

**Programmatic Environmental Assessment
Public Housing Resiliency
New York City Housing Authority (NYCHA)
New York, NY**

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LIST OF ACRONYMS

ACHP	Advisory Council on Historic Preservation
ACP	Abbreviated Consultation Process
ALB	Asian longhorn beetle
APE	Area of Potential Effect
AST	Above-ground Storage Tanks
BFE	Base Flood Elevation
BMP	Best Management Practices
CAA	Clean Air Act
CATEX	Categorical exclusion
CBRA	Coastal Barrier Resources Act
CDBG	Community Development Block Grant
CEHA	Coastal Erosion Hazard Area
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon monoxide
COC	Community of Concern
CRIS	Cultural Resources Information System
CSO	Combined Sewer Overflow
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
dBA	Decibels
DHSES	Division of Homeland Security and Emergency Services
DFE	Design Flood Elevation
DR	Disaster Recovery
ECL	Environmental Conservation Law of New York
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
HMGP	Hazard Mitigation Grant Program
HP	Horsepower

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HUD	Housing and Urban Development
IPaC	Information, Planning, and Conservation System
IPCC	Intergovernmental Panel on Climate Change
kW	Kilowatt
Leq	Equivalent noise level
Ldn	Day night noise level
LWRP	Local Waterfront Revitalization Plan
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NOx	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
NPCC	New York Panel on Climate Change
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NYC	New York City
NYCDEP	New York City Department of Environmental Protection
NYCHA	New York City Housing Authority
NYCRR	New York Codes, Rules, and Regulations
NYFD	New York City Fire Department
NYNHP	New York Natural Heritage Program
NYPD	New York City Police Department
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York Department of State
NYSHPO	New York State Historic Preservation Officer
O ₃	Ozone
OMB	Office of Management and Budget (New York City)
OPA	Otherwise Protected Area
OSHA	Occupational Safety and Health Administration
PA	Public Assistance
Pb	Lead
PEA	Programmatic Environmental Assessment
P-FIRM	Preliminary Flood Insurance Rate Map
P.L.	Public Law
PM	Particulate Matter

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ppm	Parts per million
REC	Record of Environmental Consideration
SEA	Site-Specific Environmental Assessment
SLR	Sea Level Rise
SO ₂	Sulfur Dioxide
SOI	Secretary of the Interior
SPDES	State Pollution Discharge Elimination System
SPL	Sound pressure level
SRIA	Sandy Recovery Improvement Act
SWPPP	Stormwater Pollution Prevention Plan
TCO ₂ E	Tons of CO ₂ Equivalent
UA	Urbanized Area
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

On October 29, 2012, heavy rain, wind, and storm surge from Hurricane Sandy caused damage throughout the New York City (NYC) area including numerous public housing developments owned and operated by the New York City Housing Authority (NYCHA). President Barack Obama declared a major disaster for selected counties in New York on October 30, 2012 (FEMA-4085-DR-NY). In accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) of 1974 (Public Law [P.L.] 93-288) (42 U.S.C. 5121-5206) as amended, implementing regulations in 44 Code of Federal Regulations [CFR] 206.31-206.48, the Sandy Recovery Improvement Act (SRIA) of 2013 (P.L. 113-2), and the accompanying Disaster Relief Appropriations Act, 2013. The SRIA amended Title IV of the Stafford Act, adding Section 428, which authorizes alternative procedures for permanent work funding under the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Program. NYCHA (Subgrantee), which operates affordable housing in NYC, has applied to FEMA for financial assistance under both the Public Assistance Alternative Procedures Program and the Hazard Mitigation Grant Program (HMGP) for a comprehensive utilities flood mitigation project at public housing complexes and community centers in New York, Queens, and Kings Counties. NYCHA proposes to construct new boiler plant buildings and electrical annex buildings, install backup power generators, and enhance associated utility corridors. The New York State Division of Homeland Security and Emergency Services (NYS DHSES) is the Grantee partner for the proposed action.

FEMA is required, as part of its decision-making process, to evaluate the environmental consequences of proposed actions it funds or undertakes. This Programmatic Environmental Assessment (PEA) is prepared in accordance with Section 102 of the National Environmental Policy Act (NEPA) of 1969, as amended, the President's Council on Environmental Quality (CEQ) regulations for Implementation of NEPA (40 CFR Parts 1500 to 1508), and FEMA's implementing regulations (44 CFR Part 10). The purpose of this PEA is to evaluate and document the potential impacts of the proposed action and its alternatives (including a No Action Alternative) on the human and natural environment and to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

In accordance with regulations 40 CFR Parts 1500.4(i), 1502.4, and 1502.20 the development of program-level NEPA environmental documents and the use of tiering is encouraged in order to eliminate repetitive discussions and to focus on the issues specific to the proposed action. The analysis contained in this PEA is programmatic in nature. Prior to individual project approval, FEMA will evaluate the scope and the nature of site-specific impacts to determine if an individual project is consistent with the scope, impacts, conditions, and mitigation measures described in this PEA. If so, FEMA would document the project review and analysis in a Record of Environmental Consideration (REC) (Appendix A, Document A) that would be tiered off of this PEA. The REC would reference this PEA and address specific conditions unique to each site.

If a project is found to be consistent with the scope, impacts, conditions, and mitigation described in this PEA, then only a REC (Appendix A, Document A) would be required. If an individual project is expected to create impacts not described in this PEA; create impacts greater in magnitude, extent, or duration than those described here; or require best management practices (BMPs) or mitigation measures that cannot minimize impacts below significant levels, then a tiered Site-Specific Environmental Assessment (SEA) and corresponding FONSI, or an EIS if a FONSI cannot be issued, would be prepared to address the specific action. The SEA would be tiered from this PEA, in accordance with 40 CFR Part 1508.28. Appendix C, Table A addresses the thresholds for what would trigger an SEA.

2.0 PURPOSE AND NEED

FEMA's PA Program assists communities in responding and recovering from presidentially declared disasters and encourages hazard mitigation measures for the protection of these damaged facilities to reduce future losses. Following a Presidential major disaster declaration, FEMA's HMGP Program helps communities implement hazard mitigation measures to reduce or eliminate long-term risk to people and property from natural hazards. The need stems from the fact that many essential building utility services were damaged from flooding and wind damage from Hurricane Sandy and they needed to be repaired and restored. Essential building utility services include electricity, heat, and hot water. The loss of utilities following Hurricane Sandy exposed NYCHA residents to significant health and safety concerns for days and weeks at some locations. There is also a need to ensure that utilities are consistently and reliably provided during and following future storm and flood events by improving the resiliency of NYCHA developments and community centers undamaged from Hurricane Sandy.

3.0 BACKGROUND

First established in 1934, NYCHA is currently the largest public housing authority in North America, operating facilities in each of NYC's five boroughs (NYCHA 2014). NYCHA's mission is to increase opportunities for low- and moderate-income New Yorkers by providing safe, affordable housing and facilitating access to social and community services. Today, NYCHA has a total of 328 developments located in the five boroughs with more than 2,500 buildings, ranging from small buildings to high-rise apartment buildings within the developments (NYCHA 2015). As of 2014, more than 400,000 people reside in NYCHA's public housing developments (NYCHA 2014). NYCHA provides maintenance and utilities for these buildings, including heat, water, and electricity.

In addition to the Conventional Public Housing Program, NYCHA administers a citywide Section 8 Leased Housing Program, also funded by the United States Department of Housing and Urban Development (HUD), which provides subsidized rental assistance to another 235,000 NYC residents (NYC 2015). NYCHA provides housing assistance for a significant portion of NYC's population; NYCHA residents and Section 8 voucher holders combined occupy 12.4% of the NYC's rental apartments and comprise 7.4% of New York City's population (NYCHA 2014). A total of 26 NYCHA

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developments – home to more than 45,000 residents – are in Hurricane Evacuation Zone A (NYC Recovery 2013).

The storm surge from Hurricane Sandy inundated many public housing developments, particularly affecting the crawlspaces, basements, and ground floors of many of the buildings, where the majority of the mechanical and electrical infrastructure was located. This includes heating, electrical systems, and elevators, rendering them inoperable. In addition to saltwater from the storm surge, surface runoff combined with contaminated floodwater from the NYC stormwater and sewage system and backed up on NYCHA properties and into buildings. The storm damaged many first floor apartment units and rendered them uninhabitable.. The interruption of essential building utilities created serious public health and safety concerns for NYCHA residents limiting their mobility and access to health care due to egress issues, as well as the ability to engage in daily life activities.

NYCHA restored essential building services at storm-damaged developments, but some of the most severely impacted developments waited up to 25 days after the storm. Approximately 80,000 NYCHA residents in 423 buildings were affected by lost power, heat, and/or hot water (NYC Recovery 2013). NYCHA used portable pumps to dewater flooded facilities and dry out salt water-damaged electrical panels and various boiler system components. NYCHA installed temporary trailer-mounted boilers, where needed, to feed development-wide heating distribution systems and mechanical service connections were established through nearby boiler building walls. NYCHA performed other essential emergency repairs to electrical components, select condensate return mechanical equipment, certain roofing elements, and other building features to ensure the immediate health and safety of NYCHA residents. NYCHA's facilities are facing on-going deterioration related to storm damage which is presents hazards that permanent repairs are needed to resolve. Hazards include inoperative boiler rooms, many of which are located in below-grade basement areas, and over 120 crawlspaces with damaged piping components. These unaddressed areas harbor pests and other potentially hazardous conditions, including mold and asbestos-containing materials that require environmental testing and remediation.

FEMA PA funding is proposed to return storm damaged NYCHA facilities to pre-disaster conditions with upgrades to meet current codes and standards as needed. These activities include the restoration of crawlspaces, basements, first floor facilities, interior and exterior architectural features, and rooftops and roof structures to their pre-disaster capacity and functions. NYCHA will replace damaged fire suppression systems, trash compacter and waste management systems as well as pumps, pipes, water tanks, steam distribution, and condensate return systems. Site-wide, NYCHA will replace damaged lighting, closed circuit TV systems, and damaged recreational spaces and playground equipment. These projects meet categorical exclusions (CATEX) as described in 44 CFR 10.8 and are not functionally dependent on the proposed utility system mitigation project; therefore, these activities are not discussed further in the alternative analysis.

FEMA HMGP funding is proposed for use at NYCHA owned and operated community centers to transform them into safe-havens for the community by mitigating against loss of function from severe

storms, flooding and power outages. Many of these elements are CATEX actions under 44 CRF 10.8 and are not functionally dependent on the proposed utility mitigation project. The exception would be if utility system mitigation would require elements described in Section 4 of this PEA. See Appendix A Document B for summary of project including both CATEX and potential PEA elements. Additionally, HMGP funding is proposed to divert flood and stormwater away from developments that NYCHA has identified as high risk for future damage. See Appendix A Document D for a summary of the project.

HUD administers a Community Development Block Grant (CDBG) – Disaster Recovery (DR) program to help address housing and non-housing needs in communities affected by federally declared disasters, such as Hurricane Sandy. The Disaster Relief Appropriations Act of 2013 requires CDBG-DR grantees to submit an action plan to HUD “detailing the proposed use of all funds, including criteria for eligibility and how the use of these funds will address long-term recovery and restoration of infrastructure and housing and economic revitalization in the most impacted and distressed areas.” The NYC Office of Management and Budget (OMB) administers CDBG-DR funds allocated to the city and submitted the NYC-wide Action Plan to HUD in May 2013. For NYCHA, the City of New York has allocated \$317.6 million through CDBG-DR funds (Grant B-13-MS-36-001), \$308 million of which NYC has designated to provide the required local cost share for FEMA grants as well as to address projects not funded by FEMA.

