Environmental Assessment
Carolina Downtown Flood Mitigation Project
Carolina, Puerto Rico
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U.S. Department of Homeland Security
Federal Emergency Management Agency Region 2
Caribbean Area Office - Joint Recovery Office
50 State Road PR-165, Guaynabo, PR 00968

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LIST OF ACRONYMS

ABFE	Advisory Base Flood Elevation
ACS	American Community Survey
AMSL	Above Mean Sea Level
APE	Area of Potential Effects
BFE	Base Flood Elevation
BMP	Best Management Practice
CAA	Clean Air Act
CFR	Code of Federal Regulations
COR3	Central Office of Recovery, Reconstruction, and Resiliency
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted dB
DCHSFC	Doctors' Center Hospital San Fernando de la Carolina
DNL (or Ldn)	Day-Night Average Sound Level
EA	Environmental Assessment
ECVSDCC	Emergency Calls and Video Surveillance Department's Command Center
EJ Screen	EPA's Environmental Justice Screening and Mapping Tool
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	FEMA Insurance Rate Map
FONSI	Finding of No Significant Impact
ft	Feet
GHG	Greenhouse Gases
GIS	Geographic Information System

Ha	Hectare
H&H	Hydrologic and Hydraulic
HMGP	Hazard Mitigation Grant Program
ICP	Institute of Puerto Rican Culture
in.	Inch
IPaC	Information for Planning and Consultation
ISSVTD	Integrated Security Services and Virtual Technology Department
km	Kilometer
km^2	Square Kilometers
L10	Sound levels exceeded 10 percent of the time
Leq	Equivalent Noise Level
Lmax	Maximum Noise Level
m	Meter
MBTA	Migratory Bird Treaty Act
MRI	Mag Resonance Imaging
NAAQS	National Ambient Air Quality Standards
NATA	National Scale Air Toxics Assessment
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OGPe	Oficina de Gerencia de Permisos (i.e., Puerto Rico Permits Management Office)
OSHA	Occupational Safety and Health Administration

PM	Particulate Matter
PRDNER	Puerto Rico Department of Natural and Environment Resources
PREQB	Puerto Rico Environmental Quality Board
PRPB	Puerto Rico Planning Board
PRSHPO	Puerto Rico State Historic Preservation Office
RCNM	Roadway Construction Noise Manual
RGL	Rio Grande De Loiza
RMP	Risk Management Plan
ROW	Right-of-Way
SOI	Secretary of Interior
SPCC	Spill Prevention, Control, and Countermeasure
SPL	Sound Pressure Level
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
ULSD	Ultra-Low Sulfur Diesel
U.S.	United States
U.S.C.	United States Code
USACE	U.S Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
$\mu g/m^3$	Micrograms per Cubic Meter

1.0 INTRODUCTION

The mission of the Federal Emergency Management Agency (FEMA) is to help people before, during, and after disasters. Beginning September 17, 2017, Hurricane Maria caused significant damage to Puerto Rico. The President of the United States issued a disaster declaration for Hurricane Maria on September 20, 2017, encompassing all of Puerto Rico. This declaration authorized FEMA to provide assistance to Puerto Rico under federal disaster DR-4339-PR. The Municipality of Carolina (subrecipient) has applied to FEMA under the Hazard Mitigation Grant Program (HMGP) for funding of the Carolina Downtown Flood Mitigation Project. Specifically, the Municipality of Carolina has applied for funding through the Central Office of Recovery, Reconstruction and Resiliency (COR3; recipient) in accordance with Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (42 United States Code [U.S.C.] Section 5172), as amended, and the Sandy Recovery Improvement Act of 2013.

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

2.0 PURPOSE AND NEED

FEMA's HMGP fosters the protection of health, safety, and welfare of citizens; assists communities in mitigating damage caused by disasters; and reduces future losses resulting from natural disasters. The Municipality of Carolina has experienced severe flooding from many past events, including Hurricanes Hugo (1989), Hortense (1996), Georges (1998), Maria (2017), and most recently Fiona (2022). The purpose of the proposed project is to construct a new stormwater and flood control system for the Municipality of Carolina's downtown area to reduce the severity of flooding and flood-related damage that endangers life, property, and critical infrastructure in the urban center (i.e., downtown) of the Municipality of Carolina. Flooding from Hurricane Maria resulted in substantial damages to infrastructure in downtown Carolina and the Villa Caridad community including houses, businesses, access roads, infrastructure, municipal security systems, and a hospital, which affected vulnerable community members. The proposed project would improve the resiliency of the community by increasing stormwater capacity and reducing the risk of future flood damage to residents, businesses, and critical community infrastructure.

The need for this project is to protect the community from the effects of flooding as a result of hurricanes and severe storm events and the subsequent failure of the stormwater system. Specifically, the project is needed to maintain community services and utilities, safeguard public health, and improve the community's overall resiliency from the effects of flooding that results from severe storms. The project is also needed to address several related considerations. It is needed to maintain the economic prosperity of the municipality and its residents by decreasing flood-related economic impacts to the downtown Carolina area from physical damage to businesses and interruptions in their services. It is needed to ensure transportation services and community access during severe weather events, including evacuation routes and access for emergency vehicles and vehicles that provide food, water, and other commodities. Lastly, the project is needed to protect surface water quality by decreasing the introduction of sediments and potential contaminants into local surface water bodies.

3.0 BACKGROUND

The proposed project area is located within the downtown area of the Municipality of Carolina in the northeastern area of Puerto Rico, just east of San Juan (Appendix A, Figure 1). This area of Carolina has experienced severe flooding during many past events, including Hurricanes Hugo (5 to 7 inches of rain), Hortense (13.5 inches of rain), Georges (5 inches of rain), and Maria (10.7 inches of rain). The Municipality of Carolina has a population of 134,203 (U.S. Environmental Protection Agency [EPA] 2022a). The Villa Caridad community is a designated Special Community within the municipality, with a census tract population of 527 (EPA 2022b). A Special Community is defined in the Puerto Rico Special Communities Integral Development Act [Act No. 1 of March 1, 2001, as amended], which acknowledged the existence of marginalized communities and established policies and governmental entities, with a mission of promoting a better quality of life and social development in these communities. The act created a process for identifying "Comunidades Especiales" or "Special Communities," who would be empowered to improve their communities with assistance from governmental entities.

Heavy rainfall and strong winds from Hurricane Maria flooded the downtown Carolina area and damaged several facilities, including the Doctors' Center Hospital San Fernando de la Carolina (DCHSFC) and the Villa Caridad community. Local streets and private properties were flooded. DCHSFC is a regional acute care general hospital that provides inpatient diagnostic and therapeutic services for a variety of medical conditions, both surgical and nonsurgical. The hospital serves a wide population group within Carolina as well as the nearby municipalities of Canovanas, Trujillo Alto, Loiza, and Rio Grande, which together have a total population of approximately 339,000 (U.S. Census Bureau, 2022). Flooding from Hurricane Maria damaged the hospital and affected access to the emergency room as well as the first and second levels of the parking garage. Critical hospital infrastructure was affected, including the medical gas supply, air, and suction; anesthesia waste removal; magnetic resonance imaging (MRI) cooling system; potable water cistern; biomedical waste room; fire extinguishing and fire suppression systems; electrical controls for the stormwater management system, sanitary pumps, and elevators; and the electrical panels of emergency generators. As a result, operating rooms were disabled, placing the lives of several patients at risk, in particular patients who were on mechanical ventilation. In addition, refrigeration within the hospital mortuary was compromised. Hurricane Maria also damaged the Integrated Security Services and Virtual Technology Department (ISSVTD) which is located in the same building as the DCHSFC and includes the Municipality's Public Safety Response Point and the Emergency Calls and Video Surveillance Department's Command Center (ECVSDCC). Other facilities and structures affected include the U.S. post office; a church; state route PR-874, which provides access to the downtown area and to the Villa Caridad community; and a number of local roads. The municipality estimates that 82 residences in the Villa Caridad community were flooded (Commonwealth of Puerto Rico, Autonomous Municipal Government of Carolina 2022).

The downtown area of Carolina is currently protected from flooding from the Rio Grande De Loiza (RGL) by the Monserrate Dike, which was built in the late 1980s. However, the stormwater system has limited capacity and does not prevent flooding from high rainfall within the downtown area itself. Recent studies have determined that the existing system can accommodate storm events with less than a 10-year period of recurrence. The current stormwater system comprises stormwater structures and pipes (storm sewer pipes) that discharge into the RGL through the Monserrate Dike with flap valves to protect from backflow whenever there are high water elevations in the RGL. During hurricanes and other significant rainfall storm events, the high-water elevation in the RGL causes the flap valves to remain closed and the stormwater system to backflow into the downtown area of Carolina, flooding the area. The Monserrate Dike has not been overtopped by the RGL since its construction, including the flood events during Hurricanes Irma and Maria. Nevertheless, because the four outfalls crossing the dike are prevented from draining into the RGL during hurricanes when the river levels are elevated, several high-rainfall events have caused severe local flooding in the downtown area. During Hurricane Maria, flood levels at the DCHSFC were approximately 1.73 meters (m) (approximately 5.7 feet [ft]) above the ground elevation (PMG & Associates, LLC 2021).

Because of frequent flood impacts from stormwater backflow, the subrecipient commissioned detailed Hydrologic and Hydraulic (H&H) studies to determine flood elevations within four major zones (Zones 1 through 4) based on the four discharge outlets through the Monserrate Dike (PMG and Associates 2020 and 2021). These zones are situated from north to south along the western side of the dike. Zone 1, the southernmost zone, contains the DCHSFC, where the highest flood elevations were experienced. The H&H study modeled various discharge scenarios, including flap valves open, closed, and open/closed depending on RGL water elevation variations, and showed local flood problems in all scenarios. The study proposed to mitigate future flooding in all four zones by implementing permanent flood control improvements in Zone 1, which is in the downtown area of Carolina.

The subrecipient developed a Management Plan to Minimize Impact to Inhabitants and Structures During Construction (Appendix B, Document 1). The management plan included coordination with relevant agencies to avoid and minimize impacts to geology and soils, air quality, water quality, noise, transportation, and public utilities and services. The management plan identifies ordinary working hours; includes measure to avoid erosion, sedimentation, and fugitive dust; and requires temporary infrastructure for wastewater, drinking water, electricity, and telecommunications as well as transportation access through a Maintenance of Traffic Plan.

4.0 ALTERNATIVES

FEMA and the Municipality of Carolina considered alternatives that would fulfill the purpose and need for this project. This consideration is based upon engineering constraints, environmental impacts, and available property. Budgetary constraints are included but are not the controlling factor.

Additionally, a No Action Alternative is included in the analysis. This section describes the No Action Alternative, feasible alternatives that would satisfy the purpose and need (including the Proposed Action), and alternatives that were considered and dismissed from further analysis.

4.1 Alternative 1: No Action Alternative

The No Action Alternative is included to describe potential future conditions if no action is taken to reduce flood hazards. Under the No Action Alternative, there would be no federal financial assistance provided for the construction of a new stormwater and flood control system. FEMA anticipates that, because of budgetary constraints within Puerto Rico and the municipality, the proposed stormwater mitigation work would remain unfunded or deferred indefinitely. The existing stormwater system would continue to deteriorate and remain susceptible to failure, leaving the community vulnerable to severe flooding and at risk of direct and indirect health impacts, contamination of local potable and surface waters, impeded community accessibility, and impacts to the local and downtown economy. There would be no reduction in the levels and durations of flooding events that occur because of the substandard stormwater system that endanger life and property in the Municipality of Carolina, including one of the area's main hospitals, as well as other critical municipal facilities, infrastructure, and residences.

4.2 Alternative 2: Proposed Action

Under Alternative 2, the Proposed Action, the Municipality of Carolina would improve infrastructure to address flooding impacts in the drainage area that lies immediately west of the Monserrate Dike, specifically four subdrainage zones that encompass approximately 46 hectares (ha; 114 acres) and include the DCHSFC, the government and commercial core, as well as high-density urban development. The Proposed Action would include proposed improvements across an area of approximately 1.5 ha (3.9 acres), of which approximately 0.8 ha (2 acres) are located along existing streets in the town center of Carolina, and 0.74 ha (1.85 acres) are located along and to the east side of the Monserrate Dike within a vegetated area adjacent to the floodplain (Appendix A, Figure 2).

The Proposed Action would include the construction of a new stormwater system interconnected with the existing one; repair of existing stormwater infrastructure; construction of a new detention pond, pump station, and new dike; and improvements to the infrastructure and telecommunications system within the project limits (collectively referred to as the stormwater and flood control

system). Additionally, the Proposed Action would contribute to decreasing community risks related to direct and indirect health impacts, contamination of local potable and surface waters, impeded community accessibility, and impacts to the local and downtown economy. This alternative is based on the recommendations proposed in the H&H studies and is referred to as the Proposed Action in this EA.

The components of the Proposed Action are described below.

Stormwater System

The proposed stormwater and flood control system would include the construction of new cross inlets on Manuel Fernandez Juncos Avenue and San Francisco Street to capture stormwater runoff that would be directed through box culverts to a new 1.83 m (72-inch [in.]) diameter pipe (Appendix A, Figures 3 through 5). The new pipelines and other stormwater infrastructure would be located largely in existing roadways. The new pipeline would be routed along Manuel Fernandez Juncos Avenue (State Road PR-874), through the parking lot of the DCHSFC/ISSVTD, and along Parque Street and Quebrada Street, after which it would discharge into a new detention pond located immediately east of and adjacent to the Monserrate Dike. Catch ponds and stormwater maintenance holes would be added to connect the 1.83 m (72 in.) pipe sections and would interconnect the new stormwater system with the existing system. Additionally, a new 0.91 m (36 in.) diameter pipe would connect the existing stormwater system on Molinillo Street to the proposed new detention pond.

Detention Pond and Pump Station

A new detention pond would be constructed to receive the runoff that would discharge via the 1.83 m (72 in.) gravity pipe and would include a new pump system that would push water through the Monserrate Dike to the RGL. The portion of the project area that would be used for the detention pond and pump station would be located on land owned by the Puerto Rico Department of Natural and Environmental Resources (PRDNER) in agreement with the Municipality of Carolina (PRDNER 2022). The site consists of an approximately 0.74-ha (1.85-acre) vegetated area along the western bank of the RGL between the eastern ends of Molinillo Street and Quebrada Street, parallel to and east of the existing Monserrate Dike (Appendix A, Figures 2 through 7).

The current conditions of the detention pond site include dense overgrown vegetation and three unpermitted buildings/structures on the site. The Proposed Action would include clearing and grubbing of the area and demolition of two buildings and one structure within the proposed footprint of the detention pond and pump station (Appendix A, Figure 2). The buildings, identified as Buildings #1 and #2, include two, one-story dwellings constructed of wood, metal, plastic, and an assortment of varying materials. The structure is a horse shed that is in poor condition. A third building, identified as Building #3, is located in close proximity to the proposed detention pond. The overall area has 12 buildings/structures, some of which are occupied and some of which are

vacant. Of these, the three located within the detention pond site (Buildings #1, #2, and the horse shed) are vacant. Building #3 is occupied however the residents have stated they are relocating. The proposed project would not affect the remaining buildings/structures in the overall area. The detention pond measures approximately 21 m by 69 m (69 ft by 227 ft) and would be accessed along the existing asphalt road (Los Torres Street) on top of the Monserrate Dike.

The proposed pump station would be new and Archimedean screw type, with a reinforced concrete structure (Appendix A, Figure 7). The pump station would include two conveyor pumps with a combined capacity of 189,271 liters per minute (50,000 gallons per minute). The new pump station would also include emergency generators, fences and gates, sidewalks and vehicular access, lighting and water service, and stormwater pipes to interconnect the new stormwater system with the existing one.

Dike

To provide the necessary level of protection for the proposed new detention pond from the RGL flood levels, a new dike with an elevation above the 100-year flood level of 13.8m (45.2 ft) above mean sea level (AMSL) would be constructed (Appendix A, Figure 6). The pond configuration would be designed to remain within the Zone AE, with an additional outfall structure discharging in the adjacent regulatory floodway shown on FEMA's Flood Insurance Rate Map [FIRM].

Other Infrastructure

The Proposed Action would include cleaning the existing 1.22 m (48 in.) and 1.37 m (54 in.) stormwater pipes located behind the DCHSFC and along Molinillo Street. Additional proposed improvements include relocation and reconstruction of affected infrastructure, including relocation of underground power, telecommunication, and aqueduct lines on Manuel Fernandez Juncos Avenue due to the construction of new cross inlets. Proposed improvements also include reconstruction of the existing aerial electrical, aerial telecommunication, select sidewalks, and aqueduct and sanitary sewer systems along Parque Street, Quebrada Street, Colón Street, and adjacent to Los Torres Street within the Villa Caridad Community.

Reconstruction of aqueduct and sanitary sewer systems within the Villa Caridad Community would include sanitary connections; sanitary and drinking water distribution pipes; fire hydrants; valves; and thrust blocks. The Proposed Action would also include concrete protections for surface pipes and potable water pipes, relocation of the drinking water pipe in the detention pond area, and a new potable water connection to serve the pumping station.

Staging Areas

Three possible staging areas during construction have been identified. One staging area would be located next to the U.S. post office on San Francisco Street and would also include an inspection office. A second staging area would be on an undeveloped parcel located northeast of the intersection of Molinillo and Principal Streets. A third staging area for the contractor would be within the back area of a nearby school located on Manuel Fernandez Juncos Avenue (Luis Muñoz Rivera Elementary School), which is currently undergoing renovation and is not in operation at this time (Appendix A, Figure 2).

4.3 Alternatives Considered and Dismissed

In addition to the two alternatives outlined above, there was an additional alternative, Alternative 3, that was considered and dismissed from further evaluation. The additional alternative discussed here is not addressed in Section 5.

Similar to Alternative 2, Alternative 3 was based on the results of the H&H study (PMG and Associates 2020 and 2021). Alternative 3 would have included a new stormwater system interconnected with the existing system, a detention pond, and a stormwater pump station. Under this alternative, the detention pond and pump station would be located west of Monserrate Dike requiring acquisition of nine private properties. The Municipality of Carolina determined this alternative to be technically feasible; however, Villa Caridad, the project's proposed project location, is a Special Community protected by laws that promote community self-management and control, which make expropriations such as property acquisition and eminent domain difficult. This alternative was dismissed based on the cost and logistics associated with property acquisition, including the need for residents to relocate from their homes.

4.4 Summary of Alternatives

Three alternatives were evaluated relative to their ability to fulfill the purpose and need for the project. One alternative was dismissed from further consideration for the reason discussed in Subsection 4.3, above. The two remaining alternatives evaluated in this EA are the following:

1. Alternative 1: No Action Alternative
2. Alternative 2: Proposed Action – Stormwater and Flood Control System

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

5.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

The following sections discuss the potential environmental impacts and proposed mitigation measures associated with the No Action Alternative and the Proposed Action. When possible, FEMA considers quantitative information to establish potential impacts; the significance of potential impacts is evaluated based on the criteria presented in Table 5.1. Potential cumulative environmental impacts are discussed in Section 5.19.

Table 5.1 Impact Significance and Context Evaluation Criteria for Potential Impacts

Impact Scale	Criteria
No Impact	The resource area would not be affected and there would be no impact.
Negligible	Changes would either be nondetectable or, if detected, would have impacts that would be slight and local. Adverse 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. Adverse impacts would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse impacts.
Moderate	Changes to the resource would be measurable and have either localized or regional scale impacts. Adverse impacts would be within or below regulatory standards, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary, and the measures would reduce any potential adverse impacts.
Major	Changes to the resource would be readily measurable and would have substantial consequences on regional levels. Adverse impacts would exceed regulatory standards. Mitigation measures to offset the adverse impacts would be required to reduce impacts, though long-term changes to the resource would be expected.

In addition to these criteria, FEMA distinguishes between direct and indirect impacts. These impacts are defined in the Council on Environmental Quality's *National Environmental Policy Act Implementing Regulations* as follows:

- Direct effects are reasonably foreseeable changes to the human environment that are caused by the action and occur at the same time and place.
- Indirect effects are changes to the human environment that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. In addition, indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

FEMA is omitting the following four environmental resource topics presented in Table 5.2 because they do not apply to the project as covered by this EA.

Table 5.2 Eliminated Resource Topics

Topic	Reason
Bald and Golden Eagles	Neither Bald Eagles or Golden Eagles are found in Puerto Rico; therefore, there would be no impact and the species are not considered further.
Coastal Resources	The project is not within the Coastal Zone Boundary or within a Coastal Barrier Resources Unit.
Essential Fish Habitat	The project area is not within or near coastal or brackish waters. The Proposed Action and alternatives would not have any impact on essential fish habitat in accordance with the Magnuson-Stevens Fishery Conservation and Management Act.
Wild and Scenic River System	There are no Wild and Scenic Rivers designated within the project area.

5.1 Geology, Topography, and Soils

5.1.1 Existing Conditions

Topography and Soils

The topography of the project area is mostly flat with slopes of approximately 2% toward the east. According to the Topographic Quadrangle of Carolina (U.S. Geological Survey), the elevation varies between 10 and 15 m AMSL (Appendix A, Figure 8).

According to the U.S. Department of Agriculture's (USDA) Soil Conservation Service, the soils to the east of the Monserrate Dike are classified as Toa silty clay loam. Based on information from the Geologic Map of the Carolina Quadrangles, the project site, which is on the east and west sides of Monserrate Dike, is within the Alluvium and River Terrace Deposits (Holocene and Pleistocene), which consist of sand, clay and sandy clay, and beds of sand along the sides of the RGL that contain gravel (Monroe 1977) (Appendix A, Figure 9). The geotechnical survey and field explorations identified deep human-made fill consisting of interlayered sandy silts, clayey silts, and sandy soil deposits (Earth Engineers, Inc. 2021). Wood pieces and foreign matter were occasionally encountered. Hydrocarbon odors were detected from 5.5 to 9.1 m (18 to 30 ft) below existing ground surface. No hydric soil indicators were present in the project area (Earth Engineers Inc. 2021).

The project area is located within an urbanized area; therefore, it is not subject to the provisions of the Farmland Protection Policy Act of 1981 (7 U.S.C. Section 4201, et seq.).

Seismicity

Puerto Rico and the nearby Caribbean islands are in a seismically active region. In the 20th century alone, there have been several very large earthquakes north of Puerto Rico, with known magnitudes of 7.0 between 1946 and 1953 and magnitude 8.0 in 1946 that had four major aftershocks of magnitude 7. An earthquake sequence in southwest Puerto Rico began on

December 28, 2019, with a magnitude 4.7 earthquake (U.S. Geological Survey 2020). Minor earthquakes causing land slumps and slides are common in the mountainous areas of Puerto Rico (Larsen and Torres-Sanchez 1998).

5.1.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no construction, soil disturbance, or grading; thus, no direct effects to soils, topography, or seismicity would occur. However, ongoing erosion would continue to occur naturally, particularly at the banks of the RGL. The risk of flooding would not be reduced in the Municipality of Carolina. There would be no change in the ability of the existing Monserrate Dike to retain floodwaters. Floodwaters would have the potential to cause soil erosion and the deposition of debris and sediments on the ground surface that could physically damage soil properties and any vegetation. Loss of vegetation from flooding would contribute to erosion in the flooded area. However, flood events would be temporary and generally would not last long enough to alter soil properties. Therefore, the No Action Alternative would have a negligible, short-term, indirect adverse impact on soils, and a moderate, long-term, indirect adverse impact on soils in the project area vicinity depending on the extent and duration of flooding. The No Action Alternative would have no impacts relative to topography or seismicity.

Alternative 2: Proposed Action

The Proposed Action would have minor, short-term construction impacts on soils from earth-disturbing activities, such as excavation, trenching, and grading. This would temporarily increase the risk of erosion. Approximately 9,587 cubic meters (12,539 cubic yards) of soils would be excavated and disposed. According to the geotechnical report (Earth Engineers Inc. 2021), the cut material is not suitable for use as fill; therefore, 19,813 cubic meters (25,914 cubic yards) of engineered fill material from a permitted source following PRDNER guidelines would be placed. The new detention pond, dike, and stormwater pump station would require a new right-of-way (ROW) area of approximately 0.74 ha (1.85 acres), mostly covered by grass and medium dense groves. The new infrastructure elements would meet current codes and standards and would be installed under the appropriate permits. In addition, during construction, sediment control structures (e.g., silt fence and straw bales) and other best management practices (BMPs) would be implemented to minimize the potential for temporary soil erosion impacts. Therefore, the Proposed Action would have minor, short-term, direct adverse impacts to soils. The Proposed Action would provide long-term benefits by reducing the risk of erosion during flood events in the project area and vicinity. This would be a minor, long-term, indirect beneficial impact on soils. The Proposed Action would have no impacts relative to topography or seismicity.

5.2 Air Quality

The Clean Air Act (CAA) of 1970 (42 U.S.C. Sections 7401–7661 [2009]) is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The act authorized the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The NAAQS include standards for six criteria air pollutants: lead, nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, and particulate matter (including both particulate matter (PM) less than 10 micrometers in diameter [PM10], and fine particulate matter less than 2.5 micrometers in diameter [PM2.5]). Areas where the monitored concentration of a criteria pollutant exceeds the applicable NAAQS are designated as being in nonattainment of the standards, while areas where the monitored concentration of a criteria pollutant is below the standard are classified as in attainment.

Federally funded actions in nonattainment and maintenance areas for the criteria pollutants are subject to EPA conformity regulations (40 CFR Parts 51 and 93), which ensure that emissions of air pollutants from planned federally funded activities would not affect the state's ability to meet the NAAQS. Section 176(c)(1) of the CAA requires that federally funded projects conform to the purpose of the State Implementation Plan, meaning that federally funded activities would not cause any violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone.

5.2.1 Existing Conditions

According to EPA's Green Book, the Municipality of Carolina is not within a nonattainment or maintenance area for any criteria pollutant (EPA 2022c) (Appendix A, Figure 10).

5.2.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no site preparation, construction, or demobilization activities. As a result, no temporary construction-related emissions would occur within the project area and there would be no short-term direct impacts to air quality under the No Action Alternative.

Normal air emissions within the project area would remain unchanged from existing conditions. However, under the No Action Alternative, the existing stormwater system improvements would not be implemented, and the project area would continue to be subject to periodic flooding during heavy rain events. Emergency response actions would generate short-term emissions of criteria pollutants from the operation of vehicles and equipment such as portable generators and pumps. It is expected that such emissions would be below *de minimis* thresholds and, therefore, long-term, direct adverse operational air quality impacts would be negligible.

Alternative 2: Proposed Action

Under the Proposed Action, emissions from on-site construction equipment, on-road construction-related vehicles, and dust-generating construction activities have the potential to affect air quality. Additionally, construction activities may result in vehicular delays from temporary road and/or lane closures, as well as the temporary closure of the DCHSFC parking lot, as discussed in Section 5.16. Vehicular delays and associated congestion could result in a negligible, short-term, direct adverse impact due to increases in regional vehicle emissions and would primarily be associated with detours and vehicle idling from the partial closure of Manual Fernandez Juncos Avenue adjacent to the DCHSFC during construction. While the temporary closure of Parque and Quebrada Streets would disrupt vehicle flow in the Villa Caridad area, this traffic disruption would be highly localized and would result in negligible local emissions from vehicular detours and idling.

Construction-related equipment and vehicle use would involve both gasoline and diesel engines. The primary criteria pollutant associated with gasoline engines would be carbon monoxide, however, localized carbon monoxide impacts from gasoline engine exhaust are typically only experienced at intersections servicing hundreds of thousands of daily vehicle trips – far beyond the magnitude of vehicular detours or vehicle trips associated with the Proposed Action. The primary criteria pollutant associated with diesel engines would be nitrogen oxide, however, in an attainment area, the applicable major source threshold would be 100 tons of nitrogen oxide emissions per year – far beyond the magnitude of emissions that would be expected from the Proposed Action. EPA mandates the use of ultra-low sulfur diesel (ULSD) fuel for all highway and nonroad diesel engines. Because sulfur in fuels inhibits the effectiveness of modern pollution control systems in engines, the use of ULSD fuel provides for greater reductions in nitrogen oxide emissions, along with reductions in other criteria pollutants. In addition to the vehicle exhaust emissions, ground-disturbing activities would generate airborne dust, which is a source of particulate matter.

Implementation of the Proposed Action, including site preparation, replacement of sanitary and utility lines, and reconstruction of the site, would take approximately 20 to 24 months; thus, vehicle and equipment use in the project area would be temporary and localized. Additionally, construction activities would abide by all applicable state and municipality regulations as well as the subrecipient's management plan (Section 3), including those that pertain to reduction of air pollutant emissions and control of fugitive dust (Appendix B, Document B1). Combined direct construction emissions and indirect emissions from traffic disruption would not be anticipated to result in an exceedance of any NAAQS. Additionally, because the project area is not located within a nonattainment or maintenance area, general conformity and *de minimis* thresholds would not apply.

Earthmoving would be a major component of the Proposed Action during trenching along local roadways for conveyance pipeline installation and during the excavation of the detention pond. Unabated, earthmoving activities can result in significant emissions of airborne fugitive dust, which can negatively affect local air quality. While the subrecipient's management plan and standard BMPs such as the application of water to disturbed ground areas would reduce fugitive dust emissions associated earthmoving, residential receptors along Parque Street and Quebrada Street, and on Colón Street adjacent to the detention pond site, would likely still experience high levels of localized airborne dust intermittently throughout construction activities. Therefore, construction of the Proposed Action would have moderate, short-term, direct adverse impacts to local air quality during earthmoving operations and minor, short-term, direct adverse impacts to regional air quality throughout construction.

Long-term operation of the Proposed Action would not involve the notable use of pollutant-emitting equipment or vehicles. Negligible amounts of criteria pollutants would be generated by maintenance vehicles and by the intermittent use of the emergency generator at the pump station. In addition, electricity required to operate the project would be substantially similar to electricity consumption under the No Action Alternative. It is not anticipated that implementation of the Proposed Action would result in an exceedance of any NAAQS. Additionally, because the project area is not located within a nonattainment or maintenance area, general conformity and *de minimis* thresholds would not apply. Therefore, operation of the facilities constructed under the Proposed Action would have negligible, long-term, direct adverse impacts on air quality.

5.3 Climate Change

Climate change refers to changes in the Earth's climate caused by a general warming of the atmosphere. Its primary cause is emissions of greenhouse gases (GHG), including carbon dioxide and methane. Climate change can affect species distribution, temperature fluctuations, and weather patterns. Executive Order (EO) 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, commits the federal government to considering climate change, including protecting the environment, reducing GHG emissions, and bolstering resilience to the impacts of climate change.

5.3.1 Existing Conditions

Consequences of climate change include heat waves, coastal flooding, and river flooding. Infrastructure will be increasingly compromised by climate-related hazards, including sea level rise, coastal flooding, and intense precipitation events. Temperatures in Puerto Rico have increased by more than 1 degree Fahrenheit since the mid-20th century, and the surrounding waters have warmed by nearly 2 degrees Fahrenheit since 1901. The sea is rising about 0.02 m (1 in.) every 15 years, and heavy rainstorms are becoming more severe. In the coming decades, rising temperatures are likely to increase storm damages (EPA 2016).

5.3.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

No construction would occur under the No Action Alternative. There would be no heavy equipment exhaust emissions within the project area and no changes in the operation of the stormwater system. Therefore, this alternative would have no direct GHG emissions and no construction-related adverse impacts on climate change. However, under the No Action Alternative, the existing stormwater system improvements would not be implemented, and the project area would continue to be subject to periodic flooding during high rain events. Emergency response actions would generate short-term emissions of GHGs from the operation of vehicles and equipment such as portable generators and pumps. Moreover, climate change is expected to increase the frequency and intensity of precipitation events, resulting in increased flooding events in the project area. Thus, the No Action Alternative would have negligible, long-term, indirect adverse impacts with respect to climate change.

Alternative 2: Proposed Action

The Proposed Action would generate GHG emissions, which would contribute to climate change. During construction, the combustion of fossil fuels from construction equipment and construction-related vehicles would produce GHG emissions. BMPs that would implement emission control measures would minimize these emissions. Additionally, construction activities may result in vehicular delays from temporary road and/or lane closures, as well as the temporary closure of the DCHSFC parking lot; the associated congestion could increase vehicular GHG emissions. Upon completion of construction, the Proposed Action would produce direct operational emissions when the emergency generator at the pump station is in use and from periodic maintenance vehicles. These sources would result in negligible emissions of GHGs and a negligible, short-term and long-term, direct adverse impact. Electricity required to operate the project would be substantially similar to electricity consumption under the No Action Alternative. The GHG emissions related to power consumption would result in a negligible, short- and long-term, indirect adverse impact. Due to the short construction schedule, Proposed Action scope, and negligible short- and long-term emissions of GHGs, climate change implications of the project would be negligible.

The effects of climate change, including intense precipitation events, would continue to exist under the Proposed Action. The Proposed Action would reduce the vulnerability of downtown Carolina to climate change-driven effects and allow continued operations despite potential increased frequency of flooding and severe storms. Thus, the Proposed Action would have negligible, short-term, direct adverse impacts with respect to climate change and moderate, long-term, indirect beneficial impacts with respect to climate change resiliency.

5.4 Water Quality

Congress enacted the Federal Water Pollution Control Act in 1948, which was later reorganized and expanded in 1972 and became known as the Clean Water Act (CWA) in 1977. The CWA provides for the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters and establishes the basic structure for regulating discharges of pollutants into the waters of the United States (U.S.) and promulgating quality standards for surface waters, with sections of the act falling under the jurisdiction of both the U.S. Army Corps of Engineers (USACE) and EPA. Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES) program, which governs the discharge of pollutants into surface waters and traditional navigable waterways for projects with ground disturbance of more than 0.4 ha (one acre). Under the NPDES program, EPA regulates both point and nonpoint pollutant sources, including stormwater and stormwater runoff. Activities that disturb 0.4 ha (one acre) of ground or more are required to apply for an NPDES permit and prepare a Stormwater Pollution Prevention Plan (SWPPP). Section 404 of the CWA establishes the USACE permit requirements for discharging dredged or fill materials into waters of the U.S. and traditional navigable waterways.

