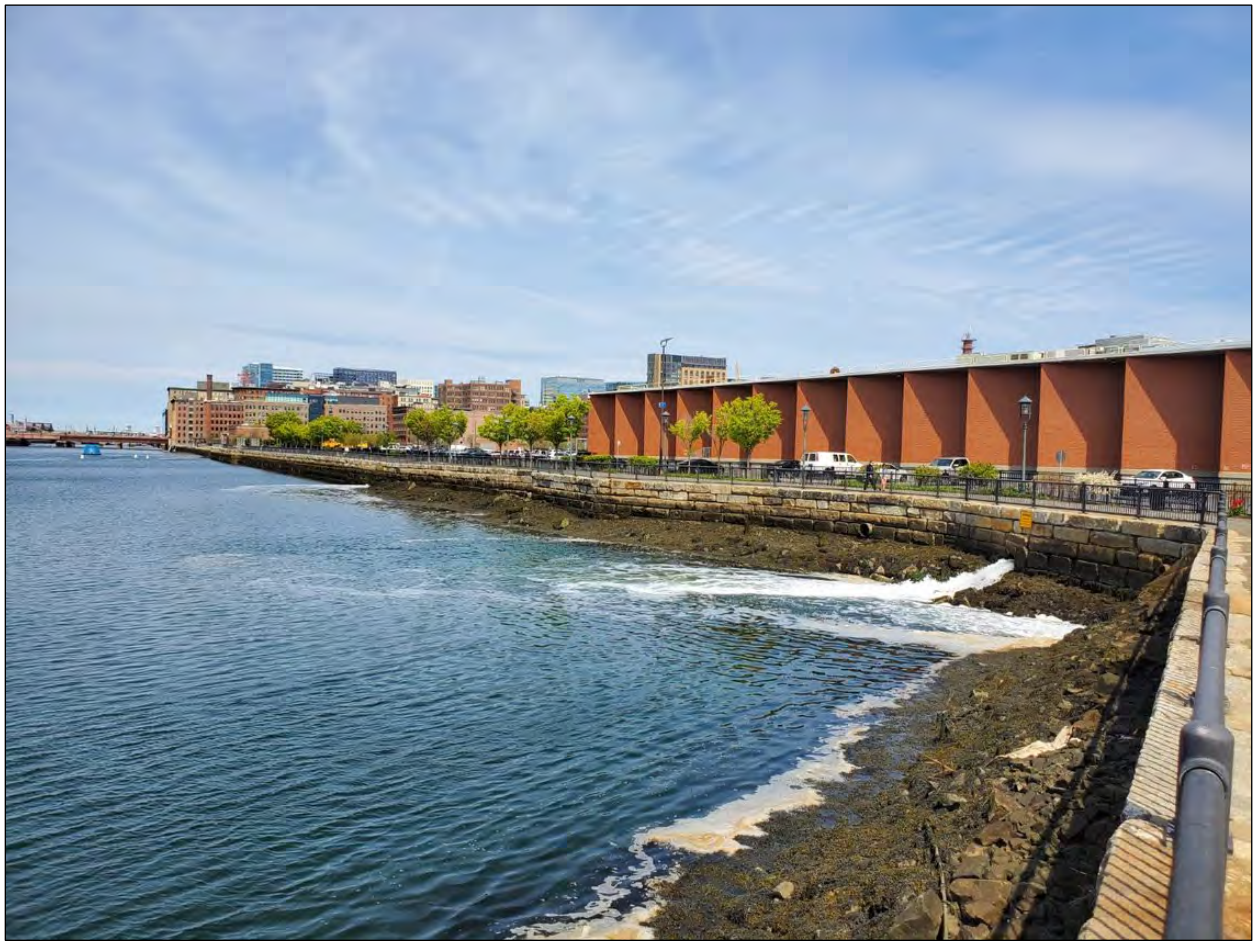

Draft Environmental Assessment

City of Boston Resilient Fort Point Channel Infrastructure Project

City of Boston, Suffolk County, Massachusetts

PDMC-PJ-01-MA-2019-008

*October 2021 – **DRAFT***

FEMA

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Federal Emergency Management Agency, Region I
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APPENDICES

ACRONYMS

ACEC	Areas of Critical Environmental Concern
APE	Area of Potential Effect
BMP	Best Management Practices
BUAR	Massachusetts Board of Underwater Archaeology
BWCo	Boston Warf Company
C.F.R.	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
CWA	Clean Water Act
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
MACRIS	Massachusetts Cultural Resource Information System
MA CZM	Massachusetts Coastal Zone Management
MassDEP	Massachusetts Department of Environmental Protection
MBTA	Massachusetts Bay Transportation Authority
MHC	Massachusetts Historical Commission
NAVD88	North American Vertical Datum of 1988
NECCO	New England Confectionary Company
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHESP	Natural Heritage & Endangered Species Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRIS	National Resources Information Service
PDM	Pre-Disaster Mitigation Grant
RCRA	Resource Conservation and Recovery Act
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Loads
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

The Massachusetts Emergency Management Agency submitted a Pre-Disaster Mitigation (PDM) grant application to the Federal Emergency Management Agency (FEMA) on the behalf of the City of Boston (City). The PDM Grant Program is authorized under Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Under the PDM grant program, FEMA may provide technical and financial assistance to states and local governments to assist in the implementation of pre-disaster hazard mitigation measures that are cost effective and designed to reduce injuries, loss of life, and damage and destruction of property, including damage to critical services and facilities resulting from natural disasters.

The Proposed Action would construct approximately 2,300 feet of mixed berm and floodwall mitigation features along a portion of the southeast edge of Fort Point Channel to reduce flood damage and provide protection to nearby infrastructure, utilities, and structures in the 100 Acres Master Plan area.

The National Environmental Policy Act (NEPA) requires FEMA to follow a specific planning process to ensure that it has considered, and the general public is fully informed about, the consequences of a proposed federal action, such as the approval of a mitigation project under the PDM grant program authorized by the Stafford Act. To meet its NEPA requirements, FEMA has prepared this Environmental Assessment to analyze the potential effects of the Proposed Action and alternatives to determine whether the project warrants preparation of an environmental impact statement or a Finding of No Significant Impact (FONSI). FEMA has prepared this Environmental Assessment in accordance with NEPA, its implementing regulations, and FEMA and Department of Homeland Security policy.