4.0 ALTERNATIVES

In accordance with 40 CFR 1502.14, this section evaluates a range of reasonable alternatives that meet the purpose and need for the proposed project. This section discusses the No Action Alternative as a basis for analysis and those alternatives that were considered but eliminated from further analysis. The range of reasonable alternatives represents classes of actions that NYCHA may implement individually or in combination with one another. A preferred alternative is not identified in this document because not all of the alternatives would be reasonable at all project locations. The proposed action would be undertaken in three of New York City’s boroughs – Brooklyn, Manhattan, and Queens (Kings, New York, and Queens Counties), at public housing developments and community centers that sustained major damage from Hurricane Sandy (Appendix C Table B). The proposed project would also be undertaken at NYCHA housing developments that were not damaged from Hurricane Sandy. The selected alternative, or combination of alternatives, would be documented in a REC completed by FEMA or HUD for each project.

4.1 Alternative 1: No Action Alternative

The No Action Alternative is defined as maintaining the status quo with no federal involvement. Under this alternative, federal assistance would not be provided to repair or implement resiliency measures for building utilities and the threat of flood and storm damage would continue. The damaged boilers and associated utilities would not be replaced, permanent power generators would not be provided and temporary ones will continue to operate, and resiliency measures would not be implemented. NYCHA buildings would remain vulnerable to another flooding event. The risk of heat, hot water, and electricity

loss would continue and NYCHA's residents would continue to experience hazards from disruption of essential building utility services, many of whom are low-income, elderly, or both. The No Action Alternative would not meet the purpose and need. Ongoing restoration measures described in Section 3.0 are not part of the proposed project and would still occur under the No Action Alternative.

4.2 Alternative 2: New Boiler Plants

Under this alternative, NYCHA would construct new elevated boiler plant buildings to house boiler systems and associated fuel oil tanks at housing developments. The original, damaged oil-fired boilers would be replaced by energy-efficient dual-fuel boilers that would operate primarily on natural gas with backup capacity to burn #2 fuel oil.

In accordance with the NYC Building Code, the floor of the boiler plants would be elevated to a minimum of base flood elevation (BFE) plus one (1) foot for the design flood elevation (DFE). NYCHA would add a design criterion that considers sea-level rise (SLR), to the maximum extent practicable, to further elevate the building up to 2.5 feet more, for a total maximum of 3.5 feet. The new boiler plants would either be standalone buildings or attached to existing buildings, depending on individual site conditions. For new standalone buildings, the SLR design criterion would add 2.5 feet above the DFE. For new boiler plants that would be attached to existing buildings, the SLR design consideration would be incorporated to the extent possible without eliminating the functionality of apartments within the existing building such as blocking windows or egress routes.

The cumulative footprint and estimated maximum height of new boiler plant buildings would vary by development, but the footprint would generally range from 3,000 to 10,000 square feet and the maximum height would not exceed 55 feet above the selected DFE (measured from the DFE to the roof). Once the boiler plants are fully operational and providing permanent building services, the designated construction areas would be restored and the temporary boiler systems, described in Section 3.0, would be removed from the property. The provision of new elevated boiler plant buildings includes several key activities:

- **The removal of damaged boiler systems:** NYCHA would remove storm-damaged boilers and ancillary systems from the boiler rooms using one of two methods depending on conditions at sites. First, pending environmental testing and remediation, NYCHA would dismantle the boiler equipment into manageable components for removal through existing doorways. A secondary possibility is that NYCHA would remove the boilers in their entirety by creating an opening in the wall of the side of the building. A 10-ton or smaller truck crane may be utilized to help remove the damaged boilers and other demolished equipment from the site. Following removal of the damaged boiler systems, general restoration of the boiler room area would enable conversion to non-essential uses.
- **The installation of foundation piling:** The new boiler plant buildings may require pilings that would generally be driven to a nominal depth of 90 feet or to the bedrock depth, whichever is shallower. Each new boiler plant building foundation would generally require 24 to 60 structural

pilings. Piles would subsequently be encased in the concrete foundation of the new boiler plant following conduit installation for utilities.

- **The disposition of under-ground storage tanks (UST):** In conjunction with the replacement of damaged oil-fired boilers by primarily natural gas-fired boilers, NYCHA would either remove the existing fuel oil tanks or abandon them in place. The buried fuel oil tanks range in capacity from 8,000 to 35,000 gallons. If NYCHA determines that they are buried in an accessible location that is external to the building, then the tank may be removed. If NYCHA determines that the UST is not accessible or would compromise building foundations or utilities, then it would be abandoned in place per New York State Department of Environmental Conservation (NYSDEC) and local ordinance requirements. Any remaining fuel would be removed prior to tank removal or abandonment in place. Subject to sampling for environmental contamination, excavation for UST removal would be limited to two (2) feet around the tank and to a depth of two (2) feet below the tank. After UST removal, clean backfill would be placed to grade and then the area would be either paved or re-vegetated. Should environmental sampling indicate past leakage from a buried tank, further assessment would be performed in accordance with all applicable regulatory requirements.
- **The installation of new boiler systems:** New dual-fuel burner boilers would be installed in the new buildings and connected for service. The new boiler packages would be Environmental Protection Agency (EPA)-rated low-emission boilers (rated for 30 parts per million (ppm) nitrogen oxide (NO_x) emissions) and would consist of a maximum 1,000 horsepower (HP) dual-fueled boiler with alarms and other safety requirements. Each new boiler would be fired primarily by natural gas with a secondary option to run on #2 fuel oil, which would be stored in above-ground storage tanks (AST) located inside or adjacent to the boiler plant buildings.
- **The installation of AST:** As a backup fuel supply, #2 fuel oil may be stored in new ASTs installed within each boiler plant. Each tank would have a maximum 5,000 gallon capacity to provide a minimum of eight (8) hours of service in the event that the natural gas service becomes interrupted. Each tank would be elevated above the DFE, equipped with an alarm system and other spill control and containment measures. NYCHA would obtain all required federal, state and NYC permits for tank installation and use. The permit requirements typically require alarms and specific containment capacity that is based on the size and contents of the tank.
- **The installation of boiler exhaust/emission controls:** Each new boiler plant building would have controls for the boiler emissions. The type of emission control system would largely be dependent on site-specific conditions. NYCHA anticipates there would be three potential types of new boiler plant emission systems:
 - **Rehabilitation of existing chimney to support adjacent boiler plant:** For an existing boiler room facility where the chimney is located on the exterior of the building and rises above the roofline of adjacent residential buildings, the chimney would be rehabilitated to handle emissions from both natural gas and #2 fuel oil.
 - **Construction of new chimney to support adjacent boiler plant:** For existing boiler room facilities where the chimney rises through the center of a residential building, this chimney would be abandoned. If a new boiler plant is constructed adjacent to this building, then a new

chimney would be constructed that rises above the nearby residential rooftops and it would handle emissions from both natural gas and #2 fuel oil.

- **Construction of separate, standalone boiler plant with unique emissions stacks:** For each standalone building, each boiler would have its own unique emission stack to handle both natural gas and #2 fuel oil emissions. The stacks would rise above the boiler plant roof to no less than five (5) feet and no more than 10 feet, and would be located no less than 50 feet from the nearest receptor.

4.3 Alternative 3: New Backup Generators

Under this alternative, NYCHA would equip each residential building with a new New York City Department of Environmental Protection (NYCDEP)-rated energy-efficient power generator. The dual-fueled engines would be powered by natural gas. The size of the generators would vary from 60 kilowatt (kW) up to 1000 kW depending on the electrical needs of the development. The generators would be stationary and sized to provide complete power demands for the structure that they support. The “generator sets” would consist of the generator itself together with the energy-producing equipment that drives it and all ancillary devices such as, controls, power distribution equipment, sound attenuation canopies, ventilation/exhaust systems, control panel systems, circuit breakers, safety alarms, and automatic transfer switches. The generator sets would provide resiliency in support of essential building systems by maintaining electricity during future power outages.

The generators and all supporting equipment would operate as a standby backup to the municipal electrical power utility grid that primarily serves the buildings. The generator sets would either be located on the building rooftops, within a new boiler plant building (see Section 4.2), or co-located in the electrical annexes (see Section 4.4). Stand-alone structures would contain a sufficient number of generators with the capacity required to serve one or more buildings. For generators that can be installed on the roofs of buildings, NYCHA would perform full roof replacement, rehabilitation, or reinforcement as needed. A certified structural engineer would make a site assessment and identify requirements for structural steel reinforcement prior to generator roof installation.

4.4 Alternative 4: Electrical Annexes and Utility Corridors

Construction of New Electrical Annexes. The addition of new standby generators would require new electrical systems and controls. New electrical annex structures to accommodate the required system controls would likely be a separate, standalone building; however, some existing building layouts already offer enough space to accommodate the new system controls. Building sizes would vary by individual developments but would generally be in the range of 250 to 2000 square feet with a limited number of buildings up to 4,000 square feet. To provide for future resiliency these new electrical annex buildings would be elevated to the minimum DFE (BFE plus 1 foot) and would have a maximum height of 40 feet above the DFE. The type of concrete foundation would depend on the building or annex size and weight as well as the bearing capacity of underlying soils and would include piles, pile caps and

elevated slabs. Any pilings would generally be limited to a nominal depth of 90 feet or to the bedrock depth, whichever is shallower 90 feet in depth.

- **Separate, standalone electrical annex buildings:** For some developments, NYCHA would construct separate, standalone buildings to house electrical systems and control rooms and some may house generators as discussed in Section 4.3. The new footprint of each new, elevated building would vary within each development, but would generally be in the range of 250 to 2000 square feet and 40 feet height. For new standalone buildings, a SLR design criterion of 2.5 feet would be added to the DFE.
- **Electrical rooms attached to existing buildings:** For other developments, NYCHA would construct new electrical rooms that would be attached to existing buildings and elevated above concrete slab foundations. New attached electrical buildings would be sized to accommodate required system controls, and if needed, backup generators as discussed in Section 4.3. New electrical rooms that are attached to existing buildings would incorporate the 2.5 foot SLR, to the extent possible, without eliminating the functionality of apartments within the existing building.

Utility Corridors. In support of new electrical annexes and boiler plants, existing utilities may be repaired, replaced, or rerouted and new utility lines may be required. Existing underground electrical lines would be repaired or replaced. New natural gas and underground steam distribution systems would also be installed. New utility corridors would be trenched across previously developed property in areas with existing utility corridors. Corridors would be placed where the ground disturbance associated with prior utility installation varies from four (4) to six (6) feet either side of the existing alignment. Trenches for repair and replacement would be excavated alongside existing utilities within these existing utility corridors. New utility trenches would be excavated the shortest distance possible and would be aligned with existing utility corridor segments wherever possible. In the case of replacement, the old utilities would be removed. Maximum depth of ground disturbance for repair/replacement activities would be no more than 12 feet.

If new alignments are required, the excavation would be no more than eight (8) feet wide and four (4) feet deep. New utilities would be protected with a concrete cover and the uppermost one (1) to two (2) feet would be backfilled with clean soil and re-vegetated or paved to be consistent with the pre-installation conditions.

4.5 Summary of Alternatives Considered But Dismissed

NYCHA considered two alternatives that were dismissed from further consideration. The first alternative considered relocating all residents from substantially damaged buildings. This alternative would require the acquisition of property to relocate residents to, but it was dismissed primarily because such property is not readily available in NYC. Even if such properties were available, it would be likely that the types of utility upgrades described under the proposed actions would still be required to meet the purpose and need. It was considered unlikely that NYCHA would be able to purchase properties that would not require costly rehabilitation work that would require extensive time to plan and complete.