Section 305(b) of the CWA requires states, territories, and other jurisdictions of the U.S. to biannually submit reports to EPA on the quality of their surface waters. These entities have determined the appropriate uses of each waterbody within their jurisdiction, which in Puerto Rico includes recreation, aquatic life, and drinking water sources. Section 305(b) reports provide information on the water quality status of waters in Puerto Rico, whereas section 303(d) lists are a subset of these waters – reporting those waters that are impaired by a pollutant and in need of a Total Maximum Daily Load (TMDL) plan (EPA 2022d). A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for pollutants. The EPA approves and establishes TMDLs for the assessment unit/pollutant combination. Once the TMDL for a specific waterway is determined, a plan is developed and implemented to improve the waterway's water quality (EPA 2022d).

5.4.1 Existing Conditions

The project area is within the watershed of the RGL and lies west of the RGL, on both the east and west sides of the Monserrate Dike. The portion of the project area located to the east of the Monserrate Dike is drained by an underground stormwater system that discharges into the RGL. According to the Puerto Rico 2020 305(d) and 303(d) Impaired Waters List, the RGL is designated as impaired for aquatic life, drinking water supply, and primary and secondary contact recreation. Water body impairments are listed in Table 5.3 (EPA 2022e). No restoration plans are currently in place for the watershed. Watercourses in and near the project area are shown in Appendix A, Figure 11.

Table 5.3 Rio Grande de Loiza Water Quality Impairments

Impairment	Designated Uses
Hexavalent Chromium	Aquatic Life
Total Phosphorus	Aquatic Life, Drinking Water Supply
Turbidity	Aquatic Life, Drinking Water Supply
Enterococcus	Primary Contact Recreation, Secondary Contact Recreation
Fecal Coliform	Primary Contact Recreation, Secondary Contact Recreation

5.4.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action Alternative would not reduce the risk of flooding. During heavy rain events when the RGL level rises, the outfall crossing the Monserrate Dike cannot drain into the river. Flood waters would inundate the project area, increasing the likelihood of contaminants and debris being introduced to the RGL when floodwaters recede. Potential pollutants in flooded areas, including fuels and bacteria, may travel with the floodwater, thus introducing these contaminants into the RGL. Thus, the No Action Alternative would have a moderate, short-term, direct adverse impact on water quality during heavy rainfall and floods depending on the duration and scale of flooding.

Alternative 2: Proposed Action

The Proposed Action would include construction-related activities that could introduce pollutants to nearby surface water bodies. The most common pollutant to surface waters from construction sites is sediment and turbidity; however, metals, trash and debris, nutrients, organic matter, pesticides, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, and other toxic organics can also be construction-derived pollutants (EPA 2009). Construction activities would be temporary and the subrecipient would abide by all applicable state and municipality regulations, including those that pertain to reduction of pollution to surface water. The Proposed Action would not create new discharge points or sources of pollution to surface waters. The subrecipient would manage construction activities to prevent pollutants from entering stormwater runoff and thus from entering surface waters. The subrecipient would prepare a SWPPP prior to construction and would implement the BMPs specified therein during construction, in accordance with requirements of the Construction General Permit. Therefore, construction would have a negligible, short-term, direct adverse impact on water quality in the RGL.

The Proposed Action includes the construction of an outfall structure on the eastern side of the new detention pond that, when in operation, would discharge stormwater runoff impounded in the detention pond. Operation of the detention pond and outfall would not appreciably change the quality or quantity of stormwater that is delivered to the RGL. As noted above, floodwaters have the potential to introduce contaminants, including fuels and bacteria, into the RGL. The Proposed

Action would improve stormwater conveyance and reduce the amount of standing floodwater. These improvements would reduce floodwaters during heavy rain events and therefore reduce introduction of contaminants to the RGL. Therefore, the Proposed Action would have moderate, long-term, direct beneficial impacts to water quality by reducing the introduction of contaminants to the RGL.

5.5 Wetlands

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, to the extent possible, the long- and short-term adverse effects associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands, wherever there is a practicable alternative. The EO also requires that proposed actions that include construction located in wetlands include all practicable measures to minimize harm to wetlands that may result from such use. Each federal agency must take action to minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. FEMA uses the eight-step decision-making process to evaluate potential effects on, and mitigate effects to, wetlands and floodplains in compliance with EO 11990 and 44 CFR Part 9.

5.5.1 Existing Conditions

According to the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (USFWS 2022a), no wetlands are present within or adjacent to the project area (Appendix A, Figure 11). However, wetlands included in the NWI are identified based on an analysis of high-altitude imagery. Thus, some margin for error is expected, and detailed on-the-ground assessments may result in the identification of additional wetlands not included in the NWI or in the revision of the wetland boundaries indicated by the NWI. On June 16, 2021, Coll Rivera Environmental conducted a wetland delineation of the project area (Coll Rivera Environmental 2021a) in accordance with methods prescribed in the USACE *Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region* (Version 2.0, USACE 2011). The findings of this wetland delineation confirmed that no wetlands exist within the project area. However, wetlands may occur just east of the project area along the RGL where the flowing river and/or seasonal flooding may support wetland hydrology.

5.5.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

The No Action Alternative would have no direct impact on wetlands because none occur within the project area, and existing hydrological conditions that may support wetlands in the vicinity would not be altered. However, during heavy rain events, flood waters would inundate the project

area, increasing the likelihood of contaminants and debris being introduced to the RGL, which could affect wetlands that may occur just east of the project area along the RGL. This would have a moderate, short-term, indirect adverse impact on wetlands outside the project area depending on the volume of the release.

Alternative 2: Proposed Action

Because there are no wetlands within or directly adjacent to the project area, the Proposed Action would have no effect on wetlands through direct disturbance resulting from construction activities. Therefore, the Proposed Action would have no short- or long-term, direct adverse impacts on wetlands within the project area. The Proposed Action could adversely affect water quality in the RGL in the short-term due to construction activities, which would have a negligible adverse impact on wetlands that may occur outside the project area along the RGL because the RGL is the primary source of hydrology for these wetlands. In the long-term, the Proposed Action would substantially reduce the risk of flood control infrastructure failure and thereby reduce the risk of flooding and the introduction of contaminants to the RGL and any surrounding wetland areas. Therefore, the Proposed Action would have a negligible, short-term, indirect adverse impact and a moderate, long-term, indirect beneficial impact on wetlands outside the project area along the RGL.

5.6 Floodplain

Executive Order 11988, Floodplain Management, requires that a federal agency avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative. FEMA uses FIRM to identify the floodplain in determining compliance with the EO. Federal actions within the 100-year floodplain, or the 500-year floodplain for a critical action, which includes actions that address damage to facilities such as hospitals, require the federal agency to conduct an eight-step decision-making process. This process, like NEPA, requires the evaluation of alternatives prior to funding the action. FEMA's regulations on conducting the eight-step decision-making process are contained in 44 CFR Part 9.

5.6.1 Existing Conditions

The Proposed Action is a critical action based on its purpose to protect the Carolina downtown area including the DCHSFC and ISSVTD. Critical actions are those for which even a slight chance of flooding is too great to structures or facilities such as hospitals nursing homes, and facilities that store or use hazardous materials, among others. Therefore, the project was reviewed against the 0.2% (500-Year) floodplain in the eight-step decision-making process. The project area falls within FEMA FIRM map #72000C0390J, effective November 18, 2009, and Advisory Base Flood Elevation (ABFE) map #75000C0390J, effective April 13, 2018 (Appendix A, Figure 12). Based on that mapping, the project area is in FEMA flood zone AE, which is a 1.0% (100-Year)

floodplain, and 0.2% (500-Year) floodplain with a portion of the project within the regulatory floodway. The portion of the project within the floodway includes the eastern boundary of the project area, including the outfall structure and portions of the riprap mattress structure. A regulatory floodway is the channel of a river or other watercourse and the adjacent land areas that discharge the base flood without cumulatively increasing the water surface elevation. FEMA has applied the eight-step decision-making process per 44 CFR 9.6 (Appendix B, Document B2).

5.6.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, flooding would continue to impact the properties in the Community of Villa Caridad, and the DCHSFC, ISSVTD, and other buildings in downtown Carolina. The No Action Alternative would not include any new development within the existing floodplain, modify drainage flows that would adversely affect the floodplain, or result in any changes to existing flooding risks. However, the No Action Alternative would do nothing to reduce the flood risk to existing development within the floodplain. Therefore, the No Action Alternative would have moderate, long-term, direct adverse impacts to people and property within the floodplain as well as on natural floodplain functions depending on the extent and duration of the flooding.

Alternative 2: Proposed Action

Construction of the Proposed Action would not include new development that would be subject to loss of life or property due to flooding but, rather, proposes improvements to the existing drainage system. Although construction activities would include the presence of construction equipment and materials in the floodplain, these additions would be temporary in nature and would not materially increase the floodplain. Therefore, there would be negligible, short-term, direct adverse impacts on the floodplain from construction.

The Proposed Action would reduce flooding at properties within Villa Caridad and facilities such as the DCHSFC and ISSVTD. Because the DCHSFC is a hospital, the Proposed Action is considered to be a critical action by FEMA (40 CFR Part 9 Section 9.4). Most project components would be belowground and would not affect the floodplain. The detention pond would be built within Zone AE but would include a new dike with an elevation above the 100-year flood level, which would protect the detention pond from flooding (Appendix B, Document B2). Additionally, the floor level of the pump station structure, including the generator and any associated electrical and mechanical components would be elevated 0.6 m (2 ft) above the 100-year base flood elevation (BFE) of 14.03 m (46.1 ft), for a total of 14.64 m (48.3 ft). The pond configuration would be designed to remain outside of the adjacent floodway zone established by FEMA's FIRM with an outfall structure and portions of a riprap mattress structure located in the floodway (Appendix A, Figure 12). Work within the floodway would be completed at or below existing ground levels to

avoid any encroachment to the floodway that would cause an increase in flood levels. National Flood Insurance Program (NFIP) compliance is currently pending, awaiting review of the H&H evaluation from PRDNER. The Office of Geology and Hydrology of the Puerto Rico Planning Board (PRPB) concluded with the H&H analysis that the project is in compliance with the regulations of Planning Regulation No. 13 (Regulation on Special Flood Hazard Areas) (P.C. & Associates 2022). The preliminary No Rise Certification for the project states that the project does not represent a change in levels, filling, or reduction in the main channel. The action does not propose an encroachment to the greater channel that may cause an increase in flood levels. The Proposed Action would have moderate, long-term, direct beneficial impacts on flood protection and values in the project area and vicinity.

5.7 Vegetation

Vegetation serves many functions: it can provide essential habitat for wildlife, prevent erosion by stabilizing soil resources, and enhance visual aesthetics. Executive Order 13112, Invasive Species, requires federal agencies, to the extent practicable, to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. Invasive species prefer disturbed habitats and generally possess high dispersal abilities, enabling them to outcompete native species. In accordance with EO 13112, federal agencies cannot authorize nor provide funding or accomplish actions considered capable of causing or promoting the introduction or dispersion of invasive species to the U.S. unless the agency first considers reasonable measures that diminish the risks.

5.7.1 Existing Conditions

The U.S. Forest Service (USFS) has developed a hierarchical framework of ecological units to provide a basis for landscape-level assessments of environmental conditions to inform regional planning and resource management (USFS 1994a). Under this framework, provinces (regional units) are split into sections (subregions) that are further divided into climatic zones defined by their predominant environmental and biological features. According to this system, the project area is in a tropical moist forest zone within the Dry-Humid Mountains section of the Puerto Rico province (USFS 1994b). Climatic conditions in this zone are favorable for crop growth, which has led to widespread deforestation to support agricultural development (Miller and Lugo 2009). The westerly portion of the project area consists of existing paved areas in a highly developed part of downtown Carolina west of the Monserrate Dike. However, the portion of the project area east of the Monserrate Dike is largely composed of naturally vegetated areas.

A reconnaissance-level survey was conducted by Coll Rivera Environmental in May 2021 to characterize existing biological features in the portion of the project area east of the Monserrate Dike (Coll Rivera Environmental 2021b). The findings of the survey indicate that this area has been subject to significant past and ongoing anthropogenic disturbance related to the construction of the Monserrate Dike and activities associated with existing private residences and horse

pastures. Of the 64 plant species identified during the survey, approximately 53% were nonnative, and the remaining 47% (i.e., native species) are affected by the activities carried out in the project area. Plant species observed within the project area are regionally common, with the most abundant species being African tulip tree (*Spathodea campanulata*), bread and cheese (*Paullinia pinnata*), slender dayflower (*Commelina erecta*), Venezuela grass (*Paspalum fasciculatum*), hoopvine (*Trichostigma octandrum*), and seasonvine (*Cissus verticillata*). Of these, African tulip tree and Venezuela grass are introduced species, and Venezuela grass is considered invasive. The most represented plant families were grasses (*Poaceae* – 11 species), spurges (*Euphorbiaceae* – 5 species), arums (*Araceae* – 4 species), and peas (*Fabaceae* – 4 species).

5.7.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no construction or ongoing systematic vegetation management activities conducted in the project area. Therefore, there would be no impact on existing vegetation within the project area.

Alternative 2: Proposed Action

The Proposed Action would entail the clearing and grubbing of approximately 0.74 ha (1.85 acres) of tropical moist forest vegetation—characterized by varying degrees of previous disturbance—within the footprint of the detention pond and pump station. This area would be permanently converted to flood control infrastructure. Additional vegetated areas near the detention pond footprint would be subject to short-term impacts from construction activities, such as trenching or materials staging. The subrecipient would conduct tree removals in accordance with local regulations, including obtaining cutting, pruning, transplanting and tree system authorization as part of the Incidental Operational Permit that would be required for the project. Soil and vegetation disturbance could cause the spread of invasive plant species, but the magnitude of this potential effect would be reduced with implementation of construction BMPs. Appropriate BMPs, such as minimizing the use of off-road areas, erosion control measures, and placing barriers to delineate the limits between impact areas and conservation zones (such as forested areas) would reduce vegetation disturbance and would control the spread of invasive plant species during construction.

The extent of vegetation loss resulting from the Proposed Action would be relatively small compared to the large similarly vegetated areas that occur north, south, and east of the project area. In addition, the vegetation to be removed primarily consists of nonnative and/or invasive species. Further, the Proposed Action would include the revegetation of temporarily disturbed areas with noninvasive native species and would establish a reforestation program using native species that, in addition to helping to minimize erosion, would benefit wildlife. Replanting native vegetation would be beneficial; however, some native species would be removed, and it would take time for the planted native species to become established following construction. Therefore, the

construction phase of the Proposed Action would have negligible, short-term, direct adverse impacts on vegetation from the removal of vegetation during construction.

Following completion of the construction phase of the Proposed Action, the subrecipient would regularly manage vegetation within the immediate vicinity of the flood control structures to prevent plants from encroaching on the structures and to maintain landscaped areas. Because the size of these maintained areas would be small, operational impacts on vegetation would be negligible. Therefore, the post-construction operational phase of the Proposed Action would have negligible, long-term, direct adverse impacts on vegetation.

5.8 Wildlife and Fish

In addition to specific federal laws such as the Endangered Species Act (ESA) of 1973 (16 U.S.C. Sections 1531–1543), there are numerous laws and regulations at the federal level that seek to protect and conserve fish and wildlife populations for recreation and commercial values. One such law is the Migratory Bird Treaty Act (MBTA) of 1918, which provides a program for the conservation of migratory birds that fly through lands of the United States. USFWS is the lead federal agency for implementing the MBTA. The law makes it unlawful at any time, by any means, or in any manner to take any part, nest, or egg of migratory birds. "Take" is defined in regulation (50 CFR Section 10.12) as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect," or any attempt to carry out these activities.

5.8.1 Existing Conditions

Puerto Rico is generally characterized by a diverse assemblage of wildlife, of which approximately 50% consists of terrestrial species (Miller and Lugo 2009). Outside of insects, the most represented taxonomic group by number of species is birds (269 species), followed by reptiles (54 species) and mammals (32 species) (Miller and Lugo 2009).

The project area comprises heavily developed urbanized areas west of the Monserrate Dike and lightly developed, largely forested areas immediately east of the Monserrate Dike. Owing to existing levels of development, suitable wildlife habitat within the project area is limited to areas east of the Monserrate Dike. As noted in Section 5.6, a biological survey of the eastern portion of the project area (i.e., areas east of the Monserrate Dike) was conducted in May 2021 (Coll Rivera Environmental 2021b). According to the survey findings, the eastern portion of the project area has been degraded by anthropogenic disturbance. Vegetation composition in this area is characterized by a high proportion (approximately 53%) of nonnative species that commonly colonize human-disturbed forests. No surface water features, wetlands, or riparian vegetation communities are present within the project site. Terrestrial wildlife observed during the survey consist of regionally common species (Table 5.4)—the most commonly observed being the Greater Antillean grackle (*Quiscalus niger*) and the bananaquit (*Coereba flaveola*). The survey report

concluded that the project area lacks complex ecological associations and demonstrates low biodiversity.

Table 5.4 Animal Species Observed in the Project Area

Common Name	Scientific Name
Birds	
Bananaquit	*Coereba flaveola*
Cattle egret	*Bubulcus ibis*
Cave swallow	*Petrochelidon fulva*
Gray kingbird	*Tyrannus dominicensis*
Pearly-eyed thrasher	*Margarops fuscatus*
Puerto Rican woodpecker	*Melanerpes portoricensis*
Red-legged thrush	*Turdus plumbeus*
Greater Antillean grackle	*Quiscalus niger*
Red-tailed hawk	*Buteo jamaicensis*
House sparrow	*Passer domesticus*
Scaly-naped pigeon	*Patagioenas squamosa*
White-winged dove	*Zenaida asiatica*
Zenaida dove	*Zenaida aurita*
Reptiles	
Green iguana	*Iguana iguana*
Puerto Rican crested anole	*Anolis cristatellus*
Amphibians	
Red-eyed coquí	*Eleutherodactylus antillensis*
Common coquí	*Eleutherodactylus coqui*
Insects	
Western honey bee	*Apis mellifera*
Tree termite	*Nasutitermes costalis*
Snails	
Tree snail	*Caracolus caracolla*

According to a recent study of the fish species present in Puerto Rico, there are 46 fish species known from the island's freshwater systems (Rodríguez-Barreras et al. 2020). Puerto Rico's freshwater habitats are largely dominated by fish species introduced from America, Africa, and Asia (Rodríguez-Barreras et al. 2020). Of the 46 species reported for the island, approximately 80% are nonnative (Rodríguez-Barreras et al. 2020). The project area is devoid of aquatic habitat; however, the section of the RGL approximately 70.1 m (230 ft) east of the project area has the potential to support the fish species indicated in Table 5.5, all of which are nonnative (Rodríguez-Barreras et al. 2020).

Table 5.5 Freshwater Fish Species with the Potential to Occur in the RGL

Common Name	Scientific Name
Amazon sailfin catfish	*Pterygoplichthys pardalis*
Nile tilapia	*Oreochromis niloticus*
Red devil	*Amphilophus labiatus*
Sailfin catfish	*Pterygoplichthys multiradiatus*
Sailfin molly	*Poecilia latipinna*
Southern platyfish	*Xiphophorus maculatus*
Southern molly	*Poecilia vivipara*

The list of species protected under the MBTA was most recently updated in 2020 (Title 50 Part 10.13), and currently includes 86 species that are known in the Municipality of Carolina (eBird 2022). With the exception of the house sparrow, all of the bird species observed during the biological survey (Table 5.4) are protected by the MBTA. The breeding season for the bird species with the potential to nest in or near the project area is generally March through June, depending on the species and location (Castro-Prieto et al. 2021).

5.8.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, the condition of existing wildlife habitat within and near the project area, including potential nest sites for migratory birds, would remain unchanged. Therefore, the No Action Alternative would have no impact on fish and wildlife, including migratory birds.

Alternative 2: Proposed Action

Construction activities under the Proposed Action would have the potential to affect terrestrial wildlife occurring within and near the eastern portion of the project area through temporarily increased levels of noise and visual disturbance, habitat modification, and habitat loss. Increased levels of noise and visual disturbance would lead to the displacement of wildlife within and in the immediate vicinity of the project area as animals move away from sources of disturbance. Similarly, habitat modification due to short-term construction-related disturbance, such as in staging areas and along access routes, would cause animals to move away from preferred habitat areas within the construction footprint. However, displaced individuals would be able to relocate to similar habitats nearby and would be able to return to portions of the project area that are restored through revegetation activities once construction is completed. Although the Proposed Action would result in the permanent loss of approximately 0.74-ha (1.85-acre) of vegetated habitat in the footprint of the detention pond and pump station, this 0.74-ha (1.85-acre) area has been degraded by past and ongoing anthropogenic disturbance. As such, this area provides marginal habitat for terrestrial wildlife; consequently, the Proposed Action would not eliminate any unique or

high-quality terrestrial wildlife habitat. Further, animal species that would occur in the project area during construction are regionally common and consist of those generally found in semi-disturbed, altered habitats. For these reasons, construction activities conducted under the Proposed Action would have minor, short-term, direct adverse impacts and negligible, long-term, direct adverse impacts on terrestrial wildlife.

Construction activities under the Proposed Action would be limited to areas over 60 m (200 ft) from the western bank of the RGL. Additionally, site stabilization measures that would be implemented in accordance with NPDES permitting requirements, the SWPPP, and the Puerto Rico Erosion and Sediment Control Handbook for Developing Areas (Puerto Rico Environmental Quality Board [PREQB] and USDA National Resources Conservation Service [NRCS] 2005) would minimize the potential for disturbed soil within the construction footprint to be delivered to the RGL via erosion and runoff. Therefore, construction activities would have a negligible, short-term, indirect adverse impact on the RGL and the species therein. The Proposed Action would include the construction of an outfall structure on the eastern side of the detention pond that, when in operation, would discharge stormwater runoff impounded in the detention pond. However, post-construction operation of the detention pond and outfall would not appreciably change the quality or quantity of stormwater that is delivered to the RGL. Therefore, post-construction operation of the facility would have a negligible, long-term, indirect adverse impact on aquatic wildlife inhabiting the RGL.

Vegetation removal associated with construction activities could impact migratory birds if work is performed during the nesting season of species that may occur in the vicinity (i.e., March through June). Vegetation clearing and grubbing could result in inadvertent nest destruction, nest abandonment, and the displacement of birds from preferred foraging areas. If the nesting season cannot be avoided, the subrecipient would be responsible for (1) determining whether active nests are present prior to removing vegetation and (2) obtaining and complying with any necessary permits from USFWS. However, the construction footprint is currently subject to human activity levels that likely discourage some species from nesting, and the vegetation to be removed largely consists of invasive species that provide marginal nesting and foraging habitat for migratory birds (Castro-Prieto et al. 2021). Therefore, vegetation removal resulting from construction activities would have a minor, short-term, direct adverse impact on migratory birds. As mentioned above, the Proposed Action would not eliminate any unique or high-quality habitat; therefore, the loss of vegetation would have a negligible, long-term, direct adverse impact on migratory birds.

5.9 Threatened and Endangered Species

The ESA of 1973 provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies responsible for implementing the ESA are the USFWS and the U.S. National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS). The law requires federal

agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife.

Critical habitat, as defined in the ESA, is a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may also include areas that are unoccupied by the species but are necessary for its recovery.

The ESA defines the action area as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR Section 402.02). Therefore, the action area where effects on listed species must be evaluated may be larger than the project area where project activities would occur. For the purposes of this EA, the action area is defined as the project footprint in addition to a 200-foot buffer surrounding the project footprint to account for potential noise, vibration, dust, and human disturbance associated with the construction activities included under the Proposed Action.

5.9.1 Existing Conditions

According to the USFWS Information for Planning and Consultation (IPaC) online tool (USFWS 2022b) and the list of species under NMFS jurisdiction for Puerto Rico (NMFS 2021), there is one federally listed species with the potential to occur in the action area, the Puerto Rican boa (*Chilabothrus inornatus*, but listed as *Epicrates inornatus*). USFWS issued a proposed rulemaking in July 2022 to remove the Puerto Rican boa from federal listing; this rulemaking is not yet final (USFWS 2022c). According to the USFWS and NMFS critical habitat mappers (USFWS 2022d, NMFS 2022), no critical habitat occurs within or near the action area. The Puerto Rican boa is widely distributed across the island of Puerto Rico and occurs in a variety of habitat types ranging from mature forest to disturbed areas (USFWS 2020). However, the species generally prefers forested areas near water where it may be found on the ground or in trees (Gould et al. 2008). The Puerto Rican boa is primarily nocturnal and remains concealed or basks in the sun during the day (USFWS 2020). Although the Puerto Rican boa was not encountered during the biological survey of the eastern portion of the project area, the species is generally difficult to detect because of its high degree of inactivity and cryptic coloration. Therefore, given the presence of suitable habitat in the eastern portion of the action area, some potential for the Puerto Rican boa to occur in the action area may be reasonably assumed.

5.9.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, the condition of existing Puerto Rican boa habitat within the action area would remain unchanged. Therefore, the No Action Alternative would have no impact on the Puerto Rican boa. There would be no impact on any other federally listed species since none are anticipated to occur in the project area.

Alternative 2: Proposed Action

Construction activities under the Proposed Action would have the potential to affect Puerto Rican boas through interactions with construction equipment and habitat loss. Construction equipment could injure or crush Puerto Rican boas if individuals do not move away from active work areas. Noise and general human activity associated with construction work could also cause Puerto Rican boas to move away from sources of disturbance into nearby human-inhabited areas where they could be killed or injured by vehicles or illegally captured. However, Puerto Rican boas are generally expected to avoid injury or mortality by avoiding or leaving construction areas and moving to similarly suitable forested habitat located immediately outside the action area. Informal consultation with USFWS was initiated on November 23, 2022 to request concurrence with FEMA's determination that the Proposed Action "may effect but is not likely to adversely affect" the *Chilabothrus inornatus* (Puerto Rican boa), by applying conservation measures in the consultation letter (USFWS 2020). USFWS concurred with these findings on January 12, 2023 (Appendix C, Correspondence 1).

The subrecipient would be responsible for complying with these measures and any additional conditions issued by USFWS. Therefore, with the implementation of these conservation measures, construction activities under the Proposed Action would have a minor, short-term, direct adverse impact on the Puerto Rican boa.

The Proposed Action would result in the permanent conversion of approximately 0.74 ha (1.85 acre) of suitable Puerto Rican boa habitat to human uses within the footprint of the detention pond and pumping station. Puerto Rican boas that are permanently displaced from this approximately 0.74-ha (1.85-acre) area may be forced to overlap their home ranges with other Puerto Rican boas, resulting in increased competition for resources, which could ultimately increase their mortality rate and reduce their fitness. However, as described in Section 5.8, this approximately 0.74 ha (1.85-acre) area provides marginal habitat for terrestrial wildlife, including the Puerto Rican boa. Further, the biological survey did not detect this species within the project area despite conducting nighttime surveys that focused on areas where the species would be most likely to occur (Coll Rivera Environmental 2021b). This suggests that the Puerto Rican boa is not abundant in the area. Therefore, the permanent loss of approximately 0.74 ha (1.85 acres) of habitat under the Proposed Action is not expected to substantially increase intraspecific competition for

resources in the vicinity. As such, permanent habitat loss resulting from the Proposed Action would have a minor, long-term, direct adverse impact on the Puerto Rican boa. There would be no impact on any other federally listed species since none are anticipated to occur in the project area.

5.10 Cultural Resources

FEMA must consider the potential effects of its funded actions upon cultural resources prior to engaging in any undertaking in accordance with Section 106 of the National Historic Preservation Act (NHPA), as amended and implemented by 36 CFR Part 800. The NHPA of 1966 defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register." Eligibility criteria for listing a property on the National Register of Historic Places (NRHP) is detailed in 36 CFR Part 60.

Pursuant to 36 CFR Section 800.4(a)(1), the Area of Potential Effects (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. FEMA evaluates impacts to cultural resources prior to the undertaking (Proposed Action) for both historic (standing) structures (above ground historic architectural resources) and archaeological (below ground) resources within the APE. FEMA determined that the APE for the undertaking is limited to the proposed footprint of the construction activities, including the areas of the proposed detention pond, pumping station, dike, and the stormwater and infrastructure improvements.

5.10.1 Existing Conditions

Background research was completed using online databases that include NRHP-listed properties, cultural resources surveys completed for federal undertakings dating from 2012 to 2016, and an inventory of cultural resources per municipality. The information is based on available online information at the Puerto Rico State Historic Preservation Office (PRSHPO) and the Institute of Puerto Rican Culture (ICP) geographic information system (GIS) database.

In accordance with Section 106 of the NHPA, FEMA initiated consultation with the PRSHPO on December 6, 2022. FEMA determined that there are no historic architectural resources eligible for, or listed in, the NRHP within or adjacent to the APE. In addition, a Phase IA and Phase IB cultural resources survey, including archaeological testing, conducted in advance of the proposed undertaking did not locate any intact archaeological sites (conducted by Gonzalez Colon in 2021). Based on identification and evaluation steps, on December 6, 2022, FEMA submitted a consultation to PRSHPO with a determination that the proposed project would result in No Historic Properties Affected.

On December 9, 2022, PRSHPO responded that, based on their review of the submitted archaeological survey and because the project's APE is in a flood prone area, they recommend additional mechanical subsurface archaeological testing in the area of the proposed detention pond

and that the depth of testing should not be less than 2 m (6.51 ft) deep. On December 12, 2022, FEMA submitted a continuing consultation to PRSHPO concurring with the archaeological testing requirements. As a result, FEMA revised its finding of effect to No Adverse Effect to Historic Properties with Conditions. SHPO acknowledged receipt of the revised FEMA finding on December 20, 2022. Once the additional testing is completed, FEMA will submit the results to PRSHPO as a continuing consultation. The FEMA Section 106 consultation package is provided in Appendix C, Correspondence 2.

5.10.1.1 Historic (Standing) Structures

A review of the PRSHPO online information, the ICP GIS database, and the NRHP database indicated that the APE is not located within a listed or previously identified NRHP eligible historic property or district. Historic aerials and maps, including ones from 1937, 1950, 1962, 1981 (Gonzalez Colon 2021), and 1967, reveal the APE was undeveloped from 1937 through 1967. Between 1967 and 1981, the APE transformed to its present-day conditions. The APE consists of a variation of one- and two-story vernacular buildings constructed after 1967. Based on review of architectural styles in the area, combined with the aerials, most of the APE was developed in the late 1970s and early 1980s, to the present. Construction activities within the downtown area are proposed within roadways, parking lots, curbs, and ROW, which would not result in direct or indirect effects to buildings or structures within the APE.

Project activities within the proposed detention pond and pump station area include the demolition of two buildings and one structure. The buildings include two vacant dwellings, identified as Buildings #1 and #2. The structure is a shed that formerly housed a horse (known as the horse shed). A third building, identified as Building #3, is located in close proximity to the proposed detention pond. All the buildings and the horse shed are located within a densely vegetated area, making aerial research limited. The buildings consist of unpermitted dwellings constructed of readily available materials likely built beginning in the 1980s. Buildings #1, #2, and #3 are constructed of local material of metal slats, wood, and cement block. The Municipality of Carolina has noted that Buildings #1 and #2 are now vacant. The horse shed consists of a metal slat roof supported by wood timbers and pilings. The frame is enclosed with a combination of wood slats and metal fencing. Building #3 is a one-story raised building or one and one-half story dwelling, with a low-pitched metal slat roof. The building is constructed of cement block and clad in metal and wood planks. None of the buildings or structures identified in the proposed detention pond area possess integrity of location, design, setting, materials, workmanship, feeling, and association to convey historic significance. They are not associated with a particular historical event or person; period of construction, architecture type, or designer; or part of a historic district. Therefore, none of the buildings/structures possess historic significance and/or integrity to meet the criteria for listing in the NRHP.

5.10.1.2 Archaeological Resources

In 2021, Gonzalez Colon conducted Phase IA and Phase IB cultural resources surveys in advance of the proposed undertaking. The cultural resources surveys were designed to determine the presence or absence of cultural resources in the project's potential impact area. The Phase IA documentary research revealed no recorded archaeological sites were located on and/or within the immediate vicinity the project's APE. Documentary research revealed a low potential to encounter undocumented archaeological sites within the streetscape and noted extensive ground disturbances associated with the development of the downtown Carolina area. The survey noted the proposed location of the detention pond has become an inundated garbage dump (Gonzalez Colon 2021).

The Phase IB cultural resources survey conducted by Gonzalez Colon (2021) within the locations of the detention pond and stormwater pipe included excavation of eight shovel test pits up to 90 cm (35.43 in) in depth. The soil profiles recorded from the shovel test pits consisted of fill layers underlain by truncated subsoils and the results confirmed the significant level of disturbance and sterile soils. No archaeological resources or archaeological sites were identified.

In consultation with PRSHPO, it was determined that additional deep archaeological testing would be required in the area of the proposed detention pond. The RGL watershed is known to be one of the most archaeologically sensitive regions in Puerto Rico and since the archaeological survey (Phase IA-IB) conducted did not rule out the possibility of the presence of archaeological resources at greater depths, additional mechanical deep testing will be conducted. As a result, FEMA determined that project would result in No Adverse Effect to Historic Properties with Conditions. The conditions include additional mechanical subsurface testing to depths greater than 2 m (6.56 ft) and appropriate archaeological reporting (Appendix C, Correspondence C2).

Once the results contained in the archaeological survey report(s) are evaluated and determined to have sufficient and adequate information to identify and evaluate potential archaeological resources existing in the APE, FEMA will continue consultation with PRSHPO and will revise the findings of effect if necessary.

5.10.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no impact on historic standing structures or potential archaeological sites, as there would be no construction activity nor would continued flooding events impact any cultural resources.

Alternative 2: Proposed Action

The Proposed Action would have no impact to historic structures and archaeological resources within the proposed streetscape areas in downtown Carolina and Villa Caridad.

