal agency to conduct an Eight-Step Review Decision-Making Process. FEMA's regulations for conducting the Eight- Step Review Process are contained in 44 CFR Part 9. The Eight-Step Review Documentation conducted for this project can be found in Appendix C.

5.2.2.1 Existing Conditions

The majority of the facility is located within the 100-year floodplain (AE11 and AE12 zones) as depicted on FEMA's Preliminary Firm Panels 34013C0159G and 34013C0178 G dated May 30, 2014 (See Appendix A). A small portion of the project site adjacent to Newark Bay is located within a coastal high hazard area (VE14 zone). Per 44 CFR Park 9.11(d)(1) this facility is considered a functionally dependent use and the floodwall protects this facility to a 500-year flood event. Small sections of the project site are located within the 500-year floodplain (0.2% chance of flood annually in any given year).

Areas of the project site are also classified as flood hazard areas (FHA) and riparian areas, as defined at N.J.A.C. 7:13 and regulated by the State of New Jersey. N.J.A.C 7:13-1.2 FHA consists of land, and the space above that land, which lies below the FHA design flood elevation. A "Riparian zone" includes land and vegetation within and adjacent to regulated water as described at N.J.A.C. 7:13-4.1 and illustrated at N.J.A.C. 7:13-2.3. The riparian zones at the project site are shown on Figure 8 in Appendix A.

The facility was flooded directly from tidal surge from Newark Bay and storm surge travelling up Jasper Creek and inundating the site from the west. An analysis using the NJDEP FHA (7:13-3.5) approximation method (Method #5) determined that Jasper Creek falls into the NJDEP FHA tidal regulatory guidelines.

5.2.2.2 Potential Impacts and Proposed Mitigation

<u>Alternative 1: No Action</u>

The No Action alternative would promote continued floodplain occupancy and would perpetuate a facility at risk of future flood damage. Release of untreated

wastewater would likely result during a future storm event due to the lack of implementation of risk reduction measures and would pollute the surrounding water bodies.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

The proposed perimeter floodwall would provide flood damage risk reduction up to the 500-year flood elevation for the entire facility. This would address floodproofing of structures and internal processes. Floodproofing the facility would minimize potential for disruption of this critical utility service. The project's public benefits to human health, safety and welfare outweigh the minor or negligible adverse effects of the proposed alternative to the floodplain.

The Subgrantee has coordinated with the NJDEP to obtain all applicable permits or authorizations related to floodplain management. The NJDEP issued a Flood Hazard Area Individual Permit and Verification (#0714-09-0004.4, FHA 140001 and 140002) and Water Quality Certificate for the project on December 23, 2014. The project complies with the Clean Water Act (P.L. 95-217).

The Proposed Alternative would be constructed to the National Flood Insurance Program standards on existing previously developed, largely impervious surfaces, outside the top of bank of site perimeter regulated water areas. The Hydrologic and Hydraulic Analysis for the project is included in FEMA's Flood Insurance Study for Essex County, Volumes 1, 2, & 3 available at FEMA's Map Service Center https://msc.fema.gov/portal. A new stormwater management system would be constructed to control stormwater and address displaced flood storage area and volume in order to minimize the potential for localized induced flooding on neighboring properties. Facility stormwater would be collected through a system of existing and proposed inlets and piping. The existing storm drainage system currently discharges offsite to the Newark drainage system, Jasper Creek and Newark Bay. The proposed onsite drainage system improvements will disconnect from these current connections, thereby diverting all onsite stormwater to the proposed pump stations. The proposed pump stations will receive stormwater runoff from all onsite drainage collection systems. The pump stations will pump on site runoff generated by rainfall events to either Newark Bay or Jasper Creek. The stormwater management systems will properly handle floodwaters during flood events. The system would be designed with structural protections to isolate the facility as needed during flood events to prevent interior flooding of the facility

through the drainage system. The stormwater would be treated in accordance with BMPs and discharged at the new pump stations located at Jasper Creek and the tidal creek at Newark Bay. The storm drainage piping and new pump stations will be designed to handle up to the 100-year rainfall event. Analysis of the pump station discharges under the 100-year rainfall event indicates no negative impact to the receiving waters of Jasper Creek and Newark Bay. The construction of these proposed onsite stormwater management structures is permitted by the NJDEP Freshwater Wetlands Individual Permit, Flood Hazard Are Individual Permit and Water Quality Certificate.

A relatively small square footage of existing lawn and upland landscape areas would be converted to impervious cover; however, the project would not impact the overall floodplain function or value of the area in this industrialized area. Riparian zone impacts would be mitigated on-site through the restoration and enhancement of wetlands in the riparian corridor of Jasper Creek, as described in the previous section of this document. BMPs would be used during construction to avoid or minimize potential sedimentation and manage stormwater during construction to avoid discharge of pollutants into the floodplain, Jasper Creek and/or Newark Bay.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

The structures of the facility would be floodproofed to the 500-year floodplain elevation with walls or other floodproofing (e.g. flood-tight doors) customized to each structure. This alternative would reduce the risk of future flood damage to process areas and buildings and would address the project need to minimize disruption of this critical utility service during future flooding events. Nevertheless, facility flood hazard risk reduction and site accessibility would not be addressed as a whole. Compared to the Proposed Alternative, the potential to induce flooding off-site is lower as flood storage capacity would not be impacted by a perimeter wall. Ultimately, however, the impact to flood storage capacity for all action alternatives is minimal in the tidal flooding context of the facility.

5.3 Coastal Resources

5.3.1 Coastal Resources

The Coastal Zone Management Act (CZMA) requires states with shorelines in coastal zones to have a Coastal Zone Management Plan (CZMP) to manage coastal development. Projects falling within designated coastal zones must be evaluated to ensure they are consistent with the CZMP. Projects receiving federal assistance must follow the procedures outlined in 15 CFR 930.90 – 930.101 for federal coastal zone consistency determinations. In order to guide development and resource management within the State's coastal area, substantive policies have been identified and promulgated by the NJDEP. The policies have been codified at N.J.A.C. 7:7E (Coastal Zone Management (CZM) Rules).

5.3.1.1 Existing Conditions

The project site is located within the regulated coastal zone.

The Subgrantee and FEMA submitted a request to the NJDEP for a Federal Consistency Determination for the proposed project pursuant to New Jersey's CZMP (see Appendix D). This request for Federal Consistency Determination followed the NJDEP's checklist for Determination of CZMA Consistency. A positive Federal Consistency Determination was issued by NJDEP on October 22, 2013 (see Appendix D), confirming the Proposed Alternative is consistent with New Jersey's CZMP.

5.3.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have no direct impacts on coastal resources. The No Action alternative would not prevent the discharge of untreated wastewater to the coastal zone and Newark Bay in the event of another storm's impact on treatment operations. Untreated sewage discharge is a negative impact and duration of impact depends on the size of the storm, damages incurred, and length of time of power outages.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

The Proposed Alternative would provide additional protection to coastal resources. The project would have a positive impact on coastal resources due to reduction of the uncontrolled release of wastewater from future flood events. The physical

location of the project would have negligible impacts to coastal resources due to the highly developed and industrialized nature of the area.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

The Component Floodproofing and Distributed On-Site Power Systems alternative would have a positive impact on coastal resources due to reduction of the uncontrolled release of wastewater from future flood events. The physical location of the project would have negligible impacts to coastal resources due to the highly developed and industrialized nature of the area.

5.4 Biological Resources

5.4.1 Vegetation

5.4.1.1 Existing Conditions

Nearly the entire site has been significantly modified by past human activities. The majority of the site is occupied by structures, impervious surfaces, or maintained landscapes (e.g. lawn). Trees such as cottonwood (*Populus deltoids*), red maple (*Acer rubrum*), sycamore *(Platanus occidentalis*), London planetree (*Platanus acerifolia*), mulberries (*Morus alba and M. rubra*), pin oak (*Quercus palustris*), sumacs (*e.g.,Rhus glabra, R. typhina, and R. aromatica*) and ashes (*Fraxinus americana and F. pennsylvanica*) are used as street trees and/or are present along the perimeter of the site.

Those areas of the site which are not covered with impervious surfaces or actively maintained are typically occupied by plant communities consisting of non-indigenous or invasive species, but none that require an invasive quarantine zone under E.O. 13122. Dominant plant species in these areas include common reed (*Phragmites australis*), mugwort (*Artemisia vulgaris*), tree of heaven (*Ailanthus altissima),* Princess tree (*Paulownia tomentosa*) and Japanese knotweed (*Fallopia japonica*).

The New Jersey Natural Heritage Program has no records of any state or federally-listed endangered plants on the site. No rare, threatened, or endangered plant species or plant communities have been observed on the site. The project does not endanger any state-or federally-protected threatened or endangered species.

5.4.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have no direct impacts on vegetation.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

Project implementation will result in the direct loss of approximately 0.5 acres of vegetation and the disturbance of approximately 5-7 acres of vegetation. All of the vegetation is located in areas which have been previously disturbed and currently occupied by maintained landscapes (lawn) or plant communities that are dominated by herbaceous non-indigenous or invasive species. Installation of the wall may also require trimming or removal of a few sycamores and London planetrees present within maintained landscapes. These trees are generally less than twelve inches in diameter. No rare, threatened or endangered plant species or plant communities will be impacted by the project.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Component floodproofing of the facility would have a greater consequence on vegetation than the Proposed Alternative. Raising processes and constructing walls around individual buildings would require greater lengths of wall and a greater area loss of existing vegetation within maintained landscapes.

5.4.2 Wildlife and Fish

5.4.2.1 Existing Conditions

Aquatic
Surface waters capable of supporting fish exist in the waters of Newark Bay, a concrete lined ditch in the eastern corner of the site and within Jasper Creek. The total area of potential fish habitat is approximately 1.41 acres.

The majority (1.05 acres) of the surface water is located in Jasper Creek. Jasper Creek is a man-made drainage ditch with a drainage area of approximately 300

acres. The entire drainage area is extensively developed. Fish passage between Jasper Creek and Newark Bay is restricted by tide gates located at the mouth of the creek. Bottom substrate is mostly very soft organic silts. When disturbed, these sediments emit a strong odor of hydrogen sulfide and hydrocarbons. In the upper reaches there are short sections where the bottom is firm sand. Under normal conditions the water depths are typically less than six inches with a few sections up to two feet in depth. Salinity in July 2013 was 0 ppt. Water temperatures mimic ambient air temperature. Turbidity is generally high and oxygen levels are likely low. Velocities are sluggish and typically less than 0.15 feet per second (fps). Following rainfall water levels, turbidity and velocity increase rapidly. Following one thunderstorm in July 2013, surface water increased by approximately 5 feet and velocities exceeded 2 fps. During 2013 field investigation, a single fish species, mummichog (*Fundulus heteroclitus*), was observed in Jasper Creek. Relatively few (typically less than 25 individuals) mummichogs were observed during each site inspection. Overall, aquatic habitat within Jasper Creek appears to be limited by poor sediment quality, low oxygen levels, and high turbidity. Richness, abundance, and diversity of aquatic species are expected to be low.