2.0 PURPOSE AND NEED

FEMA's PDM program provides grants to eligible state, territory, and local governments and federally recognized tribes to implement sustained pre-disaster natural hazard mitigation programs. The objective of the PDM program is to reduce overall risk to the population and structures from future hazard events and reduce reliance on federal funding from future disasters. The purpose of the proposed PDM project is to reduce flood hazards within the 100 Acres Master Plan area. The project is needed because of repetitive flooding from storm surge and associated damage, which is expected to increase in frequency and severity as a result of climate change and future sea level rise (EPA 2021a).

3.0 PROJECT LOCATION AND BACKGROUND

The proposed project is in Boston, Suffolk County, Massachusetts, in the urban South Boston Fort Point neighborhood (**Appendix A, Figure 1**). The project area is along the southeast edge of Fort Point Channel and is at the lowest elevation along the channel. The northern end of the project area is immediately south of the old General Electric facility at the southwest corner of Necco Street and Necco Court and extends approximately 2,300 feet south along the Fort Point Channel to Dorchester Avenue (**Appendix A, Figure 2**).

The project area encompasses the existing coastline and seawall, extends approximately 70 feet inland, and includes a portion of the Boston Harborwalk (Harborwalk). The shoreline is presently protected by a concrete seawall and riprap at the northern edge and includes 14 drainage outfalls. The Harborwalk is a ground-level, paved pathway with minimal vegetation that runs parallel to the shoreline. At the north end

of Segment 1 is the former General Electric facility property, recently purchased by Alexandria Real Estate Equities Inc. (15 Necco Street). The 15 Necco Street redevelopment includes raised landscaping features inland of the Harborwalk to mitigate flooding of areas northeast of the project area, which would tie into the Proposed Action (see **Section 5.7)**. Adjacent to Segments 2 and 3 is the Gillette facility and paved surface parking. The nearest portion of the Gillette facility is approximately 60 feet inland of the project area. There are several private redevelopment projects underway or proposed for the area, including the proposed Related Beal mixed-use development adjacent to the proposed berm in Segment 2. These projects would eventually convert the paved parking areas into buildings, structures, and open spaces, which is discussed in the Cumulative Effects section (Section 5.7).

Boston is subject to coastal storms, such as Hurricane Sandy in 2012 and nor'easter Riley in 2018 that flooded South Boston and submerged streets and vehicles in water. During these storms and flood events, many Boston residents were evacuated, streets were closed, transit services were interrupted (including flooding of some of Boston's subway stations), and other residents were left without power (Garfield 2018; Gray 2018).

South Boston was identified as a focus area for climate resilience initiatives in the Climate Ready Boston plan (Green Ribbon Commission 2016). The plan modeled projected effects of climate change and future sea level rise and determined the vulnerability of neighborhoods to extreme heat, urban stormwater flooding, and coastal and riverine flood hazards. South Boston is considered vulnerable to flooding, and modeling shows Fort Point Channel is a flood entry pathway that, if left unprotected, could contribute to even larger areas of South Boston flooding as climate change increases storm severity and raises sea levels (Green Ribbon Commission 2016). The Proposed Action is two of eight proposed flood mitigation measures at the Fort Point Channel identified in the Climate Ready Boston plan (Green Ribbon Commission 2016). Each of the projects would address a specific set of flood entry points and provide flood reduction benefits independently of the other projects. The 15 Necco Street redevelopment being constructed by Alexandria Real Estate Equities, Inc. under the 100 Acres Master Plan is one of these projects. The projects are described in more detail in **Section 5.7**. The project area is within the 100 Acres Master Plan area (**Appendix A, Figure 3**), which is bounded by Fort Point Channel on the west, Summer Street to the north, South Boston Bypass Road to the east, and West Second Street to the south. The 100 Acres Master Plan provides a framework for steering future redevelopment that would occur at the initiative of private landowners and investors. The 100 Acres Master Plan emphasizes the need for protection against flooding and flood damage along Fort Point Channel and includes the Proposed Action as part of the solution. Additional measures in the 100 Acres Master Plan include the designation of land approximately 60 feet inland of the existing Harborwalk, between Binford Street and Necco Court (adjacent to Segment 1 of the Proposed Action) as vegetated open space where impermeable surfaces are currently present.

4.0 ALTERNATIVES

NEPA regulations state that an agency must explore and objectively evaluate all reasonable alternatives, and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their elimination (40 C.F.R. 1502.14). Additionally, a No Action alternative must be included. This section describes the No Action alternative, the Proposed Action (that would provide for the purpose and need), and other alternatives that were considered but eliminated from the full analysis.

4.1 No Action Alternative

Under the No Action alternative, there would be no federal financial assistance provided for the construction of flood protection features along the Fort Point Channel. With no flood protection, high-water events compounded by sea level rise would continue to flood the 100 Acres Master Plan area and greater South Boston, damaging infrastructure, and property. During high-water events, water would continue to inundate streets, necessitating road closures and disrupting public transportation systems. Flooded sewage collection systems could back up, causing raw sewage to rise into streets and buildings. Water would continue to inundate buildings and basements, damaging electrical facilities and property. Debris, sediments, and contaminants collected by floodwaters could continue to flow out into the channel when floodwaters recede, resulting in water pollution.

4.2 Proposed Action

Under the Proposed Action, the City would construct approximately 2,300 feet of berm and floodwall mitigation features along a portion of the southeast edge of the Fort Point Channel shoreline, between approximately Necco Street and Dorchester Avenue. Flood protection measures would be constructed in three segments that vary in the proposed type of measure to be built and would be constructed over the course of approximately two years (**Appendix B, Document 1**).