Another alternative that NYCHA considered but dismissed was the demolition of existing damaged facilities and reconstruction of new public housing facilities in the same locations. This alternative was dismissed from further consideration because NYCHA would still need to provide safe and affordable housing to residents while reconstruction was ongoing.

4.6 Summary of Alternatives Evaluated

Six alternatives were originally considered to address the purpose and need to provide for consistent and reliable utility service at NYCHA affordable housing developments. Relocation and the demolition and reconstruction of new buildings were dismissed. The four remaining alternatives include:

1. No Action Alternative
2. New Boiler Plants
3. New Backup Generators
4. Electrical Annexes and Utility Corridors

The proposed alternatives meet the purpose and need for the project and can be used in conjunction with each other as individual site conditions require. These proposed alternatives are the most cost effective.

5.0 EXISTING CONDITIONS AND POTENTIAL IMPACTS

This section discusses the potential impacts of the No Action Alternative and the Proposed Action on environmental resources. The potential cumulative environmental impacts are also discussed (see Section 5.14).

When possible quantitative information is provided to establish potential impacts and the potential impacts are evaluated based on the criteria listed in Table 5.0.

Table 5.0.1: Impact Significance and Context Evaluation Criteria for Potential Impacts

Impact Scale	Criteria
No Effect	The resource area would not be affected and there would be no impact.
Negligible	Changes would either be non-detectable or, if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor	Changes to the resource would be measurable, but the changes would be small and localized. Impacts would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have either localized or regional scale impacts. Impacts would be within or below regulatory standards, but historical

Impact Scale	Criteria
	conditions would be altered on a short-term basis. Mitigation measures would be necessary, and the measures would reduce any potential adverse effects.
Major	Changes to the resource would be readily measurable and would have substantial consequences on regional levels. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, though long-term changes to the resource would be expected.

Five environmental resource topics were omitted because they do not apply to the project as covered by this PEA.

Table 5.0.2: Eliminated Resource Topics

Topic	Reason
Aesthetic Resources	Project sites are not located near scenic rivers, highways or byways and the topic is covered in both the Coastal and Cultural Resources sections. Therefore, a dedicated Aesthetic Resources section is not required.
Bald and Golden Eagle Protection Act	Golden Eagles have not historically habited the three counties covered under this programmatic and Bald Eagles have not been sighted in the three counties in over a century. Therefore a dedicated Bald and Golden Eagle Protection Action section is not required.
Magnuson-Stevens Fishery Conservation and Management Act	No work will be conducted in or near waters where marine fisheries habitats are located. Therefore the Magnuson-Stevens Fishery Conservation and Management Act section is not required.
Coastal Barrier Resource Act	No properties reside within Coastal Barrier Resource Zones or Otherwise Protected Areas covered under the Coastal Barrier Resource Act. Therefore a dedicated Coastal Barrier Resource Act section will not be required.
Farmland Protection Policy Act	Project areas are located in heavily developed and highly urbanized areas within the city limits of New York City and are mapped as “urbanized” on the Census Bureau Map. Therefore, no further consideration of FPPA is required.

5.1 Geology, Soils, and Topography

Geologic and topographic characteristics such as depth to bedrock, slopes, or soil erodibility may affect project design and construction methods. The regulatory implications of geology, topography, and soils for a project are generally established through structural codes specified in local building and zoning regulations.

5.1.1 Existing Conditions

5.1.1.1 Geology and Topography

In most areas of Manhattan, bedrock is at or close to the surface and consists of mostly of Pelitic schist with some Marble and Gneiss (United States Geological Survey [USGS] 2015). In Brooklyn and Queens, the bedrock is buried under significant thicknesses of sediment and is mostly alluvium, clay, mud, glacial deposits, and silt (USGS 2015). See Appendix B Figure A for a geological map of project area. Since bedrock is not exposed at the surface, three major landscape features occur: 1) Hills that dominate the northern parts of the boroughs; 2) a low, flat plain that slopes gently southward towards the south shore of Long Island; and 3) a series of narrow beaches and dunes that run along the south shore (Brooklyn College 2015).

5.1.1.2 Soils

According to the U.S. Department of Agriculture's (USDA) Web Soil Survey operated by the Natural Resources Conservation Service (NRCS), the overwhelming majority of the soils present within the project areas consist of "Urban Land", which are areas with highly disturbed land and impervious cover (USDA 2015). In addition to fill, other disturbances within and adjacent to the project areas consist of previous cutting and grading associated with parking lot, road, and underground utility construction.

5.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under the No Action Alternative, there would be no ground disturbance activities; therefore, there would be no effect on geology, topography, or soils.

Alternative 2: New Boiler Plants

Under the Proposed Action, there would be no impacts on geological features because the projects would not extend deeper than the surface of the bedrock. Short-term impacts on soils would occur during construction of new structures from use of construction equipment and at unpaved staging areas which will include skid steer loaders, pay loaders, boom lifts, delivery trucks, and cranes (either 75 ton or 400 ton for buildings over 7 stories). In these areas, disturbance of the surface soils from construction activities could result in erosion and sedimentation. Minor, long-term impacts would occur at each

proposed project site due to any clearing, grubbing, grading, or excavation required for construction that would permanently alter the characteristics of the surface soils. Long-term permanent effects would also occur where new impervious surfaces would be created. However, because the project sites are all located within highly urbanized areas, these effects would be expected to be minor and localized. In locations where the proposed work would be contained within existing building footprints, there would be no or negligible effects on soils.

Erosion and sedimentation impacts would be minimized through the implementation of an approved erosion and sediment control plan for construction activities. Implementation of appropriate BMPs would be required. BMPs for soil erosion and sediment control include, but are not limited to the installation of perimeter silt fences to control the migration of silt from the site and revegetation of bare soils to minimize erosion. If soil and topographic disturbance remains within the project site perimeter and the BMPs described above are implemented, a tiered REC for each site would be completed. Impacts of Alternative 2 to soils and topography would be minor and there would be no impact to bedrock resources.

Alternative 3: New Backup Generators

Under this Alternative no impacts on geological features would occur because each project would not extend deeper than where the bedrock begins. Where new backup generators would be located in new buildings (whether standalone or co-located with new boiler plants or electrical annexes), the potential impacts would be the same as described under Alternative 2 for new construction. New backup generators placed on the roofs of buildings or within existing building footprints would not require any clearing, grubbing, grading, or excavation. The impacts to soils and topography would be negligible from construction equipment and temporary staging areas.

The same mitigation measures described under Alternative 2 would be implemented to reduce impacts from erosion and sedimentation related to soil disturbance associated with new construction. There would be no impact on bedrock resources and minor impacts on soils and topography.

Alternative 4: Electrical Annexes and Utility Corridors

Impacts on geology, soils, and topography under this alternative related to the construction of new buildings or the remodeling of existing structures would be similar to those described under Alternative 2. Under Alternative 4, there would be a relatively greater potential for short-term, ground disturbing activities related to the construction of utility corridors. However, as described in Section 4, utility corridors would be preferentially located in areas where other utilities are already located. Therefore, the potential for the alternative to increase the area of disturbed soils and topography would be minor and localized. Under Alternative 4, there would be no impacts on geological resources and minor impacts on soils and topography.

5.2 Land Use and Planning

Land use is characterized by the arrangements, activities, and inputs people undertake in a certain land cover type to produce, change, or maintain it (Food and Agriculture Organization of the United Nations 2014). In NYC, zoning is overseen by the NYC Department of City Planning and the NYC Department of Buildings using the NYC 1961 Zoning Resolution (2015 NYC Planning).

5.2.1 Existing Conditions

NYC is predominately Urbanized Area (UA), which the US Census Bureau defines as urban areas of 50,000 or more people with a population density of 1000 people per square mile (2011 USBC). Since New York City is predominately UA, it is further divided into eleven broad categories, derived from data from various NYC agencies (2014a & 2014b NYC Planning). All NYCHA housing covered under this PEA falls into the Multi-Family Residential category with sub categories of walk-up buildings and elevator buildings. Multi-family walk-up residences are generally older tenement-style residential buildings or newer low-rise buildings with three or more dwelling units. Multi-family elevator buildings are usually larger apartment buildings and newer buildings with five or more stories.

5.2.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under the No Action Alternative, there would be no ground disturbance or resiliency work done at the facilities. There would still be the potential for buildings to lose essential utility services from flood or storm events that could negatively affect the living conditions within buildings as described in Section 3.0. Buildings would not be in compliance with current codes and standards.

Alternative 2: New Boiler Plants

Under this alternative, there would be no change in land use. New boiler plant buildings would be constructed on urban lands within existing NYCHA developments. Boiler plants constructed within existing building footprints would have no effect on land use or zoning. Residential access and daily activities by residents and guests may be temporarily disrupted due to construction activities under either scenario. However, the proposed project would be beneficial over the long term, by being in compliance with codes and standards during and after storm events. The impact on land use would be temporary and negligible and a tiered REC for each site would be completed. An SEA would be required if a specific project changes the land use such that the property was no longer in conformance with NYC zoning regulations.

Alternative 3: New Generators

Impacts under this alternative would be similar to those described under Alternative 2.

Alternative 4: Electrical Annexes and Utility Corridors

Impacts under this alternative would be similar to those described under Alternative 2.

5.3 Air Quality

EPA has established primary and secondary National Ambient Air Quality Standards (NAAQS) under the provisions of the CAA of 1970 (42 USC Part 7401 *et seq.*). Primary standards define levels of air quality necessary to protect public health with an adequate margin of safety. Secondary standards define levels of air quality necessary to protect public welfare (i.e., soils, vegetation, and wildlife) from any known or anticipated adverse impacts of a pollutant. Federal NAAQS are currently established for the following seven criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), lead (Pb), particulate matter (PM) equal to or less than 10 micrograms per cubic meter of air (µg/m³) (PM₁₀), and PM equal to or less than 2.5 micrometers in aerodynamic diameter (PM_{2.5}). The NAAQS currently applicable to New York State are provided in Appendix B Table A.

Federally-funded actions in nonattainment and maintenance areas are subject to General Conformity under Subpart B of 40 CFR Part 93 unless otherwise exempted or related to highway or transit projects regulated under Subpart A. Activities with potential total direct or indirect emissions as defined in 40 CFR 93.152 (not including stationary source emissions regulated under New Source Review programs) below *de minimis* levels are exempted from General Conformity review. For New York State, the applicable *de minimis* levels are as follows:

- Nitrogen oxides (NO_x) < 100 tons per year
- Volatile organic compounds (VOCs) < 50 tons per year
- CO < 100 tons per year
- PM_{2.5} < 100 tons per year
- SO₂ (PM_{2.5} precursor) < 100 tons per year
- Pb < 25 tons/year
- PM₁₀ < 100 tons/year

O₃ is a photochemical oxidant that is formed in the atmosphere from VOCs and NO_x. The *de minimis* levels for NO_x and VOCs are applicable to moderate and marginal O₃ nonattainment areas inside the O₃ transport region. The *de minimis* levels for PM_{2.5} and SO₂ 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. The emissions from construction activities are subject to air conformity review unless they are shown to be below the applicable *de minimis* levels.

5.3.1 Existing Conditions

NYC has been designated as in attainment for CO, PM_{2.5}, and lead and is currently in attainment of the annual-average NO₂ standard. Manhattan has been designated as a moderate non-attainment area for PM₁₀ and all three counties are designated as marginal non-attainment areas for 8-Hr Ozone (EPA 2015). Each individual NYCHA facility has a permit issued by NYSDEC pursuant to 6 New York City Rules and Regulations Part 201 that contains a list of the applicable federal, state, and compliance monitoring requirements for that facility. Typically permits delineate the number permitted sources including the number of generators that may be installed. Individual operating permits typically require renewal or reissuance every 10 years.