The site borders Newark Bay and there are approximately 0.37 acres of tidal surface waters on the site. Approximately 0.25 acres of these waters is associated with a concrete lined drainage ditch. The remaining 0.12 acres are along the Newark Bay shoreline. The ditch is located in the intertidal zone and contains no surface water at low tide. Most of the area in Newark Bay is subtidal, with water depths between 0 and 10 feet. The bottom substrate of the Bay and upper reaches of the ditch is a black organic silt. The aquatic resources of Newark Bay are impacted by a variety of inorganic and organic materials. These materials are released from numerous sources, including municipal and commercial discharges, nonpoint sources, combined sewer overflows (CSO), and accidental spills. Mummichogs were observed in the ditch at high tide during July and August 2013 site investigations. Salinity of the bay is brackish and varies between 13.6 ppt and 23.6 ppt depending on the tidal and freshwater inputs. Newark Bay supports a diverse aquatic community typical of the New York Bight area. Previous biological investigations have characterized the seasonal distribution and composition of the aquatic community in the Bay and surrounding area.

Federal agencies are required to assess the potential impacts that proposed actions may have on Essential Fish Habitat (EFH), in accordance with the Magnuson-Stevens Fishery Conservation and Management Act. There is EFH supported in Newark Bay for an assemblage of species including winter flounder

(*Pseudopleuronectes americanus*) and bluefish (*Pomatomus saltatrix*). The results of many of these studies are summarized in an Essential Fish Habitat Assessment for Newark Bay Maintenance Dredging prepared by the United States Army Corps of Engineers (USACE) and found at www.nero.noaa.gov.

Terrestrial

There are two general terrestrial wildlife habitats on the site: the developed portions of the site consisting of various structures, lawns and scattered trees and shrubs, and fallow areas of the site where vegetation is not cut or otherwise maintained on a regular basis. The majority of these fallow areas contain dense stands of non-indigenous species such as common reed, mugwort, and Japanese knotweed. There is approximately 0.36 acres of forested habitat on the site. Wildlife species on the site are typical of urban environments in coastal northern New Jersey. Species observed on-site include herring gull (*Larus argentatus)*, Canada goose *(Branta canadensis*), eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), grackle (*Quiscalus quiscula*), American robin (*Turdus migratorius*), Norway rat (*Rattus norvegicus*), common starling (*Sturnus vulgaris*), and other passerine birds. Wildlife utilization of the site is limited by intense development, high levels of human activity, low habitat diversity, and poor water quality. Only those species that are pollution tolerant and tolerant of disturbance are expected to occur on the site. Most wildlife species likely use both the developed and fallow areas of the site. Species such as Canada goose, woodchuck and eastern cottontail use the lawn areas for foraging and the fallow areas for escape cover and nesting.

5.4.2.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have no direct impacts on wildlife and fisheries habitat.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

The floodwall would be installed within terrestrial wildlife habitats and result in the direct loss of 0.5 acre of habitat. The wall would be installed within the developed habitats and along the interface between the developed areas and fallow areas. Wall height would vary between 6 and 12 feet above existing grade.

Openings would be along existing roadways. Installation of the wall would create a barrier between the developed areas and fallow areas of the site. The presence of this barrier would benefit species that are sensitive to human activities and primarily use the fallow areas of the site. The wall would limit the movement of species such as eastern cottontail, woodchuck and nesting Canada geese that use both the developed and fallow areas of the site and are restricted to the ground for all or a portion of their life cycle. Local impacts to wildlife from wall construction would be inconsequential as ample habitat would remain to support these wildlife species.

The project has been designed to avoid direct losses to aquatic habitats (e.g. areas regularly inundated by surface water). Construction of the two stormwater outfalls may increase the area of surface water on the site slightly by excavating terrestrial habitats. These outfalls would also likely require modification of the bottom substrate (stone) of a section of Jasper Creek to prevent erosion of the channel, see Wetlands - Alternative 2. This portion of the project is under review by the USACE to determine if permits and permit conditions are required. The Proposed Alternative design calls for placing the channel lining at or below the elevation of the existing channel bottom. Therefore, this lining is not anticipated to have any long term impacts to aquatic habitat as existing water depths and water quality characteristics would not be significantly modified. Over time, the lining is expected to infill with a mixture of sand and organic matter and support aquatic wildlife similar to existing conditions.

The Proposed Alternative could indirectly benefit EFH due to minimization of future sewerage releases during flood events. FEMA has determined that the Proposed Alternative would have no adverse effect on EFH.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Raising site grades and constructing floodproofing features such as floodwalls around individual buildings could result in the loss of relatively small amounts of pervious cover upland habitat. The alternative would largely retain the interface between the developed areas and open space upland habitat, and would potentially result in less direct permanent loss of wetland and riparian habitat as compared to the Proposed Alternative.

5.4.3 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) of 1973 provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead Federal agencies for implementing ESA are the United States Fish and Wildlife Service (USFWS) and the U.S. National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS). The law requires Federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a “taking” of any listed species of endangered fish or wildlife.

5.4.3.1 Existing Conditions

Endangered or threatened wildlife or plant species habitats are terrestrial and aquatic (marine, estuarine or freshwater) areas known to be inhabited on a seasonal or permanent basis by or to be critical at any stage in the life cycle of any wildlife or plant identified as "endangered" or "threatened" species on official federal or state lists of endangered or threatened species, or under active consideration for state or federal listing. The definition of endangered or threatened wildlife or plant species habitats includes a sufficient buffer area to ensure continued survival of the population of the species as well as areas that serve an essential role as corridors for movement of endangered or threatened wildlife. Absence of such a buffer area does not preclude an area from being endangered or threatened wildlife or plant species habitat.

Review of NJDEP Landscape Project, Version 3.1 and the Natural Heritage Report obtained from the Natural Heritage Program (see Appendix A, Figure 20) indicated the presence of state threatened or endangered species habitat at the site. The following species were identified on this mapping:

- Black-crowned night-heron (*Nycticorax nycticorax*) and
- Cattle egret (*Bubulcus ibis*).

Given the highly developed nature of the project site and vicinity, high levels of human activity, and limited prey abundance and diversity, the site offers suitable (but relatively low-quality) habitat for black-crowned night heron and cattle egret.

There are no terrestrial federally-listed species at the site. Aquatic federally-listed

species and marine mammals, afforded protection under the Marine Mammal Protection Act, such as Atlantic sturgeon (*Acipenser oxyrhncus*), northern right whale (*Eubalaena glacialis*), the humpback whale (Megaptera novaeangliae), and the fin whale (*Balaenoptera physalus*) may occur in the waters of Newark Bay.

5.4.3.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have no direct impacts on state and federally-listed threatened and endangered species.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

This alternative would have no long term direct impacts on state and federally-listed threatened and endangered species. Project implementation would not result in any significant direct impacts to black crowned night heron habitat. Riprap used to stabilize the bed and banks of the two watercourses will alter the bottom substrate but is not anticipated to significantly alter existing prey abundance, diversity, or foraging opportunities. Project implementation would result in the direct loss of some potential foraging habitat (lawn) for cattle egret. Given the low quality of the habitat, presumably limited use of the site for foraging, and relative abundance of remaining similar habitat on-site, the project would have no significant impact on cattle egret populations.

FEMA has determined that the Proposed Alternative would have no adverse effect on federally-listed species, as there are no terrestrial listed species known to occur in Newark. The project would have a positive indirect impact on aquatic federally-listed species due to a reduction of the future release of wastewater during flood events and enhanced stormwater management. The project would have only temporary and negligible impacts on the aquatic environment during construction of the outfalls into Newark Bay. Conditions of the anticipated USACE Nationwide Permit would be adhered to, along with basic construction BMPs to avoid or minimize potential for turbidity. Fish species would be temporarily displaced; but could, return post-construction. FEMA has determined that the Proposed Alternative would have no effect on federally-listed aquatic species and would have no effect on marine mammals. In accordance with the Migratory Bird Treaty Act, FEMA has determined that the Proposed Alternative would not significantly

impact Migratory Bird Habitat. The area would temporarily be unavailable to passerine birds due to disturbance, but the development involved with the floodplain would not impact high-quality migratory bird habitats and wetland areas are to be mitigated on-site through restoration and enhancement.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

The alternative would have no direct impacts on state and federally-listed threatened and endangered species. The project would have a positive indirect impact on aquatic federally-listed species due to reduction of future release of wastewater during flood events and due to enhanced stormwater management.

5.5 Cultural Resources

5.5.1 Cultural Resources

As a Federal agency, FEMA must consider the potential effects of any of its funded actions upon historic properties prior to engaging in any undertaking. This obligation is defined in Section 106 of the National Historic Preservation Act (NHPA). The NHPA of 1966 as Amended defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register." Eligibility criteria for listing a property on the National Register of Historic Places (NRHP) are found at 36 C.F.R. Part 60.

The firm Paulus, Sokolowski and Sartor (PS&S) was hired by the Subgrantee to conduct a Phase IA Cultural Resource Reconnaissance which includes a preliminary assessment of effects to historic resources and a cultural resource alternatives analysis to address the effect the proposed improvements would have on historic and archaeological properties in the Area of Potential Effects (APE), which includes the Passaic Valley Sewerage Commission Newark Bay Outfall Sewerage Works Historic District. The resulting comprehensive report, Cultural Resource Reconnaissance Passaic Valley Sewerage Commission Newark Bay Outfall Sewerage Works City of Newark, Essex County, New Jersey, has been reviewed by and is on file at the New Jersey Historic Preservation Office (NJHPO). A Summary Memo of the report, the NJHPO concurrence letters dated January 30, 2014 and May 20, 2015; and produced as a result of the report, and all other FEMA-NJHPO correspondence can be found in Appendix E. The

concurrence letter agrees with FEMA's finding of an adverse effect to historic properties and proposes the use of Standard Treatment Measure G, "Historic Property Inventory", as outlined in Appendix C of the Programmatic Agreement, dated April 30, 2013, among FEMA, NJHPO, the Grantee, the Advisory Council on Historic Preservation, the Absentee Shawnee Tribe of Indians of Oklahoma, the Delaware Nation, the Delaware Tribe of Indians, the Shawnee Tribe of Oklahoma and the Stockbridge Munsee Band of Mohicans. This mitigation will consist of photographing, illustrating, and providing a written description of features of the historic property that will be disturbed and/or demolished during groundwork associated with the standby power system. FEMA and the NJHPO concur with this mitigation.

FEMA also consulted with the Delaware Tribe of Indians, Shawnee Tribe of Oklahoma, and Delaware Nation. FEMA provided information regarding the undertaking and its potential effects to historic properties and afforded the Tribes the opportunity to participate in the consultation. No response was received from the Delaware Nation. The Delaware Tribe of Indians responded that there are no religious or culturally significant sites in the project area and have no objection to the proposed project. The Shawnee Tribe responded with concurrence and that they have no issues or concerns at this time. Both Tribes requested to be contacted in the case of inadvertent discovery of human remains or archaeological materials, respectively. All Tribal consultations and responses can be found in Appendix E.

5.5.1.1 Existing Conditions

The Newark Bay Outfall Sewerage Works (the Facility) consists of land created by the filling of the Newark Meadows in the early 20th century. Prior to this, the Newark Meadows was a relatively flat brackish water tidal marsh at or slightly below mean sea level. Today, the area is heavily developed and consists of fairly level ground adjacent to and west of the Newark Bay.