Under the Proposed Action, with implementation of the above-mentioned SHPO conditions, no impact to historic structures would occur within the detention pond location. With respect to archaeological resources, additional Phase IB mechanical archaeological testing is required in the proposed detention pond area prior to construction. If archaeological sites are discovered, a Phase II Archaeological Survey would be conducted to determine if they are eligible for listing in the NRHP. Should the identified archaeological resource(s) be determined NRHP-eligible, the Municipality of Carolina and FEMA, in consultation with PRSHPO, would evaluate the proposed design to determine if such sites can be avoided. If such resources cannot be avoided, FEMA, in consultation with PRSHPO, would mitigate the impacts via Phase III archaeological data recovery in compliance with the Stipulation II.C.6 Resolution of Adverse Effects in the "Programmatic Agreement Among the Federal Emergency Management Agency, the Puerto Rico State Historic Preservation Officer, and the Puerto Rico Central Office of Recovery, Reconstruction and Resiliency," as amended on November 13, 2019.

Following completion of the archaeological survey(s), if an inadvertent discovery is made during construction, the subrecipient would cease all construction activities near the discovery and notify FEMA according to the Programmatic Agreement Stipulation III.B.I. Unanticipated Discoveries, Previously Unidentified Properties, or Unexpected Effects in the "Programmatic Agreement Among the Federal Emergency Management Agency, the Puerto Rico State Historic Preservation Officer, and the Puerto Rico Central Office of Recovery, Reconstruction and Resiliency," as amended on November 13, 2019, and follow the unexpected discoveries protocol outlined therein. With implementation of these measures, the Proposed Action would have minor short- and long-term, direct adverse impacts on archaeological resources.

5.11 Aesthetic Resources

5.11.1 Existing Conditions

The general setting of the project area is characterized mostly by urban development, with residential development being the primary use. East of the Villa Caridad Community are forested areas that run along the RGL and extend approximately between 121 m (400 ft) and 213 m (700 ft) to the west bank. Trees and vegetation shield the view of the river from nearby residential properties. The project area is not within an area of particular scenic value.

5.11.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no changes to the visual resources in the project area. Therefore, aesthetic resources and viewsheds would not be impacted from new construction. However, future flood events could damage the local infrastructure, reducing the visual quality of the area until repairs occur and debris is removed. Therefore, the No Action Alternative would

have negligible, short-term, direct adverse impacts on aesthetic resources and viewsheds during and after a flood event.

Alternative 2: Proposed Action

The Proposed Action would cause minor, short-term, direct adverse visual impacts from construction activity within the project area as equipment would temporarily block views.

Following the completion of construction, the reconstructed stormwater system west of the Monserrate Dike would be located underground; as such, it would not be visible above grade and would not have any long-term impacts on visual quality of the area. The new detention pond and pump station would be visible from downtown Carolina and would be designed according to current codes and design standards for stormwater sewer systems, as recommended by the Puerto Rico Water Resources and Environmental Research Institute, which would mitigate excessive visual incompatibility and obstructions. Moreover, these facilities would be protected by a new dike, which would largely shield the detention pond and pump station from public view. Although the proposed project would require the removal of some trees east of the Monserrate Dike, the remaining vegetation would continue to block views of the river and of the new detention pond and pump station from the Villa Caridad Community. For these reasons, the new facilities would not be readily visible from the residences and would not negatively alter the physical appearance of the area from any important viewpoints or adversely affect visual resources in the long term. Therefore, the Proposed Action would have a negligible, long-term direct adverse impact on aesthetic resources and viewsheds.

5.12 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to identify and address "…disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…" The first step is to define the affected area. The affected area used was the H&H study area, which includes the area directly adjacent to the project (potential construction impacts) as well as the larger geography that would benefit from flood risk reduction.

The EPA's Environmental Justice Screening and Mapping Tool (EJ Screen) was used to evaluate the demographic characteristics of the affected area. The EJ Screen analysis is based on the U.S. Census Bureau 2016 to 2020 American Community Survey (ACS) 5-year summary data at the census block group level (EPA 2022c).

Environmental justice populations include minority and low-income populations and are defined as those that meet either of the following criteria:

- Populations within the affected area contain a minority or low-income population that equals or exceeds the 50th percentile compared to the average of the territory (Appendix A, Figures 13 and 14).
- One or more environmental justice index (e.g., air quality pollutants, traffic proximity and volume, proximity to hazardous waste sites) equals or exceeds the 80th percentile compared to the average of the territory (Appendix A, Figures 15 and 16).

5.12.1 Existing Conditions

According to the 2016 to 2020 ACS, approximately 76% of the population within the affected area is considered low income (50th percentile as compared to Puerto Rico) and 23% is unemployed. The entire population is considered minority (99th percentile as compared to Puerto Rico) and 72% of the population identified as speaking English "less than well" (EPA 2022c).

In addition, the population within the affected area is in or exceeds the 80th percentile for two environmental justice indices: Proximity to Risk Management Plan (RMP) Sites and Proximity to Treatment Storage and Disposal Facilities (Appendix A, Figure 15, and Figure 16). RMP sites are sites that use extremely hazardous substances and require management plans in accordance with federal regulations. Treatment storage and disposal facilities are facilities that either treat or dispose of hazardous materials. Therefore, the affected area is considered to have low-income and minority environmental justice populations that are in close proximity to hazardous materials sites. Table 5.6 depicts the environmental justice data as calculated within the affected area.

Table 5.6. Environmental Justice Indicators

Environmental Justice Indicator/Index	Affected Area	Puerto Rico Average	Percentile
Percent Minority Population	100%	99%	99
Percent Low-Income Population	77%	72%	50
Unemployment Rate	23%	15%	76
Limited English Proficiency Households	72%	68%	56
National Scale Air Toxics Assessment (NATA) Air Toxics Cancer Risk (people at risk of cancer per million people)	20 people per million	23 people per million	0
NATA Respiratory Hazard Index	0.2	0.21	0
NATA Diesel Particulate Matter Level in Air (micrograms per cubic meter [µg/m^3])	0.0823 µg/m^3	0.108 µg/m^3	64
Particulate Matter 2.5 Level in Air	N/A	N/A	N/A
Ozone Level in Air	N/A	N/A	N/A
Lead Paint Indicator (% pre-1960 housing)	0.17 % of housing	0.14 % of housing	69
Traffic Proximity (within 500 meters) and Volume (count of vehicles per day)	900 vehicles per day	610 vehicles per day	79
Proximity to RMP Sites (facility count within 5 km/distance)	1.6	0.97	83

Environmental Justice Indicator/Index	Affected Area	Puerto Rico Average	Percentile
Proximity to Treatment Storage and Disposal Facilities (facility count within 5 km/distance)	1.6	0.9	80
Proximity to National Priorities List Sites (site count within 5km/distance)	0.054	0.15	30
Underground Storage Tanks (count/km^2)	0.11	1.7	0
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.003	5	52

Source: EPA 2022c

Notes:

km = kilometer

km^2 = square kilometers

5.12.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, environmental justice populations would continue to be at risk from flooding and, during floods, may experience safety risks and damage to or loss of property. Floodwaters could result in damage to RMP facilities or nearby treatment storage and disposal facilities, which could increase the risk and exposure of people to environmental justice indices. In addition, environmental justice populations could be disproportionately and adversely affected by a flood event because of their limited resources to recover from losses. Therefore, under the No Action Alternative, moderate long-term indirect adverse impacts may occur to environmental justice populations in the project vicinity, depending on the scale, intensity, and location of flooding.

Alternative 2: Proposed Action

Construction impacts under the Proposed Action that could affect environmental justice populations include increased noise, vibration, and ground-borne noise from the use of construction equipment (see Section 5.14); air pollutants from the use of gasoline and diesel vehicles and potential for fugitive dust (see Section 5.2); increased traffic from the transport of equipment and personnel and reduced access to adjacent residences (see Section 5.15); and the demolition of two buildings and a structure (Buildings #1, #2, and the horse shed). Construction of the Proposed Action would not impact RMP sites or nearby treatment storage and disposal facilities, and therefore would not be expected to increase the risk or exposure of people to environmental justice indices (e.g., proximity to hazardous waste sites).

Construction-related noise, vibration, air pollution, traffic, and reduced access impacts would be temporary, similar to other comparable flood risk reduction projects in the region, and result in localized impacts (occurring close to the work). Construction vibration could result in damage to nearby structures; however, vibration would be infrequent, with the greatest vibration occurring during the use of a vibratory roller, and short-term at any one location. Demolition of the two

buildings and structure would be a permanent change; however, the buildings proposed to be demolished are unoccupied. The third building in proximity to the project (see Section 4.2) could be impacted during construction activities; however, the building is unpermitted and, while it is occupied, the residents stated they are relocating. Therefore, the Proposed Action would have moderate, short-term, direct and indirect impacts to environmental justice populations during construction activities.

Construction impacts would be mitigated through the implementation of the *Management Plan to Minimize Impact to Inhabitants and Structures During Construction* (management plan), see Appendix B, Document B1. Those living or with property close to the project area have been contacted by the Department of Citizen Services to discuss and address any potential needs that could arise as a result of the project (Commonwealth of Puerto Rico, Autonomous Municipal Government of Carolina 2022) (Appendix B, Document B1). The management plan limits construction activity to daytime hours; includes measures to avoid air pollution from fugitive dust; maintains public utilities and services using temporary infrastructure for wastewater, drinking water, electricity, and telecommunications; and maintains transportation access through a Maintenance of Traffic Plan (Commonwealth of Puerto Rico, Autonomous Municipal Government of Carolina 2022). In addition to these measures, BMPs would be implemented to reduce noise, vibration, and ground-borne noise (see Section 5.14). With implementation of the management plan and the noise- and vibration-related BMPs, the Proposed Action would have minor, short-term, direct and indirect impacts to environmental justice populations during construction activities.

Construction activities would impact all populations in proximity to the work, which are predominantly environmental justice populations. Under the definition of impacts in EO 12898, the Proposed Action would have disproportionately high and adverse impacts to environmental justice populations during constructions activities.

In the long term, the pump station would result in a permanent new source of noise and vibration. However, adjacent residences and structures would be buffered from noise and vibration by natural and artificial features (Section 5.14) and noise would only occur while the pump station is in use during storm and heavy rain events when ambient noise levels would be higher. In the long term, the risk of flooding and associated damage to/loss or property would be reduced with project implementation. The reduced risk of flooding would reduce the potential for floodwaters to damage nearby RMP sites or treatment storage and disposal facilities. Risk reduction would be applicable to all populations in proximity to the project, which are predominantly environmental justice populations. Therefore, the Proposed Action would have a moderate, long-term, beneficial, direct impact to environmental justice populations from the reduced risk of flooding.

5.13 Land Use and Planning

5.13.1 Existing Conditions

Zoning within the project area is predominantly "urban ground" with the exception of land directly adjacent to the RGL, designated as "rustic land with special protection" (Para La Naturaleza 2022). Primary existing land uses within the project area include residential properties of the Villa Caridad Community, hospital services associated with the DCHSFC, other municipal functions, rustic open space on both sides of RGL, and transportation uses associated with Parque and Quebrada Streets. The closest quiet area to the project is the DCHSFC, 8 m (26 ft) to the north. Adjacent land uses that have been impacted by past flooding include residential, community-serving uses such as the DCHSCF, ISSVTD, and the U.S. post office; religious institutions (e.g., church); open space owned by PRDNER; stream banks associated with the RGL; and transportation uses associated with Manuel Fernandez Juncos Avenue/Muñoz Rivera Street (State Road PR-874) and neighborhood roads, including Molinillo, Parque, Principal, Quebrada, Flamboyan, and Colón Streets (Appendix A, Figure 17).

5.13.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, no short-term adverse or beneficial impacts on land use and planning would occur. The No Action Alternative would not impact existing zoning for properties in the project area nor would there be any short-term changes to existing land uses. The No Action Alternative would not facilitate, advance, or support improvements related to flood protection and the resilience of Carolina's downtown. In the long-term, continued flooding could reduce access to roadways and existing land uses and could result in the temporary or permanent loss of function from these damaged facilities due to shutdowns for repairs or abandonment. The loss of these facilities would not likely align with Puerto Rico Planning Board (PRPB) and Municipality of Carolina's land use and planning zones. This could also limit the development potential of the downtown Carolina area. Therefore, the No Action Alternative would result in moderate, long-term, indirect adverse impacts on land use and planning.

Alternative 2: Proposed Action

Under the Proposed Action, land uses would be temporarily impacted during construction through the establishment of construction work zones, staging areas, and access roads. Street and sidewalk closures during construction would result in temporary limitation on movement for pedestrians, cyclists, and vehicles within the community. However, closures would be temporary, periodic, and would not restrict access to or from the community. Standard construction practices may include scheduling lane and/or road closures to minimize disruptions and using wayfinding signage to inform the public of reroutes due to closed pedestrian areas and roadways. Therefore, minor,

short-term, direct adverse impacts related to land use and planning would occur during construction within the project area.

The Proposed Action would not affect the current zoning or land uses within or adjacent to the project area, with the exception of the new detention pond and stormwater pump station between the Monserrate Dike and the west bank of the RGL. The installation of the new detention pond and dike would occur on a small strip of land, zoned as "rustic land with special protection," that consists of forest trees and herbaceous vegetation. The land proposed for the detention pond and stormwater pump station is owned by the PRDNER, would require a permanent easement, and may require a change in zoning.

The reconstructed aqueduct and sanitary sewer systems would remain largely within the same existing public ROW; therefore, no substantial changes in land use would occur in the Villa Caridad Community or within the main channel of the RGL. Implementation of the proposed project would require the demolition of two unoccupied buildings and one structure in the detention pond area however, as these buildings are not permitted residential uses, this would not result in a change in land use.

The proposed project would reduce flood hazards throughout downtown Carolina and there would be a reduced risk of altering land use because of inaccessibility or permanent abandonment of existing infrastructure and facilities. Therefore, the Proposed Action would result in a minor, long-term, indirect beneficial impact on land use and planning.

5.14 Noise

Noise is defined by EPA as unwanted or unwelcome sound, measured in units of decibels (dB) or decibels weighted by human perceptibility (A-weighted dB or dBA). The Noise Control Act of 1972 required EPA to establish criteria to promote an environment protective of noise effects on public health and welfare. In response, 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 (EPA 1974). The EPA report stated that keeping the maximum 24-hour day-night average sound level (DNL or Ldn) value below 70 dB would protect most people from hearing loss. 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 and can cause immediate irreparable damage at 140 dB. The Occupational Safety and Health Administration (OSHA) has adopted a standard of 140 dBA for maximum impulse noise exposure.

Sound pressure level (SPL) is used to measure the magnitude of sound and is expressed in dB, 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 Ldn is based on the 24-hour Leq and is used to measure the average sound impacts for guiding 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 by adding 10 dBA to all noise levels measured between 10:00 p.m. and 7:00 a.m. 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 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, short-term or instantaneous events, such as fire sirens and other impulse noises. Leq and Ldn represent average measurements of acoustic energy over a given period of time. Because the decibel scale is logarithmic, louder sounds (higher SPL) are weighted more heavily, while loud, infrequent noises with short durations, such as fire sirens, would not significantly increase Leq or Ldn.

In 1982, federal noise control policy shifted the primary responsibility of regulating noise to state and local governments. The PREQB, under the PRDNER, regulates noise within Puerto Rico in accordance with the Noise Pollution Control Regulation (PREQB 2011). This regulation establishes noise thresholds for commercial, industrial, residential, and quiet zones. Quiet zones include hospitals, clinics, mental health facilities, court houses, care centers for the elderly and children, schools, or other areas previously designated by the department. Table 5.7 presents the applicable Noise Pollution Control Regulation noise thresholds for Puerto Rico.

Table 5.7 Puerto Rico Noise Limits by Source and Receptor Zones

Emitting Source Zone	Receptor Zones [a]							
	Zone I Residential		Zone II Commercial		Zone III Industrial		Zone IV Quiet	
	Day [b]	Night	Day [b]	Night	Day [b]	Night	Day [b]	Night
Zone I Residential	60	50	65	55	70	60	55	50
Zone II Commercial	65	50	70	60	75	65	55	50
Zone III Industrial	65	50	70	65	75	75	55	50
Zone IV Quiet	65	50	70	65	75	75	55	50

Note:

a. Noise limits represent sound levels (dBA) exceeded 10% of the time during the monitoring period (L10).
b. Daytime is defined as the period from 7:00 a.m. to 10:00 p.m. of any given day.
c. Nighttime is defined as the period from 10:01 p.m. to 6:59 a.m. of the next day.

Rule 21.A.4 of the Noise Pollution Control Regulation prohibits the nonemergency operation of construction or demolition equipment during nighttime hours. Noise Pollution Control Regulations also provide exceptions for noise limits for certain activities. Rule 29.A provides exceptions for sounds emitted during the installation and repair of essential public services during daytime hours, while Rule 29.D emphasizes that the application of best available control technology for noise control may still be required for noise sources with exceptions. Rule 29.A also provides exceptions for sounds emitted by temporary projects for the repair and maintenance of homes and their dependencies during daytime hours. Rule 29.B provides exceptions from the Puerto Rico noise limits for sounds emitted for emergency work performed at any hour to protect the welfare of communities and individuals.

5.14.1 Existing Conditions

The ambient noise level near the project site is typical for an urban area. Most of the land near the project area consists of residential uses, medical uses, or natural habitat associated with the west bank of the RGL. Sensitive receptors include residences in the Villa Caridad area along Quebrada Street and Parque Street and the quiet zone receptor, the DCHSFC on Manuel Fernandez Juncos Avenue. The dominant source of existing ambient noise levels in the area of the project site is vehicular traffic on the nearby Puerto Rico Highway 3 (PR-3, also known as 65th Infantry Regiment Avenue in the project area) and on local roadways. Average ambient noise levels for normal suburban residential areas and urban residential areas, which could be considered representative of the land use types in the project area, range from 55 dBA to 60 dBA daytime Leq (EPA 1974). Background noise levels for the hospital and residences near to major roadways are assumed to be comparable to those typical of urban residential areas (60 dBA). Background noise levels at the residences further from major roadways and adjoining the detention pond construction site are assumed to be comparable to those typical of suburban residential areas (55 dBA).

5.14.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

No pipe laying, roadway, sidewalk, or curb reconstruction, site preparation, detention pond excavation, or other construction activities would occur under the No Action Alternative; therefore, no changes to existing ambient noise levels from these activities would be expected. The No Action Alternative would have no short-term construction-related impacts to noise.

The No Action Alternative would not reduce the risk of flooding. Future flooding in the project area would be expected to result in noise-generating repair and maintenance activities and/or the rerouting of local vehicle traffic. These noise sources have occurred historically in the area and are consistent with flood-related noise impacts under existing conditions. Moreover, as discussed previously, noise related to the repair of structures and of essential public utilities are provided exceptions from the Puerto Rico noise limits and would thus not be considered disturbing or

undesirable sound as defined by the Noise Pollution Control Regulation. Therefore, the No Action Alternative would have negligible, long-term, indirect adverse impacts to noise in the project area.

Alternative 2: Proposed Action

Under the Proposed Action, noise would be emitted by the operation of the construction equipment necessary to implement the action, resulting in short-term temporary increases to ambient noise levels close to the project site. Nonemergency construction activities associated with the project are expected to occur during daytime hours (defined as the period from 7:00 a.m. and 10:00 p.m. of any given day).

Table 5.8 identifies the primary noise-generating construction areas of the Proposed Action and presents the distances to nearby receptors.

Table 5.8 Construction Activities in Proximity to Noise Receptors

Construction Areas	Adjacent Receptor Zones	Approximate Distance to Nearest Receptor (m [ft])
Manuel Fernandez Juncos Avenue	Residential Quiet (hospital)	36 (118) 12 (39)
Hospital parking area, Parque Street, and Quebrada Street	Residential Quiet (hospital)	3 (10) 40 (132)
Detention pond area	Residential Quiet (hospital)	15 (49)) 184 (603)

As shown in the table, construction would occur close to noise-sensitive receptors during all components of project construction. Residences throughout Villa Caridad would experience construction-related noise, with the residences immediately adjacent to construction activities on Parque Street and Quebrada Street experiencing the maximum noise impacts. Earth-moving and construction activities along the RGL western bank in the detention pond area would also expose residences in Villa Caridad to construction-related noise, with those residences on Colón Street, which are nearest to the site, experiencing the greatest noise from these activities. Construction activities on Manual Fernandez Juncos Avenue would expose residences in Villa Caridad, particularly those on Parque Street, to construction noise, however noise from this construction area would be lower at these noise-sensitive receptors than during construction in other areas due to the greater distance between the receptors and the construction area (Appendix A, Figure 1).

Noise levels would vary depending on the construction activity being implemented, the types and counts of construction equipment necessary for that construction activity, and the distance from the construction site to the nearest receptor. Table 5.9 presents expected noise levels associated with the operation of typical construction equipment.

Table 5.9 Noise Levels Associated with Typical Construction Equipment

Equipment Description	Noise Level at a Distance of 15.2 m (50 ft) [a]
Air compressor	23.8 m (78 ft)
Asphalt compactors	24.4 m (80 ft)
Asphalt paver	23.5 m (77 ft)
Asphalt trucks	23.2 m (76 ft)
Backhoe loader	23.8 m (78 ft)
Basket trucks	22.9 m (75 ft)
Bobcat	24.1 m (79 ft)
Brooms	n/a
Concrete pumps	24.7 m (81 ft)
Concrete trucks	24.1 m (79 ft)
Cranes	24.7 m (81 ft)
Digger	23.8 m (78 ft)
Digger (attached hammer)	27.4 m (90 ft)
Drilling truck	24.1 m (79 ft)
Excavator with drilling attachment (auger drill)	25.6 m (84 ft)
Excavators	24.7 m (81 ft)
Hauling trucks	23.2 m (76 ft)
Horizontal directional drilling equipment (hammer, bits and accessories)	25.0 m (82 ft)
Hydraulic shoring	n/a
Mini excavators	24.7 m (81 ft)
Pickup trucks	22.9 m (75 ft)
Shoring	n/a
Survey equipment	n/a
Tamper	25.9 m (85 ft)
Telescopic forklift	25.9 m (85 ft)
Walk-behind saw	27.4 m (90 ft)
Water trucks	22.6 m (74 ft)
Wheel loaders	24.1 m (79 ft)

Note:

a. Noise levels are actual measured maximum noise level (Lmax) of equipment or Construction Noise Control Specification 721.560 Lmax where actual measured data is unavailable, from Table 1 of the Federal Highway Administration (FHWA) Roadway Construction Noise Manual (RCNM) User's Guide (2006).

The Proposed Action would require the use of construction equipment on and along local public roadways to install stormwater pipelines and reconstruct roadways, curbs, and sidewalks disturbed by pipeline installation. These types of construction activities would occur on Manuel Fernandez Juncos Avenue, in the hospital parking area, and on Parque Street and Quebrada Street. Construction activities in the hospital parking area, Manuel Fernandez Juncos Avenue, Parque Street, and Quebrada Street would be highly mobile and short-term in nature, exposing nearby receptors to peak construction-related noise levels for a small portion of the overall project construction period. These construction activities would be perceived as loudest by affected receptors because of their close proximity to residences, in combination with the need for high

noise equipment–such as walk-behind saws, excavators, telescopic forklifts, and concrete trucks–and the lower background noise levels of the Villa Caridad area. Construction along the western bank of the RGL would occur at and around the site of the stormwater detention pond and would affect receptors near the site for the duration of construction. Receptors would be further from project construction in general during this construction activity than during construction on roadways. Equipment such as horizontal directional drilling equipment, auger drills, excavators, and asphalt compactors would be the loudest anticipated sources of noise in this area. Table 5.10 shows the estimated noise levels that could be expected at the nearest receptor to various construction areas.

Table 5.10 Estimated Noise Levels at the Closest Receptors to Construction Activities

Construction Activities	Construction Equipment Noise (dBA at 15.2 m [50 ft]) a	Distance to Nearest Receptor (ft) and Receptor Type	Construction Equipment Leq at Receptor (dBA)	Estimated Background Leq (dBA)	Leq Total (dBA)	L10 Diurnal/ Nocturnal Noise Limit (dBA)
Manuel Fernandez Juncos Avenue	89 89	118 (residential) 39 (quiet)	81 91	60 60	81 91	60/50 55/50
Hospital Parking, Parque Road, and Quebrada Road	90 90	10 (residential) 132 (quiet)	104 81	55 60	104 81	60/50 55/50
Detention Pond Area	87 87	49 (residential) 603 (quiet)	87 65	55 60	87 66	60/50 55/50

Note:

a. Noise levels are based on estimated overlapping equipment use and account for acoustical use factors. Noise levels are estimated for each construction area using actual measured Lmax or Construction Noise Control Specification 721.560 Lmax where actual measured data is unavailable, from Table 1 of the FHWA RCNM User's Guide (2006).

Noise levels presented in Table 5.10 represent the maximum localized noise exposure and include the combined noise effects of all equipment operating simultaneously at the shortest estimated distance to the nearest receptor for each construction area. However, it is not expected that all construction equipment would be in operation at the same time; therefore, the noise levels in Table 5.10 are very conservative and likely overstate actual noise impacts. Moreover, due to the highly mobile and temporary nature of project construction, particularly in the roadway areas, noise events approaching these maximum noise levels would be highly localized and experienced only

on a short-term basis at those noise-sensitive receptors nearest to construction activities. The estimated peak noise levels generated by construction activities at the nearest receptors would range from 11 dBA to 44 dBA over the corresponding diurnal noise limits. However, the Noise Pollution Control Regulation maximum permissible noise limits are levels which may not be exceeded more than 10% of the time during a given exposure period. It is not possible to determine variations in noise levels throughout a given construction day due uncertainty relating use of construction equipment, therefore only maximum noise levels are presented. Noise intensity decreases exponentially with increased distance from the source; therefore, receptors not located immediately adjacent to the project site would experience substantially reduced noise effects.

As discussed previously, the Puerto Rico Noise Pollution Control Regulation states that construction of an essential public utility–such as stormwater conveyance, collection, and management structures and components, which together compose the Proposed Action–are provided exceptions from the Puerto Rico noise limits during daytime hours. Additionally, all emergency work performed to protect the welfare of communities and individuals is also provided exceptions from the noise limits at any hour. Therefore, although noise exceeding the permissible noise levels would be experienced by nearby receptors, noise levels would be consistent with regulatory requirements. The Proposed Action would have moderate, short-term, direct adverse impacts to noise in the project area.

The construction contractor(s) would be required to implement BMPs to reduce construction-related noise levels to within the permissible noise limits, consistent with Rule 29.D of the Puerto Rico Noise Pollution Control Regulation. Due to the dynamic nature of construction activities, it is not feasible to specify in the planning stage exactly which noise attenuation measures would be feasible and applied through project implementation. BMPs may include but are not limited to:

- Controlling working hours to daytime hours
- Using noise attenuating equipment, such as sound dampers and sound suppressors, while operating close to residences and quiet zones areas
- Staggering construction equipment operation as practicable to reduce the overall off-site noise levels from combined operation of construction equipment
- Locating stationary equipment, such as generators, compressors, or pumps, at the greatest practical distance from noise-sensitive uses during construction
- Installing temporary solid noise barriers of adequate height to enclose or obstruct line of sight of noise sources that would provide the maximum feasible and commercially available noise reduction to the satisfaction of the Municipality
- Installing sound aprons, such as sound absorptive mats or curtains, on equipment or frames attached to equipment as feasible
- Limiting construction equipment and vehicle idling to 5 minutes or less when equipment is not in use or whenever running of the engine is not necessary for the safe and proper operation of such equipment

- Regular maintenance of all equipment, including checking for the proper attachment of mufflers and other equipment components
- Substituting the loudest projected construction equipment for the quietest available construction equipment, including electric equipment or combustion equipment utilizing enclosures or baffles, when such technology/equipment is commercially available
- Communicating with affected noise-sensitive receptors regarding the anticipated dates and durations of anticipated high-noise construction activities

The FHWA RCNM User Guide Appendix A, indicates that existing obstructions, such as trees located between the detention pond area and nearby receptors, or buildings located between the construction site and Villa Caridad residences not immediately adjoining construction areas, would reduce noise levels by up to 15 dBA.

Existing natural and artificial features of the project area and the implementation of BMPs during construction would reduce project noise effects on nearby noise-sensitive receptors. With the implementation of BMPs, the Proposed Action would have moderate, short-term, direct adverse impacts to noise in the project area because of the duration of the construction period.

Under the Proposed Action, construction workers would be exposed to elevated levels of noise. Implementation of the project would adhere to OSHA regulations and would provide the appropriate level of personal protective equipment to minimize adverse impacts during anticipated construction activities. Therefore, the Proposed Action would have negligible, short-term, direct adverse impacts to occupational noise during construction.

Construction activities may also generate vibrations that could result in ground-borne noise. However, ground vibrations would be short-term and mostly associated with the infrequent use of a vibratory roller during roadway reconstruction. Moreover, many of the previously identified BMPs–such as suppressing noise from equipment, locating equipment as far as feasible from residences, limiting idling, maintaining equipment, and substituting loud equipment for quiet alternatives–would also reduce the effects of vibration and ground-borne noise. Thus, the Proposed Action would have highly localized, moderate, short-term, direct adverse impacts to vibration-related ground-borne noise in the project area.

While the Proposed Action would include new permanent sources of noise and vibration in the form of stormwater management equipment, primarily from two new Archimedean screw type conveyor pumps and a 300-kilowatt emergency generator, such equipment would be installed following the requirements of Puerto Rico's regulations on noise contamination and would include sound dampers and sound suppressors as applicable. Archimedean screw type pumps generally operate at lower speeds and pressures, generating minimal noise during operation as compared to equivalent standard centrifugal type pumps. Moreover, the operation of the proposed equipment would be limited to storm events where ambient noise levels would already be substantially elevated, and noise regulations provide exceptions for noise generated by emergency work

performed to protect the immediate health, safety, or welfare of the community or individuals. Additionally, implementation of the Proposed Action would be expected to reduce the frequency and extent of noise-generating traffic diversions and repair activities following RGL flood events. Therefore, the Proposed Action would result in highly localized, negligible, long-term, direct adverse impacts to noise during storm events and negligible, long-term, indirect beneficial impacts to noise following storm events in the project area.

5.15 Transportation

The Puerto Rico Department of Transportation and Public Works is responsible for managing both maritime and nonmaritime transportation facilities. This department comprises four agencies: the Puerto Rico Highway and Transportation Authority, the Puerto Rico Port Authority, the Maritime Transport Authority, and the Metropolitan Bus Authority. The Puerto Rico Highway and Transportation Authority is a government-owned corporation responsible for constructing, operating, and maintaining roads, bridges, avenues, highways, tunnels, public parking, tolls, and other transit facilities. Municipal roadways are not marked with a Puerto Rico National Highway network system road marker; unlike state roads, which are signed with numbers, municipal roads are signed with names.

5.15.1 Existing Conditions

The downtown area of the Municipality of Carolina is primarily accessed from Puerto Rico Highway 65 (PR-3), through Manuel Fernandez Juncos Avenue/Muñoz Rivera Street (State Road PR-874). Several local roadways fall within the project area, including Manuel Fernandez Juncos Avenue, San Francisco Street, Molinillo Street, Parque Street, and Quebrada Street. Manuel Fernandez Juncos Avenue is the most traveled of the local roads in the project area. The new pipelines and other stormwater infrastructure associated with the Proposed Action would be located largely in existing roadways.

Pedestrian facilities in the project area consist of sidewalks on both sides of Manuel Fernandez Juncos Avenue and San Francisco Street, a sidewalk on the west side of Parque Street, and a sidewalk on the north side of Quebrada Street. The Puerto Rico Metropolitan Bus Authority (Autoridad Metropolitana de Autobuses) T7 bus line serves the project area with a 30-minute frequency, Monday through Friday between 5:30 a.m. and 9:00 p.m. and Saturday and holidays between 6:00 a.m. and 8:00 p.m. (Moovit 2022).

The Carolina Intermodal Transportation System (Sistema Intermodal de Transportación Carolinense) provides bus service within the Municipality of Carolina, Monday through Friday between 6:00 a.m. and 6:00 p.m. The red and green bus lines serve the project area (Municipality of Carolina 2019). There are no marked bike lanes within the project area.

5.15.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no site preparation, demolitions, or construction activities and therefore, there would be no impact upon transportation in the proposed project area or surrounding municipalities. However, under the No Action Alternative, large storm events could continue to cause backflow and flooding into the downtown area of Carolina. Flooded streets or flood-related repairs could cause the closure of roads, temporarily impacting traffic patterns, pedestrian circulation, movement of goods and services, and access to public transit, which would be a moderate, short-term, direct, adverse impact to transportation.

Frequent flood conditions under the No Action Alternative would have long-term indirect effects on the availability, reliability, and quality of transit services. The repeated disruption and damage by flood conditions could disincentivize investment in new or improved transportation services in the area and would result in degradation to the quality of local roadways, requiring more extensive and more frequent repairs. Reduced roadway conditions and circulation could also affect access to businesses in the downtown area. Therefore, there would be moderate, long-term, indirect adverse impacts on transit services under the No Action Alternative.

Alternative 2: Proposed Action

The Proposed Action would require temporary roadway and/or lane closures as well as the temporary closure of the DCHSFC parking lot during construction. These closures would require traffic diversion through alternative routes around the construction, as well as the addition of construction-related traffic. Local traffic in the Villa Caridad area, including resident vehicle traffic on Parque Road and Quebrada Road, would be substantially inhibited by construction activities throughout the construction period (estimated to take approximately six months along each roadway). Public transportation would also be inhibited by construction activities on Manuel Fernandez Juncos Avenue. This would result in a moderate, short-term, direct impact on transportation. However, the subrecipient's management plan (Section 3) would include implementation of appropriate BMPs, which would limit construction-related transportation impacts. With implementation of these measures, the Proposed Action would have minor, short-term, direct adverse impacts to transportation.

Post-construction, the Proposed Action would reduce the likelihood of and limit the extent of roadway and pedestrian facility closures in the project area following storm events. Operation of the Proposed Action is not anticipated to generate significant vehicular traffic, as the proposed infrastructure would not require daily trips and would only require occasional maintenance. Implementation of the Proposed Action would have indirect benefits to transportation in the downtown Carolina area, improving the reliability of public transit services and the movement of goods and services following storm events and reducing flood-related degradation of local

roadways. Therefore, the Proposed Action would have minor, long-term, direct and indirect beneficial impacts to transportation in the downtown Carolina area.

5.16 Public Services and Utilities

A public utility is an organization that maintains the infrastructure for a public service. The interruption of service from public utilities can cause public health concerns. A reduction in the reliability of public utility services affects areas of daily life.