Segment 1 would extend from approximately Necco Street to the southern end of the Gillette pump house and would be approximately 729 feet long and 45 feet wide, resulting in approximately 32,800 square feet (0.75 acres) of ground disturbance to a depth of 2 feet. Ground disturbance may occur deeper than 2 feet at utility crossings if utilities need additional protection. Flood protection in Segment 1 would be an earthen berm with a 5-foot crown width and side slopes with a ratio of 4:1 (four horizontal units to one vertical unit). The earthen berm would be located landward of the existing Harborwalk, currently at 8 feet North American Vertical Datum of 1988 (NAVD88)and would be elevated to approximately 14.6 feet NAVD88. The designed elevation height of 14.6 feet NAVD88 is based on the 100-year flood event accounting for 27.9 inches of sea level rise (based on the Boston Harbor Flood Risk Model for a design life to 2058) and two feet of freeboard–additional height above the base flood elevation included for safety. A knee wall on the seaward side of the berm feature would be incorporated to minimize the lateral width required for the berm to 45 feet. The knee wall would be raised 2.5 feet relative to the existing Harborwalk, to an elevation of approximately 10.5 feet NAVD88. The berm would end at the access driveway at the pump house and where a 15-foot-wide passive deployable flood gate would be installed to cross the driveway.

Segment 2 would extend from the Gillette pump house to where Fort Point Channel turns west and would be approximately 816 feet long. Segment 2 would consist of a double retaining wall of granite blocks that would match and be built on top of the blocks of the existing seawall. The seaward side of the retaining wall would raise the existing seawall's crest elevation approximately 6 vertical feet to reach 14.6 feet

NAVD88. The landward side would also make use of granite blocks as a retaining wall feature, with impermeable clay fill in between the seaward and landward walls. This segment would be 18 feet wide, with a 12-foot-wide, shared-use path for the Harborwalk on top of the clay fill. The blocks would rest on a concrete footing. All blocks would be dowelled together with rebar rods. Ground disturbance expected for this segment would be approximately 40,800 square feet (0.94 acres) to a depth of approximately 2 feet but could be slightly deeper at utility crossings.

Segment 3 would extend from the western turn in the Fort Point Channel to Dorchester Avenue and would be 774.5 feet long and approximately 45 feet wide. Segment 3 would have a similar earthen berm as described for the Segment 1 flood protection that would run parallel to and landward of the existing Harborwalk. Segment 3 would require ground disturbance of 34,853 square feet (0.80 acres) to a depth of 2 feet but could be slightly deeper at utility crossings.

In addition to the three flood control segments, the Proposed Action includes deployable interim flood walls and backflow mitigation improvements. These three deployable floodwalls around the 100 Acres Master Plan area would ensure the Proposed Action would have independent utility from the other proposed flood control measures in the area by protecting both the primary flood pathway along the Fort Point Channel (mixed berm and floodwall feature) and minor flood pathways (interim flood measures) into the 100 Acres Master Plan area. These interim floodwalls would be removed once other projects in the Climate Ready Boston plan are implemented (see **Section 5.7**). The interim floodwalls are part of the Proposed Action and ensure it functions as designed independently of the completion of other projects in the plan. Below are the locations and descriptions of the three deployable floodwalls, (see **Appendix A, Figure 4** for location map):

- **A Street** – Located under the Summer Street overpass on A Street. An approximate 31-foot-long stop log or flex wall system would tie into the Summer Street bridge abutments on the north and south sides of A Street.
- **West Service Road** – Located under the Summer Street overpass on West Service Road. A 300-foot-long stop log or flex wall system would tie into the bridge abutment on the northern end and into high ground located on private property on the south.
- **Necco Court** – Located on the end of Necco Court facing the Fort Point Channel. An approximate 25-foot-long stop log or flex wall system would be located between the two buildings flanking the roadway (27 Melcher Street and 5 Necco Court).

The deployable floodwalls would be within the City's right-of-way and require regrading of sidewalks and roadways, and the stop logs would connect to permanent anchor points. Implementation of the interim measures would require minimal ground disturbance. The floodwalls would be transported to the areas in anticipation of a flood event and stored at the Boston Planning and Development Agency property at 22 Drydock Avenue when not in use.

Backflow prevention would include installing flap gates on each municipal and industrial outfall along the entire length of the project on the channel walls. Sections of outfall pipe below the proposed berms and floodwalls may need to be strengthened to reduce the risk of misalignment or cracking during the natural settlement of the berms and floodwalls. Work on the outfalls would be accessed from land and the work area would be isolated with cofferdams. Thus, some in-water work from the implementation of the

cofferdam would be needed to repair existing drainage outfalls. Work would also occur during low tides to minimize effects on water quality.

Equipment needed for the construction of the berms and floodwalls may include excavators, loaders, graders, concrete trucks, dump trucks and other large vehicles, hand tools, and potentially a crane. Staging and access would occur landward of the project area on the existing surface parking lots, such as the channel side lot west of A Street or the Gillette parking lot. Access to staging areas and the project area would likely occur via A Street and Binford Street. The entire proposed resilience feature would disturb 108,435 square feet, or approximately 2.5 acres.

4.3 Alternative Considered but Dismissed – Flood Gate Alternative

The Flood Gate alternative would construct flood protection near the mouth of Fort Point Channel under the Seaport Boulevard Bridge. The alternative included installing a flood gate or series of gates between the channel banks that could be closed in advance of high-water events. The flood control gates would remain open most of the time for proper stormwater evacuation and daily tidal exchange. This alternative would require more specialized engineering to construct, larger up-front costs than the Proposed Action, and more costly and specialized long-term operation and maintenance procedures and staff. This alternative would have a shorter design life and require more frequent closures of the gates over time as sea levels rise, limiting its effectiveness and increasing potential environmental effects as compared with the Proposed Action. Potential environmental effects would include impeding the movement of fish during gate closures and contributing to changes in nutrient and chemical concentrations in the channel, which could negatively affect aquatic life. The potential environmental effects of construction in the water and alterations to aquatic habitats and long-term aquatic processes would be substantially greater than under the Proposed Action. This alternative was determined to be technically and financially impracticable and was dismissed from further analysis.

5.0 AFFECTED ENVIRONMENT AND POTENTIAL EFFECTS

This section describes the environment potentially affected by the alternatives, evaluates potential environmental effects, and recommends measures to avoid or reduce those effects. Effects are changes to the existing environment including ecological, aesthetic, historic, cultural, economic, social, or health conditions. Effects may also include consequences resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (40 C.F.R. 1508.1(g)(1)).

When possible, quantitative information is provided to establish the magnitude of potential effects; otherwise, the potential effects are evaluated qualitatively based on the criteria listed in Error! Reference source not found..