<u>Prehistoric Resources</u>
Research at the New Jersey State Museum (NJSM) and NJHPO indicate that no registered prehistoric archaeological sites have been identified within a 1-mile radius of the APE. Additionally, none of the archaeological surveys conducted within ½ mile of the Facility and on file with the NJHPO resulted in the discovery of Native American artifacts or activity areas. The absence of registered sites may be attributable to the dense urban and industrial development of the area, which would have displaced or destroyed prehistoric and early historic period sites. The

absence of sites at or below the Facility's elevation is likely due to submerged conditions in such areas prior to the early 20th century and the area's history of filling and development.

The only evidence of Native American activity that might be located within the APE would be occasional, sparsely distributed artifacts left by brief forays into the wetlands during prehistoric times. Deposits of this nature are not likely to have survived the extensive disturbance involved in construction of the Facility and would probably not retain stratigraphic integrity. While it is conceivable that some small ephemeral deposits might exist below the fill in sediments related to the former wetlands, the likelihood of detecting and recovering any significant prehistoric archaeological materials given existing conditions is extremely low.

The potential of encountering these deposits would be limited to a known deposit of peat which accumulated in the tidal wetlands prior to the 1905-1915 filling event. Geotechnical borings taken in 1978 establish that foundations associated with the proposed hazard mitigation may penetrate the tidal marsh sediments in one small area associated with the construction of the northern floodwall east of Doremus Avenue. The maximum depth of disturbance within the peat deposit is expected to be 2 feet 6 inches (see Appendix F, Boring Logs).

The archaeological sensitivity of the tidal marsh peat deposits is low, and the proposed disturbance within these sediments is limited.

Historic Resources

The APE has a low potential for historic period archaeological resources pre-dating construction of the Facility due to the same factors that affect the potential for prehistoric resources. The original belowground components of the Facility (i.e., the historic Main Conduits, Passaic Valley Interceptor Sewer, Newark Shaft, Units 2 and 3 Sedimentation Basins, Old Sludge Conduits, Old Sludge Pumping Station, Old Sludge Storage Tanks and Outfall Tunnel) have been identified by the NJHPO as character defining features of the potentially eligible Passaic Valley Sewerage Commission Newark Bay Outfall Sewerage Works. These belowground elements along with the some of the Facility's buildings constitute the potentially eligible components of the sewerage works. Proposed improvements within the APE have the potential to impact character-defining features onsite. FEMA and the applicant propose to use Standard Treatment Measure G "Historic Property Inventory" to mitigate the potential loss of character-defining features onsite.

The Facility is a complex site in that it includes above- and belowground resources built during the 20th century, and some of the components have been decommissioned or demolished. The Facility was originally designed to reduce growing threats to the health of Passaic River Valley residents that were presented by the dumping of raw sewage into the Passaic River and Newark Bay. Most of the planning and design of the Facility occurred between 1908 and 1924. The Newark Meadows were filled between 1905 and 1915. Aboveground construction began after the filling of the Newark Meadows, while construction of some of the belowground structures outside of the Facility (e.g., The Passaic Valley Interceptor Sewer, Newark Shaft and Outfall Tunnel) may have begun as the meadows were being filled. The Facility's architecture was designed in a uniform Neoclassical style by Frederick A. Phelps, a notable Newark architect. The Facility's highly innovative engineering was overseen by William M. Brown, P.E.

Prior to the Facility's 1924 opening, the State of New York sued the State of New Jersey over its plan to disperse untreated sewage into the New York Bay. The suit resulted in the addition of a treatment facility to the Facility's design. Treatment was primarily accomplished by the addition of a sedimentation basin (Unit 1), and Unit 2 and Unit 3 in the late 1920s and mid-1930s to increase treatment capacity. A sludge handling capacity was added in a minor expansion of the Facility in the late 1950s, along with several sludge storage tanks and sludge conduits. The addition of sludge handling both altered the Facility's function in a manner that was not consistent with the original engineering and involved architecture which was not compatible with the Facility's original design. In the late 1970s and early 1980s, as part of the Federal Clean Water Act, the Facility experienced sweeping modernizations which included the removal of several buildings and structures and the addition of many new buildings and structures.

Although the potential Historic District has been investigated by architectural historians and archaeologists seven times since 1975 the Facility's definition, period of significance, and the details of its historical significance have not been clearly articulated. As a result of PS&S's report, the NJHPO has determined that the Historic District is eligible for the National Register of Historic Places (NRHP) under Criteria A and C for association with and distinctive representation of a major historical movement in architecture and city planning (City Beautiful) and as a significant achievement in sanitary engineering. The period of significance was found to be from 1908 to 1936 and includes all of the remaining buildings associated with the City Beautiful Movement constructed in the Neoclassical style and all of the belowground engineered historic structures that were designed to

support the Facility's original sanitation mission (see Appendix B, Table 13 & Appendix E, PS&S Public Participation Memo & NJHPO Revised Consultation Letter). The NJHPO opinion dated January 30, 2014 expands the period of significance to 1958. This decision does not impact this project.

Excluded from this period of significance are buildings and structures built for the purpose of integrating sludge handling capabilities at the Facility, and the numerous buildings and structures built in the 1970s and 1980s to comply with the Federal Clean Water Act (see Appendix E, NJHPO Opinion Letter).

5.5.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would not reduce the current risk to cultural resources from storm surge and flooding and would have no effect on historic properties.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

Physical adverse effects: Although there would be minor physical adverse effects upon a few of the Historic District's contributing elements by the construction, overall this alternative would provide increased protection for all onsite cultural resources by protecting them during storm surge and flooding. An adverse effect, although minimal, would be to a portion of the Historic Main Conduits which consist of four conduits that run parallel to one another, connecting the portions of the Facility that lie to the east and west of Doremus Avenue. A portion of the two conduits on the north side of this set, west of Doremus Avenue, approximately 60 feet by 20 feet, or 5% of the Historic Main Conduits, may be destroyed or penetrated by piles during the construction of the standby power system.

In the planning phase, PS&S engineers have made changes based upon finding of this report that would minimize and/or avoid impacting contributing elements to the Historic District. One example was to minimize disturbance to the Unit 2 Sedimentation Basins (a late 1920s addition that is no longer functioning as part of the Facility but considered a contributing archeological resource). To achieve this, the standby power system was relocated and the building's overall footprint was minimized. In this new location, only a small portion of the northeast corner of the Unit 2 Sedimentation Basins, approximately 130 feet by 50 feet, or 15% of the

Unit 2 basins, would be destroyed by the construction of the standby power system building.

Visual Adverse Effects within the Historic District: There would be no visual adverse effects upon standing structures in the Historic District by the proposed floodwalls as these buildings do not retain their original setting. Historic standing structures are minimal and are spaced out and include the Wet Weather Pumping Station, the Venturi Chamber Building, and the Head House. Only the Wet Pumping Station and the Venturi Building are in view of each other. The segments of the floodwall closest to these buildings would be obscured or buffered by numerous existing modern non-contributory components of the Facility. The new standby power system stack (100 feet high) would be one of many similar non-contributory modern stacks and structures already present and in visual range of these buildings. The new, standby power system building, not visible from the Venturi Chamber Building, would be mostly screened from the Wet Weather Pumping Station by modern structures and topographic changes. The visual integrity of the Head House would not be impacted either. The significance of the Head House as an important engineering structure is associated with its internal structure. The exterior has been modified and it too does not retain its original setting.

Visual Adverse Effects outside the Historic District: There are three National Register Historic Districts within ¼ mile of the APE. None of the three nearby railroad districts will be visually affected by the proposed improvements. The southern segment of the proposed floodwall would be visible from the Lehigh Valley Railroad Oak Island Yard Historic District as it would be placed atop a low berm along the Facility's southern boundary, which is shared with the historic rail yard. However, since the rail yard itself has little to nothing left of its historic viewshed, the approximately 4-foot (above the top of the berm) floodwall would not provide a significant alteration of the existing viewshed. In addition to the surrounding modern construction, which has reduced or removed the integrity of historic setting for all of these districts, the Pennsylvania Railroad and Newark and Elizabeth Branch Historic Districts are also buffered by distance and intervening modern construction (see Appendix E, Map of Previously Identified Cultural Resources within ½ Mile of the Project site).

Mitigation of Adverse Effects: To mitigate the adverse effects as a result of the improvements, in accordance with the NJHPO concurrence letter to FEMA dated January 30, 2014, Standard Treatment Measure G, as outlined in Appendix C of

the Programmatic Agreement, dated April 30, 2013, among FEMA, NJHPO, the Grantee, the Advisory Council on Historic Preservation, the Absentee Shawnee Tribe of Indians of Oklahoma, the Delaware Nation, the Delaware Tribe of Indians, the Shawnee Tribe of Oklahoma and the Stockbridge Munsee Band of Mohicans, will be utilized. Mitigation will consist of photographing, illustrating, and providing a written description of features of the historic property that will be disturbed and/or demolished during groundwork associated with construction of the on-site standby power system (see Appendix E, NJHPO Opinion Letter).

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Floodproofing the Facility would require raising critical processes and equipment to a safe elevation above the floodplain, closing off extant openings, sealing buildings and/or erecting individual floodwalls around critical Facility systems and buildings.

No floodproofing would be provided to the Venturi Chamber Building, the best extant representative example of the Facility's original design remaining within the Historic District because the building has no function in the Facility's current operations. Proposed individual floodwalls would surround and attach to portions of the Wet Weather Pumping Station, resulting in severe physical and visual adverse effects upon the Historic District as a whole. Most of the Wet Weather Pumping Station's front façade would be enclosed within a floodwall, as would its wing-end entrances.

Several of the most critical modern components of the Facility may be raised above the floodplain. This would increase the visual distinction between the Facility's modern components and historic buildings, diminishing remaining limited visual coherence the Historic District currently retains, and increasing the visibility of modern structures from the nearby railroad districts to the south.

In addition, the presence of several floodwalls within the Facility itself would result in additional adverse impacts to the belowground components of the Facility unless bridging structures were designed to protect them. These additional issues would require a variety of cultural resource management processes which would increase the cost and extend the timetable of the project's permitting phase.

5.6 Socioeconomic Resources

5.6.1 Environmental Justice

5.6.1.1 Existing Conditions

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires agencies to identify and address disproportionately high and adverse human health or environmental effects its activities may have on minority or low income populations. Since no high and adverse human health or environmental impacts are anticipated as a result of the construction or operational phases of the Proposed Alternative, no such impacts on minority or low income populations are expected.

In order to provide context for this report a demographic analysis was undertaken. The first step was to define a relevant Community of Concern (COC). In the context of the Proposed Alternative, which seeks to prevent a loss of function of the wastewater treatment plant by constructing improvements to an existing facility, the Service District could be the relevant COC. In this case there would not be a disproportionately high and adversely burdened community. The proposed alternative would benefit the community.

On a smaller scale the COC could be defined as including Census Tracts 34013007400 and 34013980200, a total of 9.3 square miles.