5.16.1 Existing Conditions

The westerly portion of the project area is located within a developed urban area and is served by utilities and infrastructure, including underground and aerial electrical power systems, natural gas lines, underground and aerial telecommunication systems, and water and sewer lines.

5.16.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, the existing stormwater infrastructure would not be repaired or upgraded, and a new detention pond and pump station would not be installed. Large storm events could continue to cause the flap valves to remain closed, leading to backflow and flooding in the downtown area of Carolina. Sewer and stormwater utilities could occasionally become surcharged during floods, leading to disruptions in service. Residents, businesses, and critical infrastructure, such as the DCHSFC, could be without water, sewer, electricity, and other utilities until emergency repairs are made. Depending on the location and nature of required emergency repairs, other utilities may need to be shut down over small areas for short periods of time. Therefore, there would be moderate, short-term, direct adverse impacts on public services and utilities due to a storm event under the No Action Alternative.

Frequent flood conditions under the No Action Alternative could affect the long-term availability and quality of public utilities and services in the downtown Carolina area, with indirect economic impacts to the community. The repeated disruption and damage due to flood events could disincentivize investment in new or improved public utility services and hinder local economic growth. Therefore, there would be moderate, long-term, indirect, adverse impacts on public services and utilities under the No Action Alternative.

Alternative 2: Proposed Action

Under the Proposed Action, the existing stormwater infrastructure would be upgraded, and a new detention pond and pump station would be installed. Construction activities would require relocation and reconstruction of existing utility services, including power, telecommunication, and aqueduct lines on Manuel Fernandez Juncos Avenue and existing aerial electrical, aerial

telecommunication, and aqueduct and sanitary sewer systems within the Villa Caridad community. This would result in a minor, short-term, direct, adverse impact to public services and utilities during the construction period.

Post-construction, the Proposed Action would reduce flood impacts to public utilities, which would allow for continued services for the community. Businesses using public utilities would be able to continue operations and contribute to economic growth. The Proposed Action would have moderate, long-term, direct and indirect beneficial impacts to public services and utilities, including stormwater, sanitary sewer, water, and other utility infrastructure because it would prevent service interruptions and provide increased resilience against future storm events.

5.17 Public Health and Safety

Numerous health and safety laws and regulations exist for a wide variety of activities. The U.S. Congress enacted the OSHA Act of 1970, 29 U.S.C. Section 651 et seq. to assure safe and healthy working conditions.

The EPA, through the Safe Drinking Water Act, requires that the Puerto Rico Aqueduct and Sewer Authority monitor water quality in the filtration plants and distribution systems. Water quality sampling is determined by the population of the specific distribution system, and results and analysis are reported to the Puerto Rico Department of Health and EPA. Failing to comply means violations to standards, monitoring, and reports, which could result in monetary fines. In addition to the federal standards, National Primary Standards protect the public health by establishing an acceptable level of contaminants in drinking water. It is expected that water utilities fully comply with the act and with National Primary Standards.

5.17.1 Existing Conditions

Public health and safety services within the Villa Caridad community are provided by both local and state agencies. Specifically, police and fire services are provided by the municipality and emergency services are provided by the Carolina Municipal Office for Emergency Management (Oficina Municipal para el Manejo de Emergencias) and the Puerto Rico Emergency Management Agency. The following describes the primary authorities tasked with ensuring public health and safety in the municipality:

- The Police Command of Carolina, Puerto Rico (Comandancia de la Policía de Puerto Rico de Carolina) and various agencies within the Municipality of Carolina are responsible for the general protection of public health and safety at and near the project area. The police station is located at 214 Ignacio Arzuaga Street, approximately 0.4 mile (0.6 km) west of the project site.

- The Carolina Fire Station (Estación de Bomberos de Carolina) provides emergency services and fire protection services to the project area and is located at 115-A Roberto Clemente Avenue, approximately 1.3 miles (2 km) northwest of the project site.
- The DCHSFC is the primary emergency health care facility for the project area and is located adjacent to the westernmost portion of the project area. In addition to serving the local community, the DCHSFC is a regional acute general hospital serving the nearby municipalities of Canovanas, Trujillo Alto, Loiza, and Rio Grande.

5.17.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

There would be no construction activity under the No Action Alternative and therefore no effect on emergency response from construction-related detours or lane closures. Emergency response times and vehicle access to DCHSFC could be adversely affected during flood events that result in the closure of roads, such as Manuel Fernandez Juncos Avenue, as a result of flooded streets or flood-related repairs. These flood events also have the potential to destroy and contaminate essential medical equipment affecting DCHSFC health services. In addition, emergency services may have to manage more emergencies and safety issues during flood events and, depending on resources available, may not be able to respond to all emergency needs.

Frequent flood conditions would adversely affect public health and safety in the downtown Carolina area in the short- and long-term. Flooding increases safety risks for people that cannot find shelter from flowing water and could increase the need for hospital services. The DCHSFC could be adversely affected by flooding and would not be able to provide health services to the community. Flooding could contaminate potable water supplies and result in sewage system overflows that would degrade long-term public health. Therefore, there would be moderate, short- and long-term, indirect adverse impacts on public health and safety under the No Action Alternative.

Alternative 2: Proposed Action

The Proposed Action would result in roadway closures during construction activities, which would affect hospital access and could affect emergency response times. Construction of the Proposed Action would have moderate, short-term, direct, adverse impacts to public health and safety.

Post-construction, the Proposed Action would reduce the risk of flooding and the flooding related impacts to public health and safety. Public safety services, such as fire, police, and first responders, would experience improved accessibility and emergency response times during flood events as the project would mitigate road flooding. Structures in the vicinity would not flood under the Proposed Action, increasing the safety of occupants. The DCHSFC would not experience flood impacts under the Proposed Action and would be able to continue to provide health services during and

after events. The Proposed Action would reduce risks to public health by preventing potential contamination of potable water supplies and incidental discharge of sewage due to flood events. Therefore, the Proposed Action would have moderate long-term, indirect beneficial impacts to public health and safety in the downtown Carolina area.

5.18 Hazardous Materials

Hazardous materials and wastes are regulated under several federal laws, including the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976; the Toxic Substances Control Act; the Comprehensive Environmental Response, Compensation, and Liability Act as amended by the Superfund Amendments and Reauthorization Act; and the CAA. In addition, OSHA standards under the Occupational Safety and Health Act seek to minimize adverse effects on worker health and safety (29 CFR Part 1926). The evaluation of hazardous materials and wastes considers whether any hazardous material or waste would be used or generated by the proposed activity and/or already exists at or in the general vicinity of the project area such that hazardous materials or wastes would pose a risk associated with project implementation.

5.18.1 Existing Conditions

There is no known contamination of soils or water from hazardous wastes at the project site. A survey of the two buildings and one structure to be demolished determined that there was no lead-based paint or asbestos in the structures (PREQB 2022a, 2022b). There are no known fuel storage tanks or fueling operations on-site. A review of the EPA EnviroMapper (EPA 2022g) indicates no known hazardous waste generators on or close to the project site. However, the RGL, which is located east of the project area, is an impaired water body that receives agricultural runoff, wastewater treatment plan effluent, septic system effluent and seepage, industrial discharges, and general urban runoff. As noted in Section 5.4, it has been contaminated by heavy metals, trace elements, and organic compounds (EPA 2022e).

5.18.2 Potential Impacts and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, construction work would not occur and there would be no impacts related to hazardous materials either from the use of construction equipment or from the exposure to soil contaminated with hazardous wastes through ground-disturbing activities. There would be no demolition of structures or roadways and, therefore, no potential to encounter previously unknown hazardous wastes. However, without the proposed improvements, future flooding could lead to emergency repairs that would require vehicles and construction equipment that would use hazardous materials such as fuels and oils. Moreover, future flooding events would continue to pose a risk of contamination of potable water supplies and an increase in hazardous

wastes being carried to the RGL. Therefore, the No Action Alternative would result in a moderate, long-term, indirect adverse impact with respect to hazardous materials, depending on the duration and scale of flooding.

Alternative 2: Proposed Action

Under the Proposed Action, site preparation/construction, excavation, and demobilization activities would temporarily use hazardous materials (e.g., lubricants and fuels) and may encounter or generate hazardous wastes. The subrecipient would be responsible for handling and disposing of hazardous materials and wastes in accordance with federal and local regulations and specific BMPs. If the subrecipient were to encounter contaminated soil, sediments, surface water, or groundwater during construction, work would stop and PRDNER and other regulators would be notified in accordance with applicable permits. The subrecipient would be responsible for adhering to PRDNER guidance before resuming work. For circumstances where the CWA requires the implementation of a Spill Prevention, Control, and Countermeasure (SPCC) plan, implementation of appropriate BMPs would contain and limit impacts of hazardous wastes to the immediate area of the release.

The structures that would be demolished do not contain asbestos or lead-based paint. If additional structures require demolition, the subrecipient would be responsible for complying with applicable federal and local laws and regulations, including conducting surveys to determine the presence or absence of hazardous building materials. The project would be carried out in accordance with all applicable laws and regulations, including obtaining permits for the removal of asbestos and lead if necessary. The subrecipient would ensure that on-site personnel receive appropriate job specific safety training in accordance with OSHA regulations. Demolition activities would be in accordance with federal and local laws and regulations regarding the handling of hazardous materials or wastes. Appropriate signage and construction barriers would be installed prior to construction to alert the public of project activities and risks and prevent unauthorized personnel from gaining access to the project area. Therefore, the Proposed Action would have negligible, short-term, direct adverse impacts on hazardous materials and wastes.

Post-construction, maintenance vehicles and equipment would use hazardous materials such as lubricants and fuels. Such use would comply with all applicable laws and regulations. Moreover, the Proposed Action would reduce the risk of flooding and the need for emergency response, thereby reducing the presence of emergency vehicles and other equipment that would use hazardous materials. In addition, the Proposed Action would reduce the risk of flooding during heavy rain events that could contaminate potable water supplies and introduce hazardous wastes to the RGL. Therefore, the Proposed Action would have a negligible, long term, indirect beneficial impact from the reduced use of hazardous materials or spills resulting in hazardous wastes contaminating soils or water within the community.

5.19 Cumulative Effects

This EA considers the overall cumulative impact of the Proposed Action and other actions that are related in terms of time or proximity. Cumulative effects represent the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (Council on Environmental Quality 2022). In the context of evaluating the scope of a Proposed Action, direct, indirect, and cumulative effects must be considered.

In addition to NEPA, other statutes require federal agencies to consider cumulative effects. These include the CWA Section 404(b)(1) guidelines, the regulations implementing the conformity provisions of the CAA, the regulations implementing Section 106 of the NHPA, and the regulations implementing Section 7 of the ESA.

5.19.1 Independent Projects

Independent of the Proposed Action, there are three projects within the area that could have cumulative effects in conjunction with the Proposed Action effects. The first is a medical office building under construction, in front of the DCHSFC, which will create space for private medical offices and commercial uses that support the hospital. Additionally, construction is planned for two additional levels to the west wing of the hospital, which will increase medical services available to the community. Finally, FEMA is proposing to fund a separate project for the DCHSFC. The project would consist of wet and dry floodproofing of the facility and a mitigation proposal including construction of a stormwater pump station at the end of the Molinillo Street and Pablo Velazquez Street. This system collects runoff from Manuel Fernandez Juncos Avenue's low point, at the southeast corner of the DCHSFC that crosses from southeast to northwest, along the floodwall, until reaching Molinillos Street, where it then turns toward the southwest and across the floodwall with eventual discharge into the RGL floodway. Sewer overflow may be caused by limited sewer conveyance capacity under free outflow condition and pipe backflow caused from river flooding and/or closure of flap gates at outfall point. These drainage limitations are being addressed in the Proposed Action.

5.19.2 Proposed Action

The Proposed Action described in this EA would have minimal impact on the affected environment. Implementing BMPs and requirements identified through permitting are expected to limit project-specific impacts. Mitigation measures to reduce impacts are addressed in each affected environment section and project conditions section. The Proposed Action would have moderate beneficial long-term impacts to the project area and surrounding community by reducing

damages from flooding and mitigating the risk to residents, businesses, governmental buildings, and community-serving uses.

5.19.3 Cumulative Projects (Independent Projects plus Proposed Action)

The projects described above, in combination with the Proposed Action, have the potential to result in cumulative adverse impacts. Specifically, if construction of any of the cumulative projects overlapped with construction of the Proposed Action, there could be short-term cumulative impacts to air quality, water quality, aesthetic resources, environmental justice, noise, transportation, public services and utilities, public health and safety, and hazardous materials. However, compliance with federal and local requirements, in addition to the implementation of BMPs, would ensure that short-term, direct adverse cumulative impacts would be minor.

In the long term, the cumulative impacts of the three independent projects and the Proposed Action would be beneficial. Implementation of the medical office, the expansion of the hospital, the FEMA project to address flooding at the DCHSFC, and the Proposed Action would collectively improve public health and safety and, indirectly, would be beneficial with respect to environmental justice. In addition, the FEMA DCHSFC project, in conjunction with the Proposed Action, would reduce the effects of flooding in downtown Carolina and the Villa Caridad community, protecting critical infrastructure and reducing the need for emergency response, which would reduce indirect impacts to the broad range of environmental resources addressed in this section. Therefore, the Proposed Action, in conjunction with the other independent projects, would have a moderate, long-term, direct and indirect beneficial cumulative impact.

6.0 PERMITS AND PROJECT CONDITIONS

The subrecipient is responsible for obtaining all applicable federal, state, and local permits and other authorizations for project implementation prior to construction and adherence to all permit conditions. The subrecipient is also responsible for following the stipulations of the management plan. Any substantive change to the approved scope of work will require re-evaluations by FEMA for compliance with NEPA and other laws and EOs. The subrecipient must also adhere to the following conditions during project implementations and consider the below conservation recommendations. Failure to comply with grant conditions may jeopardize federal funds:

1. **Municipality of Carolina:** Must comply with the environmental and historic preservation applicable laws. Federal funding is contingent upon acquiring the necessary federal, Puerto Rico, and local permits. Noncompliance with this requirement may jeopardize the receipt of federal funds.
2. **Utility Clearance:** For ground-disturbing activities, the subrecipient is responsible for locating utilities. The OSHA mandates that if a utility provider cannot respond to a request to locate underground utility installations or cannot establish the exact location of these installations, the contractor may proceed, provided they use detection equipment or other acceptable means to locate utility installations.
3. **Stormwater and Soils:** A Construction NPDES permit and a SWPPP will be prepared and implemented by the subrecipient; BMPs will be implemented during construction in accordance with requirements of the Construction General Permit to manage any piles of soil or debris, minimize steep slope disturbance, preserve native topsoil unless infeasible, and minimize soil compaction and erosion.
4. **Erosion and Sediment Control:** The BMPs and guidelines recommended in the *Puerto Rico Erosion and Sediment Control Handbook for Developing Areas* (PREQB and USDA-NRCS 2005) will be implemented by the subrecipient for the Proposed Action. The subrecipient will be responsible for obtaining the necessary permits such as an NPDES permit and implementing the associated erosion and sediment control plans included as part of the PRPB Joint Regulation Single Incidental Operational Permit and SWPPP.
5. **Spill Prevention, Control and Countermeasure:** An SPCC plan will be prepared by the subrecipient to establish procedures, methods, and equipment requirements to (1) prevent fuel or lubricants from reaching waters and (2) contain discharges of harmful substances.
6. **ESA:** An ESA Section 7 informal consultation letter was submitted on November 23, 2022 to the USFWS with the determination of impacts to listed federal threatened or endangered species. FEMA determined that the Proposed Action "May Affect, but is Not Likely to Adversely Affect" federally listed species with implementation of conservation measures. Appendix C1 includes the FEMA consultation request to USWFS, including conservation measures. USFWS concurred with these findings on January 12, 2023.
7. **Floodplain:** The subrecipient must obtain any required permits from the Puerto Rico Permits Management Office (Oficina de Gerencia de Permisos, also known as OGPe) prior

to initiating work and comply with any conditions of the permit established by the PRPB for construction in floodplains. A preliminary No-Rise certificate is under review; NFIP compliance is currently pending concurrence from PRDNER.

8. **Historic Preservation/Archaeological Resources:** A continuing consultation letter was submitted to the PRSHPO on December 14, 2022, in compliance with Section 106 of the NHPA, in which FEMA determined that the proposed activities would result in No Adverse Effect to Historic Properties with Conditions. The conditions include additional mechanical deep archaeological testing within the area of the proposed detention pond. All work must be conducted by Secretary of Interior (SOI) qualified archaeologists and must be completed prior to construction activities beginning. In the event that historical or archaeological materials or features are discovered, FEMA will require that an SOI-qualified archaeologist conduct an Intensive Archaeological Survey (Phase II) to determine if such archaeological resources are eligible for the NRHP. If any NRHP-eligible sites cannot be avoided, FEMA, in consultation with PRSHPO, will mitigate the impacts via Phase III archaeological data recovery in compliance with the Stipulation II.C.6 Resolution of Adverse Effects in the "Programmatic Agreement Among the Federal Emergency Management Agency, the Puerto Rico State Historic Preservation Officer, and the Puerto Rico Central Office of Recovery, Reconstruction and Resiliency" as amended on November 13, 2019. A communication from PRSHPO dated December 20, 2022, acknowledges FEMA's revised finding and consultation will continue once PRSHPO has reviewed the survey report (Appendix C2). The subrecipient will also be responsible for coordinating with the ICP to comply with Puerto Rico's historic preservation and archaeological requirements. If any cultural materials or human remains are discovered during construction, the contractor must halt work immediately and contact FEMA. The FEMA staff will evaluate the discovery in coordination with PRSHPO.
9. **Construction/Demolition Material and Debris:** The subrecipient is responsible for obtaining required permits for the demolition activities, as well as the handling and transportation of construction material, solid waste, and debris. The subrecipient is also responsible for procuring the required lead and asbestos certifications. The contractor will identify, handle, transport, and dispose of hazardous materials and/or toxic waste in accordance with EPA and PRDNER requirements, including the details associated with the proposed action construction materials and debris handling as part of the PRPB Joint Regulation, General Consolidated Permit of the Single Incidental Operational Permit. It is also responsible for ensuring that nonrecyclable debris generated from project activities will be disposed at a PRDNER-permitted landfill.
10. **CAA**: The subrecipient is responsible for complying with applicable EPA and PRDNER requirements for fugitive dust suppression. Vehicular emission and airborne dust particulates resulting from construction activities and equipment operation must be below the NAAQS. An Operation Plan to implement emissions control measures would be

included as part of the Single Incidental Operational Permit application, as required by the PRPB Joint Regulation.

11. **Atmospheric Pollution Control**: The subrecipient will evaluate the proposed equipment associated to the proposed action to comply with Regulation 5300 and PRDNER requirements. A Puerto Rico General Consolidated Permit application will be prepared and submitted to PRDNER for a permit to operate emergency generators.
12. **Invasive Species Act**: The subrecipient is responsible for restoring disturbed soils with planting native, noninvasive species once project activities are completed. Construction equipment should be power washed prior to initial transport to the construction site and prior to changing locations to prevent spread of noxious weeds.
13. **Compliance with State (Local) Permit Requirements**: The subrecipient will submit to OGPe and PRDNER the corresponding applications to obtain, if required, the following environmental protection permits and endorsements:
    a. Single Incidental Operational Permit: This permit includes the Incidental Activity Permit for Public Infrastructure Works, Trees Cutting and Pruning Authorization, and the General Consolidated Permit.
        i. Determination of Environmental Assessment (Determinación de Evaluación Ambiental): The subrecipient is responsible for complying with the recommendations and conditions stipulated in the Determination of Environmental Compliance for Environmental Assessment.
        ii. Tree Cutting: The subrecipient is responsible for complying with the requirements of the PRPB Joint Regulation on the requirements to mitigate trees that are impacted by the proposed action. A tree inventory will be prepared by an OGPe Planting Authorized Inspector to identify trees within the proposed action areas, as part of the Single Incidental Operational Permit as required by the PRPB Joint Regulation. A permit will be required for tree cutting prior to beginning clearing and grubbing.
        iii. Natural Habitat Categorization Certificate: The subrecipient will submit to the PRDNER an application to request concurrence on the habitat classification for the proposed project.
    b. Infrastructure and Utilities Recommendations: The Proposed Action information is presented for consideration and comments for conformity with state utility agencies for building requirements.
    c. Maintenance of Public Infrastructure Works Permit: Required for maintenance of public infrastructure facilities.
14. **Construction Noise:** The construction contractor(s) would be required to implement BMPs to reduce construction-related noise levels to within the permissible noise limits, consistent with Rule 29.D of the Puerto Rico Noise Pollution Control Regulation.

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

This EA is available for agency and public review and comment for a period of 30 days. The public information process will include a public notice in both English and Spanish with information about the proposed action in the *El Nuevo Dia* and *Primera Hora*. A Spanish translation of the EA, and public notice will also be posted on FEMA, Municipality of Carolina, and COR3 websites.

The EA is available for download at the following websites:

- FEMA: https://www.fema.gov/emergency-managers/practitioners/environmental-historic/nepa-repository
- Municipality of Carolina: https://www.municipiocarolina.com
- COR3: https://recovery.pr.gov/es/document-library#

A hard copy of the EA will be available for review at the following location:

- Carolina Municipality City Hall, Planning Department, 2do Floor, Manuel Fernandez Juncos Avenue, Pueblo Ward, Carolina Puerto Rico

Interested parties may request an electronic copy of the EA by sending an email to FEMA at FEMA-EHP-DR4339@FEMA.DHS.GOV. This EA reflects the evaluation and assessment of the federal government, the decision-maker for the federal action; however, FEMA will consider 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 sending an email to FEMA-EHP-DR4339@FEMA.DHS.GOV or via mail to:

FEMA Region 2 – DR-4339-PR
Puerto Rico Joint Recovery Office
50 State Road 165, Suite 3
Guaynabo, PR 00968
Attn: Environmental Assessment Carolina Downtown Flood Mitigation Project

If FEMA receives no substantive comments from the public and/or agency reviewers, FEMA will adopt the EA as final and will issue a FONSI. If FEMA receives substantive comments, it will evaluate and address comments in the FONSI, revise and issue a Final EA for further comment, or issue a Notice of Intent to prepare an EIS.

8.0 LIST OF PREPARERS

FEMA Region 2, Environmental and Historic Preservation, 26 Federal Plaza, New York.

FEMA Puerto Rico Joint Recovery Office, Environmental and Historic Preservation, Field Operations, Guaynabo, Puerto Rico.

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9.0 SUMMARY OF IMPACTS

Table 9.1 provides a summary of the potential environmental impacts from implementation of the No Action Alternative and the Proposed Action.

Table 9.1 Summary of Impacts

EA Section	Topic	No Action Alternative	Proposed Action: Short-term / Temporary Impacts	Proposed Action: Long-term / Permanent Impacts
5.1	Soils	Negligible Adverse Indirect (short-term) Moderate Adverse Indirect (long-term)	Minor Direct Adverse	Minor Indirect Beneficial
5.1	Topography	No Impact	No Impact	No Impact
5.1	Seismicity	No Impact	No Impact	No Impact
5.2	Air Quality (Localized impact during construction)	No Impact	Moderate Direct Adverse	No Impact
5.2	Air Quality (Regional impact during construction)	No Impact	Negligible Direct Adverse (vehicular delays during construction adjacent to the DCHSFC) Minor Direct Adverse (throughout construction)	No Impact
5.2	Air Quality (Impact during operations)	Negligible Adverse Direct (long-term)	No Impact	Negligible Direct Adverse
5.3	Climate Change (GHG emissions)	No Impact (short-term) Negligible Indirect Adverse (long-term)	Negligible Direct and Indirect Adverse	Negligible Direct and Indirect Adverse
5.3	Climate Change (Climate resiliency)	Negligible Indirect Adverse	Negligible Direct Adverse	Moderate Indirect Beneficial
5.4	Water Quality	Moderate Direct Adverse (short-term)	Negligible Direct Adverse	Moderate Direct Beneficial
5.5	Wetlands (Within project footprint)	No Impact	No Impact	No impact
5.5	Wetlands (Outside of project footprint)	Moderate Indirect Adverse (short-term)	Negligible Indirect Adverse	Moderate Indirect Beneficial
5.6	Floodplains	Moderate Direct Adverse (long-term)	Negligible Direct Adverse	Moderate Direct Beneficial
5.7	Vegetation	No Impact	Negligible Direct Adverse	Negligible Direct Adverse
5.8	Wildlife	No Impact	Minor Direct Adverse	Negligible Direct Adverse
5.8	Fish	No Impact	Negligible Indirect Adverse	Negligible Indirect Adverse

EA Section	Topic	No Action Alternative	Proposed Action: Short-term / Temporary Impacts	Proposed Action: Long-term / Permanent Impacts
5.8	Migratory Birds	No Impact	Minor Direct Adverse	Negligible Direct Adverse
5.9	Threatened and Endangered Species (Puerto Rican boa)	No Impact	Minor Direct Adverse	Minor Direct Adverse
5.9	Threatened and Endangered Species (Other species)	No Impact	No Impact	No Impact
5.10	Cultural Resources (Historic Structures)	No Impact	No Impact	No Impact
5.10	Cultural Resources (Archaeological Resources – Carolina and Villa Caridad streetscape)	No Impact	No Impact	No Impact
5.10	Cultural Resources (Archaeological Resources – detention pond area)	No Impact	Minor Direct Adverse	Minor Direct Adverse
5.11	Aesthetic Resources	Negligible Direct Adverse (short-term)	Minor Direct Adverse	Negligible Direct Adverse
5.12	Environmental Justice	Moderate Indirect Adverse (long-term)	Minor Direct and Indirect Adverse with management plan and BMPs	Moderate Direct Beneficial
5.13	Land Use and Planning	No Impact (short-term) Moderate Indirect Adverse (long-term)	Minor Direct Adverse	Minor Indirect Beneficial
5.14	Noise (to sensitive receptors during construction)	No Impact	Moderate Direct Adverse with BMPs	No Impact
5.14	Noise (ground-borne noise to sensitive receptors during construction)	No Impact	Moderate Direct Adverse with BMPs	No Impact
5.14	Noise (occupational during construction)	No Impact	Negligible Direct Adverse	No Impact
5.14	Noise (operations during and after flood events)	Negligible Indirect Adverse (long-term)	No Impact (short-term)	Negligible Direct Adverse (during storm event) Negligible Indirect Beneficial (after storm event)

EA Section	Topic	No Action Alternative	Proposed Action: Short-term / Temporary Impacts	Proposed Action: Long-term / Permanent Impacts
5.15	Transportation	Moderate Direct Adverse (short-term) Moderate Indirect Adverse (long-term)	Minor Direct Adverse with BMPs	Minor Direct and Indirect Beneficial
5.16	Public Services and Utilities	Moderate Direct Adverse (short-term) Moderate Indirect Adverse (long-term)	Minor Direct Adverse	Moderate Direct and Indirect Beneficial
5.17	Public Health and Safety	Moderate Indirect Adverse (short- and long-term)	Moderate Direct Adverse	Moderate Indirect Beneficial
5.18	Hazardous Materials	No Impact (short-term) Moderate Indirect Adverse (long-term)	Negligible Direct Adverse	Negligible Indirect Beneficial
5.19	Cumulative Impacts	Not Applicable	Minor Direct Adverse	Moderate Direct and Indirect Beneficial

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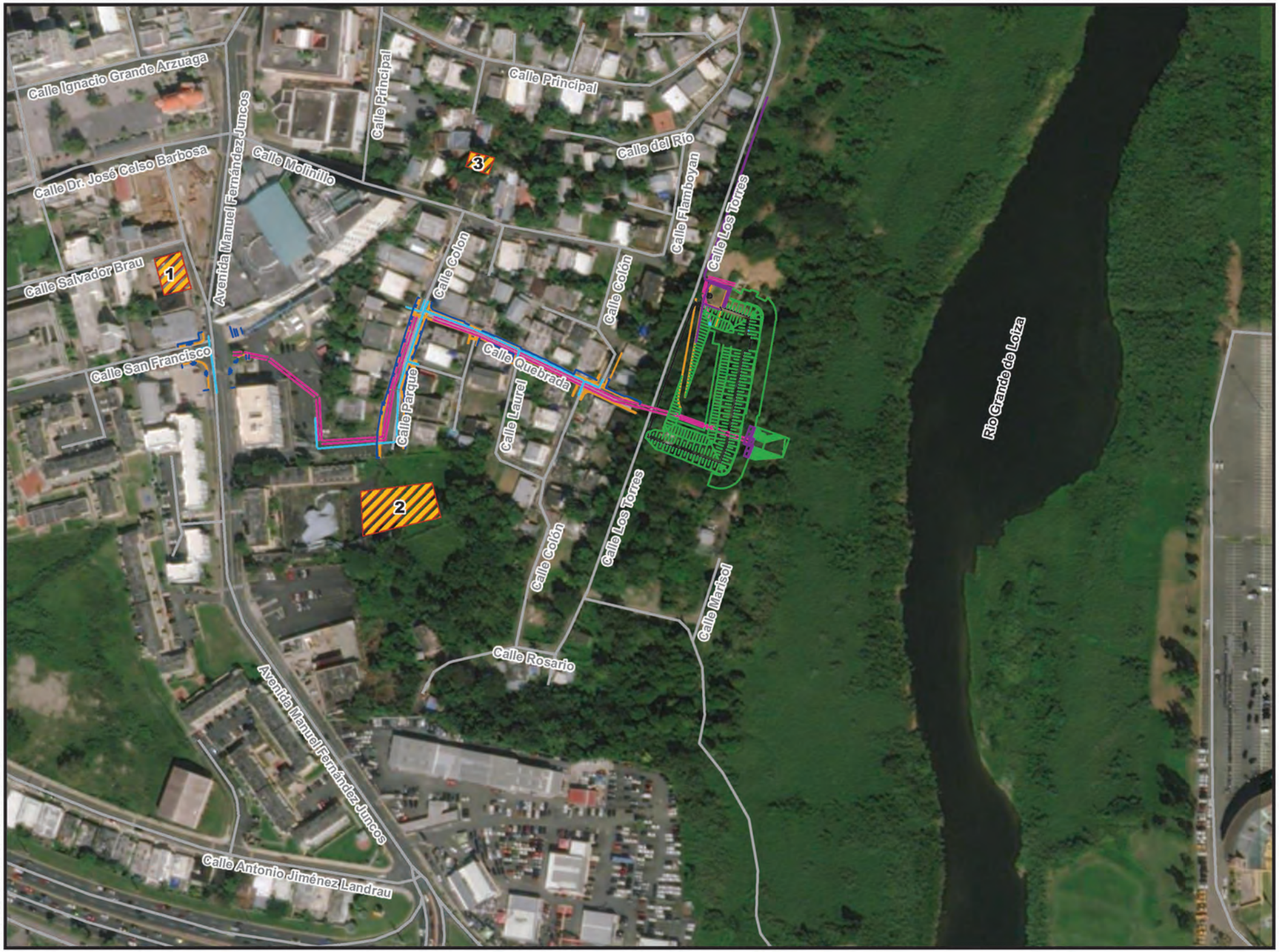
Appendix A: Figures



Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 1 Project Location

N

1 inch = 76.2 meters

0 62.5 125 Meters

0 200 400 Feet

Legend

- Possible Staging
- Walls
- Walks
- Stormwater Pipes
- Slopes
- Drainage
- Fences
- Curbs
- Roads

Sources:
1. Federal Emergency Management Agency
2. Municipality of Carolina
3. ESRI

FEMA

Region 2

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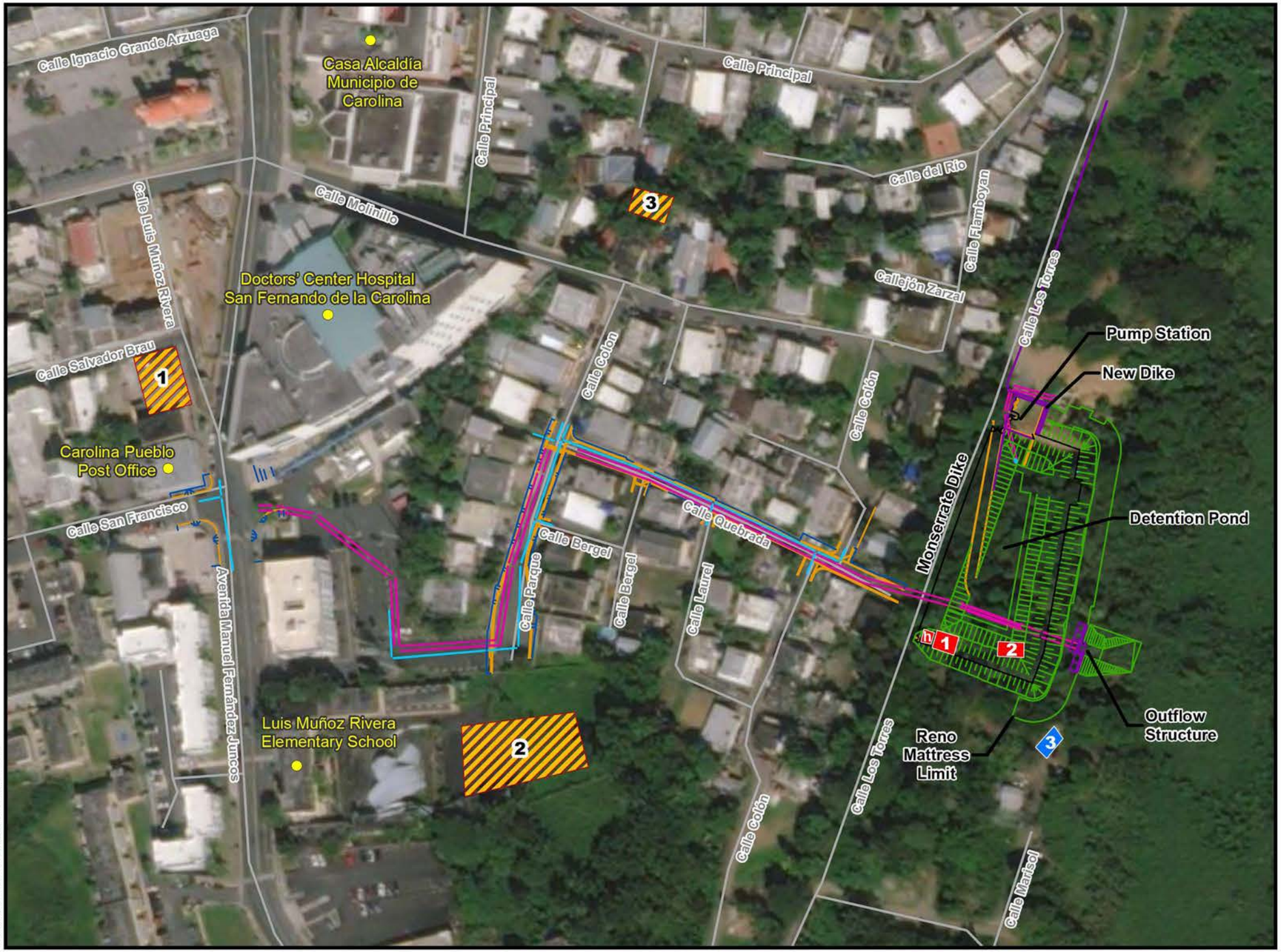