Table 5.1. Classification of Potential Effects

Effect Scale	Criteria
None/Negligible	Resource area would not be affected and there would be no effect, OR changes or benefits would either be nondetectable or, if detected, would have effects that would be slight and local. Effects 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 or beneficial effects would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have either localized or regional scale effects/benefits. Effects would be within or below regulatory standards, but historic conditions would be altered on a short-term basis. Mitigation measures would be necessary, and the measures would reduce any potential adverse effects.
Major	Changes to the resource would be readily measurable and would have substantial consequences/benefits on a local or regional level. Effects would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce effects, though long-term changes to the resource would be expected.

Based on a preliminary screening of resources and the project's geographic location, **Table 5.2** identifies resources that do not require a detailed assessment and the reasons why.

Table 5.2. Resources Not Present

Resource	Reason for Elimination from EA
Geology	Project activities would not reach bedrock depths, because fill and layers of clay, sand, and shell extend at least 70 feet below the surface (City of Boston 2020a).
Designated Farmland Soils (Farmland Policy Protection Act)	The project area is in an urbanized and developed area and does not contain farmland. No conversion of farmland would occur per Title 7, Code of Federal Regulations (C.F.R.), Part 658.2(a).
Executive Order 12699: Seismic Safety	According to the U.S. Geological Survey Earthquake Hazard Program, the project area is not in a seismically active area; therefore, the alternatives would not affect seismic activity or be affected by seismic hazards.
Climate Change	The release of greenhouse gasses would be negligible and not result in a measurable effect on climate.
Federally Designated Wild and Scenic Rivers (Wild and Scenic Rivers Act)	The closest wild and scenic rivers are the Sudbury, Assabet, and Concord Rivers, all approximately 16 miles to the west. The alternatives would have no effect on a wild or scenic river.
Sole Source Aquifers (Safe Drinking Water Act)	According to the U.S. Environmental Protection Agency's (EPA) Sole Source Aquifer mapper, the project area is not located above a sole source aquifer; therefore, the alternatives would have no effect on a sole source aquifer.
Coastal Barrier Resources System (Coastal Barrier Resource Act)	The project area is not within a Coastal Barrier Resource Unit, an Otherwise Protected Area, or associated buffer zones, based on a review of the U.S. Fish and Wildlife Service (USFWS) Coastal Barrier Resource System mapper.

5.1 Physical Resources

5.1.1 Topography and Soils

5.1.1.1 Existing Conditions

The project area is located in the Boston Basin ecoregion, which is characterized by low rolling topography and includes the hilly urbanized Boston area and outlying lowlands on metamorphic and volcanic rock types (EPA 2009a). Topography in the project area is generally flat with a slope ranging between 0 and 3 percent (USDA 2021c).

Much of the Boston shoreline, including the project area, is composed of artificial fill material from land reclamation practices dating back to the 1600s (Mason 2017). According to geotechnical borings performed by the City, the project area is composed of soft clay and mud fill to approximately 25-30 feet below the surface and below that is composed of alternating layers of hard and soft compressible clays, mixed with sporadic sand and shell lenses to approximately 70 feet below existing grade (City of Boston 2020a).

5.1.1.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, no berm would be constructed, and the existing seawall would not be raised; thus, no changes to topography would occur. Some ad hoc flood control efforts may be implemented that could disturb soils. The ad hoc flood control efforts would likely protect individual buildings and some infrastructure but would not protect the 100 Acres Master Plan area from flood-related soil loss. Because the project area and greater South Boston is developed urban land, soil disruption due to flooding would be minimal, as there are very few surface soils in the area. Therefore, there would be negligible short- and long-term effects from soil disruption during flood events.

Proposed Action

Under the Proposed Action, construction of the berm in Segment 1 and Segment 3 and raising the existing seawall in Segment 2, including the placement of artificial fill, would raise the project area topography by up to 5 feet to an elevation of 14.6 feet NAVD88. Because the project area and vicinity are presently composed of artificial fill, following a history of land reclamation practices, impacts on soils would be negligible. Construction of the mixed berm and floodwall features would disturb approximately 108,435 square feet, or 2.48 acres, to a depth of approximately 2 feet. Interim flood control measures would not require excavation below what has been previously disturbed for urban development, including roads, buildings, and parking lots. Construction of the Proposed Action would likely require a National Pollutant Discharge Elimination System (NPDES) Construction General permit because it would be larger than one acre. An NPDES permit would be administered by EPA and would include conditions to reduce erosion and sediment loss during construction activities. The proposed construction materials, such as clay and concrete blocks, would be impermeable and resistant to erosion and would prevent the underlying soils from eroding. Sod would be planted over areas where permeable soils are proposed, such as the 6 inches of topsoil in Segment 1 and Segment 3, thus reducing the risk of erosion. Therefore, there would be a negligible short-term impact on topography and a minor short-term effect on soils during construction.

Post-construction, the Proposed Action would reduce flooding in the 100 Acres Master Plan area that could cause topsoil erosion; however, this beneficial effect on soils would be negligible because the

project area is already heavily developed, and there is only a small risk of soil disruption during flooding. The presence of compressible soil layers could lead to consolidation settlement of the berm and floodwall features over time. The design and construction sequencing of the Proposed Action would prevent settlement and periodic maintenance would occur to maintain the designed elevation height. Therefore, there would be no effect long term on topography because the design height of 14.6 feet NAVD88 would be maintained. There would be no long-term effect on soils because of the history of artificial fill, reduced soil loss from floodwaters, and the developed nature of the project area.

5.1.2 Clean Air Act

The Clean Air Act regulates air emissions from area, stationary, and mobile sources. Air quality standards have been set for lead, nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, and particulate matter to protect public health and the environment. Areas where the monitored concentration of a pollutant exceeds air quality standards are designated as nonattainment areas. Areas where all pollutants are below the standards are classified as in attainment areas.

5.1.2.1 Existing Conditions

The project area is located in Suffolk County, Massachusetts. Suffolk County is in attainment status for all criteria pollutants (EPA 2021c).

5.1.2.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts may be implemented that could require construction-related emissions. However, the 100 Acres Master Plan area would remain at risk of flooding and flood damage, which could require road closures. Therefore, there would be a negligible, recurring, short-term, and adverse effect on air quality from vehicle and equipment emissions resulting from equipment used for flood-related repairs and additional vehicle emissions generated by road detours. There would be no long-term effect on air quality because there would be no new permanent air emissions source.