Per USEPA Region 2's *Guidelines for Conducting Environmental Justice Analyses*, for New Jersey, a community would be considered an Environmental Justice (EJ) community if the minority population percentage was 48.52% or higher or if 18.58% or more of the community population was below poverty. Examination of the Predominant Race Population Map (Appendix A Figure 22) indicates the populations surrounding the facility (Census Tracts 34013007400 and 34013980200) meet the criteria for "Minority Populations". However, the area immediately surrounding the facility is heavy commercial/industrial and Environmental Systems Research Institute (ESRI) data confirms there are very few, four (4), households located in Tract 34013980200 and a limited number of households (930) located within Tract 34013007400. In an effort to pinpoint the location of these housing units, NJDEP's Land Use/Land Cover dataset was reviewed. Using this dataset, it appears the nearest of these households is located a distance of 4,500 feet (0.85 mile) from the facility (see yellow block areas in

Appendix A Figure 21). These households are part of the City of Newark's "Ironbound District". Directly across Newark Bay from the facility, a distance of 4,150 feet (0.79 mile) is a residential section of the City of Bayonne. Both of these areas are served by the Subgrantee.

The nearest communities of concern are the Ironbound District and the area of Bayonne directly across Newark Bay from the facility. These two areas are over three-quarters of a mile distant from the facility. According to the ESRI data, the Ironbound District does not meet the criteria for minority population; however, the area of Bayonne meets the criteria for minority population (see Appendix A, Figure 22).

The USEPA Region 2 poverty threshold is also met in these census tracts (see Appendix A, Figure 24). The geographical discussion previously outlined applies equally to this criterion.

Other census data related to environmental justice, including diversity, house values, household size and population age are provided for additional reference (Appendix A, Figures 23 and 25-27). These figures are maps developed from ESRI 2012 estimates using Census 2010 geographies.

5.6.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action alternative the facility remains susceptible to another extended loss of facility function as a result of a flood event and power outage.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

Potential adverse impacts to the Ironbound District are temporary increases to noise levels and traffic during construction, increased noise due to operation of the on-site standby power system during power outages, and emissions from the on-site standby power system. The Air Quality and Noise discussions in this document demonstrate that construction and operation of the Proposed Alternative has a negligible impact with respect to air quality and noise. Temporary construction traffic would not impact the City of Bayonne and should not impact the Ironbound District as there are several arterials such as Route 21, Route 22,

Route 1 and Interstate 78 that provide more direct routes to the facility and would allow traffic to bypass local roads.

If the COC is defined as the Service District there would be no disproportionate or adverse effect from construction and operation of the Proposed Alternative. The analyses performed as part of this EA demonstrates there are negligible or no impacts to studied resources. With respect to the Service District a positive impact of this alternative is that it would prevent a loss of function to the facility should a flood event and power outage occur due to a similar storm event ensuring the health and safety of the community.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Floodproofing the facility and installing a standby power system would result in similar impacts to the proposed alternative.

5.6.2 Noise

5.6.2.1 Existing Conditions

Noise/sound-level standards applicable to the project site are specified in the New Jersey State Noise Code (N.J.A.C. 7:29) and the City of Newark Noise Control Ordinance/Code (Revised General Ordinances Title XX Chapter 3). The State Noise Code specifies that continuous airborne sound from any industrial, commercial, or community service facility, when measured at the property line or on the property of any other commercial or community service facility, shall not exceed 65 dB(A) during daytime or nighttime hours. The State Noise Code definition of industrial facility includes manufacturing and fabrication facilities, and industrial-like activities including wastewater treatment. The definition of a commercial facility includes wholesale service facilities, office buildings, transportation facilities and warehouses. The definition of a community service facility includes government buildings and maintenance centers (such as department of public works facilities). The state standards do not apply to receiving locations on the property of other industrial facilities. The City of Newark Noise Control Code specifies sound-level standards of 65 dB(A) at receiving locations on commercial properties (including community service properties) and 75 dB(A) at receiving locations on industrial properties.
The above sound-level standards are applicable only to the noise emitted from a

specific facility/activity and do not include background (ambient) noise levels. The State Noise Code identifies background sound levels in the neighborhood as the "Neighborhood Residual Sound Level". "Noise" is defined in the noise codes as any sound that is not in conformance with the applicable sound-level standards.

The facility is located in an industrial/commercial area of Newark just west of the New Jersey Turnpike and north of active railroad lines. Based on the results of the study of existing sound-levels in the project site, sound levels in the vicinity of the facility are currently dominated primarily by truck traffic on local roads, as well as New Jersey Turnpike traffic, rail / train pass-bys, and aircraft operations associated with the Newark Airport.

Measurement of the background sound level is useful in characterizing a community with respect to existing noise, and for assessing potential noise impacts of planned projects. The background sound level is the minimum sound level in the absence of identifiable or intermittent local sources. The L90 (referred to as the ambient level) is a statistical descriptor represents the level exceeded 90 percent of the time. The L90, measured with a continuous statistical sound meter, and the ambient sound level, measured by trained personnel with a sound-level meter, have been shown to be closely correlated with one another (Bolt, Beranek, and Neman, Inc. 1978). The "equivalent sound level," Leq is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by Leq(1), or 24 hours, denoted as Leq(24)), conveys the same sound energy as the actual time-varying sound. Leq is used in the prediction of future noise levels by adding the contributions from new sources of noise to the existing levels and in relating annoyance to increases in noise levels.

Existing sound levels were measured on a weekday in July 2013 at several locations surrounding the proposed location of the turbine generators associated with the on-site standby power system. Monitoring locations are shown on Appendix A, Figure 28. These sound-level measurements were obtained using the A-weighted scale, dB(A) for approximately 15 to 17 minutes at each location. Existing nearby sound sources potentially influencing the area observed during sound monitoring were also noted.

Noise monitoring results are shown in Appendix B, Table 14. The monitored L90 values, which include ambient noise as well as sound from the facility, but exclude extraneous noise, are below the New Jersey Noise Code standard of 65 dB(A) at four of the five noise monitoring locations. Because of the heavy influence of

local truck traffic at NM-3, the minimum monitored sound level (Lmin) was used for comparison with the applicable Noise Code standard at this location.

5.6.2.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have insignificant to minimal impacts. In the event of a major storm event and power outage, noise would emanate from temporary generators and pumps and from equipment used at the facility.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

The noise impacts from construction under the Proposed Alternative would be minimal and temporary over the 2 to 5 year construction period. These temporary construction noise impacts are also projected to be less than the Federal Transit Administration (FTA) noise guideline of 100 dB(A) at all off-site receptors. The noise impacts from operation of the on-site standby power system are projected to be insignificant or negligible as discussed in the section entitled "Operational Noise Impacts."

Construction Noise Impacts
Construction activities would use backhoes, loaders, cranes, concrete trucks, delivery trucks, air compressors, etc. Pile driving would be required for the construction of the floodwalls and for the foundations of the stormwater pumping stations and power system.

Construction activities are exempt from the noise performance standards in the City of Newark Noise Control Code provided that construction is not performed between the hours of 8:00 p.m. and 7:00 a.m. on weekdays or Saturday and at any time on Sunday or legal holidays. In addition, construction activities are not listed as being applicable to the noise level standards in the State Noise Code, and the State Model Noise Ordinance specifically lists construction and demolition activities as being exempt from the sound level limits.

Construction noise impacts may also be evaluated based on relative noise criteria, i.e., increases in sound levels over existing levels. An increase of less than 3 dB(A) is unnoticeable, an increase of 6 dB(A) is noticeable, and an increase of 10

dB(A) is perceived as a doubling of loudness.

Appendix B, Table 16 shows typical outdoor noise levels associated with construction activity for typical phases of construction at various distances from the proposed floodwall construction locations. These sound levels would decrease with increasing distance from the project site. Projected sound levels at the site boundary would also vary with the type and location of the construction activity on the project site. Because construction activities would be carried out at various locations and because these activities change as work progresses, the project site would have both spatial and temporal noise dimensions. Total noise levels at the various receptors would depend on the work activity, the proximity of the work activity (relative location on site/distance to receptor), and background noise sources (trucks, buses, trains and other background sources).

Construction Noise Distance Contours in the area surrounding the project site (Appendix A, Figure 29) were developed by projecting typical construction sound levels at the site boundary to various distances from the site boundary. No adjustments were made to account for shielding from intervening structures, therefore projected noise levels are considered conservative. The nearest sensitive receptor to the project site is the Delaney Hall Community Education Center (Education Center), an adult education and substance abuse treatment facility for former offenders, located at 451 Doremus Ave, approximately 1,600 feet north of the project site. This Education Center is shown on the Construction Noise Distance Contours Map (Appendix A, Figure 29). No other sensitive receptors (residences, schools, hospitals, recreational facilities) are located within 4,000 feet of the project site.

Typical sound levels associated with construction at the project site are compared to existing sound levels at various distances in Appendix B, Table 16, and potential temporary construction noise impacts for the proposed project are summarized below:

- Construction noise impacts are projected to be less than the FTA noise guideline of 100 dB(A) at all off-site receptors.
- Maximum noise levels associated with construction from activities other than pile driving are projected to be from 1.5 to 23 dB(A) above existing levels at receptor locations within 400 feet from construction site boundaries.

- Increases in sound levels over existing levels from activities other than pile driving are projected to be less than 10 dB(A) at distances of 500 feet or more from construction site boundaries.
- Maximum noise levels associated with construction from activities other than pile driving are projected to be less than 75 dB(A) at distances of 300 feet or more from construction site boundaries, and less than 65 dB(A) at distances of 1,000 feet or more from construction site boundaries.
- Maximum noise levels associated with pile driving are projected to range from 23 to 35 dB(A) above existing levels at receptor locations within 400 feet from pile driving activities.
- Maximum noise levels associated with pile driving are projected to range from 71.5 to 81 dB(A) at receptor locations 500 to 1,500 feet from pile driving activities.

Operational Noise Impacts

Projections of sound-level contributions from the proposed on-site standby power system were predicted using the SoundPLAN Essential (V. 2.0) acoustic propagation model software (Braunstein and Berndt, GmbH/ SoundPLAN LLC, 2011). The SoundPLAN industrial noise type option was used for the sound modeling calculations. The industrial calculation standard for sound propagation applied by SoundPLAN is the ISO 9613-2 industrial standard for sound propagation (Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation).

Sound modeling was performed based on the current conceptual design of the proposed on-site standby power system, using sound level data for two turbine generators in operation, as shown in Appendix B, Table 17. Sound level data reflect worst case (loudest) operating conditions. Sound level data were input using vendor frequency spectra provided for the Solar Taurus 250 turbines, the current Basis of Design for the on-site standby power system, as well as A-weighted sound levels. Sound pressure levels at 50 feet were converted to sound power levels using formulas specified by Solar Turbines. Sound levels from an unenclosed turbine package (mechanical noise) were reduced by 10 dB(A) based on the use of noise attenuating louvers.

Minimum ground absorption (hard ground surface) was assumed for all ground surfaces. All walls and structures were conservatively modeled with their sound impact as being “minimally absorbent” (default reflection loss of 1 dB) with maximum reflection. The modeled sound level impacts from the proposed on-site

standby power system are shown in Appendix A Figure 30.

Appendix B, Table 18 presents a summary of the modeled sound level impacts from the proposed on-site standby power system at the closest property boundary receptors. The existing sound-levels, the combined projected (existing and proposed equipment) sound levels and the increases in existing (difference between existing and combined) sound-levels have been included in this table for reference. The existing sound levels at the identified modeling receptor locations were based on representative background sound measurement locations NM-1, NM-2, NM-2, NM-4 and NM-5, as shown in Appendix A Figure 28 and Appendix B Table 14. The equivalent sound level (Leq) is used in the evaluation of increases in sound level. The table also includes the State of New Jersey and City of Newark Sound Level Performance Standards to provide a compliance comparison for the projected sound-level impacts.