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Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 2 Structures & Staging

N

1 inch = 48.05 meters

0 40 80 Meters

0 125 250 Feet

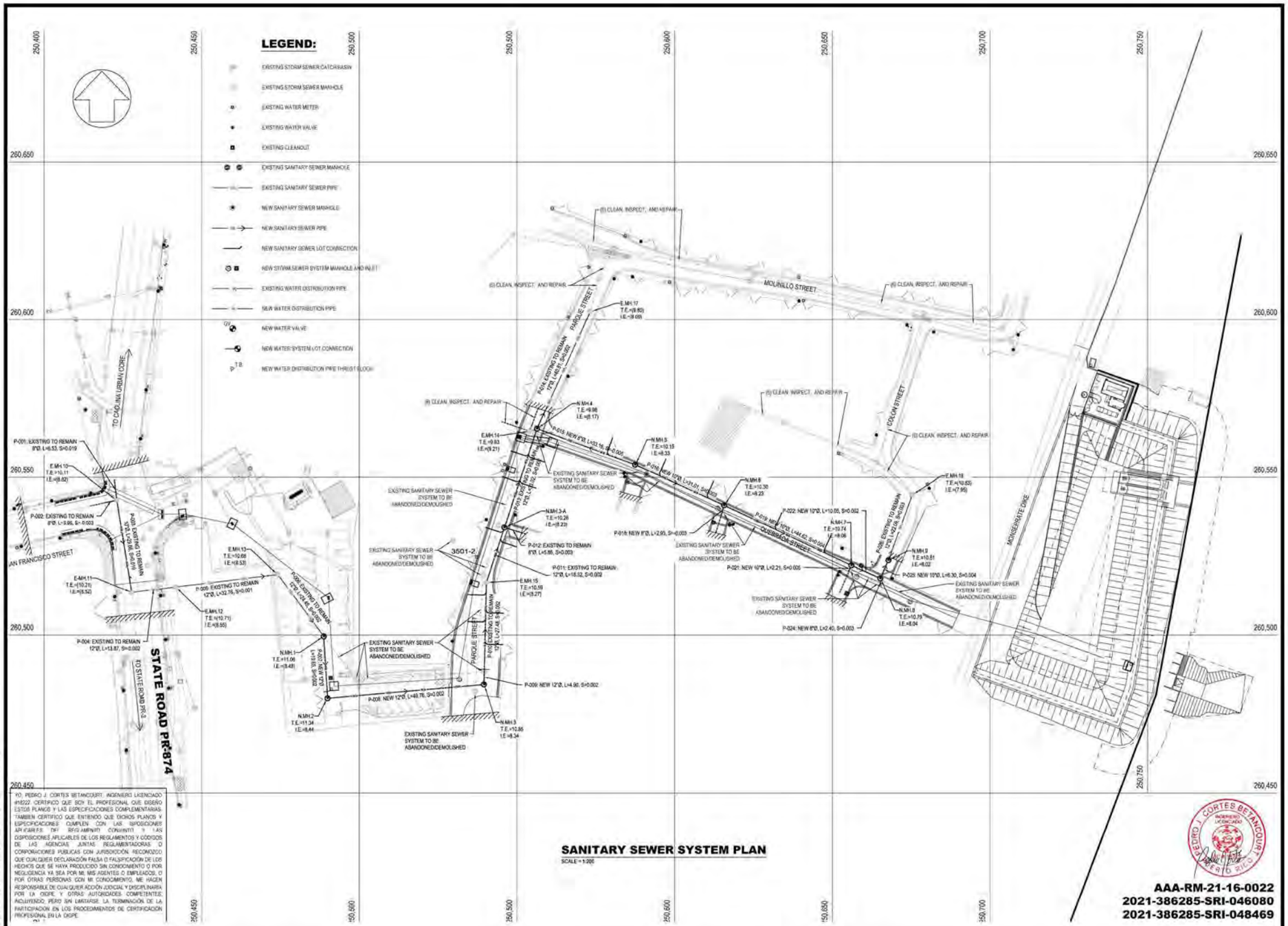
Legend

- Possible Staging
- Structures to be Demo'd
- Building 3
- Walls
- Walks
- Stormwater Pipes
- Slopes
- Drainage
- Fences
- Curbs
- Roads

Sources:
1. Federal Emergency Management Agency
2. Municipality of Carolina
3. ESRI

FEMA

Region 2



SANITARY SEWER SYSTEM PLAN
SCALE = 1:200

YO, PEDRO J. CORTES BETANCOURT, INGENIERO LICENCIADO #16222 CERTIFICO QUE SOY EL PROFESIONAL QUE DISEÑO ESTOS PLANOS Y LAS ESPECIFICACIONES COMPLEMENTARIAS. TAMBIEN CERTIFICO QUE ENTIENDO QUE DICHOS PLANOS Y ESPECIFICACIONES CUMPLEN CON LAS DISPOSICIONES APLICABLES DEL REGLAMENTO CONJUNTO Y LAS DISPOSICIONES APLICABLES DE LOS REGLAMENTOS Y CÓDIGOS DE LAS AGENCIAS, JUNTAS, REGLAMENTADORAS O CORPORACIONES PÚBLICAS CON JURISDICCIÓN. RECONOZCO QUE CUALQUIER DECLARACIÓN FALSA O FALSIFICACIÓN DE LOS HECHOS QUE SE HAYA PRODUCIDO SIN CONOCIMIENTO O POR NEGLIGENCIA YA SEA POR MI, MIS AGENTES O EMPLEADOS, O POR OTRAS PERSONAS CON MI CONOCIMIENTO, ME HAZEN RESPONSABLE DE CUALQUIER ACCIÓN JUDICIAL Y DISCIPLINARIA POR LA OGPE Y OTRAS AUTORIDADES COMPETENTES, INCLUYENDO, PERO SIN LIMITARSE, LA TERMINACIÓN DE LA PARTICIPACIÓN EN LOS PROCEDIMIENTOS DE CERTIFICACIÓN PROFESIONAL EN LA OGPE.

PEDRO J. CORTES BETANCOURT
INGENIERO LICENCIADO
#16222
PUERTO RICO

AAA-RM-21-16-0022
2021-386285-SRI-046080
2021-386285-SRI-048469

Environmental Assessment Carolina Downtown Flood Mitigation Project Figure 3 Sanitary Sewer

Sources:
1. Municipality of Carolina

FEMA
Region 2

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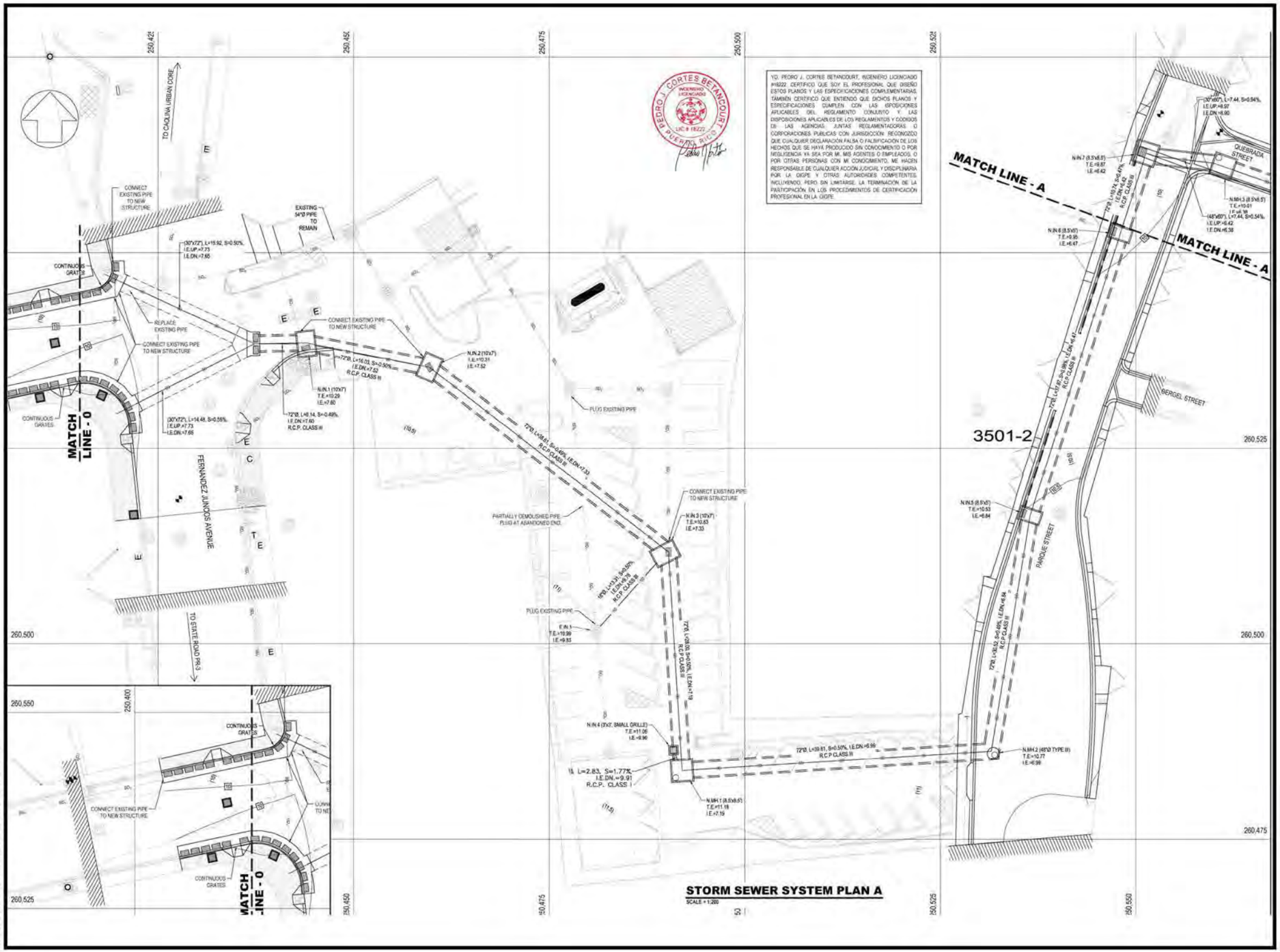

YO, PEDRO J. CORTES BETANCOURT, INGENIERO LICENCIADO #18222 CERTIFICO QUE SOY EL PROFESIONAL QUE DISEÑO ESTOS PLANOS Y LAS ESPECIFICACIONES COMPLEMENTARIAS, TAMBIEN CERTIFICO QUE ENTIENDO QUE DICHOS PLANOS Y ESPECIFICACIONES CUMPLEN CON LAS ISPOSICIONES APLICABLES DEL REGLAMENTO CONJUNTO Y LAS DISPOSICIONES APLICABLES DE LOS REGLAMENTOS Y CODIGOS DE LAS AGENCIAS, JUNTAS REGLAMENTADORAS O CORPORACIONES PUBLICAS CON JURISDICCIÓN RECONOZCO QUE CUALQUIER DECLARACIÓN FALSA O FALSIFICACION DE LOS HECHOS QUE SE HAYA PRODUCIDO SIN CONOCIMIENTO O POR NEGLIGENCIA YA SEA POR MI, MIS AGENTES O EMPLEADOS, O POR OTRAS PERSONAS CON MI CONOCIMIENTO, ME HAGEN RESPONSABLE DE CUALQUIER ACCIÓN JUDICIAL Y DISCIPLINARIA POR LA OGPE Y OTRAS AUTORIDADES COMPETENTES, INCLUYENDO, PERO SIN LIMITARSE, LA TERMINACIÓN DE LA PARTICIPACIÓN EN LOS PROCEDIMIENTOS DE CERTIFICACIÓN PROFESIONAL EN LA OGPE.

PEDRO J. CORTES BETANCOURT INGENIERO LICENCIADO LIC.# 18222 PUERTO RICO

STORM SEWER SYSTEM PLAN A
SCALE = 1:200

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 4 Street Improvements

Sources:
1. Municipality of Carolina

FEMA
Region 2

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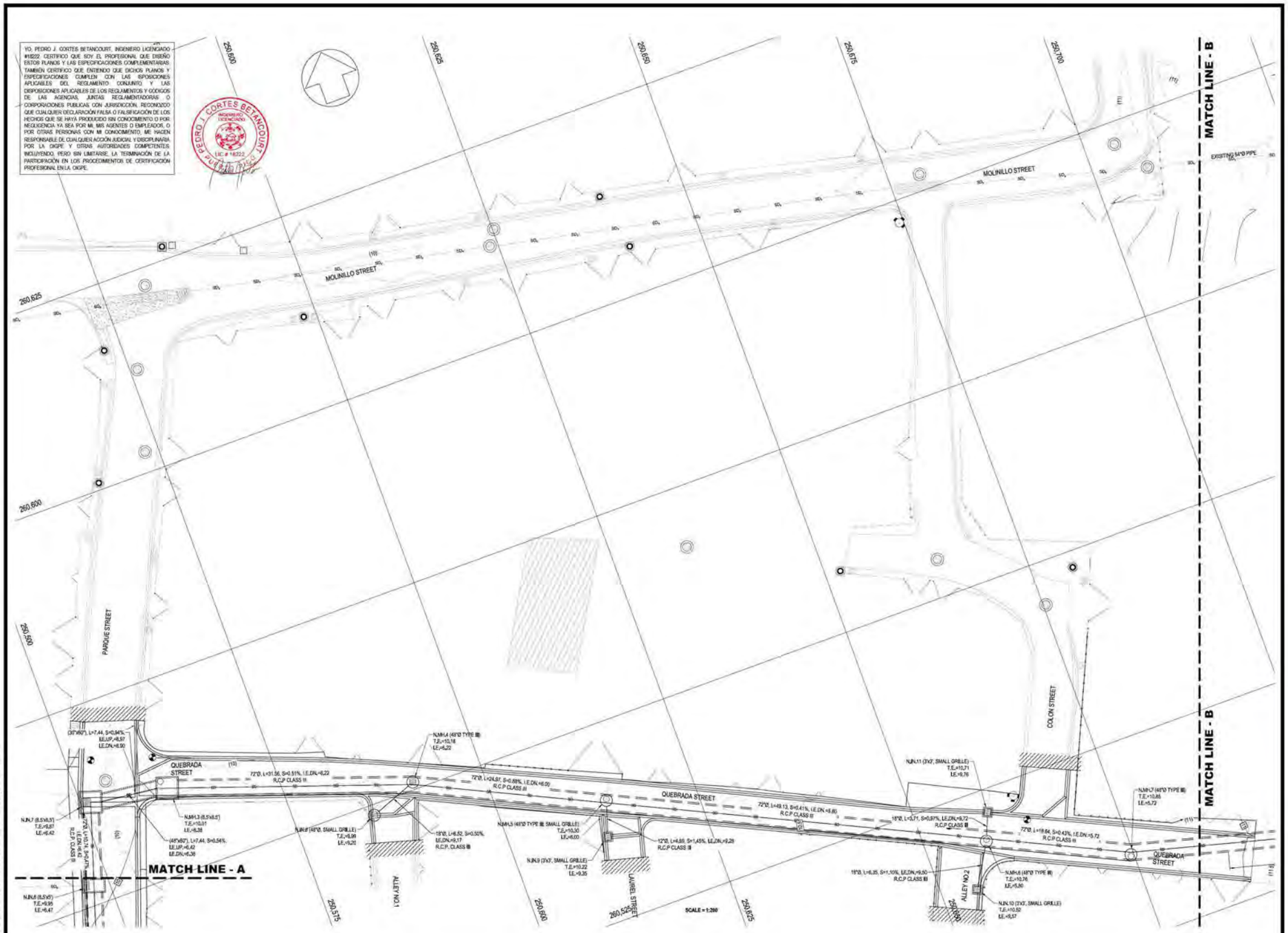

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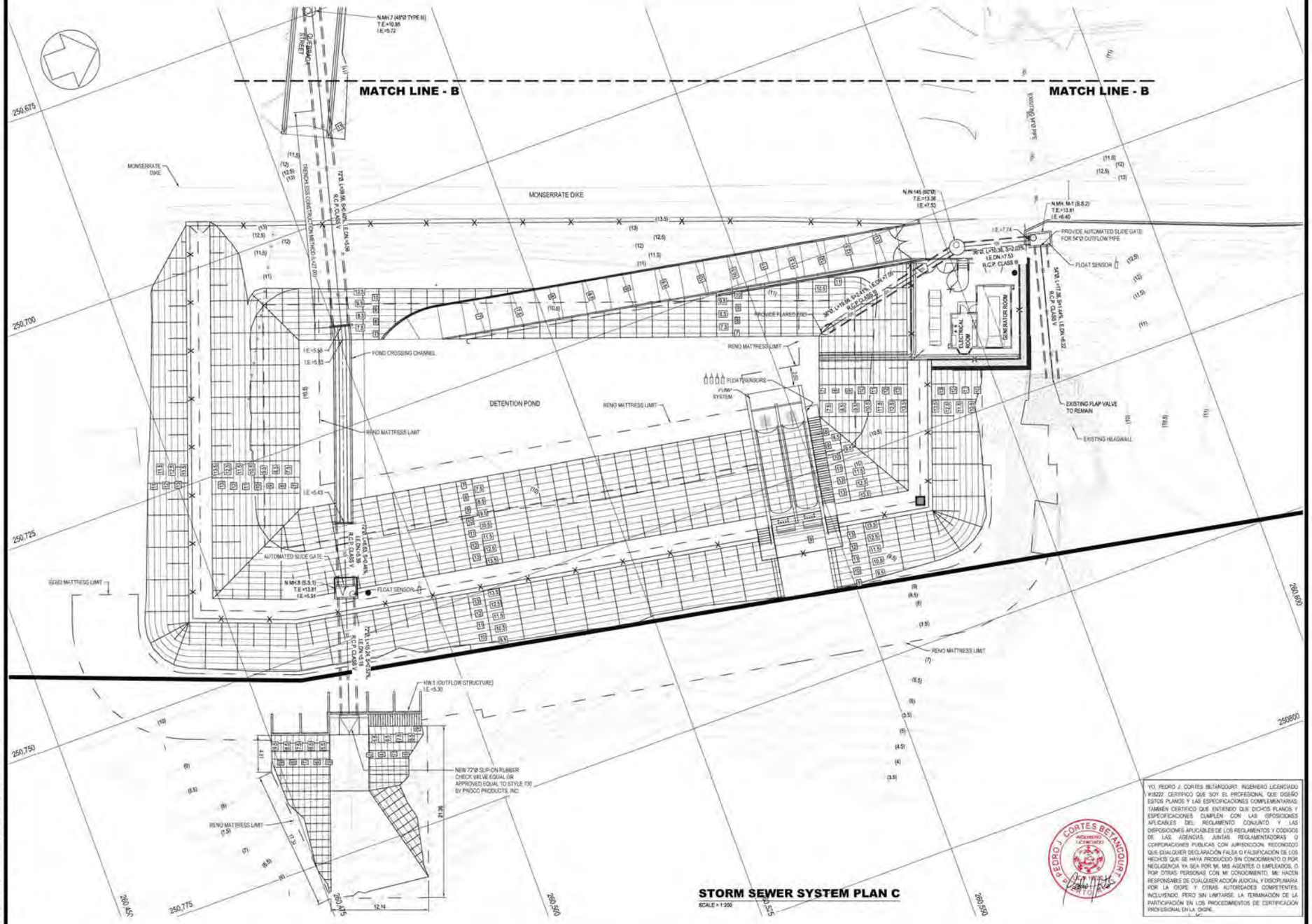
Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 5 Storm Sewer System

Sources:
1. Municipality of Carolina

FEMA

Region 2

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 6 Detention Pond



STORM SEWER SYSTEM PLAN C

SCALE = 1:200

YO, PEDRO J. CORTES BETANCOURT, INGENIERO LICENCIADO #18222, CERTIFICO QUE SOY EL PROFESIONAL QUE DISEÑÓ ESTOS PLANOS Y LAS ESPECIFICACIONES COMPLEMENTARIAS. TAMBIÉN CERTIFICO QUE ENTIENDO QUE DICHOS PLANOS Y ESPECIFICACIONES CUMPLEN CON LAS DISPOSICIONES APLICABLES DEL REGLAMENTO CONJUNTO Y LAS DISPOSICIONES APLICABLES DE LOS REGLAMENTOS Y CÓDIGOS DE LAS AGENCIAS, JUNTAS, REGLAMENTADORAS O CORPORACIONES PÚBLICAS CON JURISDICCIÓN. RECONOZCO QUE CUALQUIER DECLARACIÓN FALSA O FALSIFICACIÓN DE LOS HECHOS QUE SE HAYA PRODUCIDO SIN CONOCIMIENTO O POR NEGLIGENCIA YA SEA POR MÍ, MIS AGENTES O EMPLEADOS, O POR OTRAS PERSONAS CON MI CONOCIMIENTO, ME HACEN RESPONSABLE DE CUALQUIER ACCIÓN JUDICIAL Y DISCIPLINARIA POR LA OIGPE Y OTRAS AUTORIDADES COMPETENTES, INCLUYENDO, PERO SIN LIMITARSE, LA TERMINACIÓN DE LA PARTICIPACIÓN EN LOS PROCEDIMIENTOS DE CERTIFICACIÓN PROFESIONAL EN LA OIGPE.

Sources:
1. Municipality of Carolina

FEMA

Region 2

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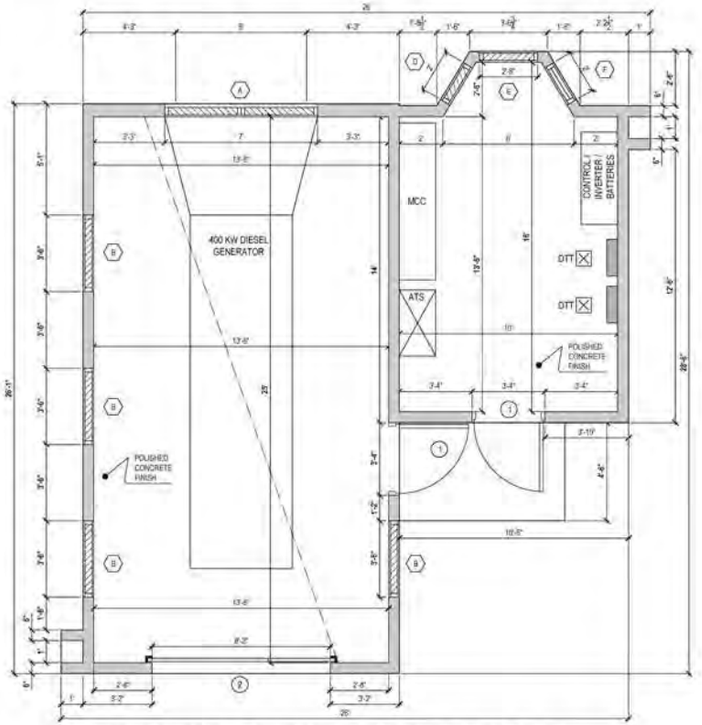
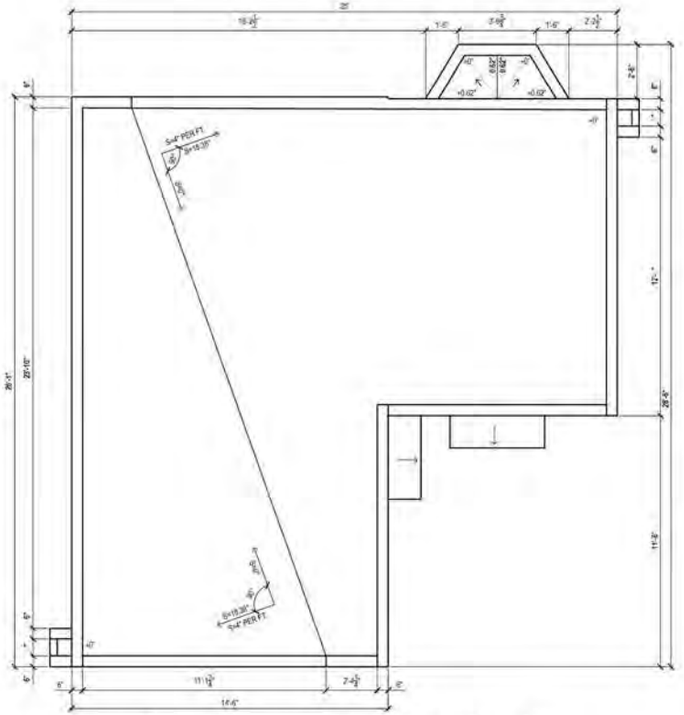


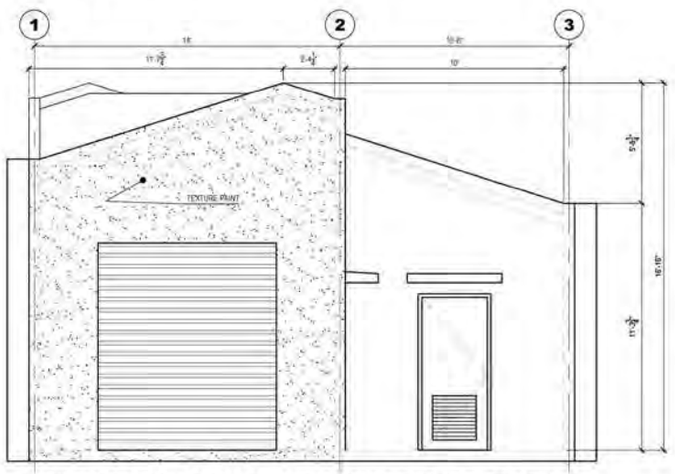
PUMP STATION SERVICE STRUCTURE FLOOR PLAN

SCALE: 3/8"=1'-0"



PUMP STATION SERVICE STRUCTURE ROOF PLAN

SCALE: 3/8"=1'-0"



PUMP STATION SERVICE STRUCTURE FRONT ELEVATION

SCALE: 3/8"=1'-0"

PUMP STATION SERVICE STRUCTURE REAR ELEVATION

SCALE: 3/8"=1'-0"

"YO, PEDRO J. CORTES BETANCOURT, INGENIERO LICENCIADO #18222 CERTIFICO QUE SOY EL PROFESIONAL QUE DISEÑO ESTOS PLANOS Y LAS ESPECIFICACIONES COMPLEMENTARIAS. TAMBIEN CERTIFICO QUE ENTIENDO QUE DICHOS PLANOS Y ESPECIFICACIONES CUMPLEN CON LAS DISPOSICIONES APLICABLES DEL REGLAMENTO CONJUNTO Y LAS DISPOSICIONES APLICABLES DE LOS REGLAMENTOS Y CODIGOS DE LAS AGENCIAS, JUNTAS, REGLAMENTADORAS O CORPORACIONES PUBLICAS CON JURISDICCIÓN RECONOZCO QUE CUALQUIER DECLARACIÓN FALSA O FALSIFICACIÓN DE LOS HECHOS QUE SE HAYA PRODUCIDO SIN CONOCIMIENTO O POR NEGLIGENCIA YA SEA POR MI, MIS AGENTES O EMPLEADOS, O POR OTRAS PERSONAS CON MI CONOCIMIENTO, ME HACEN RESPONSABLE DE CUALQUIER ACCIÓN JUDICIAL Y DISCIPLINARIA POR LA DIGPE Y OTRAS AUTORIDADES COMPETENTES, INCLUYENDO, PERO SIN LIMITARSE, LA TERMINACIÓN DE LA PARTICIPACIÓN EN LOS PROCEDIMIENTOS DE CERTIFICACIÓN PROFESIONAL EN LA DIGPE.

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 7 Pump Station

Sources:
1. Municipality of Carolina

FEMA

Region 2

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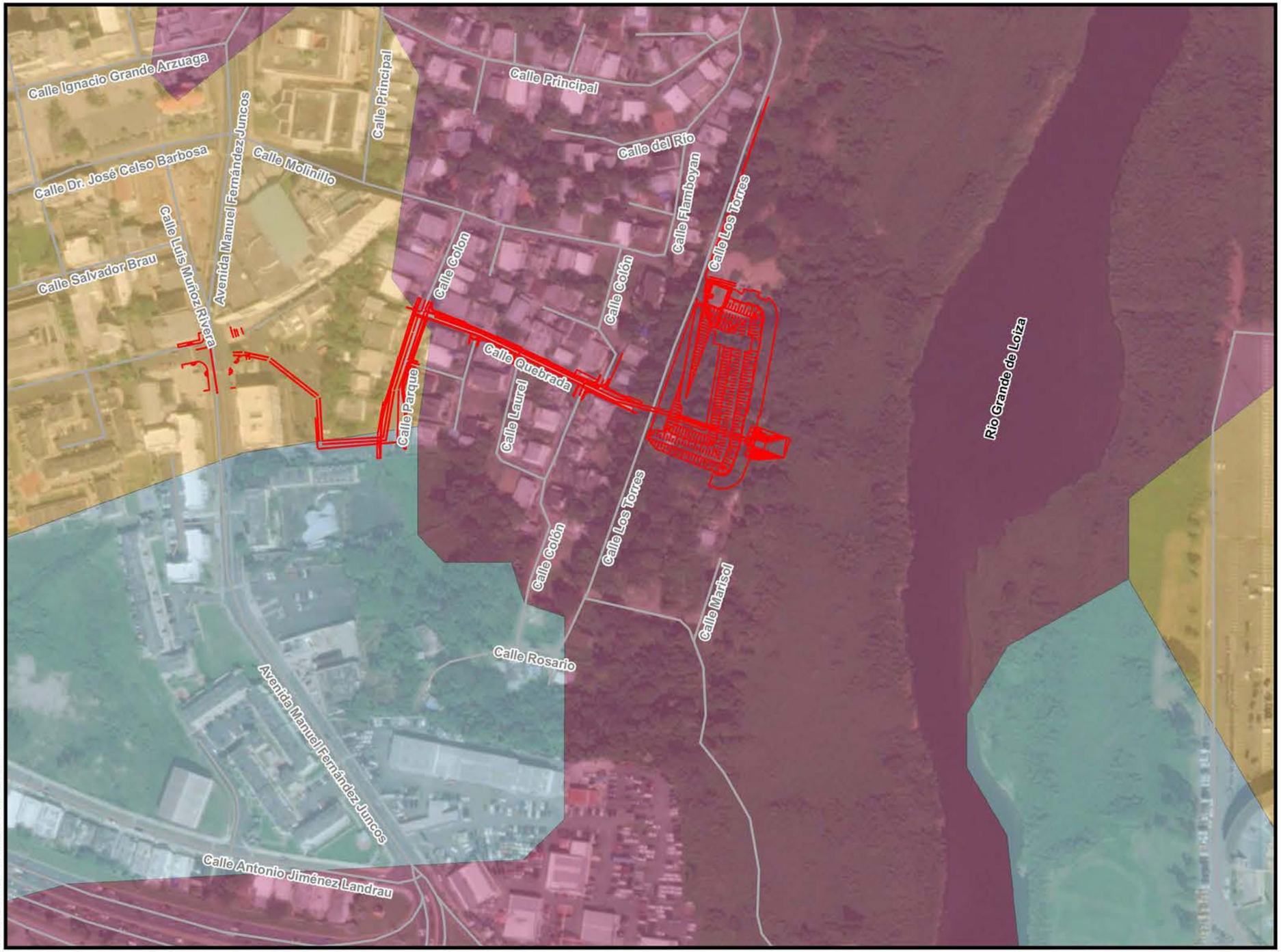