5.3.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under the No Action Alternative, air quality would not change as the current temporary and working utility equipment would still operate under existing emissions levels and permits and no emissions from construction would occur. Therefore, the No Action Alternative would have no impact on air quality.

Alternative 2: New Boiler Plants

This alternative would result in temporary emissions due to construction activities. PM_{2.5} and PM₁₀ levels would likely increase during excavation of soils and construction equipment. To minimize air quality impacts due to fugitive dust, BMPs would be employed that would include, at a minimum, covering spoil piles, covering the haul vehicle loads that contain fill or cut materials, and spraying the site with water. Construction activities may require the use of skid steer loaders, payloaders, boom lifts, delivery trucks, and cranes at either 75 ton or 400 ton for over 7 story tall buildings. Emissions from construction vehicles, generators, and equipment could temporarily increase the levels of some of the criteria pollutants, including CO, NO₂, O₃, PM₁₀, and non-criteria pollutants such as VOCs (EPA 2003). Running times for fuel-burning equipment would be kept to a minimum, and engines would be properly maintained. Ultra-low sulfur diesel fuel would be used, as required by the Clean Air Non-road Diesel Rule (EPA 2012). Emissions would be below the *de minimis* levels. Construction activity would be temporary and, by implementing BMPs, impacts on air quality would be negligible.

The new boiler packages would be energy efficient, low-emission (30-PPM-rated NO_x) that would operate primarily on natural gas but would also have the backup capacity to burn #2 fuel oil and would consist of a maximum 1000 HP with. For all project sites, emissions are anticipated to decrease from existing levels. Therefore, potential impacts on air quality would be beneficial due to lower emission levels. A general conformity applicability analysis will be conducted at each site. If emissions for both construction and operation do not exceed NAAQS levels and NYCHA acquires any needed permits from EPA and NYSDEC, a tiered REC would be completed.

Alternative 3: New Backup Generators

Potential construction impacts would be similar to those discussed for Alternative 2. Backup generators would only be used in the event of a loss of power from the municipal electrical power utility grid that primarily serves the buildings. NYCHA will be using energy efficient generators that would limit the amount of emissions produced. Therefore, operational effects on air quality would be temporary and negligible.

Alternative 4: Electrical Annexes and Utility Corridors

Potential construction impacts would be similar to those discussed for Alternative 2. This alternative would not create any emissions during operation; therefore, there would be no operational effects on air quality.

5.4 Climate Change

Climate change “...refers to any significant change in the measures of climate lasting for an extended period of time” (EPA 2014). Observed trends include higher temperatures, changing rain and snow patterns, more droughts, warmer oceans, rising sea level, stronger storms, increased ocean acidity, shrinking sea ice, and thawing permafrost (EPA 2014). Climate change may result from natural factors and processes or from human activities. EPA identifies and regulates human actions that may affect climate change, dubbed “abrupt climate change,” which occurs over decades and is distinguished from natural variability that occurs gradually over centuries or millennia.

The President signed EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, in 2009 which sets sustainability goals for federal agencies and focuses on making improvements in environmental, energy, and economic performance. EO 13653, *Preparing the United States for the Impacts of Climate Change*, signed in 2013, sets standards to prepare the United States for the impacts of climate change by undertaking actions to enhance climate preparedness and resilience. Under these EOs, FEMA is required to consider climate change risks and vulnerabilities, and when feasible, implement climate change preparedness in FEMA-funded projects.

5.4.1 Existing Conditions

As a coastal city, NYC has always faced risks from severe storms and coastal flooding and has experienced increased storm activity over recent years. These include a blizzard in December 2010, Tropical Storm Irene in August 2011, Hurricane Sandy in October 2012, and a Nor’easter in November 2012. This is part of an overall larger trend. Many hurricane experts say the Atlantic Ocean and the Gulf of Mexico have begun to spin off more frequent and destructive hurricanes than in previous decades. Tropical storms have been on the rise since 1995 and a record 15 hurricanes made their way into the North Atlantic in 2005 (NYCOEM 2015).

Broader discussion of climate change impacts can be found in the following documents and are incorporated here by reference, as recommended by CEQ:

- Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC 2013)
- Third National Climate Assessment (United States Global Change Research Program 2014)
- New York City Panel on Climate Change 2015 Report (NPCC3 2015)

The NPCC3 report is the latest and best available source of climate change information for the NYC area. According to NPCC3, sea levels in NYC are projected to increase by up to 30 inches by the 2050s (90th percentile estimate, with a middle range, 25-75th percentile, of 11 to 21 inches), 58 inches by the 2080s (middle range 18 to 39 inches), and 75 inches by 2100 (middle range 22 to 50 inches). A “100-year” flood, which is a flood with a 1.0 % probability of occurring annually under current conditions, would have up to a 12.7 % probability of occurrence annually by the 2080s.

Green House Gas (GHG) emissions levels in NYC totaled 48 tons of CO₂ equivalent (TCO₂E) in 2013 from buildings and street lights (33.8 million TCO₂E), transportation (11.4 Million TCO₂E), and fugitive emissions (2.8 million TCO₂e) (CNY 2014). NYC has reduced its GHG emissions by 19% since 2005 largely through transition to natural gas for electricity and cleaner fuels for heating buildings (CNY 2014).

5.4.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under existing conditions, energy use and associated GHG emissions would not change. The No Action Alternative does not provide for flood damage risk reduction and other hazard mitigation measures; therefore, the NYCHA developments would continue to be subject to greater risk of damage and operational disruption of critical infrastructure services in the future. The risks would increase over time due to anticipated storm frequency increases and sea level rise associated with climate change. Therefore, the No Action Alternative would have moderate risk from climate change but would have negligible impact on climate change.

Alternative 2: New Boiler Plants

Construction vehicles and new boiler plants may produce low levels of greenhouse gases and are the only sources of possible emissions. Construction-related emissions would be short-term and temporary and would not result in measurable effects. The new boiler plants would be more efficient than existing systems and would reduce potential emissions and would have beneficial effects on GHG emissions. Residents would be protected by periods of extreme temperature that may stem from climate change impacts.

Flood damage risk reduction is incorporated into the proposed projects by design. Critical infrastructure would be elevated increasing the ability of the facilities to withstand future flood damage. The new construction would be elevated to base flood elevation levels plus 1 foot plus a margin for sea level rise and would not affect flood levels. Therefore, the Alternative 2 would have negligible effects on climate change and would have a negligible risk from climate change. A tiered REC would be completed, any long-term increase in GHGs, would require proper permitting from EPA or NYSDEC if emissions go beyond conformity levels, as described in Air Quality Section 5.3.

Alternative 3: New Backup Generators

Impacts would be similar to those discussed for Alternative 2.

Alternative 4: Electrical Annexes and Utility Corridors

Impacts would be similar to those discussed for Alternative 2.

5.5 Biological Resources

Biological resources include plants and animals and their habitats. This section addresses potential project-related impacts on protected and sensitive biological resources including both vegetation and wildlife. Biological resources are protected under various federal laws and EOs including EO 13112 on Invasive Species, the Migratory Bird Treaty Act (MBTA), and the Endangered Species Act (ESA).

5.5.1 Invasive Species

EO 13112, *Invasive Species*, requires federal agencies to prevent the introduction of invasive plant and animal species and provide for their control to minimize the economic, ecological, and human health impacts that invasive species can cause. Invasive species often prefer disturbed habitats and generally possess high dispersal abilities, enabling them to out-compete native species. In addition to EO 13112, NYS Title 6 of the New York Codes, Rules, and Regulations (NYCRR) Part 575 which prohibits and regulates invasive species at the state level.

5.5.2 Migratory Bird Treaty Act (MBTA)

The MBTA of 1918 provides a program for the conservation of migratory birds that fly through the United States. Birds protected under the act include all common songbirds, waterfowl, shorebirds, hawks, owls, eagles, ravens, crows, native doves and pigeons, swifts, martins, swallows, and others. The lead federal regulatory agency for implementing the MBTA is the United States Fish and Wildlife Service (USFWS). Similar to ESA, the law makes it illegal for anyone to “take” a species with additional caveats that include import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, feathers, nests, or eggs. The MBTA does not extend protection to introduced urban birds including the House sparrow, European starling, and Rock pigeon.

5.5.3 Endangered Species Act (ESA)

The ESA of 1973 provides a program for the conservation of threatened and endangered plants and animals and their habitats. The lead federal regulatory agency for implementing the ESA for terrestrial and freshwater animal and plant species is the USFWS. 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. Per Section 3(18) of the ESA, “The term ‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (USFWS 2013a). In addition, NYS designates state-listed species that receive protection as authorized by the Environmental Conservation Law (ECL) of New York, Section 11-0535 and as specified in Section 182.2 of 6 NYCRR Part 182. The New York Natural Heritage Program (NYNHP) tracks the status of threatened and endangered species in the state and maintains a database of rare plant and animal observations (NYSDEC 2014a). Protection for marine and anadromous aquatic species listed under the ESA is administered by the National Oceanic and Atmospheric Administration (NOAA). None of the proposed project sites is expected to have any work in water or to affect aquatic species; therefore, they will not be discussed further.

5.5.4 Existing Conditions

Vegetation at the proposed project sites is primarily limited to landscape plants including some trees, shrubs, and lawn. Because the project sites are located within heavily urbanized areas, existing vegetation present would be limited in extent and diversity; however, some sites may contain mature trees and landscape plants.

The presence or absence of wildlife within or adjacent to project areas would be largely determined by the presence of suitable habitat, which is primarily a product of soils, hydrology, vegetation, and the extent of human disturbance. The project sites are located in heavily urbanized areas and would be expected to only support those species that are highly adapted to living in urban conditions. Most developments have very limited areas where wildlife may be found and most wildlife using or crossing a property would be transitory in nature.

5.5.4.1 Invasive Species

There is one invasive species of concern, the Asian longhorn beetle (*Anoplophora glabripennis*) (ALB), which is found within two of the counties (Kings and Queen). The ALB, originally from China and Korea, feeds on the heartwood of mature trees in the larval stage, which inhibits the tree’s vascular system and will often kill trees. A quarantine zone has been established in parts of Queens and Kings Counties (Appendix B, Figure B). Any NYCHA sites within these zones must adhere to NYSDEC and USDA regulations in regards to proper management of trees and woody debris within the zone.

5.5.4.2 Migratory Bird Treaty Act

According to the USFWS Migratory Bird Program (USFW, 2015a), New York City is located within the Atlantic Flyway for migratory birds. The proposed project area is urbanized and has little potential to provide habitat for migratory birds (USFW 2015b). There are no known avian habitat areas located within the project areas, though species may migrate through these areas. Common urban bird species most likely to occur within the project areas such as house sparrow and rock pigeon are not protected by the MBTA. Though project sites do not contain habitat for migratory birds they are located in flyways where these species may migrate through.

5.5.4.3 Threatened and Endangered Species.

USFWS lists four (4) species (1 plant and 3 animal species) as federally threatened or endangered in the project area of Kings, Queens, and New York Counties (USFW 2012). Seabeach amaranth (*Amaranthus pumilus*) is native (endemic) to Atlantic Coast beaches and barrier islands and is listed as federally threatened. The primary habitat of seabeach amaranth is overwash flats at accreting ends of islands, lower fore dunes, and upper strands of non-eroding beaches landward of the debris line. Seabeach amaranth usually grows on a nearly pure sand substrate, occasionally with shell fragments mixed in. No evidence of habitat that would support seabeach amaranth was found on any of the proposed project sites.