The model results indicate that the increase in sound-levels (Leq) due to the addition of the on-site standby power system is expected to be less than 2 dB(A) (unnoticeable) at all nearby commercial and industrial property lines, which represents an insignificant/negligible increase. The modeling results also indicate that the projected sound-level contributions from the planned on-site standby power system at all nearby commercial and industrial property lines to the site would be in compliance with the applicable State of New Jersey and City of Newark sound-level performance standards.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

The noise impacts from construction under this alternative are expected to be greater than the impacts from the Proposed Alternative because the total length of the floodwalls would be greater than for the Proposed Alternative, and foundations would be constructed at multiple additional locations.

The noise impacts from operation of the emergency generators are expected to be insignificant to minimal depending on the enclosures and silencers (mufflers) selected. Operational noise impacts are expected to be mostly similar to the Proposed Alternative, but for generators located near site boundaries, maximum noise impacts at some off-site receptor locations are expected to be worse than the Proposed Alternative.

5.6.3 Traffic

5.6.3.1 Existing Conditions

The facility is located in a heavily industrialized area of Newark, just west of the New Jersey Turnpike and north of the Conrail lines. Traffic on the local roads in this area is predominantly truck traffic. Temporary construction traffic would not impact the City of Bayonne and should not impact the Ironbound District as there are several arterials such as Route 21, Route 22, Route 1 and Interstate 78 that provide more direct routes to the facility and would allow traffic to bypass local roads.

5.6.3.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have no direct impacts on traffic.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

Impacts during construction are temporary. It is anticipated that some temporary road closings at Wilson and Doremus Avenues will be required for construction of modifications to the existing stormwater management system. Proper coordination for any temporary road closings would be made with the City of Newark. As area roads are a minimum of two lanes, it is envisioned that staging to permit at least one-way traffic can be achieved during temporary closings. Upon completion of construction, there would be no permanent traffic impacts.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Floodproofing the facility would result in similar impacts on traffic as that of the proposed alternative. To the extent that the total construction effort is increased by adoption of this option traffic impacts during construction would also increase.

5.6.4 Public Services and Utilities

5.6.4.1 Existing Conditions

The area is serviced by City of Newark underground municipal water and sewer, and PSE&G gas and overhead electric utilities. Underground utilities are located in Wilson and Doremus Avenues and Avenue P. The City of Newark also provides police, fire and rescue services.

5.6.4.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The facility remains susceptible to loss of function as a result of a flood event and power outage, therefore interrupting the Subgrantee's ability to provide an essential public service.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

Construction operation of floodwall, on-site standby power system, risk reduction features for stormwater enhancement and infrastructure elevation would not adversely impact existing public services and utilities. Areas where the proposed floodwall conflicts with existing underground utilities, measures would be taken to "sleeve" the utilities through the floodwall. As part of the project, modifications would be made to the stormwater management system along Wilson Avenue. However, the project design would ensure continued proper functioning of this system.

Implementation of this alternative would mitigate flood damage risk at the facility and minimize service interruptions during future flood events.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Construction operation of floodwall, on-site standby power system, risk reduction features for stormwater enhancement and infrastructure elevation would not adversely impact existing public services and utilities. Implementation of this alternative would mitigate flood damage risk at the facility and minimize service interruptions during future flood events.

5.6.5 Public Health and Safety

5.6.5.1 Existing Conditions

The affected environment associated with this project includes the Service District, an area of 155 square miles and serving 48 municipalities and 1.4 million residents, the City of New York, Newark Bay, the Passaic River and New York Harbor.

5.6.5.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The facility remains susceptible to loss of facility function as a result of a flood event and power outage. In the event of a future similar storm event, disruption of the facility's essential service could result in discharges of minimally treated and/or untreated sewage to Newark Bay and New York Harbor.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

The Proposed Alternative protects public health and safety by minimizing the risk of loss of function as a result of a flood event and by minimizing the risk of loss of power due to a storm event, enhancing the facility's capability to provide continued operation of the facility's essential public service.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

Floodproofing the facility would result in similar impacts to the Proposed Alternative.

5.7 Hazardous Materials

5.7.1 Hazardous Materials

5.7.1.1 Existing Conditions

A Hazardous Materials review of the facility was conducted. The purpose of this Hazardous Materials Review was to identify Areas of Concern (AOC) associated

with the current and historic use of the project site. The Hazardous Materials Review included a review of the USEPA database, NJDEP DataMiner website, interview with a facility engineer, and review of the Subgrantee's files relative to remediation activities.

Records reviews were conducted of USEPA and NJDEP's files for relevant information related to the facility and hazardous materials. The on-line database that the USEPA maintains on their website for relevant information pertaining to the facility was reviewed. Based on review of the Facility Detail Report, the facility is included on the following information Systems:

- National Emissions Inventory;
- Clean Watersheds Needs Survey;
- New Jersey Environmental Management Systems, for various State Programs;
- NPDES Non-Major Permit Compliance System;
- Hazardous Waste Biennial Reporter;
- Resource Conservation and Recovery Act-Small Quantity Generator;
- NPDES Major;
- National Emissions Inventory, Criteria and Hazardous Air Pollutant Inventory;
- Greenhouse Gas Reporter;
- Integrated Compliance Information System, Formal Enforcement Action; and
- Air Facility System, Air Major.

The NJDEP DataMiner website was reviewed for relevant information pertaining to the facility. Based on review of the NJDEP DataMiner website, the facility is included on the following:

- Hazardous Waste Generator under NJP000781617;
- Air;
- Air Operating Permits;
- DPCC Major Facilities;
- Non-Commercial Environmental Lab;
- Solid Waste Transporter;
- Solid Waste Facility;
- TCPA Facilities;

- New Jersey Pollutant Discharge Elimination System (NJPDES);
- Sanitary Collection System;
- Physical Connection; and
- Site Remediation Program (SRP), 4 listings.

The NJDEP SRP website identified five cases at the facility (see Appendix A Figure 31).

- **PI 003903**: This case is located across the street from the mitigation project site at the Subgrantee's Vehicle Maintenance Facility. The case is active and is in Remedial Level C2: Known Source or Release with Groundwater contamination. The case is under Licensed Site Remediation Professional (LSRP) oversight by Mr. Paul Kenny of Remington & Vernick Engineers, Bordentown, New Jersey.

- **PI 015102**: This case is located at 100 Wilson Avenue, Newark, NJ and is identified as "Passaic Valley Sewerage Comm." The case is pending and is indicated as having no known remedial level. This case is relative to an Underground Storage Tank (UST) that was reported on April 8, 1994.

- **PI 016780**: This case is the located at 600 Wilson Avenue at the facility. The case is closed and is in Remedial Level B: Single Phase Remedial Action-Single Contamination Affecting Soils Only. The case was issued an Unrestricted Use No Further Action (NFA) Approval with a case status date of March 2, 2000.

- **PI 016781**: This case is the located at 600 Wilson Avenue at the facility. The case is closed and is in Remedial Level B: Single Phase Remedial Action-Single Contamination Affecting Soils Only. The case was issued an Unrestricted Use NFA Approval with a case status date of March 2, 2000.

- **G000004533**: This case is the located at the intersection of Wilson and Doremus Avenue at the facility. The case is identified as "Sanitary Landfill" and is in Remedial Level C1: No Formal Design-Source Known or Identified-Potential Groundwater Contamination. The case status is indicated as Closed (work done and documented)

Historic. Based on conversation with representatives of the Subgrantee there is no indication that a Sanitary Landfill ever occupied a portion of the facility. This identification may be related to the on-site abandonment of former structures at the facility.

An interview was conducted with the Subgrantee on July 15, 2013. Relevant information obtained during the interview is outlined below:

1. There are 3 known active NJDEP Site Remediation Cases at the facility;

    a. Vehicle Maintenance Facility located across Wilson Avenue from the main facility. This case consists of mainly groundwater contamination impacted with benzene as a result of the removal of gasoline USTs.
    b. The Former Witco Property located to the south of the Site. The Witco property has been undergoing investigation and remediation since 1996 with multiple AOCs. The Witco property currently contains 2 petroleum hot spot areas and Historic Fill.
    c. UST Closure Program within the Site. Since 1988 the Subgrantee has conducted a Storage Tank closure and upgrade program of approximately 20 USTs. A majority of the former USTs at the Site were removed and only three remain, which were upgraded with overfill, spill, leak and corrosion protection measures. The majority of the closed USTs were granted NFA determinations by the NJDEP with the exception of 2 of the USTs. These USTs are currently undergoing investigation and remediation and are located within the facility in the general location of the former Head End (Grit & Screening) Incinerator and the Influent Pumping Station.

2. There are five 20,000 gallon Sodium Hyperchlorite aboveground storage tanks (ASTs) located within a concrete bermed area with a concrete floor and there are no drains within the containment.
3. Site stormwater is gathered and passed through the waste treatment process and is under the purview of a site stormwater plan.
4. There are approximately 39 substations of varying size throughout the property some of which are located indoors. According to site

representatives, these transformers do not contain Polychlorinated Biphenyl (PCB) oil.

Based on the information gathered and reviewed during the Hazardous Materials assessment, the following AOCs were identified in connection with the facility:

AOC # 1 - UST – Since the early 1990's, the facility has undertaken multiple UST closures and upgrades. Based on the information reviewed, there are two remaining USTs still undergoing remediation. These are located in the general vicinity of the Head End (Grit & Screening) Incinerator and the Influent Pumping Station.

AOC # 2 – Historic Fill - Based on review of the NJDEP's Historic Fill Quadrangles for Elizabeth and Jersey City the entire facility is mapped as containing Historic Fill. Historic Fill, by definition, is defined as an AOC by the NJDEP Technical Rules, necessitating employment of hazardous materials measures during construction and excavation activities. Therefore, appropriate material handling and disposal activities may be required during the course of the construction project.

5.7.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would have no impacts on Hazardous Materials.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

This alternative would result in disturbance to and contact with the Historic Fill at the site. Therefore, specific materials handling and Health and Safety procedures would be required in those areas of contact with the Historic Fill. All disposal would follow the requirements of the Resource Conservation and Recovery Act (RCRA) of 1976.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

This alternative would result in disturbance to and contact with the Historic Fill at

the site. Therefore, specific materials handling and Health and Safety procedures would be required in those areas of contact with the Historic Fill. All RCRA requirements will be followed. If the facility's buildings or equipment need to be removed or renovated, the need for a Hazardous Building Materials Assessment would be required.

5.8 Climate Change

5.8.1 Climate Change

5.8.1.1 Existing Conditions

Newark lies in the transition between a humid subtropical and humid continental climate with cold, damp winters and hot, humid summers. The January daily mean temperature is 31.6°F, and although temperatures below 10°F are to be expected in most years, sub-0°F readings are rare; conversely, some January days may be as warm as 50°F. The average seasonal snowfall is 29.5 inches, though variations in weather patterns may bring sparse snowfall in some years and increased snowfall due to several major Nor'easters in others. Spring and autumn in the project site are generally unstable yet mild. The July daily mean temperature is 77.4°F, and highs exceed 90°F on an average 27 days per year. The city receives precipitation ranging from 2.9 to 4.8 inches per month, usually falling on 8 to 12 days per month. The annual average wind speed is 10.2 mph. (Source: NOAA Online Weather Data from Newark International Airport)

Appendix A, Figure 15 and Appendix A, Figure 16 illustrate long-term increasing trends in annual mean temperatures and annual precipitation, respectively, for the project site (New Jersey Climate Division 1 (Northern New Jersey), which includes Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex, Union, and Warren counties (average of data from 10 stations). The highest recorded annual precipitation for Northern New Jersey, as shown in Appendix A, Figure 16 was 73.92 inches in 2011, which was 24.13 inches above normal.