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 8 Geology

N

1 inch = 76.2 meters

0 62.5 125 Meters

0 200 400 Feet

Legend

- Project Components
- Roads

Geologic Units

- Kfr
- Kmag
- Qa

Sources:
1. USGS
2. ESRI

FEMA

Region 2

Date Saved: 1/16/2023 12:54:24 PM

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 9 Soils

N

1 inch = 76.2 meters

0 62.5 125 Meters

0 200 400 Feet

Legend

- Project Components
- Roads

Soil Map Unit

- GPQ
- Lc
- MaC2
- Tt
- Ul
- W

Sources:
1. NRCS
2. ESRI

FEMA

Region 2

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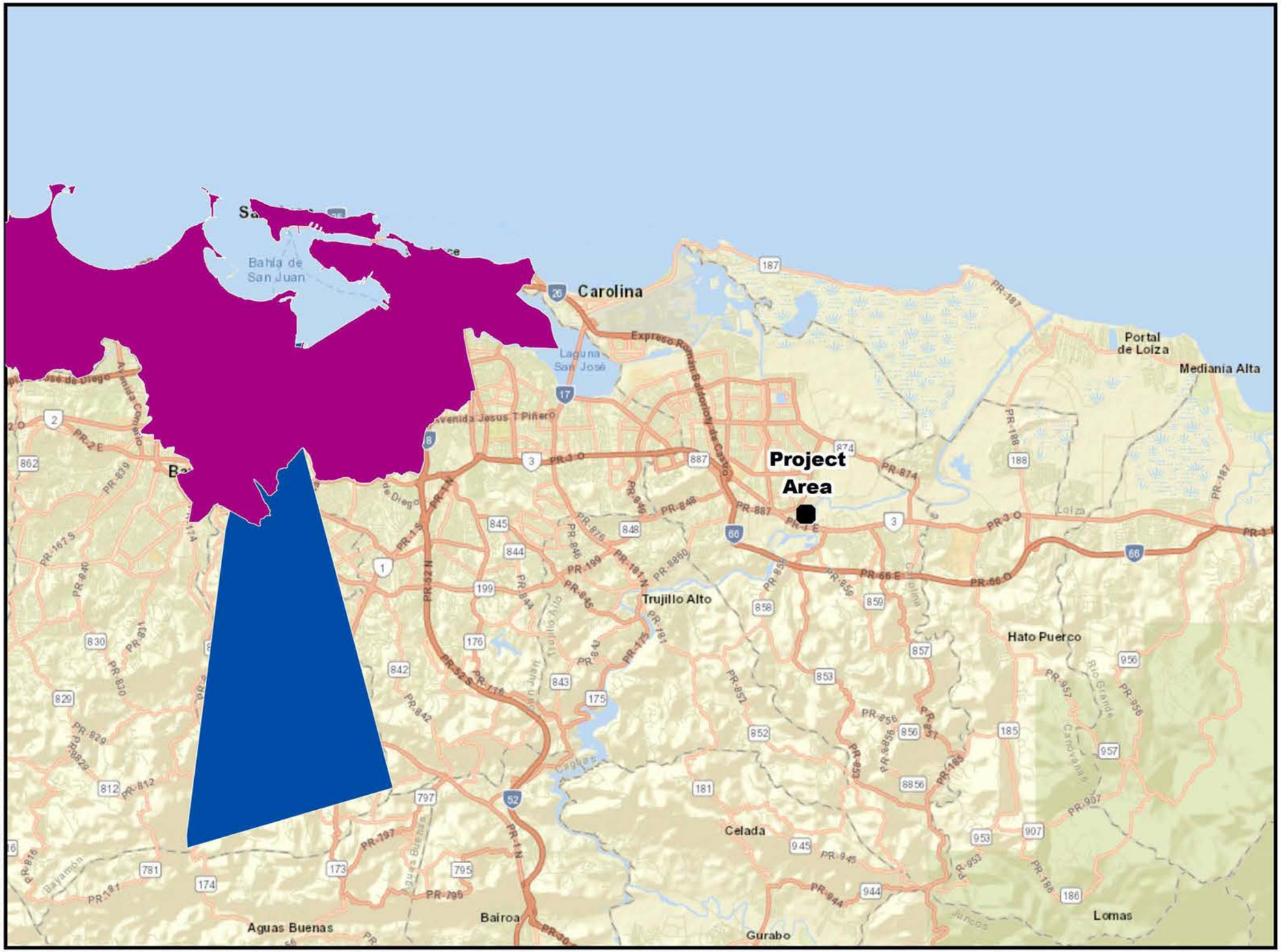

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Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 10 Air Quality

N

1 inch = 4 kilometers

0 2.75 5.5 Kilometers

0 1.5 3 Miles

Legend

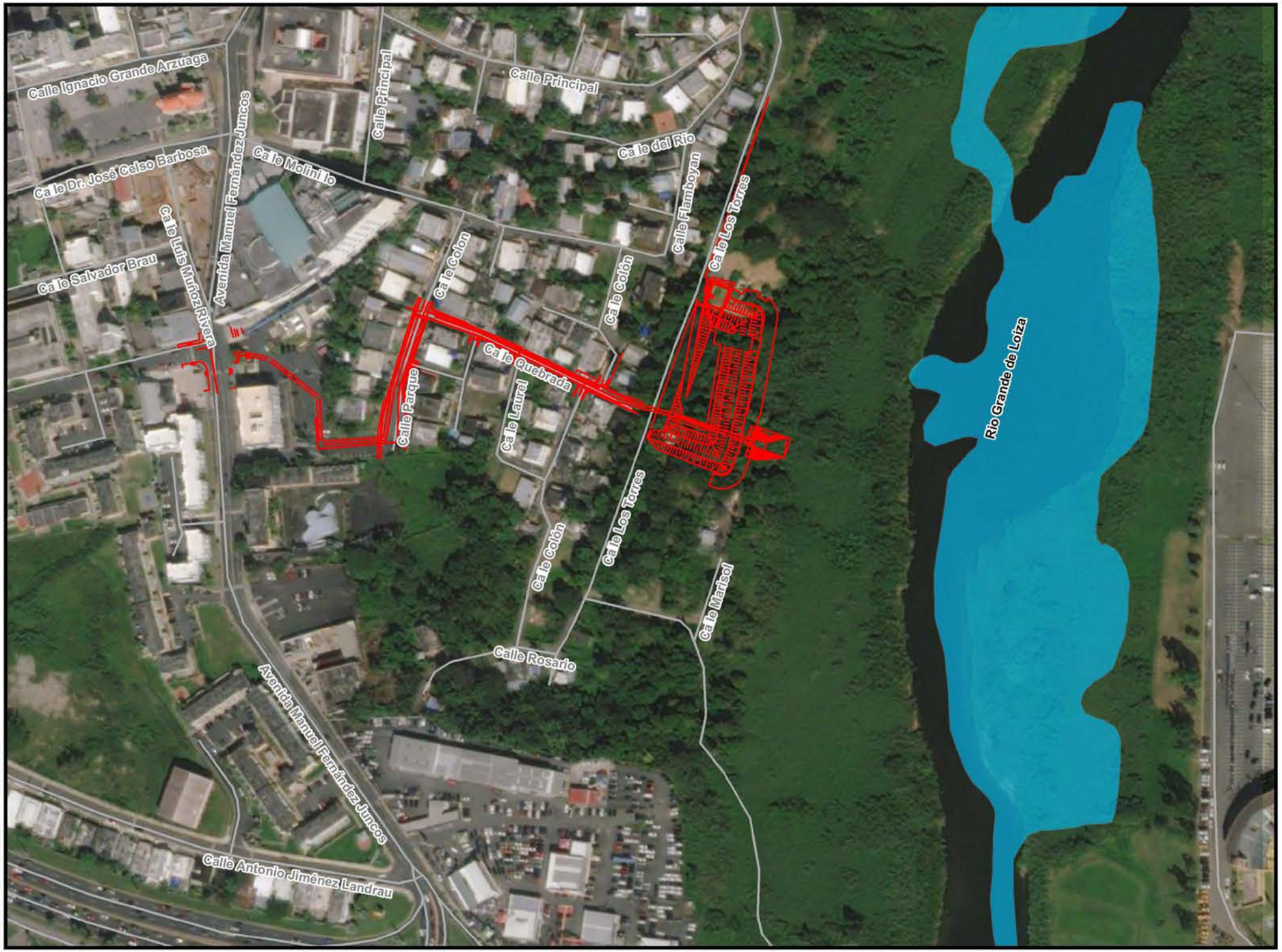
Currently Nonattainment

- PM-10 (1987)
- Sulfur Dioxide (2010)

Sources:
1. EPA
2. ESRI

FEMA

Region 2



Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 11 NWI

N

1 inch = 76.2 meters

0 62.5 125 Meters

0 200 400 Feet

Legend

- Project Components
- Riverine
- Roads

Sources:
1. USFWS
2. ESRI

FEMA

Region 2

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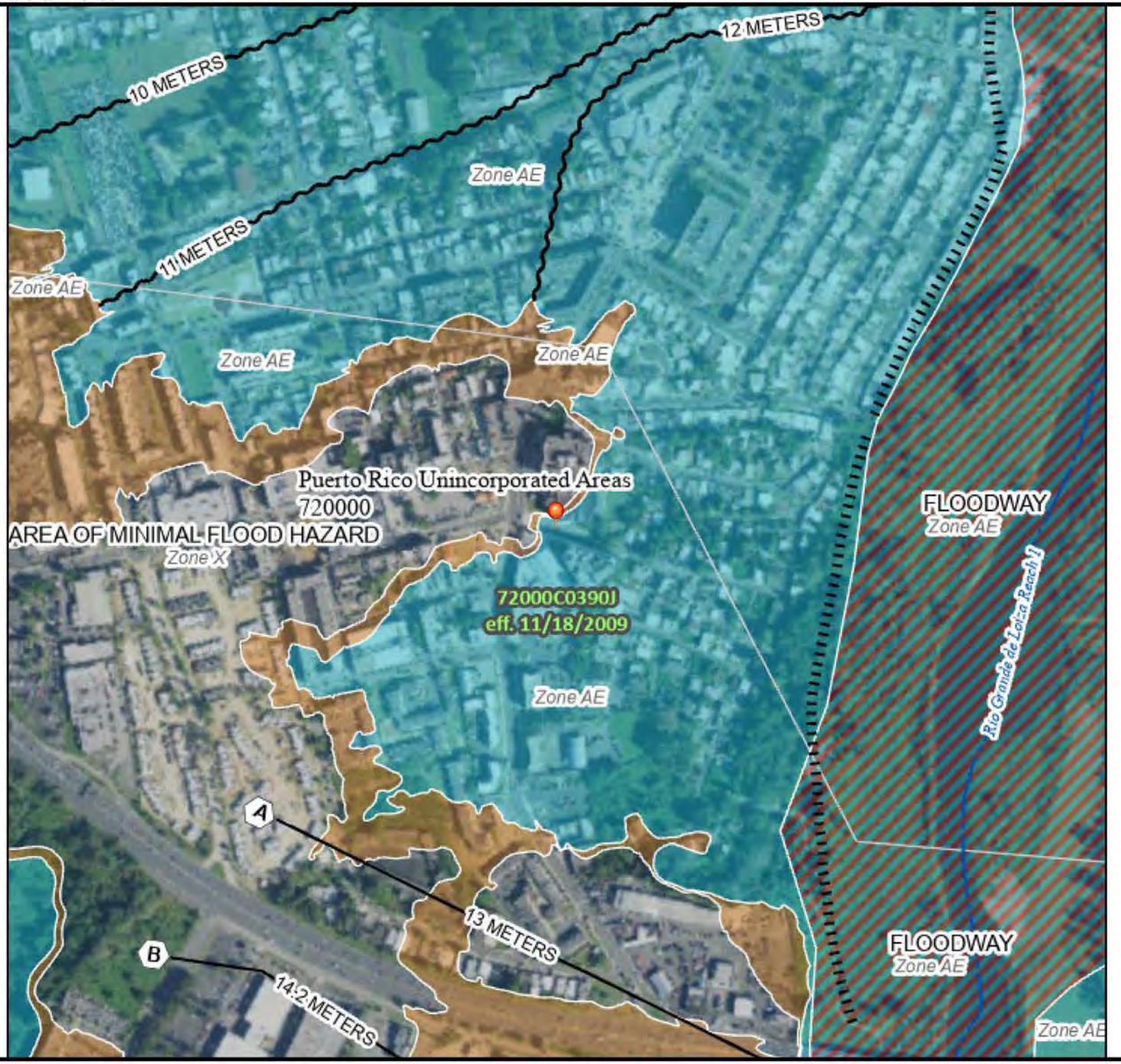

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 12 FEMA Flood Zones

Legend

Project Components

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

Sources:
1. Federal Emergency Management Agency
2. ESRI

FEMA

Region 2

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Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 13 Low Income

Legend

Low Income
(State Percentiles)

- Less than 50 percentile
- 50 - 60 percentile
- 60 - 70 percentile
- 70 - 80 percentile
- 80 - 90 percentile
- 90 - 95 percentile
- 95 - 100 percentile
- Data not available
- Project 1
- Search Result (point)

Sources:
1. EPA
2. ESRI

FEMA

Region 2

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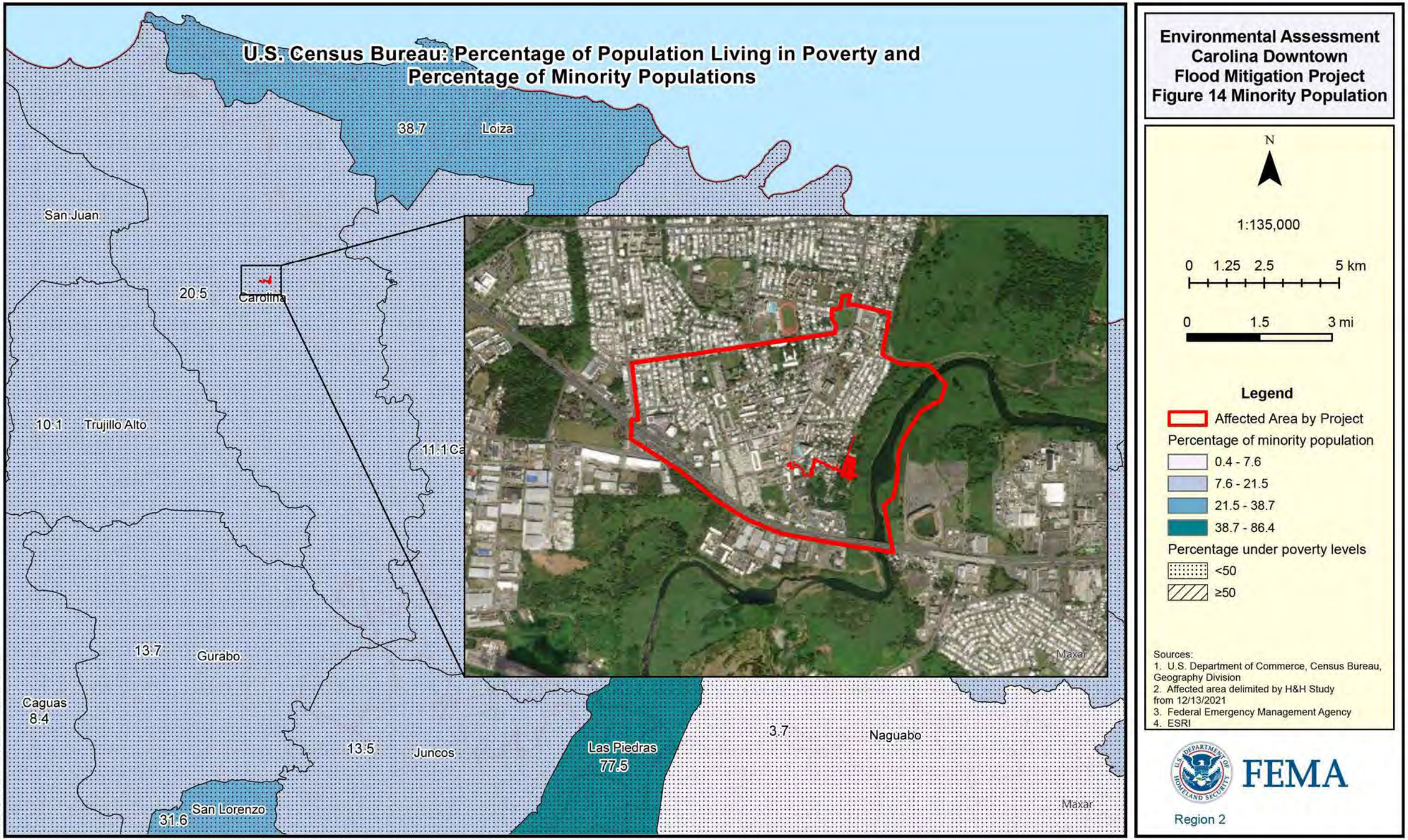

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 14 Minority Population

N

1:135,000

0 1.25 2.5 5 km

0 1.5 3 mi

Legend

- Affected Area by Project

Percentage of minority population

- 0.4 - 7.6
- 7.6 - 21.5
- 21.5 - 38.7
- 38.7 - 86.4

Percentage under poverty levels

- <50
- ≥50

Sources:
1. U.S. Department of Commerce, Census Bureau, Geography Division
2. Affected area delimited by H&H Study from 12/13/2021
3. Federal Emergency Management Agency
4. ESRI

FEMA

Region 2

Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 15 Hazardous Waste

Legend

Hazardous Waste Proximity (State Percentiles)

- Less than 50 percentile
- 50 - 60 percentile
- 60 - 70 percentile
- 70 - 80 percentile
- 80 - 90 percentile
- 90 - 95 percentile
- 95 - 100 percentile
- Data not available
- Project 1
- Search Result (point)

Sources:
1. EPA
2. ESRI

FEMA

Region 2

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Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 16 RMP Sites

Legend

RMP Facility Proximity
(State Percentiles)

- Less than 50 percentile
- 50 - 60 percentile
- 60 - 70 percentile
- 70 - 80 percentile
- 80 - 90 percentile
- 90 - 95 percentile
- 95 - 100 percentile
- Data not available
- Project 1
- Search Result (point)

Sources:
1. EPA
2. ESRI

FEMA

Region 2

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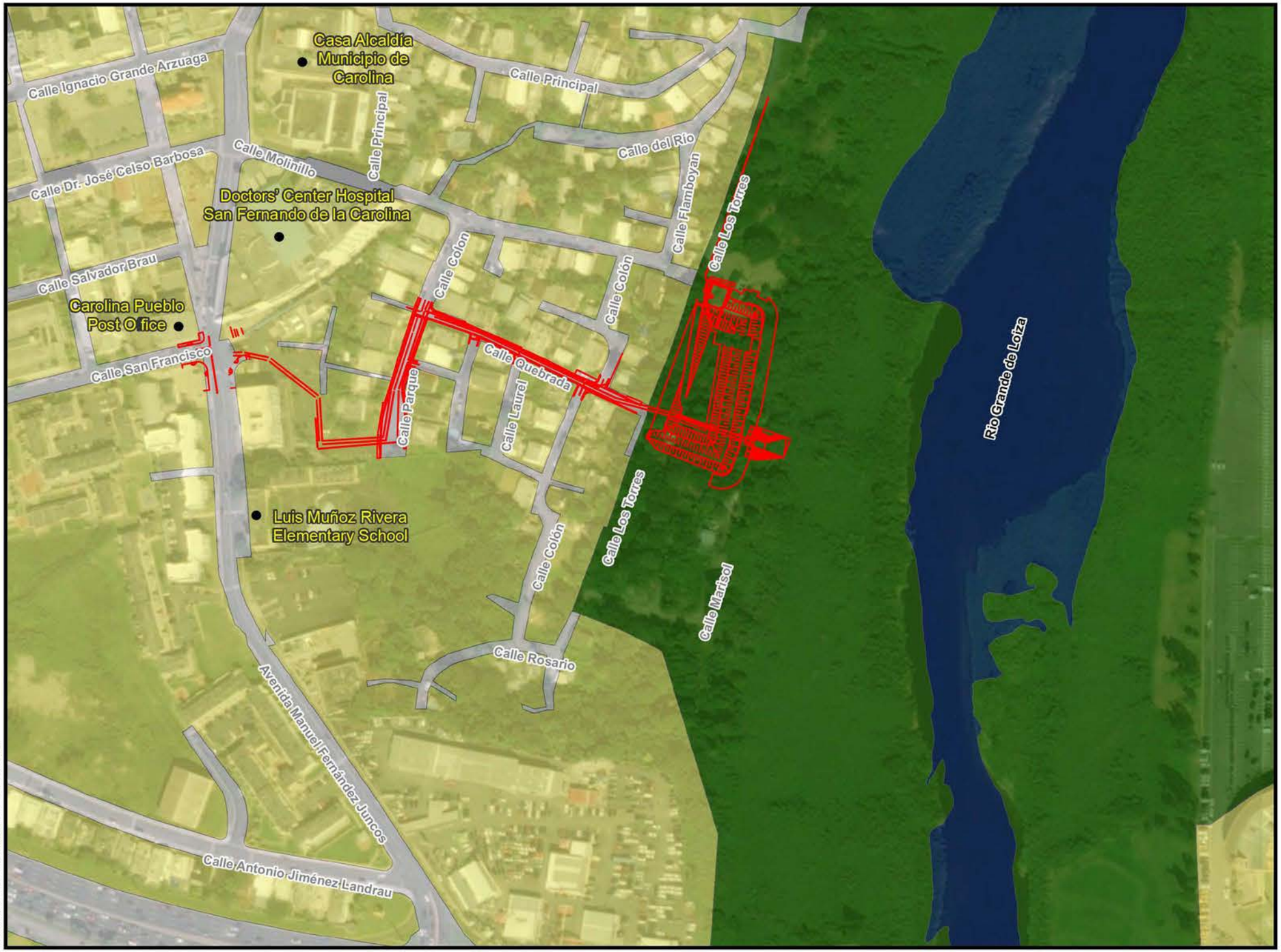

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Environmental Assessment
Carolina Downtown
Flood Mitigation Project
Figure 17 Land Use

N

1 inch = 76.2 meters

0 62.5 125 Meters

0 200 400 Feet

Legend

Project Components

Land Use

- Water
- Rustic Open Space
- Urban
- Roadway

Sources:
1. Puerto Rico Planning Board
2. ESRI

FEMA

Region 2

Appendix B: Documents

Appendix B, Document B1

Management Plan to Minimize Impact to Inhabitants and Structures During Construction, November 9, 2022 and Supplemental Revision dated December 1, 2022.

PLAN DE MANEJO PARA MINIMIZAR EL IMPACTO A HABITANTES Y ESTRUCTURAS DURANTE LA CONSTRUCCIÓN

1. El Gobierno Municipal Autónomo de Carolina (GMAC) ha coordinado, a través del diseñador, Ing. Pedro Cortés, con las agencias de utilidades básicas, para que el proyecto pueda llevarse a cabo sin que se tenga que desconectar o interrumpir los servicios básicos a ninguna de las estructuras en la comunidad, ni a las instalaciones del GMAC. Esto se logró mediante las reuniones de coordinación que llevó a cabo nuestro diseñador con las siguientes agencias: Autoridad de Acueductos y Alcantarillados (AAA), LUMA Energy, compañías de telecomunicaciones y el Departamento de Obras Públicas Municipal. La información que está incluida en los planos del proyecto y en las notas que acompañan este comunicado, salió de las reuniones con las agencias y de sus propias recomendaciones y fueron incluidas por nuestro diseñador en los documentos del proyecto.

2. Según surge de los documentos del proyecto, resaltan las siguientes instrucciones al contratista (para más detalles, referirse al comunicado adjunto):

    a. El contratista deberá proveer infraestructura temporera de alcantarillado sanitario, agua potable, energía eléctrica, telecomunicaciones y accesos temporeros, durante la construcción, para eso deberá coordinar con las entidades y agencias pertinentes.

    b. El contratista deberá implementar un Plan de Mantenimiento de Tránsito específicamente diseñado en la Avenida Fernández Juncos, para garantizar la operación adecuada del hospital y Centro de Mando de Seguridad, durante la construcción.

    c. El contratista deberá preparar Planos de Mantenimiento de Tránsito para las calles municipales, según la etapa en que se encuentre la construccion del proyecto, el cual deberá ser aprobado por la Inspección contratada, Supervisión contratada y por el Departamento de Obras Públicas Municipal.

3. Cada área de almacenaje de material y equipo, “Staging Area” será establecida según los parámetros requeridos por las regulaciones ambientales locales y federales para evitar erosión, sedimentación y polvos fugitivos. Se muestran las áreas de almacenaje en la imagen adjunta preparada por el Ing. Pedro Cortés.

4. En el área de entrada al área de construcción al este del dique se establecerá un perímetro con verja perimetral de seguridad, mallas para evitar sedimentación, rotulación de prohibición de entrada, y demás medidas de seguridad en cumplimiento con las regulaciones ambientales locales y federales.

5. Es importante recalcar que el contratista tendrá que obtener el Permiso Único Incidental (PUI) de la Oficina de Gerencia de Permisos, así como el "Stormwater Pollution Prevention Plan" (SWPPP) de la Environmental Protection Agency (EPA), y cualquier otro permiso que sea requerido, y tendrá que implementar todas las medidas de cumplimiento con dichos permisos, antes de comenzar los trabajos.

6. El acceso a la construccion al este del dique será a través de la Calle Marisol hacia detrás del dique.

7. El contratista preparará planos identificando y delimitando todos sus controles de seguridad, "buffer zones", "Staging Areas", accesos, tráfico, rutas de temporales de camiones, áreas de almacenaje de materiales, zonas de descanso, casetas, almacenamiento de uso diario aledaño a los límites de construcción al lado este del dique, y otros detalles. Dichos planos serán revisados y aprobados por la Inspección y Supervisión contratada, por el Departamento de Obras Públicas Municipal y por el Departamento de Gerencia de Proyectos, previo a su implementación.

8. El contratista preparará planes de trabajo semanal y mensual, según las directrices del GMAC, y en conformidad con las Condiciones Generales para los Contratistas del GMAC. Establecerá su horario de trabajo, velando por el mejor interés de los residentes de la comunidad y de las instalaciones criticas del GMAC. Se evitará en lo más posible trabajar en horarios nocturnos y durante fines de semana, a menos que sea conveniente o que por el tipo de trabajo a realizarse así lo amerite, para reducir el impacto al tránsito o para afectar lo menos posible a los residentes. El horario de trabajo ordinario será de 7 am a 3 pm, de lunes a viernes. Cuando sea necesario extender o alterar dicho horario, el contratista notificará a la comunidad, luego de tener la aprobación previa de la Inspección, Supervisión y del Departamento de Gerencia del Proyecto del GMAC con suficiente tiempo de anticipación, e incluirá rotulación a esos efectos.

9. En los planos del proyecto se incluye la demolición de dos estructuras y un tejado que contenía un caballo, pues están en la huella del proyecto, al este del dique, específicamente en el área de los cimientos del nuevo muro de la charca de retención. Según el informe actualizado, enviado a FEMA y COR3 el 1 de noviembre de 2022, dichas estructuras están desocupadas y el tejado de caballos fue parcialmente demolido. Además de las estructuras a demolerse, se encontraron tres estructuras, en las cuales, tres personas alegan tener pertenencias. Dichas estructuras están fuera de los límites del proyecto. Dos de las personas ocupan dos estructuras que están cercanas una a la otra, a una distancia de entre cincuenta y sesenta metros del área de construcción. Una de ellas indicó que reside en la

estructura hace muchos años y la otra indicó que está realizando gestiones para mudarse. Estas dos personas son las más cercanas al área de impacto por la construcción. Sin embargo, el proceso de la construcción no se espera que afecte dichas estructuras. El Departamento de Servicios al Ciudadano contactó a estas personas y le estará dando seguimiento al proceso de relocalización, especialmente a la persona que indicó que reside hace mucho tiempo en el lugar. Una tercera persona, tiene pertenencias en una estructura que está a una distancia de doscientos metros aproximados del área de construcción. Esta persona tiene vivienda en otro municipio, aunque interesa ser relocalizada a una égida del Departamento de la Vivienda. El Departamento de Servicios al Ciudadano estará refiriendo a esta y a las otras dos personas a las agencias pertinentes para canalizar el proceso de relocalización. Estas personas serán referidas al Departamento de Vivienda y al Departamento de la Familia, durante el transcurso del proyecto.

Anejo: Planos y Especificaciones certificados por Ing. Pedro Cortés, consultor, diseñador, GMAC

Plan Preparado por:

GOBIERNO MUNICIPAL AUTÓNOMO DE CAROLINA

Digitally signed by
Iván Ayuso Expósito
Date: 2022.11.09
08:41:14 -04'00'

Ing. Iván Ayuso Expósito
Gerente de Infraestructura, GMAC

1 de diciembre de 2022

Ing. Manuel A. J, Laboy Rivera
Director Ejecutivo
Central Office for Recovery, Reconstruction and Resiliency, COR3
Gobierno de Puerto Rico
P.O. Box 195014
San Juan, PR 00918-5014

Sr. José G. Baquero
Federal Disaster Recovery Coordinator
Joint Recovery Office Director of Puerto Rico
FEMA-4339-DR-PR/FEMA-4473-DR-PR

INFORME ACTUALIZADO SOBRE PLAN DE NOTIFICACIÓN A PARTES CON PERTENENCIAS EN EL ÁREA DEL PROYECTO CAROLINA DOWNTOWN FOOD MITIGATION PROJECT 4339-0184

Estimados señores:

En los planos del proyecto se incluye la demolición de dos estructuras y un tejado que contenía un caballo, pues están en la huella del proyecto, al este del dique, específicamente en el área de los cimientos del nuevo muro de la charca de retención. Según el informe enviado a FEMA y COR3 el 1 de noviembre de 2022, con fecha del 31 de octubre de 2022, dichas estructuras están desocupadas y el tejado de caballos fue parcialmente demolido. Las estructuras a demoler, incluidas en los planos son las siguientes:

1. Establo de caballo parcialmente demolido, alegadamente pertenece a Humberto del Valle, apodado Pachi

2. Estructura #1 abandonada que tiene pertenencias y basura del Sr. Humberto del Valle, "Pachi", el Sr. Del Valle reside en la Urb. Rosa María; la información sobre Humberto del Valle se incluyó por error en un informe anterior relacionado con la estructura #2

3. Estructura #2 abandonada, anteriormente ocupada por Nuris Albuerme Nuñez, la cual se mudó a otra vivienda que tiene mediante Sección 8 del Depto. de Vivienda; la información sobre Nuris Albuerme se incluyó por error en un informe anterior relacionada con la estructura #4

Además de las estructuras a demolerse, se encontraron tres estructuras, en las cuales, tres personas alegan tener pertenencias. Dichas estructuras están fuera de los límites del proyecto. Estas son las siguientes:

1. Estructura #3 alegadamente del Sr. Rafael Agustín esta estructura no afecta el desarrollo del proyecto. La estructura tampoco se verá afectada por el proyecto. El Sr. Agustín fue entrevistado por el personal de Servicios al Ciudadano (ver informe del 28 de octubre de 2022) y por este servidor, e indicó que está dispuesto a relocalizarse; pero con condiciones, según indicó.

2. Estructura #4 alegadamente de Edwin López, apodado Junior, (Jr.) la información del Sr. López fue confundida con la información de la estructura #2. Esta estructura no afecta el desarrollo del proyecto. La estructura tampoco se verá afectada por el proyecto. El Sr. López fue entrevistado por el personal de Servicios al Ciudadano (ver informe del 28 de octubre de 2022) y por este servidor, y le indicó a este servidor que está dispuesto a relocalizarse; pero con condiciones, según indicó.

3. Estructura #8 alegadamente tiene pertenencias del Sr. Luis Torres; Esta estructura está a una distancia de doscientos metros aproximados del área de construcción. La estructura no se afecta por la construcción, ni afecta el desarrollo del proyecto. Esta persona reside en el municipio de Trujillo Alto, aunque interesa ser relocalizada a una égida del Departamento de la Vivienda.

El Departamento de Servicios al Ciudadano (DSC) visitó y entrevistó a todas estas personas. Ninguna de ellas tiene evidencia de la titularidad de estas pertenencias, y están conscientes de que estas estructuras las expropió el gobierno de Puerto Rico. El DSC le estará dando seguimiento al proceso de relocalización. Las personas han sido visitadas, notificadas y orientadas. Sin embargo, el Gobierno Municipal Autónomo de Carolina (GMAC) solicita que se dé prioridad al proyecto, pues este beneficia a una cantidad mayor de residentes de la comunidad Villa Caridad. El Departamento de Servicios al Ciudadano estará refiriendo a estas personas a las agencias pertinentes para canalizar el proceso de relocalización. Estas personas serán referidas al Departamento de Vivienda y al Departamento de la Familia, según corresponda, durante el transcurso del proyecto.

Hemos solicitado consistentemente en las reuniones sobre el proyecto con FEMA y COR3 que el mismo pueda seguir adelante y que su desarrollo no dependa de las relocalización de las personas que invaden las estructuras #3 y # 4 y de que la persona que tiene pertenencias en la estructura #8 las remueva. Reiteramos que las estructuras #3, #4 y #8, fueron, al igual que las estructuras #1 y #2, adquiridas por el gobierno de Puerto Rico, por lo cual sus ocupantes son invasores. Estas personas han sido visitadas, informadas y orientadas sobre el proyecto que se va a llevar a cabo y se le han brindado las alternativas para relocalización. No obstante, las estructuras #3, #4 y #8 no formaban parte de nuestro plan original de notificación y/o relocalización pues ha sido nuestra solicitud de que la

responsabilidad del GMAC en este asunto se mantenga en el área determinada por la huella del proyecto. Esperamos haber aclarado todas las dudas y discrepancias en informes anteriores sobre este asunto.

Cordialmente,

Ing. Iván Ayuso Expósito
Gerente de Infraestructura

Appendix B, Document B2

Executive Order 11988, Floodplain Management Eight-Step

Carolina Downtown Flood Mitigation Project
Executive Order 11988 – Floodplain Management
Executive Order 11990 – Protection of Wetlands
Eight-Step Decision Making Process

Date: 01/16/2023

Step 1 **Determine if the proposed action is located in the base floodplain or wetlands.**

The Proposed Action is a critical action per 44 CFR 9.4 and was therefore reviewed against the 0.2% (500-Year) Floodplain. The Proposed Action aims to mitigate flooding as a result of hurricanes and severe storm events and the subsequent failure of the stormwater system which resulted in flooding the municipal downtown, nearby communities, and municipal hospital. The Proposed Action includes construction of a new stormwater system interconnected with the existing one, repair of existing storm sewer infrastructure, construction of a new detention pond including a pump station and dike, and infrastructure and telecommunications system improvements within the project limits. The new pipelines and other stormwater infrastructure would be located predominantly within existing roadways. The new detention pond would be constructed between the existing Monserrate Dike and the Rio Grande de Loiza (RGL) floodway and would receive stormwater through a gravity stormwater system. Water from the pond would be discharged to the RGL by one of two methods depending on flooding conditions in the river. In normal conditions, stormwater in the detention pond will drain by gravity through pipelines in a new structurally reinforced dike parallel to the existing Monserrate Dike. When the RGL is flooded, a valve will close the gravity system; allowing the detention pond to fill and delay discharge. The pump station would be activated and discharge water through the new dike. The project is intended to protect two facilities, Doctors' Center Hospital San Fernando de la Carolina (DCHSFC) and the Integrated Security Services and Virtual Technology Department (ISSVTD), as well as the Villa Caridad Community. The subrecipient has provided supporting documentation of previous flooding in the area.

While wetlands are not known to be present in the project area, the proposed dike and discharge headwall are located within 300 feet of riverine wetlands.