The federally threatened piping plover (*Charadrius melodus*) uses open, sandy beaches close to the primary dune of barrier islands and Atlantic coastlines for breeding. They prefer sparsely vegetated open sand, gravel, or cobble for a nest site. They forage along the wrack line where the tide washes up onto the beach. In the U.S., the federally threatened red knot (*Calidris canutus*) is found along Atlantic and bay beaches and mudflats. Federally endangered roseate terns (*Sterna dougallii dougallii*) breed in colonies almost exclusively on small offshore islands and only rarely on large islands. The northeastern colonies are on rocky offshore islands, barrier beaches, or salt marsh islands. Colonies are found close to shallow water fishing sites with sandy bottoms, bars, or shoals. No evidence of habitat that would support piping plovers, red knots, or roseate terns was found on the proposed project sites.

Per the USFWS Information, Planning, and Conservation System (IPaC), no designated critical habitat is present within any proposed project area. Site assessments conducted by FEMA on June 3rd and 5th, 2015, confirmed that no evidence of protected species or appropriate habitat exists at the sites. Therefore, FEMA has determined that all of the alternatives, including the No Action Alternative, would have no effect on federally listed threatened and endangered species or their habitats.

5.5.5 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under the No Action Alternative, there would be no construction at the project sites; therefore, there would be no effect on vegetation or wildlife habitats. There would be no effect on migratory birds and threatened and endangered species or their designated critical habitat. There would be no activities that could result in the spread of Asian longhorn beetles. This alternative would have no impact on biological resources.

Alternative 2: New Boiler Plants

Construction of new boiler plant buildings could result in the removal or disturbance of some vegetation. Landscape vegetation would be restored or replaced to the extent practicable using native plants. Because the areas affected would be relatively small and the existing vegetation is primarily landscape vegetation, potential effects on vegetation would be minor. Boiler plants constructed within existing building footprints would have no effect on vegetation or habitats.

There may be vegetation removal within the ALB quarantine zone at some of the proposed project sites. All work done within this zone must follow NYSDEC and USDA ALB regulations and guidelines. If the guidelines are followed, there would be negligible effect on the potential expansion of ALB and the proposed projects would be in compliance with EO 13112 on invasive species.

Work at the proposed project sites would be temporary and could potentially cause minor disturbances to migratory birds. These disturbances include temporarily disrupting bird behavior during construction from noise, construction activities, and removal of vegetation. However, because the work would occur within substantially developed areas with existing high levels of noise and activity, disturbances of birds would be expected to be minor.

There is no potential habitat for any threatened or endangered species within the proposed project areas; therefore, there would be no effect on ESA-listed species. Alternative 2 would have negligible to minor effect on biological resources and a tiered REC would be completed. If a project somehow disturbs a migratory bird or an ESA-listed species such that an adverse effect could result, work would cease and consultation with USFW would commence.

Alternative 3: New Backup Generators

Impacts would be similar to those discussed for Alternative 2. Potential impacts on vegetation would be somewhat less than under Alternative 2 because opportunities to place generators on roofs would reduce the number of sites requiring new building construction and associated removal of vegetation. However, sites where generators are placed on the roof may have slightly more potential to temporarily impact bird species than Alternative 2 by interfering in migrating behavior. The same mitigation and tiering requirements described for Alternative 2 would apply.

Alternative 4: Electrical Annexes and Utility Corridors

Impacts would be similar to those discussed for Alternative 2 and the same mitigation and tiering requirements would apply.

5.6 Water Resources

5.6.1 Water Quality

The Clean Water Act (CWA) regulates the discharge of pollutants into waters of the U.S. with responsibility for implementation falling under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and EPA. Section 404 of the CWA establishes the USACE permit requirements for discharging dredged or fill materials. Under Section 402 of the CWA, the National Pollution Discharge Elimination System (NPDES), EPA regulates both point and non-point pollutant sources including stormwater and stormwater runoff. In New York, EPA has delegated the authority to NYSDEC to administer the NPDES program, referred to as the State Pollution Discharge Elimination System (SPDES). Activities that disturb one acre or more of ground require an SPDES permit. The SPDES permit requires that a Stormwater Pollution Prevention Plan (SWPPP) be prepared. NYSDEC monitors the quality of surface waters per Section 303 of the CWA, ensures compliance with existing water quality standards, and produces an inventory of impaired waters, which is a list of surface waters that do not meet the assigned surface water quality standards.

The Safe Drinking Water Act of 1974 authorizes EPA to designate an aquifer for special protection if it is the sole or main source of drinking water for an area (i.e., it supplies 50 percent or more of the drinking water in a particular area) and if its contamination would create a significant hazard to public health. This law prohibits federal funding for projects that EPA determines may contaminate such a designated aquifer so as to create a significant hazard to public health (EPA 2012).

5.6.2 Wetlands

Wetlands are areas where surface or groundwater inundates or saturates with a frequency and duration sufficient to support, and that under normal hydrological conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Actions that may impact wetlands require review under several regulatory programs. EO 11990 and Section 404 of the CWA (33 U.S.C. 1344) are intended to protect wetlands. EO 11990, Protection of Wetlands, requires that federally funded agencies avoid, minimize, and mitigate any direct or indirect impacts on wetlands. Section 404 establishes a permit system to authorize dredge or fill activities in wetlands and requires compensatory mitigation for impacts. If an activity affecting a wetland cannot be avoided the agency must demonstrate that there are no practicable alternatives.

FEMA implements EO 11990 (44 CFR Part 9) concurrently with EO 11988 (See Section 5.4.3) and uses the eight-step decision making process to evaluate potential effects on and mitigate impacts to wetlands

and floodplains. In New York, NYSDEC administers and regulates wetlands under the Freshwater Wetlands Act (Article 24 of ECL) and the Tidal Wetlands Act (Article 25 of ECL – 6 NYCRR Part 661). For the purposes of this PEA, the USFWS National Wetland Inventory (NWI) map was consulted to identify potential wetlands near the project area (USFWS 2014b).

5.6.3 Floodplain

Per FEMA's implementing regulations (44 CFR Part 9), FEMA is required to use the eight-step decision-making process before undertaking an action within a floodplain or an activity that would affect a floodplain to ensure that the proposed project is consistent with EO 11988. This process requires evaluating practicable alternatives that avoid or minimize potential adverse impacts on floodplains. If no practicable alternatives exist to constructing within or affecting the floodplain, FEMA then seeks to minimize the adverse impacts.

FEMA produces Flood Insurance Rate Maps (FIRM) to determine if an action is located in the floodplain. FIRMs depict calculated locations of the one percent (100-year) and the 0.2 percent (500-year) floodplains, coastal high hazard areas, and base flood elevation levels. The maps show how high structures should be elevated to minimize damage from future flood events. FEMA develops the FIRMs through an extensive mapping process that takes into account topography and the types and strength of storms that historically have affected the region. In January 2015, FEMA released Preliminary FIRMs (P-FIRM) for NYC. These maps are in accordance with 44 CFR 9.7(c), and are the best available data and show the current flood risk for NYC.

5.6.4 Existing Conditions

NYC is a heavily urbanized area where excavation, filling, construction, and paving have radically altered surface conditions. In addition, urban development has taken over hundreds of miles of riparian corridor. Many project sites are over the Brooklyn-Queens sole source aquifer or drinking water supplies. There are no waters of the United States within or in the immediate vicinity of the existing NYCHA developments included in this PEA and proposed projects would be unlikely to require CWA permits from NYSDEC and USACE.

According to the NWI maps, NYC has 4,017 acres of tidal wetlands and 1,576 acres of freshwater wetlands for a total of 5,593 acres of wetlands. The most recent NWI Maps, created in 1999 and 2004, covers Brooklyn and Queens - the boroughs with the greatest number and acreage of wetlands (NYC Planning 2011). There are no large contiguous remaining wetland complexes in the project area.

The revised information depicted on the P-FIRMs has increased the number of NYCHA buildings located within the 100-year flood zone as compared to pre-Hurricane Sandy conditions. With one exception (Gowanus, located in Shaded Zone X), all NYCHA developments included in this PEA are located in Zone AE. In accordance with EO 11988, FEMA published an Initial Public Notice at the

declaration of the disaster to alert the public that proposed projects were located within floodplains and wetlands.

5.6.5 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under the No Action Alternative there would be no impact on water quality, aquifers, or wetlands as current conditions would not change and no construction of resiliency measures would be conducted. Developments in floodplains would continue to be at risk from flood damage on utilities. Therefore the No Action Alternative would have a minor impact on water resources.

Alternative 2: New Boiler Plants

Construction of new boiler plants would result in some ground disturbance, particularly when a project includes construction of a new building of up to 10,000 square feet. Construction of the alternative would require the preparation of a SWPPP and adherence to the conditions of SPDES General Permit for Stormwater Discharges Permit No. GP-0-15-002, if the soil disturbance would be greater than or equal to one acre. BMPs (e.g., silt fences, inlet protection) would be used to prevent adverse effects on water quality during construction. Therefore, any construction-related stormwater runoff would be localized and would result in negligible impacts on water quality.

The amount of impervious surfaces would be increased by the area of the new building. For project sites where the new boiler plant is contained within existing structures, there would not be an increase in impervious surfaces. Increases in impervious surfaces would increase stormwater runoff and the potential pollutant loading of that stormwater. However, because the project areas are within heavily urbanized areas, the incremental increase in stormwater runoff and pollutant loading would be negligible.

Construction and operation of the alternative would not adversely affect the Brooklyn-Queens sole source aquifer or drinking water supplies. Groundwater is not used as a potable water supply in the area, and the proposed projects would not result in groundwater withdrawal or have the potential to affect the quality of the Brooklyn-Queens sole source aquifer. Therefore, this alternative would have a negligible impact on groundwater resources on or in the vicinity of the project sites, and would be compliant with Section 1424(e) of the Safe Drinking Water Act. Any project that is located over a sole source aquifer will require a review by EPA.

As required by EO 11988 and in accordance with 44 CFR Part 9, FEMA conducted the 8-step decision-making process programmatically for the proposed action as described in this PEA (Attachment A Document C). No heavy equipment would be operated in wetlands and no staging areas would be located in wetlands. FEMA also found that there is no practicable alternative that would relocate the action out of the floodplain. The project would not encourage further development in the floodplain due

to the already developed nature of the area. Construction activities would comply with all NYC Building Code requirements including those for flood-resistant structures located in the 100-year flood zone as shown on the P-FIRM maps. This alternative would also mitigate against future flood damage by lifting utilities out of the flood zone.

This alternative would have no effect on wetlands and only a negligible impact on floodplains. A tiered REC would be completed if all permits are obtained and BMPs are implemented. A tiered SEA would only be required if this alternative would contribute to existing exceedances of water quality standards on a prolonged basis.

Alternative 3: New Generators

Impacts under this alternative would be similar to those described under Alternative 2 if generators are placed in new buildings. If they are placed on roofs or within the footprint of existing buildings, there would be no effect on water quality, wetlands, or floodplains. The same mitigation and tiering requirements described for Alternative 2 would apply.

Alternative 4: Electrical Annexes and Utility Corridors

Impacts under this alternative would be similar to those described under Alternative 2 and the same mitigation and tiering requirements would apply.