Recent severe storm events affecting the Newark area include a blizzard in December 2010, Hurricane Irene in August 2011, a Nor'easter in October 2011, Hurricane Sandy in October 2012, a Nor'easter in November 2012, and several winter storms and high wind events from November 2012 through March 2013 (NOAA Storm Events Database).

The effects of the storm surge from Hurricane Sandy were exacerbated by sea level rise. According to NOAA, sea levels in the New York harbor area have risen approximately 12 inches over the past 100 years, with 3 to 4 inches of this sea level rise attributed to land subsidence and the remainder to global warming. NOAA projects an additional 12 to 23 inches of sea level rise by the 2080s, using a similar approach to the last Intergovernmental Panel on Climate Change (IPCC) report. (Source: NOAA - climate.gov/news-features/features/superstorm-sandy-and-sea-level-rise).

5.8.1.2 Potential Impacts and Proposed Mitigation

As presented in Appendix B, Table 8 of the Air Quality section of this EA, GHG emissions and corresponding potential climate change impacts from operation of the proposed on-site standby power system are expected to have an overall beneficial impact based on a comparison with utility grid GHG emissions.

Alternative 1: No Action

The No Action alternative would have minor temporary air quality and climate change impacts in the event of a major storm event and power outage. This could result in temporary additional minor GHG emissions and climate change impacts from use of temporary generators, pumps and recovery operations at the facility.

This alternative does not provide for flood damage risk reduction and other hazard mitigation measures; therefore, the facility would be subject to greater risk of damage and operational disruption in the future. These risks would increase over time due to anticipated storm frequency increases and sea level rise associated with climate change.

Alternative 2: Proposed Alternative - Floodwall and Centralized On-Site Standby Power System Construction

Appendix B, Table 7 shows that GHG emissions and climate change impacts from the operation of the on-site standby power system are expected to be insignificant. Appendix B Table 8 shows that GHG emissions and potential climate change impacts from operation of the proposed on-site standby power system are expected to have a beneficial impact when compared with corresponding utility grid GHG emissions which the on-site standby power system emissions would replace.

This alternative is designed to incorporate flood damage risk reduction and other hazard mitigation measures at the 500-year floodplain elevation therefore increasing the ability of the facility to withstand future tidal surge damage. The risk of tidal surge damage is expected to increase over time due to anticipated storm frequency increases and sea level rise associated with climate change.

The potential effect of sea level rise on the design of the flood wall has been reviewed. Historic records for the New York City area show that the mean annual temperature has increased 4.4°F, mean annual precipitation has increased 7.7 inches and the mean sea level, measured at Battery Park in New York City, has risen 12 inches since 1900. In their report titled, ”NPCC 2013 – Climate Projections”, the New York City Panel on Climate Change anticipates that the average annual temperature shall increase 2.0 to 3.0° F by 2020 and 4.0 to 5.0° F by 2050, and annual rainfall will increase 10% by 2020 and 15% by 2050. The NYC Department of Environmental Protection (NYCDEP) predicts that the sea rise in the greater New York City area will be approximately 30 inches in 2050 and recommends that existing wastewater treatment facilities should be protected to an elevation equal to the 100 year Base Flood Elevation (BFE) + 30 inches.

Adding 30 inches of sea level rise to the current Preliminary FIS D Firm Map 100 year BFE elevations of 11.00 in the A zone and 13.0 in the Coastal A zone results in 2050 BFE elevations. Adding 30 inches of sea level rise to the current Preliminary FIS D Firm Map 100 year BFE elevations of 11.00 in the A zone and 13.0 in the Coastal A zone results in 2050 BFE elevations of 13.50 in the A zone and 15.50 in the Coastal A zone. The 2015 edition of the International Building Code includes ASCE 24-14 by reference. ASCE 24-14 requires wastewater treatment facilities to be protected from a 500 year storm. This is consistent with both FEMA and New Jersey Department of Environmental Protection guidance, as well as EO 11988 Floodplain Management, and is the Basis of Design that was used for the perimeter flood wall. The top of the flood wall in the A zone has been set at elevation 17.00 and elevation 19.00 in the Coastal A Zone. By comparison, the anticipated 2050 BFE is lower than the 500 year elevations used for the top of the flood wall.

Alternative 3: Component Floodproofing and Distributed On-Site Standby Power Systems

As presented in Appendix B, Table 7, GHG emissions and climate change impacts from the operation of the emergency generators are insignificant, i.e., well below

Significant Net Increase Thresholds, but are not expected to have an overall beneficial GHG and climate change impact.

This alternative is designed to incorporate flood damage risk reduction and other hazard mitigation measures at or above the 500-year floodplain elevation therefore increasing the ability of the facility to withstand future tidal surge damage. The risk of tidal surge damage is expected to increase over time due to anticipated storm frequency increases and sea level rise associated with climate change.

5.9 Cumulative Impacts

Pursuant to 40 CFR 1508.7, cumulative impacts are those which result from the incremental impacts of an action when added to other past and reasonably foreseeable future actions regardless of what agency or person undertakes such other action. Appendix B, Table 3 summarizes the potential environmental impacts of the alternatives. The alternatives evaluated would not significantly adversely impact the environment with respect to cumulative impacts.

PVSC has worked with State and local officials in the planning and permitting of various restoration and rehabilitation projects on the PVSC site to mitigate for infrastructure losses on the property due to Superstorm Sandy. Permits/approvals have included a wetlands Letter of Interpretation for the facility property (#0714-09-0004.4 FWW-FWLI 14-130001), Federal Consistency Determination for the floodwall and standby power system (#0714-09-0004.4 CDT 130001 Fed Con), Waterfront Development and Flood Hazard Area permits for an adjacent temporary surface parking lot (#0714-09-0004.7 WFD 140001) and most recently a Statewide General Wetlands Permit No. 21 (#0714-01-1002.4 FWW140001) for the placement of temporary utility poles and overhead electric utility line. This temporary line will provide electrical service while existing tunnel cable systems, compromised by Superstorm Sandy, are repaired. Ongoing repairs and rehabilitation on the PVSC facility are part of normal maintenance and operations, as well as storm damage response.

The PVSC facility is in located in a highly developed industrial urban waterfront setting. Adjacent uses include perimeter petroleum tank farms, an industrial processing facility, a shipping container storage area, rail transfer facility and associated industrial waterfront docking facilities. The entire area is characterized by industrial development. As the facility is an industrial zone, the visual impacts of the proposed installation of the 100’ stack associated with the on-site standby

power system and the 6 feet to 12 feet high concrete floodwall would be considered minor given the landscape context. The Subgrantee would potentially use vegetation to screen the floodwall on the sides fronting Doremus Avenue, as practicable. Vegetation could include native tall grasses or other non-woody vegetation that would be species acceptable for placement adjacent to floodwalls and in keeping with standards described in the following USACE reference: *Engineering Technical Letter 1110-2-571 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, 10 April 2009.* The Subgrantee would also consider concrete stamping or other architectural treatments to enhance the aesthetics of the structure; however, the increased cost of implanting those treatments would be evaluated during final design. The Subgrantee is also aware of the visual impacts that the temporary measure would have on the community. However the use of poles to run above ground electrical cables is necessary to maintain power to critical infrastructure while the HMP is being complete.

Disaster recovery repairs are ongoing and additionally there are no known past or reasonably foreseeable future permanent actions in the vicinity of the facility that would significantly change the cumulative impact determination for the proposed alternative. The U.S. Army Corps of Engineers, New York District, is re-evaluating alternatives for comprehensive flood damage risk reduction for the lower tidal portion of the Passaic River and adjacent area of Newark Bay in accordance with the Disaster Relief Appropriations Act of 2013. USACE has not selected a preferred design alternative to date; however, an alignment of levees, floodwalls or other protective feature along the waterfront in the proposed project vicinity would not be anticipated to, in combination with the proposed action, cumulatively cause significant adverse effects to natural or cultural resources in the project area. The USACE project, if implemented, would cumulatively provide public benefits of enhanced storm damage risk reduction. For more information concerning the USACE study go to: www.nan.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11241/Article/15714/passaic-river-tidal-protection-area.aspx.

6.0 PERMITS AND PROJECT CONDITIONS

The Subgrantee is responsible for obtaining all applicable Federal, state, and local permits and other authorizations for project implementation prior to construction and adherence to all permit conditions. The Subgrantee will also be responsible to obtain, as applicable, the following permits and other authorizations:

- USACE Nationwide Permit for stormwater outfall to tidal waterbody (to be filed for after final design of the pump station and outfall structure)
- Federal Aviation Administration – No Hazard to Air Navigation (for on-site power system emission stack, to be filed for after final design of the system)
- NJDEP Freshwater Wetlands Permit (approved on December 23, 2014, #0714-09-0004.4 FWW140001)
- NJDEP Flood Hazard Area Permit and Verification (approved on December 23, 2014 #0714-0004.4 FHA 140001 and 140002)
- NJDEP Air Permit (Title V Modification, to be applied for after final design of the power system)
- Hudson-Essex-Passaic Soil Conservation District – Soil Erosion and Sediment Control and RFA Stormwater Discharge Approval and Request for Authorization
- City of Newark Site Plan review

Any substantive change to the approved scope of work will require re-evaluation by FEMA for compliance with NEPA and other laws and EOs. The Subgrantee must also adhere to the following conditions during project implementation. Failure to comply with these conditions may jeopardize Federal funds:

1. The Best Available Data (BAD) must be used to determine both the 500-year floodplain elevation and the 100-year rainfall discharge level for final engineering design in accordance with 44 CFR Part 9. At the time of this publication, BAD is obtainable at www.region2coastal.com/sandy/abfe.

2. Any proposed construction in the floodplain must be coordinated with the local floodplain administrator and must comply with Federal, state, and local floodplain laws and regulations.
3. Excavated soil and waste materials shall be managed and disposed of in accordance with applicable Federal, state, and local regulations.
4. In the event that unmarked graves, burials, human remains, or archaeological deposits are uncovered, the Subgrantee and its contractors will immediately halt construction activities in the vicinity of the discovery, secure the site, and take reasonable measures to avoid or minimize harm to the finds. The Subgrantee will inform the Grantee, NJHPO and FEMA immediately. The Subgrantee must secure all archaeological findings and shall restrict access to the area. Work in sensitive areas may not resume until consultations are completed or until an archaeologist who meets the Secretary of the Interior's Professional Qualification Standards determines the extent and historical significance of the discovery. Work may not resume at or around the delineated archaeological deposit until the Subgrantee is notified by the Grantee to proceed.
5. The Subgrantee must submit to Grantee and FEMA a copy of the wetland mitigation plan for review and comment concurrent with its submission to NJDEP.
6. The Subgrantee shall submit copies of all obtained permits to the Grantee/FEMA at or prior to final closeout of the public assistance grant.
7. Occupational Safety and Health Administration (OSHA) standards shall be followed during construction to avoid adverse impacts to worker health and safety.
8. It is recommended that the Subgrantee restore disturbed construction areas of the site with native seed and/or plant species to minimize soil erosion and sedimentation, as well as enhance environmental habitat quality of project site. It is recommended that disturbed soil areas be planted with native plant material, as soon as practicable after exposure, to avoid or minimize growth of undesired and potentially invasive plant species that can potentially take hold without competition of native plant materials. Local landscape plant nurseries and soil conservation offices can assist with identification of

suitable native plants for site location type. The following websites may assist in identification of native plant material for the proposed project site:

- http://plants.usda.gov/java/
- www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/plants/
- www.fs.fed.us/wildflowers/nativeplantmaterials/rightmaterials.shtml

Subgrantee shall not initiate construction activities until fifteen (15) days after the date that the FONSI has been signed as "APPROVED."