Based on a review of the FEMA Flood Insurance Rate Map panel 72000C0390J, effective November 18, 2009, retrieved from the FEMA Flood Map Service Center website (https://msc.fema.gov/portal/home) on December 13, 2022, the entire proposed project area falls within Zone AE (see Figure 1). The FEMA ABFE Map effective 4/13/2018, provides the most restrictive transects, and the closest transect south of the detention pond has an ABFE of 14.16 m for the 0.2% (500-Year) and 14.03 m for the 1% (100-Year) floodplain. The detention pond outfall structure and portions of the foundation mattress of the structurally reinforced fill dike protecting the new detention pond are located in the Floodway (see Figure 2). Table 1 lists the main project components and the GPS coordinates, ABFE designation and the presence or absence of wetlands for each component.

Table 1. Proposed work locations and their designations in the floodplain or in wetlands.

Location	Coordinates	ABFE Designation	Wetlands Designation
Stormwater Pipeline	Start: 18.379671, -65.956075 End: 18.379332, -65.953567	FIRM Zone AE	None present
Detention Pond	Corners: 18.379854, -65.952933 18.379943, -65.953289 18.379052, -65.953084 18.379208, -65.953604	FIRM Zone AE	None present
Outfall	18.379183, -65.952939	FIRM Zone AE Floodway	None present
Staging Area A	18.380105, -65.956398	FIRM Zone AE	None present
Staging Area B	18.378915, -65.954835	FIRM Zone AE	None present
Staging Area C	18.380799, -65.954542	FIRM Zone AE	None present

Figure 1: FIRMette for Carolina Downtown Flood Mitigation Project

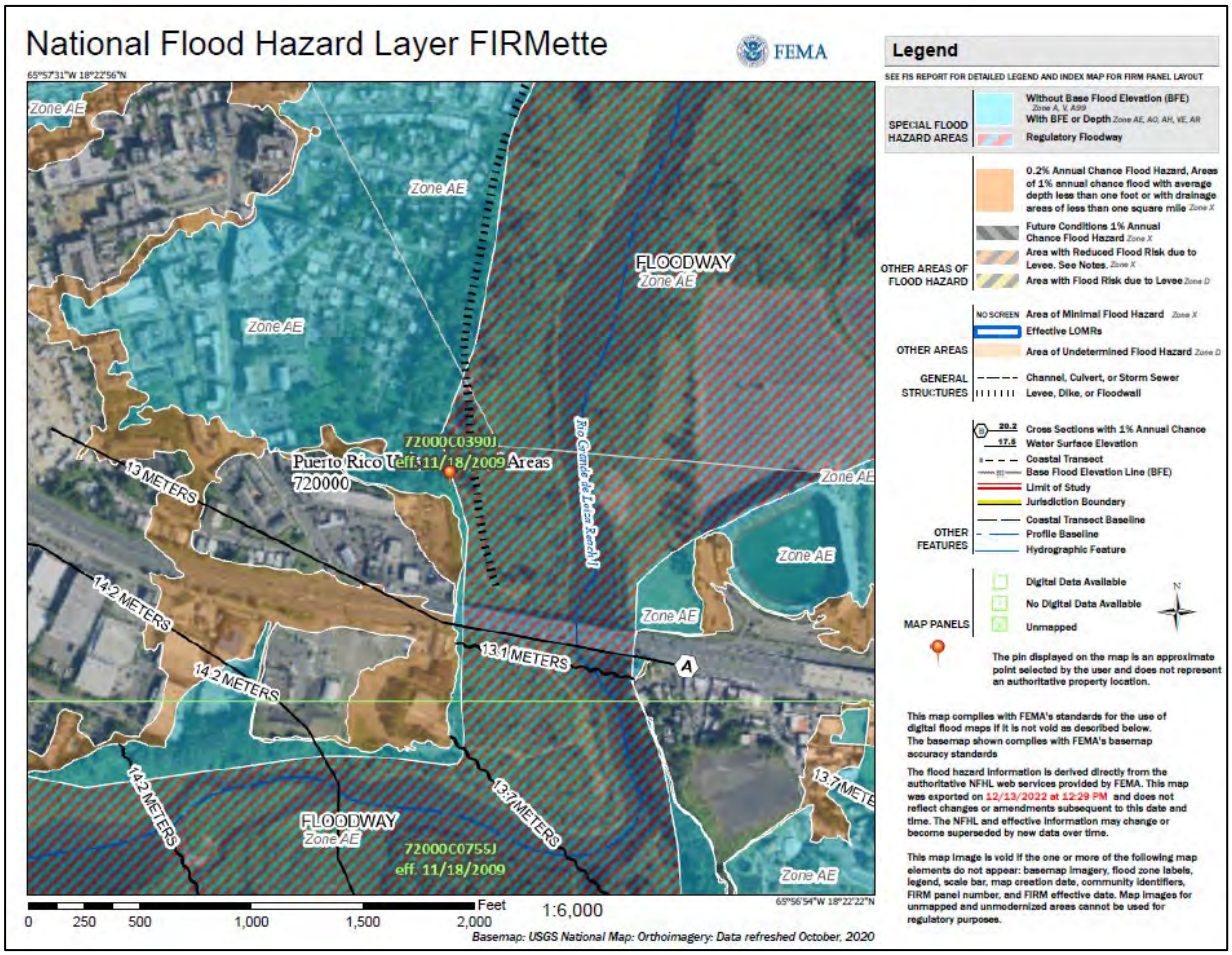
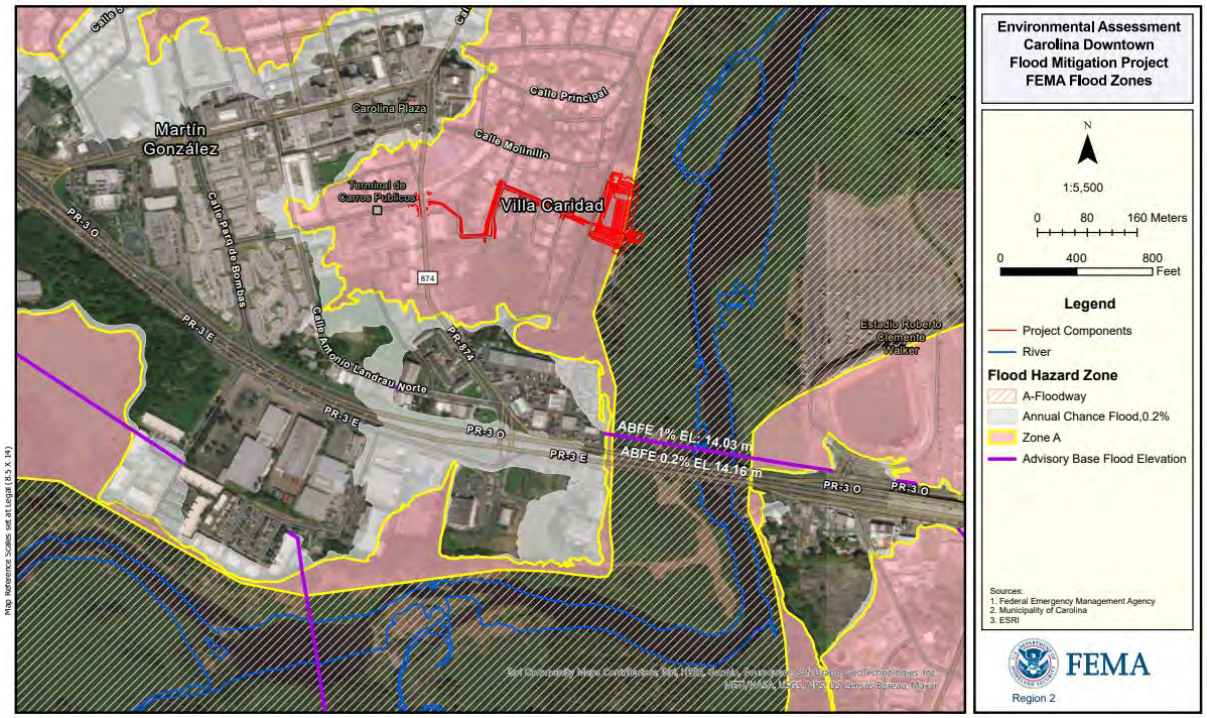


Figure 2: Project Flood Zones



***Step 2* Early public notice (Preliminary Notice).**

A disaster wide cumulative public notice was published in El Vocero newspaper on December 18, 2017.

***Step 3* Identify and evaluate alternatives to locating in the base floodplain and wetlands.**

The purpose of the Proposed Action is to reduce damage from flooding to the DCHSFC and the ISSVTD, the Villa Caridad community, and the Carolina downtown area already at risk due to their locations in the floodplain. Three alternatives were identified and evaluated under the Environmental Assessment: the No Action Alternative, the Proposed Action, and Alternative 3. There are no practicable alternatives outside the floodplain.

The No Action Alternative means there would be no federal financial assistance provided for the construction of a new stormwater and flood control system. The proposed stormwater mitigation work would remain unfunded or deferred indefinitely. According to the H&H studies completed by the subrecipient, the existing stormwater system would continue to deteriorate and remain susceptible to failure (PMG and Associates 2020; PMG and Associates 2021). The community would continue to be vulnerable to flooding that could contaminate local drinking and surface waters as well as directly and indirectly impact the health, local economy, and accessibility of the community. Due to stormwater system failures and flooding, private properties would be at continued risk from flood damages, and services and operations could be temporarily suspended at municipal offices and the DCHSFC and the ISSVTD critical facilities.

Under the Proposed Action, the Municipality of Carolina would improve infrastructure to address flooding impacts in the drainage area that lies immediately west of the Monserrate Dike. Specifically, improvements would be made to address four subdrainage zones that encompass approximately 46 hectares (114 acres) and include the DCHSFC, the government and commercial core, as well as high-density urban development. The proposed action would

include proposed improvements across an area of approximately 1.5 hectares (3.9 acres), of which approximately 0.8 hectares (2 acres) are located along existing streets in the town center of Carolina, and 0.74 hectares (1.85 acres) are located along and to the east side of the Monserrate Dike within a vegetated area adjacent to the floodplain. The detention pond would provide a storage volume of 3,700 m^3, would have an Invert Elevation (IE) of 6.5m (amsl) and would be protected by a dike above the 1% (100-Year) flood level of 13.8 m (amsl). This would isolate the pond from river flood levels. The detention pond is designed to discharge into the RGL (PMG and Associates 2021). The project would also include demolition and reconstruction of curbs, sidewalks, ramps, and pavement. To avoid impacts of flooding in the hospital basement area, an underground hospital parking entrance would be elevated at least 0.3 m above the 1% (100-Year) flood level as an additional mitigation. Improvements in the hospital parking lot area would also include demolishing and reconstructing pavement structure and asphalt, reconstruction of sanitary sewer, and partial undergrounding of the hospital's electrical outlet. The Proposed Action includes the construction of mattress and outfall structures in the floodway. There are no practicable alternatives to locating the proposed project components outside the ABFE Zones and/or wetlands to address floodplain management and wetlands protection EO 11988 and EO 11990 compliance. Proposed new construction is not in a coastal high hazard area.

The H&H study of the floodplain concluded that proposed project does not have an adverse effect in the flood levels on the RGL. If constructed outside of the floodway boundary line, the project would be in full compliance with the NFIP and local Regulation Num. 13 (PMG and Associates 2020).

Alternative 3 would include a new stormwater system interconnected with the existing system, a detention pond, and a storm sewer pump station. Under this alternative, the detention pond and pump station would be located west of Monserrate Dike. Based on this location, this alternative would include the acquisition of nine private properties where the detention pond and pump station would be located. The Municipality of Carolina determined this alternative to be technically feasible. However, Villa Caridad, where the new detention pond would be located, is a Special Community protected by laws that promote community self-management and control, which make expropriations such as property acquisition and eminent domain difficult. This alternative was dismissed based on the cost and logistics associated with property acquisition, including the need for residents to relocate from their homes.

Due to site topography, the existing Monserrate Dike, Carolina downtown services, adjacent community location and social vulnerability concerns, cost of relocation of community, hospital and other municipal essential services, and legal constrains of municipal land ownership, the Proposed Action is determined to be the most practicable alternative.

Step 4 **Identify impacts of proposed action associated with occupancy or modification of the floodplain or wetlands.**

Under the Proposed Action the new stormwater system and detention pond would be constructed within the 0.2% (500-Year) floodplain. The stormwater system would improve floodplain function by capturing high runoff flows and re-directing water towards the RGL in a controlled manner, reducing sudden flooding in the urban center of municipality. During storm events, the water surface elevations within the area would decrease due to the increased drainage and stormwater system capacity compared to existing conditions.

FEMA Hazard Mitigation Grants Program/NFIP has determined that the project complies with Part 59 and 60 of Regulation 44. Currently, the NFIP Phase 1 Conditions of Approval has not

been completed as the Municipality is pending a response from the Puerto Rico Department of Natural and Environmental Resources (PRDNER). The Municipality provided a preliminary No-Rise Certificate which states there would be no rise in flood heights due to the project. The functions of the floodplain would remain intact after project implementation.

Construction activities such as site preparation, detention pond excavation, and proposed fill could have short-term water quality impacts on municipal runoff discharges to the RGL and its riverine wetlands as a result of increased sediment from construction runoff. The subrecipient would meet all federal and state permitting requirements to prevent construction-related runoff and would implement best management practices to prevent erosion and sediment runoff into the RGL.

The Proposed Action will not adversely impact the floodplain in comparison to its pre-disaster state, therefore, it will not increase the risk of flood loss. Moreover, the Proposed Action will not result in an increase base discharge or increase the flood hazard potential to other properties and structures. The Proposed Action will minimize the impact of flood loss on human health, safety, or welfare, but will not induce future growth and development, which will potentially adversely affect the floodplain. The Proposed Action does involve fill, but it will not increase the floodplain water surface elevation and floodway levels or have any adverse effects in the flood levels on the RGL (PMG and Associates 2020). The proposed action would not create new discharge points or sources of pollution to surface waters.

The subrecipient would manage construction activities to prevent pollutants from entering stormwater runoff and thus from entering surface waters. The subrecipient would prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to construction and would implement the best management practices specified therein during construction, in accordance with requirements of the Construction General Permit. The proposed action does not restore the natural and beneficial values served by floodplains. The proposed action, however, will result in an increase to the useful life of the stormwater system. The Puerto Rico Planning Board (PRPB) determined the project is in compliance with the regulations of Planning Regulation No. 13 Regulation on Special Flood Hazard Areas.

Step 5 **Design or modify the proposed action to minimize threats to life and property and preserve its natural and beneficial floodplain or wetland or wetland values.**

The subrecipient would implement the SWPPP and best management practices specified therein during construction, in accordance with the Construction General Permit. Utility reconstruction works are proposed in accordance with Puerto Rico's planning regulations and have been evaluated by the corresponding local government agencies. The subrecipient is required to comply with requirements and conditions established by PRDNER which is currently reviewing the H&H study for NFIP determination.

Step 6 **Re-evaluate the proposed action.**

There are no practical alternatives for location of the project outside the floodplain. Alternative 3 would locate the detention pond west of Monserrate dike but due to special conditions associated with the Villa Caridad community, this alternative is not practicable.

Project work for the Proposed Action would occur in previously disturbed areas within existing road rights-of-way. The proposed project will not aggravate the current flood hazard because the staging areas and construction equipment are temporary and will not impede or redirect

flood flows. After construction, the new stormwater system would be below ground and would not impede or redirect flood flows. The proposed project will not disrupt floodplain values because it will not change water levels or permanently reduce habitat in the floodplain. The proposed project would reduce existing risk of stormwater flood hazards to the population west of Monserrate dike and would serve as additional protection from future flood hazards. There will be no impacts to wetlands. Moreover, minimization of harm to or within the floodplain can be achieved in compliance with all local and federal requirements, codes and standards, and in compliance with the terms established by FEMA and the NFIP.

Step 7 **Findings and public explanation (Final Notification).**

A disaster wide cumulative public notice was published in El Vocero newspaper on December 18, 2017. An additional project specific public notice will be provided in the public comment period for the Environmental Assessment for this project.

Step 8 **Implement the action.**

Approval is conditioned on review of implementation and post-implementation phases to ensure compliance with the requirement(s) stated in 44 CFR 9.11. The proposed project will be constructed in accordance with federal and state floodplain development requirements and other applicable laws, regulations, and executive orders, and must adhere to the grant conditions outlined in this decision document and the EA.

The subrecipient must obtain any required permits from the OGPe prior to initiating work and comply with any conditions of the permit, as well as the NFIP requirements to ensure harm to and from the floodplain is minimized.

The subrecipient is responsible for proper identification of wetlands. Under EO11990 (Protection of Wetlands); the subrecipient is responsible for coordinating with and obtaining any required Section 404 Permit(s) from the USACE prior to initiating work. The subrecipient shall comply with all conditions of the required permit.

References

PC & Associates. 2022. *Carolina Downtown Flood Mitigation Project No-Rise Certification Analysis and Documentation*.

PMG and Associates. 2020. *Hydraulic Study for the Rio Grande de Loiza Floodway – Downtown Area of the Municipality of Caroli*na. Prepared for the Municipality of Carolina.

PMG and Associates. 2021. *Hydrologic and Hydraulic Study: Drainage System Assessment and Flood Mitigation at Downtown Carolina, PR*. Prepared for the Municipality of Carolina.

Appendix C: Correspondences

Appendix C, Correspondence C1

U.S. Fish and Wildlife Section 7 Consultation

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA Region II - JRO
FEMA-4336-DR-PR / FEMA-4339-DR-PR
#50 165, Suite 3
Parque Industrial Buchanan
Guaynabo, PR 00968

November 23, 2022

Marelisa Rivera
Deputy Field Supervisor
US Fish and Wildlife Service
Caribbean Ecological Services Field Office
PO Box 491
Boquerón, PR 00622

Re: Endangered Species Act **Section 7 Informal Consultation**
FEMA HMGP DR-4339-#0184
Project 4339-DR-PR *Carolina Downtown Flood Mitigation Project*
Municipality of Carolina

Dear Ms. Rivera:

This letter is to initiate informal consultation between the Federal Emergency Management Agency (FEMA) and the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) The Municipality of Carolina (Subrecipient) has applied to FEMA under the Hazard Mitigation Grant Program (HMGP) for funding of the Carolina Downtown Flood Mitigation Project. Specifically, the Municipality of Carolina has applied for funding through the Central Office of Recovery, Reconstruction and Resiliency (COR3) (recipient). No construction work has begun for the project.

The subrecipient is requesting FEMA HMGP funds to address flooding in the downtown area of Carolina. The project location is shown in Figure 1. The project components are shown in Figure 2. The potential staging areas are shown in Figure 3. Photos of the project area are provided in Appendix B.

The proposed project would improve flooding impacts in the drainage area that lies immediately west of the Monserrate Dike. The proposed project would include improvements across an area of approximately 3.9 acres, from which 2.0 acres are located along existing streets in the town center of Carolina, and the remainder are located along and to the east side of the Monserrate Dike. Overall, the proposed project would include the construction of a new stormwater system, interconnected with the existing one, repair existing storm sewer infrastructure, construct a new detention basin, pump station, and dike, and includes improvements to the infrastructure and telecommunications system within the project limits (collectively referred to as the stormwater and flood control system).

The activities include the following components:

- Construction of the proposed stormwater system, including new cross inlets on Manuel Fernandez Juncos and San Francisco Streets to capture stormwater runoff that would be directed through box culverts to a new 1.83-meter (m) (72-inch [in]) diameter pipe. This new pipeline would be routed through the existing parking lot of the Doctors' Center Hospital San Fernando de la Carolina (DCHSF) and Integrated Security Services and Virtual Technology Department, along Parque Street and Quebrada Street where it would discharge into a new detention basin located immediately east of and adjacent to the Monserrate Dike. Catch basins and storm sewer manholes would be added to connect the 1.83-m (72-inch) pipe sections and would interconnect the new stormwater system with the existing system. Additionally, a new 0.91-m (36-inch) diameter pipe

would connect the existing storm sewer system on Molinillo Street to the proposed new detention basin. All the proposed work is located within the existing roadways, parking lots, and right-of-way (ROW). See Appendix B, Photos 1 and 2.

- Construction of a new detention basin to receive the runoff that would eventually discharge via by a 1.83-m (72-inch) gravity pipe, and a new pump system that would push water through the Monserrate Dike to the Rio Grande de Loiza. The new pumping station would also include emergency generators, fences and gates, sidewalks and vehicular access, lighting and water service, and stormwater pipes to interconnect the new storm sewer system with the existing one.
    - Site construction for the detention basin and pump station would include clearing and grubbing of approximately 1.5 acres of tropical moist forest vegetation. This area is located along the western bank of the Rio Grande de Loiza and east of Los Torres Street. Additional vegetated areas in the vicinity of the detention basin footprint would be subject to short-term impacts as a result of construction activities, such as trenching or materials staging. The detention basin would be accessed along the existing asphalt road (Los Torres Street) on top of the Monserrate Dike.
    - Additional site construction within the proposed footprint of the detention basin would include the demolition of any illegal existing structures.
- Construction of a new dike to protect the detention basin.
- Clearing and grubbing of approximately 1.5 acres of tropical moist forest vegetation for construction of the detention basin and pump station. This area is located along the western bank of the Rio Grande de Loiza and east of Los Torres Street. Additional vegetated areas in the vicinity of the detention basin footprint would be subject to short-term impacts as a result of construction activities, such as trenching or materials staging. See Appendix B, Photos 4, 5, and 6.
- Cleaning of the existing 48-inch and 54-inch stormwater pipes located behind the DCHSF and along Molinillo Street in the Villa Caridad Community.
- Relocation and reconstruction of affected infrastructure, including relocation of underground power, telecommunication, and aqueduct lines on Manuel Fernandez Juncos Street due to the construction of new cross inlets; reconstruction of the existing aerial electrical, aerial telecommunication, and aqueduct and sanitary sewer systems within the Villa Caridad Community; and work outside of the immediate project area to provide the required voltage and telecommunications for the new storm sewer system and pump station. Reconstruction of aqueduct and sanitary sewer systems within the Villa Caridad Community would include sanitary connections; drinking water, sanitary and drinking water distribution pipes; fire hydrants; valves; and thrust blocks. The project would also include concrete protections for surface pipes and potable water pipes, relocation of the drinking water pipe in the detention basin area, and a new potable water connection to serve the pumping station.
- Three possible staging areas have been identified. One staging area would be located next to the U.S. Post Office on San Francisco Street and would also include an inspection office. A second staging area would be on an undeveloped parcel located northeast of the intersection of Molinillo and Principal Streets. A third staging area (for the contractor) would be within the land behind a school located on Manuel Fernandez Juncos Street (Luis Munoz Rivera Elementary School), which is currently undergoing renovation (see Appendix A, Figure 3 and Appendix B, Photo 3).

The subrecipient proposes the following mitigation measures:

- Prepare a stormwater pollution prevention plan prior to construction and implement the Best Management Practices specified therein during construction, in accordance with requirements of the Construction General Permit. This would include the installation of sediment control structures (e.g., silt fence, straw bales, bio-nets) around all areas of exposed slopes to reduce the risk of soil erosion and the movement of sediment into surface waters.
- Revegetate temporarily disturbed areas using native species.

LISTED SPECIES

Using the USFWS Information for Planning and Consultation (IPaC), provided in Appendix C, a preliminary Section 7 of the ESA compliance review identified one (1) federally listed species located in the action area: *Chilabothrus inornatus* (Puerto Rican boa).

DETERMINATION OF EFFECTS

A descriptive study of flora and fauna at the project site was performed in May 2021 (Coll Rivera Environmental 2021). The study report is provided in Appendix D. Based on the survey, there are no natural habitats of high ecological value at the project site and plant and animal species observed during the study represent common species typical of urbanized and disturbed environments. No federally listed species were observed during the survey. However, the study recommends that measures be implemented to protect the *Chilabothrus inornatus* (Puerto Rican boa).

As described below, FEMA conducted an evaluation of the project's potential effects on *Chilabothrus inornatus* (Puerto Rican boa) and determined the project would be **Not Likely to Adversely Affect (NLAA) with Conditions** for *Chilabothrus inornatus* (Puerto Rican boa).

According to the USFWS Species Status Assessment, *Chilabothrus inornatus* (Puerto Rican boa) is widely distributed across Puerto Rico and tolerates a wide variety of habitat types, including rocky areas and haystack hills, trees and branches, rotting stumps, caves, plantations, various types of forested areas such as karst and mangrove forests, forested urban and rural areas, and along streams and road edges. Suitable habitat for the Puerto Rican boa exists at the proposed detention basin location Although the Puerto Rican boa was not encountered during the biological survey of this area, the species is generally difficult to detect because of its high degree of inactivity and cryptic coloration. Therefore, given the presence of suitable habitat in the eastern portion of the action area, some potential for the Puerto Rican boa to occur may be reasonably assumed. If the species is present in the project area, potential effects during construction include:

- Potential direct harm or mortality during ground disturbance and vegetation removal to boas sheltering in vegetation, under equipment, or in material stockpiles.
- Potential direct harm or mortality during construction due to noise and general human activity that could also cause Puerto Rican boas to move away from sources of disturbance into nearby human-inhabited areas where they could be killed or injured by vehicles or illegally captured. However, Puerto Rican boas are generally expected to avoid injury or mortality by avoiding or leaving construction areas and moving to similarly suitable forested habitat located immediately outside the project area.
- Potential indirect effects from permanent loss of habitat due to construction of the proposed detention basin. However, large areas of suitable forested habitat are located immediately outside the project area.

Based on site characteristics and to avoid any adverse effect on the Puerto Rican (PR) boa, the Applicant shall comply with the following conservation measures:

1. Inform all personnel about the potential presence of the PR boa in areas where the proposed work will be conducted. Photographs of the PR are to be prominently displayed at the site. The recipient must ensure that project personnel is able to correctly identify a PR boa. For information on PR boa, please visit: https://ecos.fws.gov/ecp/species/6628.
2. Prior to any construction activity, including removal of vegetation and earth movement, the boundaries of the project area must be delineated, buffer zones, and areas to be excluded and protected, should be clearly marked in the project plan and in the field to avoid further habitat degradation into forested areas. Once areas are clearly marked, and prior to any construction

activity, including site preparation, project personnel able to correctly identify a PR boa must survey the areas to be cleared to ensure that no boas are present within the work area. Vehicle and equipment operation must remain on designated access roads/paths and within rights-of way.

3. If a PR boa is found within any of the working or construction areas, activities should stop in the area where the boa was found. Do not capture the boa. If boas need to be moved out of harm's way, project personnel designated by the recipient shall immediately contact the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal (PRDNER phone #s: 787-724-5700, 787-230-5550, 787-771-1124). If immediate relocation is not an option, project-related activities at this area must stop until the boa moves out of harm's way on its own.
4. Measures should be taken to avoid and minimize PR boa casualties by heavy machinery or motor vehicles being used on site. Any heavy machinery left on site (staging) or near potential PR boa habitat (within 50 meters of potential boa habitat), needs to be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the equipment. If PR boas are found within vehicles or equipment, do not capture the animal and let it move on its own or call PRDNER Rangers for safe capture and relocation of the boa (PRDNER phone #s: 787-724-5700, 787-230-5550, 787-771-1124). If not possible, the animal should be left alone until it leaves the vehicle on its own.
5. PR boas may seek shelter in debris piles. Measures should be taken to avoid and minimize boa casualties associated with sheltering in debris piles as a result of project activities. Debris piles should be placed far away from forested areas. Prior to moving, disposing or shredding, debris piles should be carefully inspected for the presence of boas. If PR boas are, found within debris piles, do not capture the animal and let it move on its own or call PRDNER Rangers for safe capture and relocation of the animal. If debris piles will be left on site, they should be placed in areas that will not be disturbed in the future.
6. For all boa sightings (dead or alive), personnel designated by the recipient must record the time and date of the sighting and the specific location where the boa was found. Data should also include a photo of the animal dead or alive, and site GPS coordinates, and comments on how the animal was detected and its behavior. If the PR boa was accidentally killed as part of the project actions, please include information on what conservation measures had been implemented and what actions will be taken to avoid further killings. All boa-sighting reports should be sent to the USFWS Caribbean Ecological Services Field Office, Marelisa Rivera – Deputy Field Supervisor, 787-851-7297 extension 206, 787-510-5207, marelisa_rivera@fws.gov.

Given the project location and based on the proposed project activities; **FEMA is requesting concurrence for determination that the proposed action *May Effect but is Not Likely to Adversely Affect* the** *Chilabothrus inornatus* (Puerto Rican boa) under the jurisdiction of the USFWS with the application of the conservation measures specified above.

Attached you will find maps and photos depicting the proposed project. Should you have any questions please contact Monica Roumain, Environmental Planning and Historic Preservation Supervisor at fema-ehp-dr4339@fema.dhs.gov or (202) 706-4627.

Thank you for your assistance.

Sincerely,

JORGE A RODRIGUEZ

Digitally signed by JORGE A RODRIGUEZ
Date: 2022.11.23 14:42:48 -04'00'

Jorge A. Rodriguez Lopez
Director, Environmental & Historic Preservation Division
DR-4336 & 4339-PR (Hurricanes Irma/María)
DR-4473-PR (Earthquakes)

APPENDICES

Appendix A. Figures
Appendix B. Photos of the Proposed Project Area
Appendix C. USFWS IPaC Species List
Appendix D. Descriptive Study of Flora and Fauna

REFERENCES

Coll Rivera Environmental. 2021. Descriptive Study of Flora and Fauna. Improvements to the Flood Control System of Downtown Carolina, Municipality of Carolina, Puerto Rico. Prepared for: Autonomous Municipal Government of Carolina. July 2021.

USFWS IPaC Information for Planning and Consultation. https://ecos.fws.gov/ipac/.

USFWS. 2021. Species status assessment report for the Puerto Rican boa (*Chilabothrus inornatus*). Version 1.2. April 2021. Boquerón, PR. 67 pp.

APPENDICES

Appendix A. Figures

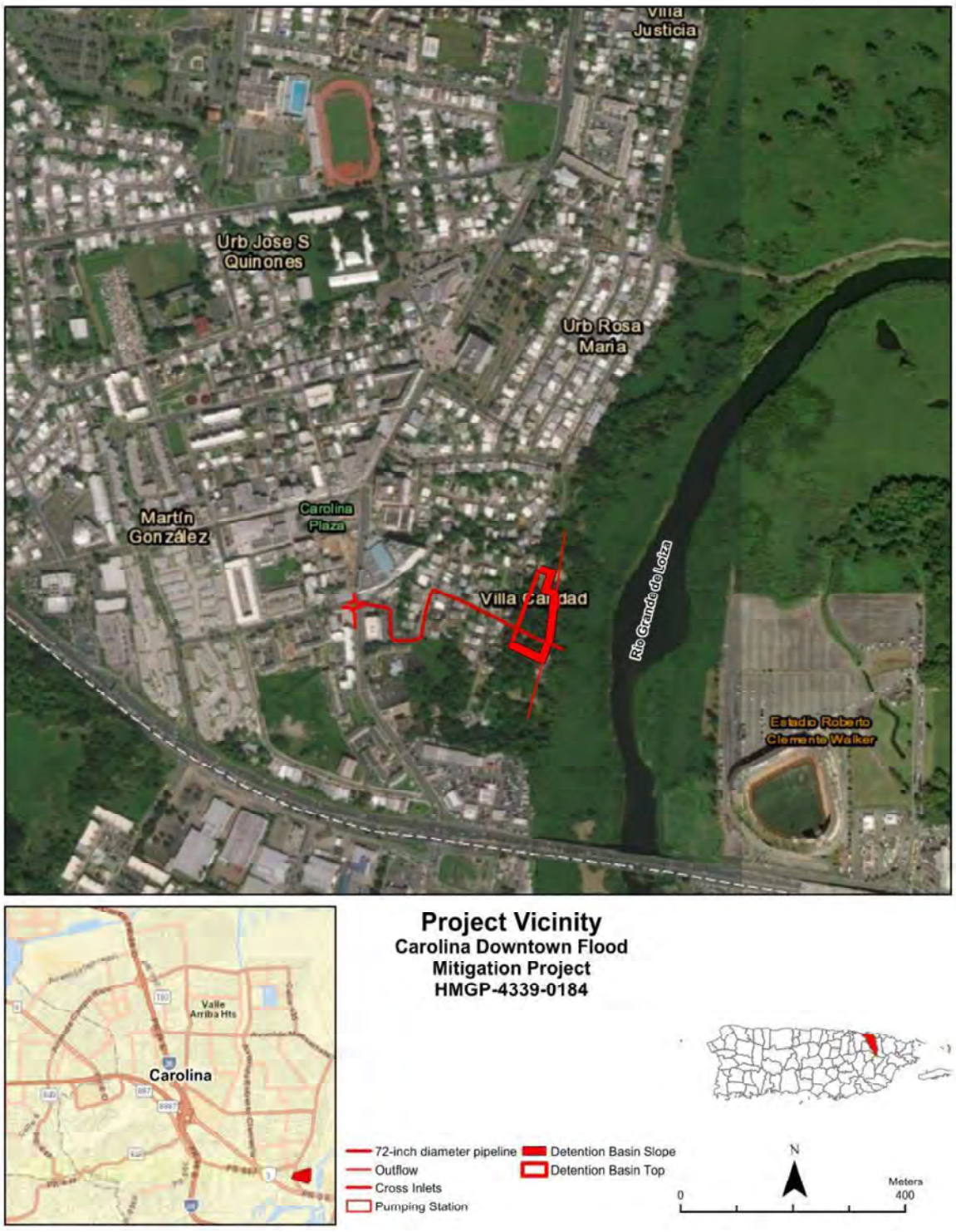


Figure 1. Proposed Project Location

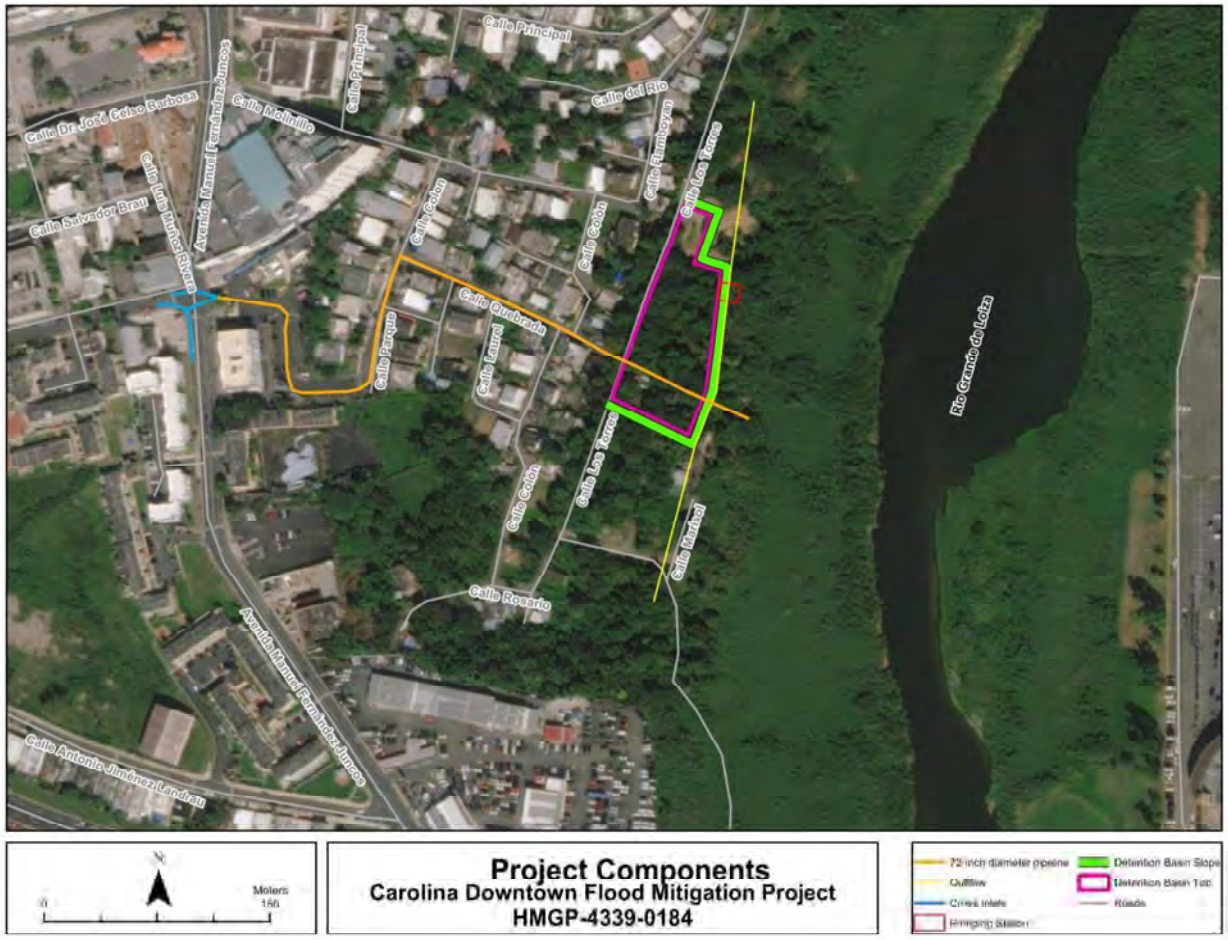


Figure 2. Proposed Project Components

Figure 3. Proposed Project Components with Staging Areas.