5.7 Coastal Resources

The Coastal Zone Management Act (CZMA) of 1972, administered by states with shorelines in coastal zones, requires states to prepare a Coastal Zone Management Plan (CZMP) to manage coastal development. Projects located within designated coastal zones or impacting coastal zones must be evaluated to ensure they are consistent with a state's CZMP. The New York State Department of State (NYS DOS) is responsible for administering the CZMP and maintaining maps of the coastal zone boundaries. The CZMP's coastal management policies seek to promote the beneficial use of coastal resources; prevent their impairment; and management of major activities that may substantially affect numerous resources.

Projects receiving federal assistance must follow the procedures outlined in 15 CFR 930 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 NYSDOS and NYSDEC. The Coastal Erosion Hazard Law (ELC 34) empowers NYSDEC to identify and map coastal erosion hazard areas and to adopt regulations (6 NYCRR Part 505). In New York City, there are three main regulatory programs that target the protection of natural areas: the Special Natural Waterfront Areas, the Significant Coastal Fish and Wildlife Habitats, and the Coastal Erosion Hazard Areas. The Coastal Erosion Hazard Area (CEHA) Permit Program manages regulated activities or land disturbance on properties within the coastal erosion hazard areas.

5.7.1 Existing Conditions

Several of the NYCHA developments are located in the coastal zone (See Appendix B Figure C), which requires projects to be analyzed for conformance with the State's adopted CZMP. NYC is a Local Waterfront Revitalization Program Community. Should an alternative require local review under the City's LWRP, it would be evaluated at the time of permit application. None of the project sites are within a CEHA or a designated Scenic Area.

5.7.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under this alternative, there would be no mitigation work on utilities at NYCHA facilities and only repairs to pre-disaster condition will occur. Therefore, there would be no change in the coastal characteristic of the area and there would be no effect on coastal resources.

Alternative 2: New Boiler Plants

Under this alternative, new boiler plant buildings may be constructed at some locations within the CZMA zones. In accordance with the requirement of the CZMA, FEMA has sought NYSDOS's concurrence with FEMA's Coastal Zone Consistency Determination. FEMA reviewed New York State Coastal Policies 1 through 44 with respect to the proposed action and has determined that the proposed activities are consistent with and would not hinder the achievement of the policies of the NYS Coastal Management Program. FEMA submitted a Coastal Management Program Consistency Review request to the NYS Coastal Management Program, NYSDOS on August 12, 2015, and NYSDOS concurred on September 30th, 2015(Appendix D Correspondence A). Construction of new boiler plants is likely to not have an effect on the CZMA, nor would it have any negative impact on scenic resources, and as a result there would only be a minor and a tiered REC for individual projects would be completed.

Alternative 3: New Backup Generators

Impacts would be similar to those discussed for Alternative 2.

Alternative 4: Electrical Annexes and Utility Corridors

Impacts would be similar to those discussed for Alternative 2.

5.8 Cultural Resources

As a federal agency, FEMA must take into account the potential effects of any of its funded actions on historic properties (i.e., undertakings) prior to engaging in any undertaking and provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. This obligation is defined in Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended and

implemented by 36 CFR Part 800. The NHPA (36 CFR Part 800.16(1)(1)) defines a historic property as “any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior (SOI). This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.” Defined in 36 CFR Part 60.2, the National Register is an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the Nation’s cultural resources and to indicate what properties should be considered for protection from destruction or impairment. To be considered eligible for inclusion in the NRHP, a historic property must meet one or more of the eligibility criteria established by the National Park Service found in 36 CFR Part 60.4. Historic resources not yet evaluated may be considered potentially eligible for inclusion in the NRHP and are afforded the same regulatory consideration as nominated and/or listed properties. The NHPA of 1966 (36 CFR Part 60.1), authorizes the SOI to expand and maintain a National Register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture. During review, consideration is given to cultural resources that may be affected by an undertaking.

A special and unique legal relationship exists between the federal government and federally-recognized Indian tribes (tribes). As part of the NHPA Section 106 review and NEPA processes, FEMA will undertake consultation with tribes regarding possible effects of federal actions on cultural properties of historic or traditional significance, referred to as traditional cultural properties. The goal of consultation is to identify cultural resources potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize, or mitigate any adverse effects on cultural resources.

The Area of Potential Effects (APE) is defined in 36 CFR 800.16(d) as the geographic area(s) within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The requirements for review include the identification of historic properties within the APE which the undertaking may impact. Within the APE, impacts on cultural resources are evaluated prior to the undertaking for both architectural resources (above ground standing structures resources) and archaeological sites (below ground resources). The NYS Historic Preservation Officer (NYSHPO) maintains a regularly updated list of historic properties listed or eligible for listing in the state and national registers. NYSHPO also reviews previously unevaluated properties within the APE to assess historic significance and potential project effects.

5.8.1 Existing Conditions

The majority of NYCHA developments were constructed between 1945 and 1965. According to NYCHA’s factsheet, as of March 1, 2015, 14 developments are at least 70 years old; a total of 60 developments are at least 60 years old; there are 54 developments 50 to 59 years old; another 106

developments are 40 to 49 years old; and 40 developments are 30 to 39 years old. Structures that are approximately 50 years old are generally evaluated for eligibility for listing in the NRHP with FEMA using 45 years as a bench mark to account for construction time. Younger structures may also be evaluated for eligibility. As part of this evaluation, the potential for visual and physical impacts on architectural resources (i.e., standing structures) and archaeological resources (i.e., below ground resources) will be conducted. Research on known historic standing structures and known archaeological resources will be conducted within the APEs using the NYSHPO Cultural Resources Information System (CRIS) to determine if any historic properties in the APE are listed in, or determined eligible for listing in the State or NRHP, either individually or within historic districts. To date, there are eight NYCHA campuses determined eligible for listing in the NRHP. As many of the housing campuses were built over 45 years ago, there may be additional properties identified as eligible for listing in the NRHP. In addition, archaeological resources may be present in areas that could be physically impacted.

5.8.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action Alternative would have no effect on historic properties as it would not alter structures, their viewsheds, or views of the structures, and it would not involve ground disturbing activities.

Alternative 2: New Boiler Plants

Construction of new boiler plant buildings has the potential to adversely affect historic-defining features or components or diminish viewsheds to and from historic properties. Physical changes within the project area could also affect the unique cultural values or existing religious or sacred uses of a site or area. Therefore, there may be an adverse effect on cultural resources.

New standalone buildings have a greater potential to result in adverse effects on archaeological resources due to their greater scale (i.e., larger physical APE) and likelihood to impact undisturbed soils. New boiler plants that are attached to existing buildings are less likely to result in potential adverse effects to archaeological resources because there is a greater likelihood that there has been prior ground disturbance from the construction of the existing building and utilities. If new construction is limited to areas that have been previously disturbed, potential archaeological impacts would be minimized.

Where new boiler plants would be installed within existing buildings, the potential for adverse effects would be much lower. However, each project within an eligible structure would still be evaluated for the potential to adversely affect the integrity of the historic resource.

For each proposed NYCHA project, FEMA is initiating Section 106 consultations as needed. Each consultation would be documented on the specific REC for each site. If any undertaking results in or would result in adverse effects, NYCHA, NYSHPO, and any participating tribe(s) would document avoidance, minimization, or mitigation measures in site-specific treatment measures using the

Abbreviated Consultation Process (ACP) described in the November 24, 2014 Programmatic Agreement between FEMA, NYSHPO, DHSES, and participating Tribal Nations. If the ACP is determined infeasible or is objected to by any of the consulting parties, FEMA, in consultation with the consulting parties, will develop a Memorandum of Agreement (MOA) in accordance with 36 CFR Part 800.6(c) to stipulate treatment measures to avoid, minimize, and/or mitigate the adverse effects on historic properties. If the ACP or an MOA is required, a tiered REC would be completed as long as the project meets the requirements. In the event of an unexpected discovery that affects a previously unidentified historic property, human remains, or a known historic property in an unanticipated manner, NYCHA would stop construction activities in the vicinity of the discovery and comply with Stipulation III.B in the statewide Programmatic Agreement between FEMA and NYSHPO.

Alternative 3: New Backup Generators

In most cases, the new backup generator sets would be located on building rooftops, which would be structurally reinforced. Each individual development where the generators would be placed on NRHP-eligible structures would need to be consulted on with the NYSHPO for possible visual and physical impacts. When generators are placed on rooftops or within existing structures there would be no potential effect on archaeological resources as there would be no new ground disturbance. Where generators are placed in new buildings, the potential effects would be the same as described for Alternative 2.

Alternative 4: Electrical Annexes and Utility Corridors

Construction of new electrical annexes would have the potential to affect historic structures and archaeological resources. Activities involving modification and/or new construction of structures and facilities that are historic properties or construction or modification of structures and facilities within the viewshed of a historic property may have adverse effects on above-ground cultural resources. Proposed improvements involving new ground disturbance, including standalone electrical annex buildings, electrical rooms attached to existing buildings, and the excavation of new utility corridors, also have the potential to affect archaeological resources in areas of high archaeological sensitivity and in areas not subject to extensive previous ground disturbance. Consultation with the NYSHPO would be conducted to determine the potential effect on cultural resources.

Repair and/or replacement of existing utility lines would have a low potential to affect archaeological resources as the utility corridors would be trenched across previously developed areas where existing NYCHA utilities currently form a utility corridor and where the ground has been previously disturbed by prior utility installation. Archaeological resources are more likely to be disturbed under this alternative if the new utility corridors are constructed in previously undisturbed areas or in areas of archeological sensitivity. In such instances, consultation with the NYSHPO to determine the potential effect on cultural resources would be undertaken.

5.9 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations, “directs federal agencies to ensure that their programs, policies, and activities do not have a disproportionately high and adverse human health and environmental effect on minority and low-income populations.” This EO also tasks federal agencies with ensuring that public notification regarding environmental issues is concise, understandable, and readily accessible.

In 1997, the Council for Environmental Quality (CEQ), which has oversight of the federal government’s compliance with EO 12898, published a guidance document on EJ for federal agencies entitled, “Environmental Justice Guidance under the National Environmental Policy Act.” The analysis presented in this section was performed in compliance with the EJ requirements of EO 12898, FEMA environmental regulations, and the CEQ EJ guidance.

The technical assessment of EJ involves the following steps:

- Identification of each of the properties included in this PEA, which are the areas where the project may cause significant and adverse effects.
- Examine the race and ethnicity and poverty data for the study areas to determine whether they include minority or low-income communities.
- If minority and/or low income communities are identified, assess whether the proposed project has potential significant adverse effect on these communities.

Per EPA Region 2’s Guidelines for Conducting EJ Analyses, a community in NYC would be considered an EJ Community of Concern (COC) if the minority population is 51.51% or higher or if 23.59% or more of the population is below the poverty line. Data for this analysis was gathered using the EPA’s EJ Mapping and Screening Tool, EJSCREEN. EJSCREEN provides a nationally consistent dataset and approach for combining environmental demographic indicators. Each of the NYCHA housing units in this EA was entered into EJSCREEN, and the appropriate fit within census blocks was determined. The majority of the housing units were within one block group; however a few larger housing units encompassed two or more block groups.

5.9.1 Existing Conditions

According to the U.S. Census, the population of NYC in 2010 was 8,175,133 (United States Census Bureau 2015). Bronx, Queens, Kings, and New York Counties are the only counties in the state that have a minority population of 51.51% or higher. Recent reports indicate that the poverty rate in NYC is 15.1% and the median income is \$57,683 (United States Census Bureau 2015).

Appendix C Table D provides minority population by Census Block for the individual NYCHA communities (EPA 2015). Thirty one of the 33 NYCHA Census Blocks had a minority concentration above 51.51% or higher.