Proposed Action

Under the Proposed Action, the use of construction equipment and vehicles would result in the short-term release of air pollutant emissions. All construction equipment would be required to meet current EPA emissions standards (EPA 2016a). Post-construction, the Proposed Action would reduce flood hazards in the project area and associated emissions from roadway detours and repairs. The deployment of stop logs at interim flood control measure sites would require temporary road closures that could increase vehicle emissions. However, the deployment of interim measures would protect larger areas of roadway from becoming inundated, which would reduce roadway detours due to damage and repairs. The project would not create a new source of permanent air emissions. Therefore, the Proposed Action would have a negligible short-term effect on air quality from temporary construction-related emissions that would be mitigated through the application of EPA emissions standards. There would be a negligible, long-term, and beneficial effect from the reduced risk of flooding that avoids flood-related emissions from roadway detours and repairs.

5.2 Water Resources

5.2.1 Water Quality

The Clean Water Act (CWA) regulates the discharge of pollutants into water and is administered by the U.S. Army Corps of Engineers (USACE) and EPA. Section 404 of the CWA establishes the requirements for discharging dredged or fill materials into waters of the United States. USACE also administers Section 10 of the Rivers and Harbors Act of 1899, which prohibits obstructions in navigable waterways. Massachusetts Department of Environmental Protection (MassDEP) administers Section 401 of the CWA and issues water quality certifications for the discharge of dredged materials, dredging, and dredged material disposal in waters of the United States. Under Section 402 of the CWA, NPDES regulates both point and nonpoint pollutant sources including stormwater and stormwater runoff. Activities that involve one or more acres of ground disturbance require an NPDES Construction General Permit issued by EPA (see **Section 5.1.1**).

CWA Section 303(d) requires states to identify waters that do not or are not expected to meet applicable water quality standards with current pollution control technologies alone. Under Section 303(d), states must develop Total Maximum Daily Loads (TMDLs) for impaired waterbodies. A TMDL establishes the maximum amount of a pollutant or contaminant allowed in a water body and serves as a planning tool for restoring water quality. In Massachusetts, MassDEP is responsible for compliance with Section 303(d) of the CWA.

MassDEP administers the regulatory provisions of the Massachusetts Public Waterfront Act, commonly called "Chapter 91." The program issues licenses for projects in waterways and ensures that projects meet public-access requirements (310 Code of Massachusetts Regulations [CMR] 9.01(2)).

The Massachusetts Wetlands Protection Act (Massachusetts General Laws Chapter 131, Section 40) protects wetlands and the public interests they provide, including flood control, prevention of pollution and storm damage, and protection of public and private water supplies, groundwater supply, fisheries, land containing shellfish, and wildlife habitat. In addition to wetlands, the law protects other resource areas, such as 100-year floodplains, riverfront areas, and land under water bodies, waterways, salt ponds, fish runs, and the ocean. MassDEP oversees the administration of the law and the Boston Conservation Commission administers the law for the City of Boston. The Boston Conservation Commission is responsible for reviewing projects on a case-by-case basis according to 310 CMR 10.00; these regulations describe how each type of resource area provides one or more of the public interests and the type and extent of work allowed in resource areas (MassDEP 2021).

5.2.1.1 Existing Conditions

The project area is adjacent to Fort Point Channel; Segments 1 and 2 of the Proposed Action are directly east of the channel and Segment 3 is directly south of the channel (**Appendix A, Figure 2**). The project area is within the Boston Harbor watershed and the Boston Harbor Coastal Drainage Area (MassDEP 2014). Water drains from the project area into the Fort Point Channel. There are 14 stormwater and combined sewer outfalls into the Fort Point Channel that carry stormwater runoff under the project area into the water immediately adjacent to the project area. Stormwater that runs off impervious surfaces adjacent to the channel, such as parking lots and buildings, is also conveyed to the channel either through surface runoff or drainage systems.

The *Massachusetts Year 2016 Integrated List of Waters* issued by MassDEP contains a list of waters requiring a TMDL, which is also known as the 303(d) list or Category 5 waters. The Boston Inner Harbor, including Fort Point channel, is included on the 303(d) list, as it is an impaired water requiring a TMDL. Categories of impairment include lack of dissolved oxygen, enterococcus, fecal coliform, polychlorinated biphenyls in fish tissue, and contaminants in fish and/or shellfish from unknown causes (MassDEP 2019). EPA Region 1 has issued a guidance document with mitigation measures addressing pathogen pollution in Massachusetts surface waters from various sources of pollutants such as stormwater and combined sewer overflows (EPA 2016b).

In February 2019, MassDEP issued a response to the City of Boston's request for guidance stating that the Proposed Action is subject to jurisdiction under the Wetlands Protection Act because it is within 100 feet of a bank bordering on the ocean.

5.2.1.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, ad hoc flood control measures could potentially result in short-term minor effects on water quality from construction-related runoff. In the long term, the risk of flooding would not be reduced substantially within the 100 Acres Master Plan area and additional construction may be required to address damage after flooding. Water would continue to inundate the area during flood events, entering the drainage system and reducing the system's ability to convey stormwater to outfalls and causing backwater conditions, surcharging, and flow reversal in some locations. As flood waters recede, they would transport debris, sediments, and contaminants such as sewage from backed up collection systems or combined overflows and petroleum-based pollutants such as motor oil, which may contribute polychlorinated biphenyls to surface waters. Sewage contributes bacteria such as fecal coliform and enterococcus to stormwater and flood discharges (EPA 2012). Sewage also contributes excess nutrients, such as phosphorus, which can result in algae growth and die-off that consumes oxygen leading to lowered dissolved oxygen levels (Minnesota Pollution Control Agency 2009). Thus, the No Action alternative could adversely affect conformance with TMDLs for polychlorinated biphenyls, fecal coliform, enterococcus, and dissolved oxygen in the Fort Point Channel. Because the project area is already contributing these pollutants to Fort Point Channel during storm events, future flood events would result in a negligible change in water contamination in the channel and on TMDL compliance. The No Action alternative would have a negligible effect on water quality.

Because the area is subject to jurisdiction under the Wetlands Protection Act, any construction required to implement ad hoc flood control measures or repairs from recurring flood damage would require permission from the Boston Conservation Commission. Continued flooding, which could become worse because of climate change-related sea level rise, would likely damage lands subject to jurisdiction under the Wetlands Protection Act and have negligible effects on water quality, as discussed above. Thus, the No Action alternative could have negligible to minor adverse effects on lands subject to jurisdiction under the Wetlands Protection Act.