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA Region II - JRO
FEMA-4336-DR-PR / FEMA-4339-DR-PR
#50 165, Suite 3
Parque Industrial Buchanan
Guaynabo, PR 00968

Appendix B. Photos of the Proposed Project Area

Photo 1. Portion of Project Area at Intersection of Parque and Quebrada Streets

Photo 2. Portion of Project Area at Intersection of Quebrada and Los Torres Streets

Photo 3. Potential Staging Location

Photo 4. Vegetation within Proposed Detention Basin Location

Photo 5. Vegetation within Proposed Detention Basin Location

Photo 6. Vegetation within Proposed Detention Basin Location

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Federal Emergency Management Agency
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Guaynabo, PR 00968

Appendix C. USFWS IPaC Species List

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS offce(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Carolina County, Puerto Rico

Local office

Caribbean Ecological Services Field Office

- (787) 851-7297
- (787) 851-7440

MAILING ADDRESS
Post Offce Box 491
Boqueron, PR 00622-0491

PHYSICAL ADDRESS
Carr 301, Km 5.1, Bo Corozo
Boqueron, PR 00622-0510

http://www.fws.gov/caribbean/es

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local offce and a species list which fulfills this requirement can only be obtained by requesting an offcial species list from either the Regulatory Review section in IPaC (see directions below) or from the local field offce directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an offcial species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an offce of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Reptiles

NAME	STATUS
Puerto Rican Boa Epicrates inornatus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6628	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

THERE ARE NO MIGRATORY BIRDS OF CONSERVATION CONCERN EXPECTED TO OCCUR AT THIS LOCATION.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there,

and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Caribbean Ecological Services
Field Office
P.O. Box 491
Boqueron, PR 00622

In Reply Refer To:
FWS/R4/CESFO/72031-052

Mr. Jorge A. Rodríguez López
Director, Environmental & Historic Preservation
Federal Emergency Management Agency
#50 165, Suite 3, Parque Industrial Buchanan
Guaynabo, PR 00968

Re: ESA Consult 4339-0184 Carolina Downtown

Dear Mr. Rodríguez:

This is in reply to your request for consultation for the above referenced project. Our comments are issued as technical assistance in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (16 U.S.C. 1531 et seq. as amended).

The Municipality of Carolina has applied to FEMA under the Hazard Mitigation Grant Program for funding of the Carolina Downtown Flood Mitigation Project. This project consists of the construction or improvement of storm sewers in the downtown area to discharge into a proposed detention basin, construction of pump house and levees. Relocation of utility lines is also proposed.

Site construction for the detention basin and pump station would include clearing and grubbing of approximately 1.5 acres of tropical moist forest vegetation. However, this area has been subject to past levee construction, illegal structures and other activities.

FEMA has identified the Puerto Rican boa *Chilabothrus inornatus* as possibly being within the detention basin construction area due to the forested nature of the site. FEMA will require the Municipality to implement PR boa conservation measures as part of the grant agreement. Based on the implementation of these measures, FEMA has determined that the proposed project may affect, but is not likely to adversely affect the PR boa.

We have reviewed the information provided in your letter and our files and concur with your determination that the proposed action may affect, but is not likely to adversely affect, the above referenced species.

In view of this, we believe that requirements of section 7 of the Endangered Species Act (Act) have been satisfied. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner that was not previously considered; (2) this action is subsequently modified in a manner not previously considered in this assessment; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

Thank you for the opportunity to comment on this action, if you have any questions please contact Felix Lopez of my staff at (305) 304-1128.

Sincerely yours,

Edwin E. Muñiz
Field Supervisor

fhl
cc:
DNER, San Juan
PRPB, San Juan

Appendix C, Correspondence C2

Section 106 National Historic Preservation Act Consultation

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA Region 2 - JRO
FEMA-4336/4339/4473-DR-PR
#50 165, Suite 3
Parque Industrial Buchanan
Guaynabo, PR 00968

December 6, 2022

Carlos Rubio Cancela
State Historic Preservation Officer
Puerto Rico State Historic Preservation Office
P. O. Box 9023935
San Juan, Puerto Rico 00902-3935

Section 106 Consultation : FEMA-4339-DR-PR
Project Number: HMGP-DR-4339-0184
Sub-Recipient: Municipality of Carolina
Undertaking: Carolina Downtown Flood Mitigation Project
Coordinates: 18.379888, -65.953227
Findings of Effect: No Historic Properties Affected

Dear Mr. Rubio-Cancela:

The Federal Emergency Management Agency (FEMA) will be providing funds authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended, in response to the major Disaster Declaration for FEMA-4339-DR-PR, dated September 20, 2017, as amended. The Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Stafford Act, 42 U.S.C. 5170c. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. FEMA, through its HMGP, proposes to fund the HMGP-DR-4339-0184 Carolina Downtown Flood Mitigation Project as requested by the Municipality of Carolina (Subrecipient). Specifically, the Municipality of Carolina has applied for funding through the Central Office of Recovery, Reconstruction and Resiliency (COR3) (Recipient). FEMA is initiating Section 106 review for the above referenced Undertaking in accordance with the "Programmatic Agreement Among the Federal Emergency Management Agency, the Puerto Rico State Historic Preservation Officer, and the Puerto Rico Central Office of Recovery, Reconstruction and Resiliency," as amended on November 13, 2019, and providing your office with the opportunity to comment on the proposed Undertaking. Documentation in this letter is consistent with the requirements in 36 CFR §800.11(e).

Summary
The Municipality of Carolina has experienced severe flooding during many past hurricane events. Flooding from Hurricane Maria resulted in substantial damages to houses, businesses, access roads, infrastructure, municipal security systems, and a hospital. The existing stormwater system is unable to drain into the Rio Grande de Loíza (RGL) during severe storms, which causes the stormwater to backflow into the storm sewer system, flooding the downtown Carolina area. The proposed project will improve the resiliency of the community by increasing the stormwater capacity and reducing the risk of future flood damage to residents, businesses, and critical community infrastructure. Overall, the proposed project

would include the construction of a new stormwater system, interconnected with the existing one, repair existing storm sewer infrastructure, construct a new detention basin, pump station, and dike, and includes improvements to the infrastructure and telecommunications system within the project limits (collectively referred to as the stormwater and flood control system).

Based on the review of documentary research, online site files, historic map research, site reconnaissance and a Phase IA and IB cultural resources survey, there are no historic properties eligible for, or listed in, the National Register of Historic Places (NRHP) within or adjacent to the proposed project area. In addition, archaeological testing completed for the proposed project did not locate any intact archaeological sites. Therefore, there are no historic properties effected by the proposed project.

Undertaking

HMGP funding aims to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMGP funding is available when authorized under a Presidential major disaster declaration in the areas of the State requested by the Governor. Section 404 funding can be used to fund structural and non-structural projects, and a facility does not need to be damaged to use these funds. This HMGP proposal seeks to assist the Municipality of Carolina to reduce flooding impacts in the drainage area that lies immediately west of the Monserrate Dike, specifically four subdrainage areas.

The activities proposed in the Scope of Work (SOW) do not conform to the Programmatic Allowances outlined in the Programmatic Agreement and, therefore, require Section 106 consultation process for a Standard Project Review, as per Stipulation II.C. of the Agreement.

The proposed activities include the following components:

- Construction of the proposed stormwater system, including new cross inlets on Manuel Fernandez Juncos and San Francisco Streets to capture stormwater runoff that would be directed through box culverts to a new 1.83-meter (m) (72-inch [in]) diameter pipe. This new pipeline would be routed through the existing parking lot of the DCHSF and Integrated Security Services and Virtual Technology Department, along Parque Street and Quebrada Street where it would discharge into a new detention basin located immediately east of and adjacent to the Monserrate Dike. Catch basins and storm sewer manholes would be added to connect the 1.83-m (72-inch) pipe sections and would interconnect the new stormwater system with the existing system. Additional curbing would be installed along the roadway. Additionally, a new 0.91-m (36-inch) diameter pipe would connect the existing storm sewer system on Molinillo Street to the proposed new detention basin. All the proposed work is located within the existing roadways, parking lots, and right-of-way (ROW). See Appendix B, Photos 1 and 2.
- Construction of a new detention basin to receive the runoff that would eventually discharge via by a 1.83-m (72-inch) gravity pipe, and a new pump system that would push water through the Monserrate Dike to the Rio Grande de Loiza. The new pumping station would also include emergency generators, fences and gates, sidewalks and vehicular access, lighting and water service, and stormwater pipes to interconnect the new storm sewer system with the existing one.
    - Site construction for the detention basin and pump station would include clearing and grubbing of approximately 1.5 acres of tropical moist forest vegetation. This area is located along the western bank of the Rio Grande de Loiza and east of Los Torres Street.

Additional vegetated areas in the vicinity of the detention basin footprint would be subject to short-term impacts as a result of construction activities, such as trenching or materials staging. The detention basin would be accessed along the existing asphalt road (Los Torres Street) on top of the Monserrate Dike.

- Additional site construction within the proposed footprint of the detention basin would include the demolition of three existing buildings; two vacant dwellings identified as Buildings #1 and #2 and one "horse shed." A fourth additional building, identified as Building #3, is located immediately outside of the proposed detention basin limits but may possibly be demolished (See Appendix A, Figures 1 through 3 and Appendix B, Photos 9 through 12).

- Construction of a new dike to protect the detention basin.
- Clearing and grubbing of approximately 1.5 acres of tropical moist forest vegetation for construction of the detention basin and pump station. This area is located along the western bank of the Rio Grande de Loiza and east of Los Torres Street. Additional vegetated areas in the vicinity of the detention basin footprint would be subject to short-term impacts as a result of construction activities, such as trenching or materials staging.
- Cleaning of the existing 48-inch and 54-inch stormwater pipes located behind the DCHSF and along Molinillo Street in the Villa Caridad Community.
- Relocation and reconstruction of affected infrastructure, including relocation of underground power, telecommunication, and aqueduct lines on Manuel Fernandez Juncos Street due to the construction of new cross inlets; reconstruction of the existing aerial electrical, aerial telecommunication, and aqueduct and sanitary sewer systems within the Villa Caridad Community. Reconstruction of aqueduct and sanitary sewer systems within the Villa Caridad Community would include sanitary connections; drinking water, sanitary and drinking water distribution pipes; fire hydrants; valves; and thrust blocks. The project would also include concrete protections for surface pipes and potable water pipes, relocation of the drinking water pipe in the detention basin area, and a new potable water connection to serve the pumping station.
- Three possible staging areas have been identified. One staging area would be located next to the U.S. Post Office on San Francisco Street and would also include an inspection office. A second staging area would be on an undeveloped parcel located northeast of the intersection of Molinillo and Principal Streets. A third staging area (for the contractor) would be within the land behind a school located on Manuel Fernandez Juncos Street (Luis Munoz Rivera Elementary School), which is currently undergoing renovation (See Appendix A, Figure 3 and Appendix B, Photo 5).

Area of Potential Effects (APE)

Pursuant to 36 CFR 800.4(a)(1), the Area of Potential Effects (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect historic resources. Based on the proposed SOW, FEMA has determined that the APE for Undertaking is limited to the proposed footprint of the construction activities, including the areas of the proposed detention basin, pumping station, dike and the stormwater and infrastructure improvements. The total APE covers an area of approximately 1.2 hectares (3.9 acres), from which 0.8 hectares (2.0 acres) are located along existing street and Right-of-Way (ROW) and 0.8 hectares (2.0 acres) are located along and to the east side of the Monserrate Dike, which includes a densely vegetated area with illegally constructed buildings (See Appendix A, Figures 1 through 3).

Identification and Evaluation

A background literature search was completed using online databases that include NRHP-listed properties, cultural resources surveys completed for federal undertakings dating from 2012-2016, and an inventory of cultural resources per municipality. The information is based on available online information at the Puerto Rico State Historic Preservation Office (PRSHPO), the Council for the Protection of the Terrestrial Archaeological Heritage and the Puerto Rico Planning Board.

Architecture

A review of the PRSHPO and ICP/CAT GIS database and the NRHP database indicates that the APE is not located within a listed or previously identified NRHP eligible historic property or district. There are two NRHP-listed properties nearby: *Edificio Alcaldia* (NR: 12/28/1983) and *Iglesia de San Fernando de Carolina* (NR: 9/18/1984). These resources are located 186 and 150 meters, respectively, to the north of the APE. Results of the 2021 cultural resources survey did not identify any historic properties within or near the APE (Gonzalez Colon 2021; Appendix C).

Historic aerials were reviewed to examine the developmental history within the APE. Review of historic maps, including 1937, 1950, 1962, 1981 (see Gonzalez Colon 2021; Appendix C) and 1967 (historicaerials.com), reveals the APE was undeveloped from 1937 through 1967. Between 1967 and 1981, the APE transforms to its present-day conditions. The APE consists of a variation of one and two-story vernacular buildings constructed after 1967 (See Appendix B, Photos 1 through 4). Based on review of architectural styles in the area, combined with the aerials, the majority of the APE was developed in late-1970s and early-1980s, to the present. Construction activities within the downtown area are proposed within the roadways, parking lots, curbs, and ROW, which won't result in direct or indirect effects to buildings or structures within the APE.

Project activities within the proposed detention basin and pump station area include the demolition of three buildings and a potential fourth building located on the border of the APE (See Appendix A, Figure 3). The buildings include two vacant dwellings, identified as Buildings #1 and #2, and one shed that housed a horse (aka "horse shed"). A fourth building, identified as Building #3, is located adjacent to the proposed detention basin. The buildings are located within the densely vegetated area making aerial research limited. The buildings consist of shanty shacks constructed using readily available materials likely constructed beginning in the 1980s, although it's difficult to discern. Based on review of the photographs, Buildings #1, #2, and #3 are constructed of local material of metal slats, wood, and cement block (See Appendix B, Photos 9 through 12). Buildings #1 and #2 are one-story, delipidated shacks constructed of local materials. The Municipality has noted that Buildings #1 and #2 are now vacant. The "horse shed" consists of a metal slat roof supported by wood timbers and pilings. The frame is enclosed with a combination of wood slats and metal fencing (See Appendix B, Photo 11). Building #3 appears to be a one-story raised building or one and one-half story dwelling, with a low-pitched metal slat roof. The building is constructed of cement block and clad in metal and wood planks (See Appendix B, Photo 12).

Archaeology

In 2021, a Phase IA and subsequent Phase IB, cultural resources survey was carried out in advance of the proposed Undertaking (conducted by Gonzalez Colon in 2021, Appendix C). The cultural resources survey was designed to determine the presence or absence of cultural resources in the project's potential impact area. The Phase IA documentary research revealed no recorded archaeological sites were located within and/or within the immediate vicinity the project's APE. Documentary research that was overlain

the project's APE revealed a low potential to encounter undocumented archaeological sites within the streetscape and noted extensive ground disturbances associated with the development of the downtown Carolina area. The survey noted the proposed location of the detention basin has become an inundated garbage dump.

The Phase IA survey concluded that the potential to encounter in-situ archaeological resources was low. However, given the proximity to the Rio Grande de Loiza, a Phase IB archaeological survey was conducted within the locations of the detention basin and stormwater pipe. The Phase IB survey included the excavation of eight shovel test pits (STP) within the detention basin area. The soil profiles recorded from the shovel test pits consisted of fill layers underlain by truncated subsoils and the results confirmed the significant level of disturbance and sterile soils. No archaeological resources or archaeological sites were located (See Appendix C).

Determination of Eligibility
Based on the information above, FEMA has determined that there are no NRHP eligible or listed historic properties within or adjacent to the APE. None of the buildings identified in the proposed detention basin area possess integrity of location, design, setting, materials, workmanship, feeling, and association to convey historic significance. They are not associated with a particular historical event or person, period of construction or architecture type or designer, or part of a historic district. Therefore, none of the buildings possess historic significance and/or integrity to meet the criteria for listing in the NRHP. In addition, results of the completed Phase IA and IB cultural resources survey did not reveal the presence of archaeological resources within the APE.

Findings of Effect
Based on the above information above, FEMA finds that there are no historic properties as defined in 36 CFR 800.16(l) within the APE. Therefore, FEMA has determined that the Undertaking will result in **No Historic Properties Affected**.

We request concurrence with this determination of effect within thirty (30) calendar days. Should you need additional information please contact Elizabeth Calvit, elizabeth.calvit@associates.fema.dhs.gov and email FEMA EHP at fema-ehp-dr4339@fema.dhs.gov.

Sincerely,

JORGE A RODRIGUEZ
Digitally signed by JORGE A RODRIGUEZ
Date: 2022.12.06 09:31:02 -04'00'

Jorge A. Rodríguez López
Director
Environmental & Historic Preservation Division
DR-4336 & 4339-PR (Hurricanes Irma/María)
DR-4473-PR (Earthquakes)

JRL / ec

Enclosures:
Appendix A. Figures
Appendix B. Photographs of the Proposed Project Area of Potential Effects
Appendix C. Gonzalez Colon, Juan, 2021, Evaluacion De Recursos culturales (Fase 1), Mitigacion de Inundaciones En El Centro Urbano De Caroloina, OGPE #2021-386285

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA Region II - JRO
FEMA-4336-DR-PR / FEMA-4339-DR-PR
#50 165, Suite 3
Parque Industrial Buchanan
Guaynabo, PR 00968

APPENDICES

Appendix A. Figures

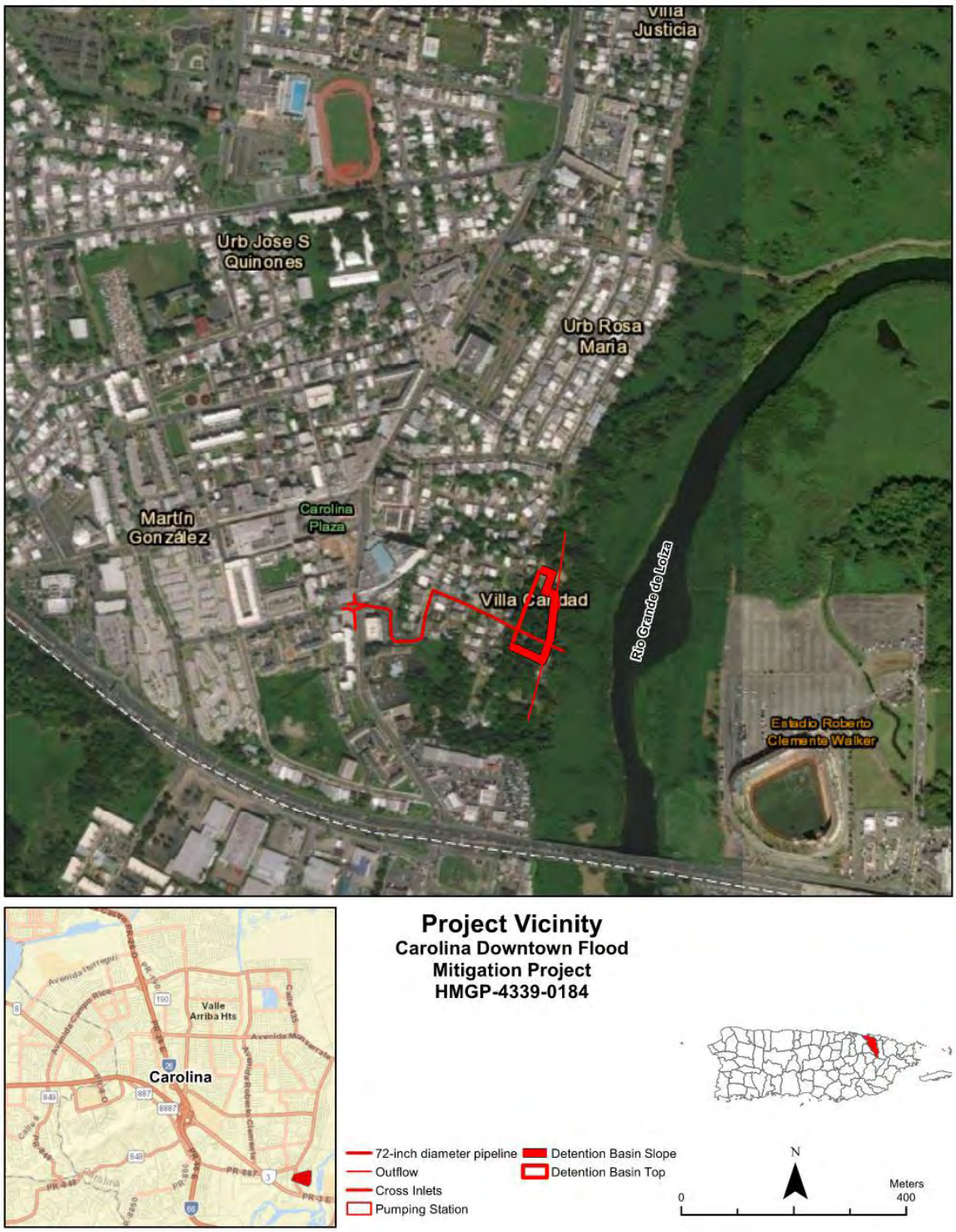

Figure 1. Proposed Project Area

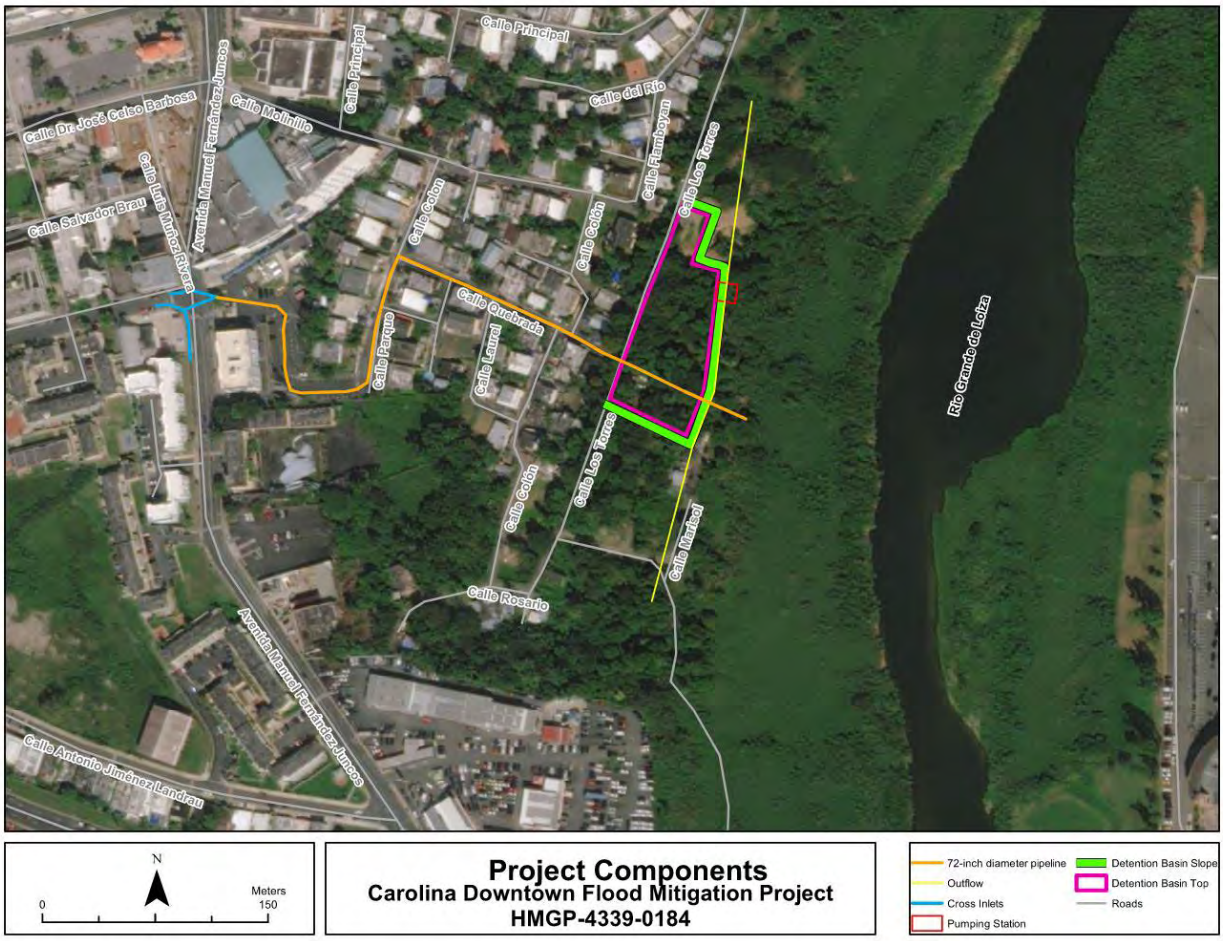

Figure 2. Proposed Project Components

Figure 3. Proposed Area of Potential Effects (APE)

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Appendix B. Photos of the Proposed Project Area

Photo 1. Portion of Project Area at Intersection of Parque and Quebrada Streets

Photo 2. Portion of Project Area at Intersection of Quebrada and Los Torres Streets

Photo 3. Portion of Project Area at end of Quebrada Street within Access Area to the Dike

Photo 4. Portion of Project Area at Intersection between Parque St & Molinillo Street

Photo 5. Potential Staging Location

Photo 6. Vegetation within Proposed Detention Basin Location

Photo 7. Vegetation within Proposed Detention Basin Location

Photo 8. Vegetation within Proposed Detention Basin Location

Photo 9. Building #1 within Proposed Detention Basin Location

Photo 10. Building #2 within Proposed Detention Basin Location

Photo 11. Horse Shed within Proposed Detention Basin Location

Photo 12. Building #3 within Proposed Detention Basin Location

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Appendix C.

Gonzalez Colon, Juan, 2021, Evaluacion De Recursos culturales (Fase 1), Mitigacion de Inundaciones En El Centro Urbano De Caroloina, OGPE #2021-386285

(see attached PDF)

GOVERNMENT OF PUERTO RICO
STATE HISTORIC PRESERVATION OFFICE
Executive Director I Carlos A. Rubio-Cancela I carubio@prshpo.pr.gov

December 9, 2022

Jorge A. Rodríguez
Director
Environmental & Historic Preservation Division
Federal Emergency Management Agency
FEMA Region II – JRO
FEMA-4336/4339/4473-DR-PR
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Guaynabo, PR 00968

SHPO: 12-06-22-01 CAROLINA DOWNTOWN FLOOD MITIGATION PROJECT, CAROLINA, PUERTO RICO/ HMGP-DR-4339-0184

Dear Mr. Rodriguez,

Our Office has received and reviewed the above referenced project in accordance with 54 USC 306108 (commonly known as Section 106 of the *National Historic Preservation Act*, as amended) and 36 CFR Part 800: *Protection of Historic Properties*.

We have reviewed the archaeological survey report included as supporting documentation for this project. Subsurface testing went no further than 90cm in the area for the proposed detention basin. Because of the flood prone nature of this area, the soils present and the proposed depth of the basin, we believe mechanical subsurface testing should also be employed to reach depths no shallower than two meters deep.

As soon as we receive the results of this deep testing we will continue with our review of this undertaking. If you have any questions regarding our comments, please do not hesitate to contact our Office.

Sincerely,

Carlos A. Rubio-Cancela
State Historic Preservation Officer

CARC/GMO/MB

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OFICINA ESTATAL DE CONSERVACIÓN HISTÓRICA
OFICINA DEL GOBERNADOR
STATE HISTORIC PRESERVATION OFFICE
OFFICE OF THE GOVERNOR

U.S. Department of Homeland Security
Federal Emergency Management Agency
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FEMA

December 14, 2022

Carlos Rubio Cancela
State Historic Preservation Officer
Puerto Rico State Historic Preservation Office
P. O. Box 9023935
San Juan, Puerto Rico 00902-3935

RE: SHPO #12-06-22-01 CAROLINA DOWNTOWN FLOOD MITIGATION PROJECT, CAROLINA, PUERTO RICO/ HMGP-DR-4339-0I84

Dear Mr. Rubio-Cancela:

On December 12, 2022, the Federal Emergency Management Agency (FEMA) received the comments issued by your office in relation to the Carolina Downtown Flood Mitigation Project. In your letter, dated December 9th, it is stated that SHPO believes that, because the project's APE is in a flood prone area, additional archaeological sampling should be carried out in the area where the new detention basin is proposed to be built and that the depth of these tests should not be less than two meters deep. FEMA acknowledge and agrees with SHPO's comments.

Considering that the Rio Grande de Loiza watershed is known to be one of the most archaeologically sensitive regions in Puerto Rico and since the archaeological survey (Phase IA-IB) conducted by the Municipality of Carolina (Sub-Recipient) does not rule out the possibility of the presence of archaeological resources at greater depths than those sampled, FEMA will revise its finding of effect and issue a finding of **No Adverse Effect to Historic Properties with Conditions.** FEMA proposes the following conditions:

1. FEMA will require that an archaeologist, who meets the Secretary of the Interior (SOI) Qualification Standards (36 CFR Part 61), conduct additional mechanical subsurface testing in the area of the new detention basin to a depth of two (2) meters. The mechanical subsurface testing should be conducted in the same locations or nearby the previous shovel tests made during Phase IA-IB study. This will translate in eight (8) mechanical tests in the new detention basin area.
2. In the event that historical or archaeological materials or features are discovered, FEMA will require that a SOI-qualified archaeologist conduct an Intensive Archaeological Survey (Phase II) to document and determine the extent, distribution, chronology, level of integrity, and

significance of the archaeological findings. The Intensive Archaeological Survey Plan must be submitted to FEMA for review prior its implementation;

3. The archaeological surveys will be documented by the SOI-qualified archaeologist in a report consistent with *The Secretary of the Interior's Standards and Guidelines for Archaeological Documentation*. After approval, FEMA EHP will submit the report to PRSHPO for comments and concurrence.

Once the results contained in the archaeological survey reports are evaluated and determined that have sufficient and adequate information to identify and evaluate potential archaeological resources existing in the APE, FEMA will continue consultation with your office and will revise its findings of effect if necessary.

Should you need additional information please contact HSSP Elizabeth Calvit at elizabeth.calvit@associates.fema.dhs.gov and email FEMA EHP at fema-ehp-dr4339@fema.dhs.gov.

Sincerely,

Jorge A. Rodríguez López
Director
Environmental & Historic Preservation Division DR-4336 & 4339-PR (Hurricanes Irma/María)
DR-4473-PR (Earthquakes)

GOVERNMENT OF PUERTO RICO
STATE HISTORIC PRESERVATION OFFICE
Executive Director I Carlos A. Rubio-Cancela I carubio@prshpo.pr.gov

December 20, 2022

Jorge A. Rodríguez
Director
Environmental & Historic Preservation Division
Federal Emergency Management Agency
FEMA Region II – JRO
FEMA-4336/4339/4473-DR-PR
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SHPO: 12-06-22-01 CAROLINA DOWNTOWN FLOOD MITIGATION PROJECT, CAROLINA, PUERTO RICO/ HMGP-DR-4339-0184

Dear Mr. Rodriguez,

We acknowledge receipt of your revised finding for the above referenced project to **No Adverse Effect to Historic Properties with Conditions**. We agree with your decision to require deep subsurface testing in the area for the proposed detention basin and that, if archaeological materials are encountered, an intensive archaeological survey should be implemented.

As soon as we receive the results of the deep archaeological testing, we will continue consultation. If you have any questions regarding our comments, please do not hesitate to contact our Office.

Sincerely,

por Carlos A. Rubio-Cancela
State Historic Preservation Officer

CARC/GMO/MB