According to 2008-2012 American Community Survey 5-Year Estimates, the median income within New York City is \$51,865 annually. NYC has percentages of low-income populations that are higher than the national average. All of the NYCHA project areas are composed of low income populations (Appendix C Table D).

5.9.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative current conditions would not change and construction of resiliency measures would not occur. NYCHA facilities would remain at risk from future storm or flood events. If a storm or flood event causes partial or full loss of utility services, minority and low-income populations would experience service interruptions, which could threaten human health and safety. Therefore, the No Action Alternative would have a moderate impact on EJ populations.

Alternative 2: New Boiler Plants

Alternative 2 may result in temporary short-term impacts to populations in the area during construction as discussed elsewhere in this PEA, but these construction-related impacts are expected to be minor, localized, and short-term. NYCHA would minimize potential impacts by planning and coordinating with service providers and construction managers prior to construction to ensure that residents are informed and those construction-related disruptions are minimized. Any new utility connections would be performed in accordance with the requirements of the public service companies and applicable codes and standards to minimize service disruptions. Construction-related effects would occur regardless of the configuration (e.g. new building or within existing buildings) chosen for the alternative.

No disproportionately high and adverse effects are expected to COC. In fact, long term, this alternative would reduce the risk of loss of heat and hot water within residences as a result of a future storm or flood event. Alternative 2 would have a minor, short-term adverse effect and a moderate, long-term, beneficial effect on EJ populations.

Alternative 3: New Backup Generators

Alternative 3 would be similar to Alternative 2 except that it would provide mitigation against the potential loss of electric service. Similar to Alternative 2, Alternative 3 would have a minor, short-term adverse effect during construction and a moderate, long-term, beneficial effect on EJ populations. The proposed project would be in compliance with EO 12898 because there would not be a disproportionately high and adverse effect on EJ populations.

Alternative 4: Electrical Annexes and Utility Corridors

The potential effects of Alternative 4 would be similar to those described for Alternative 2, except that it would provide benefits related to the reliability of gas service in addition to electrical utilities.

5.10 Infrastructure

This section evaluates potential impacts of the proposed activities on public services and utilities, which include water, gas, electricity, and transportation. A public utility is an organization that maintains the infrastructure for a public service.

5.10.1 Existing Conditions

The project sites are located within developed urban areas throughout NYC and are served by major utilities for all infrastructure classes. Electrical power is provided by Consolidated Edison and natural gas is provided to NYCHA by a variety of providers. Water is supplied by NYCDEP, which maintains three water supply systems with a watershed area of over 2,000 square miles and a storage capacity of 550 billion gallons (NYCDEP 2015b).

For heating, NYCHA operates 509 boiler plants across the five boroughs, supplying heat and hot water to 181,000 apartments and to the developments' facilities (NYCHA 2004). Currently, many of NYCHA's utilities including conduit, feeders, and switchboards are still awaiting permanent repairs following inundation by saltwater during Hurricane Sandy. Temporary trailer-mounted boilers continue in operation to provide heat and hot water to 100 buildings until permanent repairs can be completed. Some residents occasionally experience service disruptions as a result of ongoing maintenance of the temporary boilers.

Public services lines, including water, gas, and electricity, exist across the NYCHA developments and are likely in the vicinity of some, if not all, project sites, particularly in developed areas. Each development is located within heavily developed urban areas and are surrounded by fully developed transportation networks including roads, sidewalks, and transit. The locations of public facilities and utilities would be determined at each project site in order to assess individual and cumulative impacts on individual RECs.

5.10.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Residents would continue to be susceptible to displacement during future storm events due to utility outages. Without a reliable source of electricity, elevators at NYCHA developments are susceptible to failure and would leave residents who are unable to walk down multiple flights of stairs without means to evacuate in an emergency. This alternative would also leave residents at risk of heat and natural gas

outages NYCHA would continue to accrue additional costs for the temporary boilers. The impact of this alternative on infrastructure would have a moderate adverse impact.

Alternative 2: New Boiler Plants

Alternative 2 may result in delays or interruptions to public services, utilities, and transportation due to construction activity, but these are expected to be short term and minor in nature. NYCHA would provide continuity in service to protect public health and safety at developments and would minimize potential impacts by planning and coordinating with service providers and construction managers prior to construction, as appropriate. Any new utility connections would be performed in accordance with the requirements of the public service companies and applicable codes and standards to minimize disruptions related to construction. Long term this alternative would minimize the risk of loss of heat and hot water due to damage from a future storm or flood event by providing new boiler plants built above the DFE. This alternative would reduce potential strain on the city's other emergency operations and facilities by reducing the need to respond to residents harmed by heating outages. Therefore, Alternative 2 would have a minor effect on infrastructure during construction and a beneficial effect over the long-term.

All proposed work would be confined to the existing boundaries of each development; however, during construction, workers and materials would access the project area from the surrounding transportation network. Construction may result in short-term, temporary closures of sidewalks or lanes to allow for the delivery of materials or for other construction activities. All work would conform to NYC regulations regarding use of public rights-of-way, and detours and appropriate signage would be provided to minimize impacts. No road closures would be anticipated as a result of any of the activities. Over the long-term, the proposed activity would not result in any change in traffic patterns or volumes; therefore, there would be no effect on transportation.

Alternative 3: New Backup Generators

Alternative 3 would be similar to Alternative 2 except that it would provide mitigation against the potential loss of electric service. Therefore, Alternative 3 would have a minor, short-term adverse effect during construction and a moderate, long-term, beneficial effect on infrastructure.

Alternative 4: Electrical Annexes and Utility Corridors

Alternative 4 would be similar to Alternative 2 and 3, except that it would provide benefits related to the reliability of gas service in addition to electrical utilities.

5.11 Public Health and Safety

5.11.1 Existing Conditions

In NYC emergency services are composed of fire protection provided by the NYC Fire Department (NYFD) from 255 fire stations with approximately 15,000 employees (FDNY 2013), law enforcement provided by the NYC Police Department (NYPD) with approximately 49,506 full-time employees (NYPD 2015), and medical services which are provided by numerous hospital facilities located across the City. Emergency response time standards frequently exist in contractual obligations between communities and emergency service organizations. As a result, there are variations in emergency response time standards amongst NYC communities.

The project sites are located within the boundaries of the FDNY's service area. NYCHA had its own police department until it was merged with the NYPD in 1958 forming the NYPD Housing Bureau. The NYPD Housing Bureau is responsible for patrolling the 328 public housing developments and patrols nine Police Service Areas in each borough except Staten Island which has a separate unit from the Housing Bureau command. The officers of the NYPD Housing Bureau are entrusted with providing security and delivery of police services to more than 400,000 residents, employees and guests of public housing throughout NYC.

5.11.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Residents would continue to be susceptible to displacement during future storm events due to utility outages under the No Action Alternative. Without a reliable source of electricity, elevators at NYCHA developments are susceptible to failure. This would leave residents with mobility challenges and who are unable to walk down multiple flights of stairs without means to evacuate in case of a fire or other emergencies. This alternative would also leave residents at risk of heat and natural gas outages that would cause stress to residents and could result in serious health issues during extended outages. The No Action Alternative could have major impacts on public health and safety during and immediately after future storm and flood events.

Alternative 2: New Boiler Plants

During construction, activities may temporarily block or limit access to building egresses resulting in short-term and minor impacts on public health and safety. Proper planning and coordination between service providers and construction managers would occur to avoid and minimize the potential impact. Alternative 2 would not result in an increase in long-term demand for emergency services nor would it permanently affect response times. Construction design plans would be reviewed and approved by the local fire department prior to project implementation to ensure proper emergency access throughout the project site. Alternative 2 would protect public health and safety by minimizing the risk of loss utilities

as result of a future storm or flood event by providing new boiler plants to replace the temporary boilers that are currently being used. This alternative would enhance each individual facility's ability to provide continuous operation and reduce potential strain on the city's other emergency operations and facilities. Potential impacts on public health and safety would be temporary and minor during construction, and there would be no impact post-construction. A tiered REC would be completed due to the unlikely event of emergency services disruptions. The subgrantee would work with local public health and safety agencies to avoid adverse impacts as much as practicable.

Alternative 3: New Backup Generators

Under this alternative, impacts would be similar to Alternative 2.

Alternative 4: Electrical Annexes and Utility Corridors

Under this alternative, impacts would be similar to Alternative 2.

5.12 Hazardous Materials

NYSDEC defines hazardous substances as any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health and the environment (NYSDEC 2014). Hazardous materials and wastes are regulated under a variety of federal and state laws, including 40 CFR Part 260, the Resource Conservation and Recovery Act of 1976 (42 USC § 6901 et seq.), Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 USC § 9601 et seq.), Solid Waste Act, the Toxic Substances Control Act, and the Clean Air Act (CAA) of 1970 (42 USC § 7401 et seq.). Occupational Safety and Health Administration (OSHA) standards under the Occupational Safety and Health Act seek to minimize adverse impacts on worker health and safety (United States Department of Labor 2014). Evaluations of hazardous substances and wastes must consider whether any hazardous material generated by the proposed activity and/or already exists at or in the general vicinity of the site (40 CFR 312.10). If hazardous materials are discovered, they must be handled by properly permitted entities. The New York Department of Labor permits entities for asbestos waste abatement and NYSDEC issues permits for transportation and disposal of hazardous waste. In NYC, there are several different types of landfills and disposal facilities to manage waste, including municipal solid waste, land clearing debris, and construction and demolition debris.

5.12.1 Existing Conditions

NYCHA facilities contain buried fuel oil tanks that range in capacity from approximately 10,000 to 35,000 gallons that fuel the oil powered boilers. NYCHA facilities that store more than 1,100 gallons of heating oil are registered with New York State (NYCHA 2015).

5.12.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Under this alternative, the ongoing deterioration of the Hurricane Sandy damaged utility facilities would continue and the permanently damaged boilers and associated utilities would not be replaced nor would permanent power generators be provided. There would be the potential for fuel oil to contaminate flood waters during and after future flood and storm events. The No Action Alternative would have a minor impact from potential fuel oil spills but would not produce extra construction and demolition and hazardous waste from construction activities.

Alternative 2: New Boiler Plants

Under this alternative, removal of tanks from some developments would occur if they are determined to be unsafe by NYCHA. NYCHA may remove USTs that are located in accessible locations where a 10-ton or smaller truck crane can be used to remove the tank from the site. NYCHA would abandon USTs in place that are not accessible, if abandonment is determined to be the best course of action. Subject to sampling for environmental contamination, excavation for UST removal would be limited to two (2) feet around the tank and to a depth of two (2) feet below the tank. Any remaining fuel would be removed prior to removal of these tanks as specified within the permit. After UST removal replacement the hole would be backfilled with clean material to restore the grade and the site would either be paved or re-vegetated. NYCHA would obtain the required permits from the NYC Department of Buildings' Boiler Division for boiler plant and tank installation and use. Permit requirements typically require alarms and a specific containment capacity that is based on the size and contents of the tank.

NYCHA would also remove storm-damaged boilers and ancillary systems from the current boiler rooms. Pending environmental testing and remediation, NYCHA would dismantle the boiler equipment into manageable components for removal through existing doorways. A secondary removal possibility would be to remove the boilers in their entirety by creating an opening in the wall of the side of the building if the first option is not feasible. Final removal methodology would be determined by individual site conditions. Hazardous waste impacts would be minor, but compliance with federal, state, and local regulations would reduce any potential adverse effects.