Proposed Action

Construction of the Proposed Action has the potential to affect water quality. Construction of the mixed berm and floodwall features would include approximately 2.5 acres of ground disturbance near the Fort Point Channel, which could result in erosion that transports sediments into the channel via surface runoff. The interim deployable floodwalls would require minimal ground disturbance during construction and would thus have minimal potential for generating soil erosion. The Proposed Action would not place fill in water and all project components, including work on existing outfalls, would be accessed from land. The construction contractor would use cofferdams and silt curtains to isolate the area during work on the outfalls and turbidity curtains to minimize sedimentation. Construction activities near or in water may lead to the release of other pollutants into surface waters, such as trash and debris from the construction site or oils, fuels, and lubricants from equipment near or over water. Because the project area is highly urbanized, construction may reveal previously unknown underground sources of contamination and risk spreading this contamination to nearby surface waters.

The City is currently coordinating with USACE on requirements for compliance with Section 10 of the Rivers and Harbors Act and Section 404 of the CWA. The City would obtain a Section 402 NPDES Construction General Permit from the EPA, as the total amount of ground disturbance during construction is expected to exceed 1 acre. Additionally, MassDEP confirmed that a Chapter 91 Waterway License would be required for the project, as the project is within Chapter 91 jurisdiction. A 401 Water Quality Certification from MassDEP would be issued with the Chapter 91 Waterway License. An individual Section 401 Water Quality Certification would likely not be needed because fill would not be placed in the water and dredging would not occur. Any work on the outfalls would be assessed for the need for authorization under the various sections of the CWA. These permits would include conditions to avoid, minimize, and mitigate effects on water quality, such as:

- Siltation and erosion control measures (e.g., silt fences)
- Turbidity controls
- Site restoration measures (e.g., replanting exposed soils with native vegetation)
- Minimizing work within water
- Prevention of accidental releases of hazardous waste, including spills and leaks from construction equipment

With the implementation of these permit conditions, construction, including in-water work, would have a **minor** short-term adverse effect on water quality.

Post-construction, the Proposed Action would reduce the risk of flooding within the 100 Acres Master Plan area. The earthen berms would prevent flood waters from entering the Master Planning area and could route runoff and debris to catch basins rather than directly into the channel during precipitation and flood events. While the amount of impervious surface within the project area would not appreciably decrease, the earthen berms would replace parking lots in the project area that collect oils, lubricants, fuels, dirt and asphalt wear deposits, and other hazardous materials from parked vehicles, which can then be transported into the channel via runoff (Trumbull and Bae 2000). Because flood waters would inundate a smaller area, they would be less likely to transport pollutants such as oils, fuels, and sewage into the channel. Therefore, the Proposed Action would result in negligible beneficial effects by improving compliance

with TMDLs for bacteria and dissolved oxygen in the channel. Thus, the Proposed Action would have a **negligible** long-term beneficial effect on water quality compared with existing conditions in the Fort Point Channel by reducing the spread of flood waters, increasing vegetative filtration, and improving stormwater drainage in the project area.

In their February 2019 response letter, MassDEP confirmed that the Proposed Action appears permissible under the Wetlands Protection Act, as it is designed in a way that would not affect land under the ocean or the seaward face of the existing elevated landform. The City would be required to file a Notice of Intent with the Boston Conservation Commission seeking a negative determination that the Proposed Action would affect an area subject to protection under the Wetlands Protection Act. Thus, the Proposed Action would not affect lands subject to jurisdiction under the Wetlands Protection Act.

5.2.2 Floodplains

Executive Order 11988 Floodplain Management requires federal agencies to avoid, to the extent possible, the long- and short-term effects associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Each federal agency must provide leadership and take action to reduce the risk of flood loss; minimize the effect of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities. FEMA uses an 8-Step analysis to evaluate potential effects on and mitigate effects to floodplains in compliance with Executive Order 11988 and 44 C.F.R. Part 9 (see **Appendix B, Document 3)**. Initial public notice for the project was published April 13, 2021, in *The Herald* and the City's newsletter. FEMA will issue a final notice as part of the EA public notification process in accordance with 44 C.F.R. 9.8 and 9.12. The purpose of the notices is to inform and solicit feedback from the public regarding the potential effects on floodplains and notify the public of FEMA's final decision when it has been made.

The Massachusetts Department of Conservation and Recreation Flood Hazard Management Program is the State Coordinating Office for the National Flood Insurance Program (NFIP). The City of Boston participates in the NFIP (City of Boston 2020d).

The Wetlands Protection Act protects a number of resource areas in addition to wetlands, including 100-year floodplains. Compliance with this law is discussed in **Section 5.2.1**.

5.2.2.1 Existing Conditions

The project area is located within a special flood hazard area (Zone AE) subject to inundation by the one percent annual chance flood, as shown on the FEMA Flood Insurance Rate Map panel 25025C0081J dated March 16, 2016 (**Appendix A**, **Figure 5**). The project area is also in a coastal area that is subject to wave action and future sea level rise that could increase flooding. The project area has the lowest elevations along Fort Point Channel, and water from the channel frequently overtops the existing shoreline during unusually high tides and coastal storm events (**Appendix B, Document 1**). In the future, considering sea level rise, it is likely that flood waters entering through this area would extend further inland toward neighborhoods that could include other South Boston neighborhoods and the Boston Convention and Exhibition Center. By the mid to late century, the 100 Acres Master Plan area is expected to flood at least monthly (**Appendix B, Document 1**).

5.2.2.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, ad hoc flood protection measures could still be implemented to reduce localized flooding. These ad hoc measures would potentially have some minor short-term construction-related effects on the floodplain because ground disturbance can result in erosion of exposed soils that are washed into nearby surface waters and equipment use may release oils, fuels, and other hazardous materials. Because the project area is highly urbanized, construction may encounter previously unknown underground sources of contamination and risk spreading this contamination to nearby surface waters. The ad hoc flood protection measures may have negligible to minor long-term benefits by reducing localized flood damage to protected buildings and infrastructure. If these measures were not implemented in a coordinated manner, they could also have moderate long-term effects by creating barriers or directing floodwaters to unanticipated areas, resulting in increased flooding in some parts of the 100 Acres Master Plan area and South Boston. Under the No Action alternative, there would be a minor long-term adverse effect on people and property within the floodplain and the effect could become moderate as the frequency and severity of flooding increases because of climate change and sea level rise.