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

The NJDEP has been involved in the environmental assessment process, participating in scoping meetings and providing assistance and advice on required state permit and approvals. A pre-application/permit readiness checklist meeting was held with NJDEP on June 25, 2013. The NJDEP Division of Land Use Regulation issued an affirmative Federal Consistency Determination for the Proposed Alternative on October 22, 2013 (see Appendix D). The NJ Historic Preservation Office issued a concurrence letter for the Proposed Alternative on January 30, 2014 (see Appendix E).

In accordance with NEPA, this EA Report was released for a 30-day public review and comment period with an additional 15-day extension. Availability of the document for comment was advertised in The Star Ledger Press newspaper on June 4, 2014 (original) and July 8, 2014 (extension). A hard copy of the EA is available for review at the Subgrantee(s) Administration office located at 600 Wilson Avenue, Newark, New Jersey. The office is open weekdays between 8:30 a.m. and 4:30 p.m. An electronic copy of the EA may be requested by emailing FEMA4086COMMENT@fema.dhs.gov. The EA was also made available for download from the FEMA website at www.fema.gov/resource-document-library.

This EA reflects the evaluation and assessment of the federal government, the decision-maker for the federal action; however, FEMA will take into consideration any substantive comments received during the public review and comment period to inform the final decision regarding grant approval and project implementation. The public is invited to submit written comments by mail to:

FEMA, Sandy Recovery Office, ATTN: EHP Group,
260 Industrial Way West, Eatontown, NJ 07724,
or email to: FEMA4086COMMENT@fema.dhs.gov.

Copies of the EA were sent to:

Attn: Essex County Section Chief
New Jersey Department of Environmental
Protection - Land Use Regulating Program
PO Box 439, 501 East State Street
Trenton, New Jersey 08625-0439

Attn: Grace Musumeci
Environmental Review Section
290 Broadway
New York, NY 10007

Attn: Joseph Della Fave
Ironbound Community Corporation
317 Elm Street
Newark, NJ 07105

Attn: Debbie Mans
NY/NJ Baykeeper
52 West Front Street
Keyport, NJ 07735

Attn: Yaso Sivaganesh
Air Quality Permitting Program
New Jersey Department of Environmental Protection
401 E. State Street
P.O. Box 420, Mail Code 401-02
Trenton, NJ 08625
Attn: Robert Marasco, City Clerk
City of Newark
415A City Hall
920 Broad Street
Newark, New Jersey 07102

Notices of Availability of the EA were sent to the following parties:

- New Jersey State Historic Preservation Office
- Passaic River Coalition
- Mr. Anthony Ciorra, USACE New York District, Coastal Restoration and Special Project Branch
- Ms. Jodi McDonald, USACE New York District, Regulatory Branch
- NJDEP Air Quality Permitting Program
- Mr. John Moyle, NJDEP Bureau of Dam Safety & Flood Control
- City of Bayonne Town Clerk
- Essex County Town Clerk
- Essex County Community Development and Planning
- New Jersey Office of Emergency Management
- Adjacent Property Owners

The EA evaluation resulted in the identification of no unmitigated significant impacts to the human environment. Obtaining and implementing permit requirements along with appropriate BMPs would avoid or minimize potential adverse effects associated with the Proposed Alternative to below the level of a significant impact. Comments received from the public and/or agency reviewers, were evaluated and addressed by the Subgrantee and FEMA (see Appendix G).

8.0 CONCLUSION

This EA concludes that construction and operation of a floodwall, an on-site standby power system, and risk reduction features, and improving the onsite drainage to handle a 100 year rainfall event and infrastructure elevation will have no significant adverse impact on the human environment. It was determined there were no practicable alternatives to relocate the facility outside the 500-year floodplain, that site elevation above the 500-year floodplain was impractical and that elevation of individual process areas with distributed power sources was more resource intensive than the proposed alternative. It was further determined that there were no practicable alternatives to completely avoid impact to wetlands located on the site. The potential minor adverse impact to 0.25 acres of wetland will be mitigated on-site through restoration of Jasper Creek. Other environmental factors (physical, biological, cultural, socioeconomic, hazardous materials and cumulative impacts) have negligible potential for adverse impact or can be mitigated through design, regulatory compliance and/or adherence to BMPs.

During the construction period, short-term impacts to soils, surface water, transportation, air quality, visual aesthetics and noise are anticipated. Short-term impacts would be mitigated using BMPs such as silt fences, proper equipment maintenance, and appropriate signage. Environmental impacts of construction would also be minimized by adherence to any required SWPPP, adherence to permits and compliance with building and floodplain development permit requirements.

It was concluded that construction of the proposed alternative was the best option to fulfill the stated purpose and need to mitigate against the future risk of storm damage to the facility and to ensure continuity of wastewater treatment to the Service District, thereby minimizing the potential for deleterious economic, public health and environmental impacts stemming from a service disruption.

9.0 LIST OF PREPARERS

Table 1 List of Prepares

Passaic Valley Sewerage Commission 600 Wilson Avenue Newark, NJ 07105	Paulus, Sokolowski & Sartor, LLC 67B Mountain Boulevard Extension Warren, NJ 07059	FEMA Region II 26 Federal Plaza New York, New York 10278	Sandy Recovery Field Office (SRFO-NJ) 260 Industrial Way West Eatontown, NJ 07724

10.0 REFERENCES

Atchison, Robert B., and Philip A. Perazio

1995 *Phase IA Cultural Resources Investigation of Tunnel Outlet and Workshaft Locations for the Passaic River Basin Flood Control Project Tunnel*. HPO# MULT A185.

Bello, Charles A. (editor)

1986 Index, Bulletin No. 1, 1948 through Bulletin No. 40, 1986. *Bulletin of the Archaeological Society of New Jersey* 41:1-27.

1990 Index, Bulletin No. 41, 1986 through Bulletin No. 45, 1990. *Bulletin of the Archaeological Society of New Jersey* 45:96-110.

1995 Index, Bulletin No. 46, 1991 through Bulletin No. 50, 1995. *Bulletin of the Archaeological Society of New Jersey* 50:97-112.

n.d. Index, Bulletin No. 51, 1996 through Bulletin No. 60, 2005. *Bulletin of the Archaeological Society of New Jersey*. In files of the author.

Bolt, Beranek, and Neman, Inc.

1978 Electric Power Plant Environmental Noise Guide - Volume I. Edison Electric Institute.

Boylan, James

1978 *Passaic Valley Sewerage Commission, Phase I Cultural Resource Survey: Force Main Newark Bay Pumping Station to Proposed Sludge Storage Facility, Newark, New Jersey*. Prepared for Charles A. Manganaro Consulting Engineers. Prepared by the Environmental Assessment Council. HPO# ESS E9.

1979 *Phase I Archaeological Survey: Proposed Newark Sewage Treatment Plant Sludge Storage Facility, Essex County, New Jersey*. Prepared by the Environmental Assessment Council. HPO# ESS E117.

Braunstein and Berndt

2011 SoundPLAN Essential Version 2.0. Braunstein and Berndt GmbH / SoundPLAN LLC, January 2011.

Bűel & Kajaer
2005 Hand-held Analyzer Type 2250 Instruction Manual

Bzdak, Meredith A., Jean Howson, and Richard L. Porter
1996 *Archaeological Assessment and Intensive Level Historic Architectural Survey: Doremus Avenue Reconstruction Project.* Prepared for Parsons Brinkerhoff. Prepared by the RBA Group. HPO# ESS F348.

Chesler, Olga
1982 *New Jersey's Archaeological Resources. A Review of Research Problems and Survey Priorities. The Paleo-Indian Period to the Present*. Historic Preservation Office, Trenton, N.J.

City of Newark
1982 Noise Control. Revised General Ordinances Title XX Chapter 3.

Cross, Dorothy
1941 *Archaeology of New Jersey, Vol. I.* Archaeological Society of New Jersey & New Jersey State Museum, Trenton, N.J.

1956 *Archaeology of New Jersey, Vol. 2.* Archaeological Society of New Jersey and New Jersey State Museum, Trenton, N.J.

Custer, Jay F.
1994 Current Archaeological Research in the Middle Atlantic Region of the Eastern United States. *Journal of Archaeological Research* 2:329-360.

1996 *Prehistoric Cultures of Eastern Pennsylvania*. Commonwealth of Pennsylvania. Pennsylvania Historical and Museum Commission, Harrisburg, Pa.

Enright, Edward, P.E.
2013 Personal Communication with John Pastorick (PS&S)

Environmental Systems Research Institute
2013 ArcGIS Online, World Topographic Map Layer

Environmental Systems Research Institute, United States Census Bureau:

NAVTEQ
2012 ArcGIS Online, Predominant Populations in the USA Map Layer
2012 ArcGIS Online, USA Diversity Index (Extended Support) Map Layer
2012 ArcGIS Online, USA Median Household Income (Extended Support) Map Layer
2012 ArcGIS Online, USA Median Home Value (Extended Support) Map Layer
2012 ArcGIS Online, USA Average Household Size (Extended Support) Map Layer
2012 ArcGIS Online, USA Median Age (Extended Support) Map Layer

Environmental Systems Research Institute
2013 ArcGIS Online, Canvas/World Light Gray Base Map Layer

Environmental Systems Research Institute
2012 StreetMap USA GIS dataset

Environmental Systems Research Institute
2013 ArcGIS Online, World Street Map Layer

Environmental Systems Research Institute
2013 ArcGIS Online, Canvas/World Light Gray Base Map Layer

Environmental Systems Research Institute
2012 StreetMap USA GIS dataset

Essex County
2012 Parcel boundaries from digital tax parcel data prepared by Essex County

Federal Emergency Management Agency
2013 Preliminary Work Maps for Essex County, released on 7/18/2013

Ford, Richard I.
1974 Northeastern Archeology: Past and Future Directions. *Annual Review of Anthropology* 3:385-413.

Greater New York Magazine
1918 Passaic Valley Sewer Case is Set Down for Action Today. October 14, 1918. *Greater New York Magazine* Volume 7, Issues 1-44.

Hayden, Philip A., Gerry Scharfenberger, Paul J. McEachen, and Alana Knorr
2010 Cultural Resources Investigation: Delancey Street Corridor Improvements, City of Newark, Essex County, New Jersey. Prepared for PB Americas, Inc. Prepared by Richard Grubb & Associates, Inc. HPO# ESS F859.