NYCHA would direct its contractors to use approved local landfills that accept construction waste and have sufficient permitted capacity to accommodate the project's solid waste disposal needs. Construction equipment would also be maintained so as to avoid any oil or lubricant leaks during construction. If leaks do occur, the oil and lubricant waste would be cleaned up immediately and actions taken to prevent additional discharges. NYCHA shall handle and dispose of any hazardous materials exposed, generated, or used during construction in accordance with all applicable local, state, and federal regulations. Waste production would be minor and hazardous waste production would be negligible, but compliance with federal, state, and local regulations would reduce any potential adverse effects and a tiered REC would be completed.

Alternative 3: New Backup Generators

Under this alternative, NYCHA would equip each residential building with a new energy-efficient power generator. NYCHA would obtain the required permits for the new backup generators and use. There would be negligible impacts related to the use and disposal of hazardous materials and minor impacts from construction waste, but compliance with federal, state, and local regulations would reduce any potential adverse effects. The same conditions for construction vehicles as in Alternative 2 would apply to activities under Alternative 3.

Alternative 4: Electrical Annexes and Utility Corridors

Potential impacts would be similar to those discussed for Alternative 2.

5.13 Noise

Sound pressure level (SPL) is used to measure the magnitude of sound and is expressed in decibels (dBA), with the threshold of human hearing defined as 0 dBA. The SPL increases logarithmically, so that when the intensity of a sound is increased by a factor of 10, its SPL rises by 10 dB, while a 100-fold increase in the intensity of a sound increases the SPL by 20 dB. Equivalent noise level (Leq) is the average of sound energy over time, so that one sound occurring for 2 minutes would have the same Leq of a sound twice as loud occurring for 1 minute. The day night noise level (Ldn) is based on the Leq, and is used to measure the average sound impacts for the purpose of guidance for compatible land use. It weights the impact of sound as it is perceived at night against the impact of the same sound heard during the day. This is done by adding 10 dBA to all noise levels measured between 10:00 pm and 7:00 am. For instance, the sound of a car on a rural highway may have an SPL of 50 dBA when *measured* from the front porch of a house. If the measurement were taken at night, a value of 60 dBA would be recorded and incorporated into the 24-hour Ldn.

Leq and Ldn are useful measures when used to determine levels of constant or regular sounds (such as road traffic or noise from a ventilation system). However, neither represents the sound level as it is perceived during discrete events, such as fire sirens and other impulse noises. They are averages that express the equivalent SPL over a given period of time. Because the decibel scale is logarithmic, louder sounds (higher SPL) are weighted more heavily; however, loud infrequent noises (such as fire sirens) with short durations would not significantly increase Leq or Ldn over the course of a day. The Noise Control Act of 1972 required the EPA to create a set of noise criteria. In response, the EPA published *Information On Levels Of Environmental Noise Requisite To Protect Public Health and Welfare With An Adequate Margin Of Safety* in 1974 which explains the impact of noise on humans. The EPA report found that keeping the maximum 24-hour Ldn value below 70 dBA would protect the majority of people from hearing loss. The EPA recommends an outdoor Ldn of 55 dBA. According to published lists of noise sources, sound levels, and their effects, sound causes pain starting at approximately 120 to 125 dBA (depending on the individual) and can cause immediate irreparable damage at 140 dBA. OSHA has adopted a standard of 140 dBA for maximum impulse noise exposure.

5.13.1 Existing Conditions

Existing noise levels would vary by individual project site and depend on the sound level and the observer's distance from the source. As all sites are located along roadways and are within urban environments. Sources of noise near the proposed NYCHA project sites could include automobiles, trains, helicopters and airplanes; industrial equipment and machinery, humans, and animals.

5.13.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action Alternative

Existing noise conditions would not be affected under the No Action Alternative as daily operations and conditions at the existing facilities would not change. There would be no construction activities and the temporary boilers and electrical systems would continue to operate at current noise levels. The No Action Alternative would have no effect on noise levels.

Alternative 2: New Boiler Plants

Construction of new boiler plants would result in temporary noise increases and may have short-term localized impacts on persons near the construction area. Noise levels can be minimized with BMPs such as ensuring that the manufacturer's standard noise control devices are used on construction equipment and that construction activities are conducted in conformance with local noise ordinances regulating construction hours and noise levels. Construction noise would be temporary and short-term and is not expected to have an adverse impact.

Post-construction vehicular traffic would be the same as before the project with no net change in noise levels. The new boiler buildings are expected to have similar to lower noise level production as compared to the existing and temporary boilers currently in place because the updated equipment would operate more quietly. Alternative 2 would have a temporary minor impact during construction and a permanent negligible impact on noise levels and will follow NYC noise control code.

Alternative 3: New Backup Generators

Under this alternative, impacts would be similar to Alternative 2 for construction activities. The new generators would increase noise levels when in use but would be located on roofs or in utility buildings, which would mask the noise from residents and the surrounding community. Therefore, this alternative would have minor temporary construction-related impacts and negligible impacts from operation on noise levels.

Alternative 4: Electrical Annexes and Utility Corridors

Under this alternative, potential impacts would be similar to Alternative 2 for construction activities. The operation of electrical annexes and utilities in utility corridors would not create additional noise. Therefore, this alternative would have minor temporary construction-related impacts and no permanent impact on noise levels.

5.14 Cumulative Impacts

In accordance with NEPA (42 USC 4321 *et seq.*), this PEA considers the overall cumulative impact of the proposed alternatives and other actions that are related in terms of time or proximity. According to CEQ regulations (40 CFR 1500-1508), cumulative impacts represent the “impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions.” Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). In addition to NEPA, other statutes require federal agencies to consider cumulative impacts. If the alternative does not have direct or indirect effects for a particular resource, there can be no cumulative effects resulting from the project because there would be no impacts to add to past, present, or reasonably foreseeable actions.

On a programmatic level, FEMA broadly considers the potential for cumulative impacts based on the proposed action and experience with similar type projects. NYCHA is responsible for consulting with relevant federal, state, and local planning and regulatory agencies, and determining other actions that are underway or proposed at or near each individual project site that, in combination with the proposed project, could result in substantive cumulative effects. Comprehensive flood protection at a limited number of NYCHA sites constitute a reasonably foreseeable action or set of actions that could lead to cumulative effects and will be reviewed in accordance with the tiered SEA or REC as previously described. Included in the early consideration of flood protection are elements of stormwater detention, bioswales, and perimeter surge protection, among other possible elements (Appendix A, Document D).

The proposed actions described in this PEA would have minimal impact on the affected environment; implementing best management practices (BMP) and related commitments offered by NYCHA and incorporated into this document are expected to limit individual and cumulative impacts. Mitigation measures to reduce impacts are addressed in each affected environment section and project conditions section. The REC would be used to define any individual or cumulative impacts requiring mitigation on a location-specific basis as sites are confirmed and reviewed by FEMA. As discussed in Section 1, an SEA and corresponding FONSI, would be prepared if the specific action for any location is expected to create impacts not described, create impacts greater in magnitude, extent, or duration than those described, or required BMPs or mitigation measures cannot reduce impacts below the level of significance.

6.0 PERMITS AND PROJECT CONDITIONS

NYCHA is responsible for obtaining and adhering to all applicable federal, state, and local permits, permit conditions, regulatory compliance, and authorizations for project implementation. Any substantive change to the approved scope of work would require re-evaluation by FEMA for compliance with NEPA and other environmental and historic preservation laws and EOs. NYCHA must also adhere to the following conditions during project implementation. Failure to comply with grant conditions may jeopardize federal funds.

1. The best available data must be used to determine the 100-year floodplain elevation for final engineering design in accordance with 44 CFR Part 9.
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. Solid waste haulers will be required to have a NYSDEC waste hauler permit and all waste will need to be disposed of or processed at a permitted facility.
4. Threatened or endangered species are not likely to be found in the area of the proposed project sites. As a result, pursuant to Section 7(a)(4) of the ESA and implementing regulations at 50 CFR §402.02 and 50CFR §402.10, FEMA has determined that the proposed actions would have no effect to endangered or threatened species, or destroy or adversely modify critical habitat. If any threatened or endangered species are to be found in project area, work will cease and consultation with USFWS and other appropriate agencies will be conducted.
5. Projects are unlikely to affect migratory birds, however, if any action is found to negatively affect migratory birds, work will cease and consultation with USFWS and other appropriate agencies will be conducted.
6. Any work within ALB quarantine zone that requires removal of vegetation must follow NYSDEC and USDA ALB regulations and guidelines.
7. Preparation of a Stormwater Pollution Prevention Plan (SWPPP) and adherence to the conditions of State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges Permit No. GP-0-15-002, is required if the soil disturbance would be greater than or equal to one acre.
8. Any work over a sole source aquifer will require review by US EPA.
9. 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, NYSHPO 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

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around the delineated archaeological deposit until the Subgrantee is notified by the Grantee to proceed.

10. All construction and demolition and potential hazardous waste will need to be handled by NYSDEC permitted haulers and facilities.
11. The Subgrantee and its contractors are required to use all appropriate BMPs for construction not limited to sedimentation and erosion control measures, dust control, noise abatement and restriction of work areas to limit vegetation removal and habitat impacts.
12. OSHA standards shall be followed during construction to avoid adverse impacts to worker health and safety.
13. BMPs will be used to limit NAAQS emissions during and after construction under EPA guidelines.
14. The Subgrantee shall submit copies of all obtained permits to the Grantee/FEMA at or prior to final closeout of the public assistance grant.
15. Subgrantee shall not initiate construction activities until fifteen (15) days after the date that the Finding of No Significant Impact (FONSI) has been signed as “APPROVED.”

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

This PEA will be made available for agency and public review and comment for a period of 30 days. The public information process will include a public notice with information about the proposed project in the New York Post. A hard copy of the Draft PEA will be available for agency and public review at these locations:

Lower East Side:

Hamilton Fish Park Library
415 East Houston Street
NY, NY 10002
212-673-2290

East Harlem:

NYPL Aguilar Library
174 E 110th Street
NY, NY 10029
212-534-2930

Red Hook:

Red Hook Library- Brooklyn Public Library
7 Wolcott Street
Brooklyn, NY 11231
718 935 0203

Coney Island:

Coney Island Library- Brooklyn Public Library
1901 Mermaid Avenue
Brooklyn, NY 11224
718 265 3220

Rockaways:

Queens Library at Arverne
312 Beach 54th Street
Arverne, NY 11692
718 634 4784

Astoria:

Queens Library at Astoria
1401 Astoria Blvd
Queens, NY 11102
718 278 2220

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An electronic copy of the PEA may be requested by emailing FEMA at FEMA-4085-Comment@fema.dhs.gov. The EA will also be made available for download at <http://www1.nyc.gov/site/nycha/about/recovery-resiliency.page>. This PEA 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 period to inform the final decision regarding grant approval and project implementation. The public is invited to submit written comments by mail to: FEMA NY Sandy Recovery Office, Attn: EHP-NYCHA EA Comments, 118-35 Queens Blvd., Forest Hills, NY 11375, or: FEMA-4085-Comment@fema.dhs.gov. If no substantive comments are received from the public and/or agency reviewers, the EA will be adopted as final and FEMA will issue a FONSI. If substantive comments are received, FEMA will evaluate and address comments as part of the FONSI record documentation or in a Final Environmental Assessment.

Copies of the PEA will be sent to:

US HUD

Attn: Therese Fretwell
26 Federal Plaza
Suite 3541
New York, NY 10278-0068

US EPA

Attn: Lingard Knutson
U.S. Environmental Protection Agency, Region 2
290 Broadway, 25th Floor
New York, NY

NYC Office of Management and Budget
255 Greenwich Street, 8th Floor
New York, NY 10007

8.0 LIST OF PREPARERS

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