Proposed Action

The Proposed Action would result in a **minor** short-term adverse effect on the 100-year floodplain because of construction in the floodplain. Construction activities could result in accidental releases of hazardous waste during the construction period from previously unknown underground sources or minor leaks from construction equipment, and ground disturbance could cause sediment to run off into nearby water systems.

Through the 8-Step analysis, FEMA determined that the Proposed Action was the only practicable alternative, and there were no practicable alternatives outside the floodplain (see **Appendix B, Document 3).** Because the project area is already developed, many of the traditional approaches for minimizing and avoiding effects on floodplains are not practicable for this project. The Proposed Action is functionally dependent on its location in the floodplain (44 C.F.R. 9.11(d)(1)(i)) and potential effects would be minimized (44 C.F.R. 9.11(d)(5)).

FEMA would require the following conditions to avoid and minimize potential adverse effects:

- The City must obtain a local certificate that demonstrates that the cumulative effect of the Proposed Action when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community (44 C.F.R. 60.3 and 44 C.F.R. 9.11(d)(4)).
- Before construction begins, the City must obtain approval from the local permitting official responsible for floodplain development to demonstrate that the Proposed Action is consistent with the criteria of the National Flood Insurance Program (44 CFR part 59 et seq.) or any more restrictive federal, state, or local floodplain management standards (44 C.F.R. 9.11(d)(6)). A copy of the approval/permit, or documentation from the permitting official that an approval/permit is not required, shall be forwarded to the state and FEMA for inclusion in the administrative record.
- Before Construction begins, the City must submit a conditional letter of map revision ("CLOMR") request pursuant to 44 C.F.R. § 65.8 and part 72 (FEMA 2021a).

- Following construction of the Proposed Action, the City must apply for a Letter of Map Revision in accordance with 44 C.F.R. 65.6.

Post-construction, the Proposed Action would result in a **minor** long-term adverse effect on the 100-year floodplain due to the placement of fill in the floodplain that would alter the path of water during high water events. Ground disturbance and the potential biological effects of building the flood control structures in the floodplain would be minimal because the area has been developed and redeveloped for more than 100 years (BLC 1982). Areas that are currently paved and used as parking lots would be converted to flood protection structures. The interim flood control measures would be deployed in rights-of-way during flood events and stored in an industrial park when not needed. The Proposed Action would not discharge fill or riprap within waters of the U.S. and the project would not alter flow patterns of the Fort Point Channel.

The Proposed Action would have a **negligible** beneficial effect on water quality and floodplain functions from the conversion of parking lots into earthen berms. While the amount of impervious surface within the project area would not appreciably decrease, the project area would no longer be a paved surface that collects oils, lubricants, fuels, dirt and asphalt wear deposits, and other hazardous materials from parked vehicles (Trumbull and Bae 2000). The earthen berms would also redirect stormwater runoff in portions of the 100 Acres Master Plan area into catch basins rather than directly into the channel.

The Proposed Action would have a **minor**, long-term beneficial effect through a decreased risk of flood damage. The Proposed Action would decrease the risk of flood damage from high water events and sea level rise in the 100 Acres Master Plan area by protecting existing structures and utilities while protecting the public's health and safety. The mixed berm and floodwall features would address the primary flood pathway into the 100 Acres Master Plan area and the interim flood mitigation measures would address remaining flood pathways from Fort Point Channel. The Proposed Action would enhance and protect portions of the Harborwalk, as section 2 would be located on the landward side of the protection. The Proposed Action would reduce the potential for debris to be carried into the channel when floodwaters recede and would work in conjunction with existing flood mitigation measures implemented at the former GE site north of the project area to protect the larger South Boston area (see **Section 3**).

The Proposed Action would not directly support any specific development within the floodplain; however, it could indirectly support future redevelopment. Because the area that would benefit from the Proposed Action is already developed and covered with impervious surfaces, redevelopment would not increase impervious surface area or the effects of impervious surfaces on natural floodplain functions. The Proposed Action does not include the addition of, or improvements to, roadways or utilities that would support expanded urban uses of the project area. Any redevelopment that might occur would be subject to local and state floodplain development regulations, as well as the stipulations of the 100 Acres Master Plan, which requires additional greenspace and the creation of permeability along the channel’s edge (approximately 2.18 acres). Therefore, the Proposed Action may have a **negligible** long-term effect on floodplains by indirectly supporting future redevelopment, which could include increased pervious surfaces.

5.2.3 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. Each federal agency shall take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. FEMA uses an 8-Step analysis to evaluate potential effects on and mitigate effects to wetlands, in compliance with Executive Order 11990 and 44 C.F.R. Part 9.

The Wetlands Protection Act protects wetlands and the public interests they provide, such as flood control and pollution and storm damage prevention. Compliance with the Wetlands Protection Act is discussed in detail in **Section 5.2.1**.

5.2.3.1 Existing Conditions

According to the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory, no federally designated wetlands are present in the project area or vicinity (USFWS 2021). Furthermore, existing conditions in the project area are not conducive to supporting wetlands, as the project area is primarily composed of built infrastructure and pavement with minimal areas of landscape vegetation and large amounts of buried infrastructure. Historically, the project area was open water and marsh lands that have been filled to reclaim the land for development. The existing hard seawall edge protects the fill from the tidal waters of Fort Point Channel and prevents the formation of wetlands along the channel edge.

5.2.3.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, because there are no wetlands in the project area or vicinity, effects to wetlands would be **none**.

Proposed Action

Under the Proposed Action, because there are no wetlands in the project area or vicinity, effects to wetlands would be **none**.