Jefferson, Kate, Kimberly Morell, Zana Wolf, and Edward M. Morin
2009 Phase IA Cultural Resource Assessment, Bayonne Delivery Lateral, Newark, Essex County to Bayonne, Hudson County, New Jersey. Prepared for Williams Gas Pipeline – Transco. Prepared by URS Corporation. HPO # ESS R89.

Kardas, Susan, and Edward McM. Larrabee
1993 Stage IA Cultural Resource Reconnaissance, Combined Sewer Overflow Project, City of Newark, New Jersey. Prepared for the City of Newark and Clinton Bogert Associates. HPO# ESS Y143.

Karschner, Terry, and Nancy Kostrub Batchelor
1985 *Industrial Newark.* Society for Industrial Archeology, Houghton, Michigan.

Kenny, Paul
2013 Personal Communication with John Pastorick (PS&S)

King, Philip B.
1975 *Evolution of North America*. Princeton University Press. Princeton, N.J.

Kraft, Herbert C.
1986 *The Lenape*. Collections of the New Jersey Historical Society, Newark, N.J.

2001 *The Lenape-Delaware Indian Heritage*. Privately printed by Lenape Books, Elizabeth, N.J.

Kraft, Herbert C., and R. Alan Mounier

1982a The Archaic Period in New Jersey: ca. 8000 B.C.-1000 B.C. In *New Jersey's Archeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 52-102. Historic Preservation Office, Trenton, N.J.

1982b The Late Woodland Period in New Jersey: ca. A.D. 1000-1600. In *New Jersey's Archeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 139-184. Historic Preservation Office, Trenton, N.J.

Liggett, Barbara

1975 *Assessment of Passaic Valley Sewerage Commission Project: Historical and Archaeological Aspects.* Prepared by the Environmental Assessment Council. HPO# ESS E23.

Lynn Drobbin & Associates

1998 *Essex County Correctional Facility, Request for a Determination of Eligibility for Resources in the Area of Potential Effects, Newark, New Jersey.* Prepared for Daniel, Mann, Johnson & Mendenhall. HPO# ESSZ56

Lurie, Maxine N., and Marc Mappen

2004 *Encyclopedia of New Jersey.* Rutgers University Press, New Brunswick, N.J.

Marshall, Sydne

1982 Aboriginal Settlement in New Jersey During the Paleo-Indian Cultural Period: ca. 10,000 B.C.-6000 B.C. In *New Jersey's Archeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 10-51. Historic Preservation Office, Trenton, N.J.

McEachen, Paul, Philip Hayden, and Karl Franz

2005 Cultural Resources Investigation: Conrail North Jersey Terminal Capacity Improvement Project, City of Elizabeth, Union County, and City of Newark, Essex County. Prepared for Conrail. Prepared

by Richard Grubb & Associates. HPO #MULT Z123.

Modica, Glenn R.
2006 The History of the Newark Sewer System. http://www.oldnewark.com/ histories/sewer.htm

Mounier, R. Alan
2003 *Looking Beneath the Surface: The Story of Archaeology in New Jersey*. Rutgers University Press, New Brunswick, N.J.

Municipal Journal
1915 Construction Features of the Passaic Valley Sewer. *Municipal Journal* 38:3 (January 21, 1915):59.

National Oceanic and Atmospheric Administration
2012 Northern New Jersey Annual Precipitation (1895-2012)
2012 Superstorm Sandy and Sea Level Rise. www.climate.gov/news-features/features/superstorm-sandy-and-sea-level-rise
2013 Online Weather Data. www.nws.noaa.gov/climate/xmacis.php?wfo=okx
2013 Climate at a Glance. www.ncdc.noaa.gov/temp-and-precip/time-series/
2013 Storm Events Database. www.ncdc.noaa.gov/stormevents/
Office of the New Jersey State Climatologist
2013 Monthly Climate Tables.
http://climate.rutgers.edu/stateclim_v1/data/index.html

New Jersey Department of Agriculture
2014 *7th Edition, New Jersey Standards for Soil Erosion and Sediment Control in New Jersey* available at:
http://www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf

New Jersey Department of Environmental Protection
1991 N.J.A.C. 7:27-13 Ambient Air Quality Standards
2004 State of the Art (SOTA) Manual for Stationary Combustion Turbines
2009 Guidance on Preparing a Risk Assessment for Air Contaminant Emissions (Technical Manual 1003)
2011 NJDEP Division of Air Quality Risk Screening Worksheet for

Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects. http://www.state.nj.us/dep/aqpp/risk.html
2011 N.J.A.C. 7:27-18 Control and Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rules)
2011 N.J.A.C. 7:27-22 Operating Permits
2013 Annual Reports. http://www.njaqinow.net/Default.ltr.aspx
2013 Statement of Basis for Passaic Valley Sewerage Commission Title V Operating Permit Renewal - Program Interest (PI): 07349 / Permit Activity Number: BOP090001. January 11, 2013.
2013 Passaic Valley Sewerage Commission - Air Pollution Control Operating Permit Administrative Amendment - Program Interest (PI): 07349 / Permit Activity Number: BOP130001. February 26, 2013.
2013 NJDEP Classification Exception Areas/Well Restriction Areas Polygon Maps for New Jersey, Edition 20130230
2012 NJDEP Deed Notice Extent Polygons in New Jersey, Edition 20120130
DataMiner Website.
GeoWeb Website.
2012 NJDEP Known Contaminated Site List for New Jersey (Non-Homeowner), Edition 201202
NJ GeoWeb: Geology Profile. Accessed June 27, 2013.
http://www.state.nj.us/dep/gis/geoweblaunch.htm>
Historic Fill Quadrangles for Jersey City and Elizabeth, 2004.
2012 NJDEP Division of Fish & Wildlife, Endangered, Nongame Species Program, NJDEP Landscape Version 3.1
2011 NJPDES Surface Water Discharges in New Jersey, Version 20111116
2012 Streams and Riparian Zone calculations from NJDEP Surface Water Quality Standards of New Jersey
2012 N.J.A.C. 7:29 Noise Control

New Jersey Office of Information Technology, Office of Geographic Information Systems
2012 New Jersey 2012 High Resolution Orthophotography

New Jersey State Climatologist
2012 Northern New Jersey Mean Annual Temperature (1895-2012)

New Jersey State Historic Preservation Office
1975 *SHPO Eligibility Opinion* dated 9/19/1975.

New Jersey Turnpike Authority
1989 *New Jersey Turnpike Widening Project, Cultural Resources Investigation: Interchange 11 to Southern Mixing Bowl*. HPO#A55(2).

New York Bay Pollution Commission
1905 Report of the New York Bay Pollution Commission to Frank Wayland Higgins, Governor of the State. May 1, 1905. State of New York No. 39

Pagoulatos, Peter
1992 Native American Land-Use Patterns of New Jersey: Some Testable Hypotheses. *Journal of Middle Atlantic Archaeology* 8:56-77.

Passaic Valley Sewerage Commission
2013 History. http://www.nj.gov/pvsc/who/history/

Passaic Valley Sewerage Commission
2013 Sewerage District Map georeferenced and digitized from PVSC's website

Paulus, Sokolowski, and Sartor
2013 Noise Monitoring Locations prepared by PS&S, July 2013

Paulus, Sokolowski, and Sartor
2013 Proposed Floodwall prepared by PS&S, October 2013

Paulus, Sokolowski, and Sartor
2013 Wetlands delineation performed by PS&S, June 2013

Radford University
2013 Environmental History Timeline. http://www.radford.edu/~wkovarik/envhist/ 6twenties.html

Shaw, William H.
1884 *History of Hudson and Essex Counties, New Jersey*. Everts and Peck, Philadelphia.

Skinner, Alanson B. and Max Schrabisch
1913 A Preliminary Report of the Archaeological Survey of the State of New Jersey Geological Survey of New Jersey, Bulletin 9. State Geological Survey, Trenton, New Jersey.

Solar Turbines
2005 Noise Prediction – Guidelines for Industrial Gas Turbines.

State of New Jersey Department of Environmental Protection - Historic Preservation Office
1996 *Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources.* Historic Preservation Office, Trenton.

Splain, Shelby W.
1999 *Guidelines for Architectural Survey. Guidelines for Historic and Architectural Surveys in New Jersey*. Historic Preservation Office, Trenton, N.J.

Stewart, R. Michael, Chris C. Hummer, and Jay F. Custer
1986 Late Woodland Cultures of the Middle and Lower Delaware Valley and the Upper Delmarva Peninsula. In *Late Woodland Cultures of the Middle Atlantic Region*, edited by Jay F. Custer, pp.58-89. University of Delaware Press, Newark, Delaware.

U.S. Army Corps of Engineers
1978 *Draft Environmental Impact Statement, Newark Bay –Kill Van Kull Navigation Project.* HPO# MULT A12.
1979 *Engineering Technical Letter 1110-2-571 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures.*

United States Census Bureau
2010 United States Census Tract Boundaries from 2010 United States Census

United States Department of Agriculture
Natural Resources Conservation Service. Web Soil Survey. Accessed June 27, 2013.< http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

United States Environmental Protection Agency

2003 Revised HAP Emission Factors for Stationary Combustion Turbines. OAR-2002-0060, IV-B-09, 8/22/03.

2010 Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition. EPA-420-R-10-018 NR-009d, July 2010.

2010 Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling. EPA-420-R-10-016 NR-005d, July 2010.

2011 40 CFR 52.21 Prevention of Significant Deterioration of Air Quality

2011 Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources (AP-42, Fifth Edition, with updates)

2012 40 CFR Part 93 -Determining Conformity of Federal Actions to State or Federal Implementation Plans

2012 40 CFR Part 98 -Mandatory Greenhouse Gas Reporting

2012 eGRID2012 Version 1.0 Year 2009 Summary Tables. http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html

2013 National Ambient Air Quality Standards (NAAQS). http://epa.gov/air/criteria.html

2013 40 CFR Part 81 - Designation of Areas for Air Quality Planning Purposes. Subpart C - Section 107 Attainment Status Designations. §81.331 New Jersey.

2013 USEPA AirData Monitor Values Report. http://www.epa.gov/airdata/ad_rep_mon.html. Retrieved October 22-23, 2012 and June 19, 2013.

2013 40 CFR Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

Facility Registry Service Website.

Wall, Robert, R. Michael Stewart, John Cavallo, Douglas McLearan, Robert Foss, Philip Perazio, and John Dumont

1996 *Prehistoric Archaeological Synthesis*. Trenton Complex Archaeology: Report 15. New Jersey Department of Transportation, Bureau of Environmental Analysis, Trenton.

Williams, Lorraine E., and Ronald A. Thomas
1982 The Early/Middle Woodland Period in New Jersey: ca. 1000 B.C. to A.D. 1000. *New Jersey's Archeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler, pp. 103-138. Historic Preservation Office, Trenton, N.J.

Wolf, Zana, and Anthony McNichol
2010 *Letter Report: Cultural Resources Addendum to Phase IA Cultural Resource Assessment, Bayonne Delivery Lateral, Newark, Essex County to Bayonne, Hudson County, New Jersey.* Prepared for Williams Gas Pipeline – Transco. Prepared by URS Corporation. HPO # ESS R89a.

Wolfe, Peter
1977 *The Geology and Landscapes of New Jersey*. Crane, Russak and Company, New York.