5.3 Coastal Resources

5.3.1 Coastal Zone Management Act

The Coastal Zone Management Act, enacted in 1972, was established to preserve, protect, develop, and, where possible, restore or enhance the resources of the nation’s coastal zone. Section 307 of the act requires federal actions, within (or outside of, but with the potential to affect) the coastal zone, to be consistent with the enforceable policies of a state’s federally approved coastal management program. The Massachusetts Coastal Zone Management (MA CZM) is responsible for managing the state’s coastal program, which includes four main objectives, as described in the *Massachusetts Coastal Management Policy Guide*: (1) prevent, eliminate, or significantly reduce threats to public safety, property, and environmental resources resulting from hazards such as erosion, flooding, and storm damage; (2) allow natural physical coastal processes to continue while allowing appropriately sited coastal development and economic growth and promote the use of nonstructural alternatives for shore protection, where appropriate and to the extent feasible; (3) limit, prohibit, or condition public expenditures in coastal high-

hazard areas to ensure that increased exposure to coastal hazards is not encouraged; and (4) prioritize public expenditures for acquisition and relocation of structures out of hazardous coastal areas (MA CZM 2011).

5.3.1.1 Existing Conditions

The project area is entirely within the Massachusetts Coastal Zone, specifically the Boston Harbor coastal zone region (MA CZM 2021b). The project area encompasses a portion of the existing Fort Point coastline, which is presently protected by a concrete block seawall and riprap at the northern edge and includes 14 drainage outfalls. Based on site visits to the project area in spring 2021 and a review of aerial imagery, there are no natural beaches in the project area or vicinity. The project area contains a portion of the Boston Harborwalk, which runs parallel to the coastline and includes piers overlooking and providing access to the water. The project area vicinity is primarily developed infrastructure, such as buildings and parking lots with minimal areas of landscape vegetation.

5.3.1.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, ad hoc flood protection measures may be implemented, potentially resulting in short-term construction-related effects on existing coastal infrastructure, including access to the Harborwalk due to construction-related closures. Although ad hoc measures may reduce the risk of flood damage for specific areas, these measures would not substantially reduce the risk of flooding for the entire 100 Acres Master Plan area and may even cause areas of increased flooding if not implemented in a coordinated manner as discussed in **Section 5.2.2**.

Continued flooding could create hazardous conditions by damaging coastal infrastructure, depositing debris, and spreading contaminants, such as sewage. Public access to the shoreline would be limited if floods inundate and/or damage trails, piers, and roads in the area. Runoff from floodwaters entering the Fort Point Channel would continue to impair the water quality of the channel resulting in a negligible effect on water quality. Thus, the No Action alternative would have a **moderate** long-term adverse effect on coastal resources from continued flooding and would be inconsistent with MA CZM coastal policies.

Proposed Action

Construction of the Proposed Action would have a minor short-term adverse effect on coastal resources. Construction activities for Segment 2 of the mixed berm and floodwall features would require the temporary closure and re-routing of Harborwalk users and short-term visual effects from earth-moving equipment and disturbed ground. The interim flood control measures would require minimal construction in the project area, including sidewalk and roadway regrading, which could have temporary visual effects. Installation of the interim measures at A Street and West Service Road may require temporary street closures and detours. As discussed in Section 5.2.1, construction activities may affect water quality by causing erosion near the channel from ground-disturbing activities and generate turbidity by stirring up sediments during work on the outfalls on the face of the seawall. Water quality permits from MassDEP and USACE would likely require Best Management Practices (BMPs) that would reduce the risks of construction-related erosion and sedimentation and would be consistent with MA CZM coastal policies.

The Proposed Action would likely have a minor beneficial effect on the visual aspect of the area because surface parking would be replaced with earthen berms. These berms would not block views of the water as they would be located landward of the Harborwalk. Furthermore, the berms could hide many of the remaining parking lots from the view of users along Harborwalk. The interim flood control measures would be stored in an industrial park and would only be deployed during flood events, thus resulting in negligible visual effects and no effect on public access to the shoreline. Although the Proposed Action may reduce runoff from floodwaters, the change in contamination from runoff would likely be negligible.

In January 2019 MA CZM issued a response letter to the City's request for guidance, explaining that FEMA is not required to submit consistency determinations when providing financial support for projects in the coastal zone; although individual project proponents are required to undergo federal consistency review if their project requires a federal authorization listed in the Coastal Zone Management Plan and implementing regulations (301 CMR 20.04). Thus, the City would need to confirm the need for a federal consistency review with the MA CZM.

The Proposed Action is expected to be consistent with objectives 1 and 3 of the *Massachusetts Coastal Management Policy Guide*. Objective 2 would not apply, as the Proposed Action does not include the construction of permanent coastal engineering structures, such as groins or revetments, and the project area is not within or near natural beaches that allow for the littoral transport of sand. Objective 4 would not apply, as structures would not be acquired and removed from the coastal hazard area. The Proposed Action would mitigate flood hazards in the project area and greater 100 Acres Master Plan area. Therefore, the Proposed Action would support compliance with the 100 Acres Master Plan, which would be in alignment with objectives 1 and 3 of the guide. Therefore, it is anticipated that the Proposed Action would be consistent with MA CZM program policies and would result in a minor long-term beneficial effect on coastal resources. This finding would be confirmed after the City consults with MA CZM and the MA CZM issues a favorable Coastal Consistency Determination for the project.

5.4 Biological Resources

5.4.1 Vegetation

Massachusetts Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) manages state-designated rare plants and natural communities (Massachusetts Division of Fisheries and Wildlife 2021) under the Massachusetts Endangered Species Act (Massachusetts General Laws, Chapter 131A). NHESP is responsible for the conservation and protection of hundreds of species that are not hunted, fished, trapped, or commercially harvested in the state, as well as the protection of the natural communities that make up their habitats.

Massachusetts General Laws, Chapter 87 protects public shade trees, or all trees within or on the boundaries of a public way. Under this law, public shade trees cannot be cut, trimmed, or removed by any person other than the tree warden or deputy, unless permission from the tree warden is granted. If a healthy tree is requested to be removed in the city of Boston, the city's tree warden or member of the Boston Parks and Recreation Department must inspect the site to assess the tree and potential effect from its removal. After the inspection, a public hearing must be held to determine whether the tree can be removed and if yes, the party requesting removal of the tree must pay for its removal. This money is added to the Fund for Parks and Recreation (City of Boston 2020c).

5.4.1.1 Existing Conditions

The project area is primarily composed of hard infrastructure with limited areas of managed vegetation that includes Binford Street Park and sections parallel to the Harborwalk with grasses, ground cover, and some street trees. The greater 100 Acres Master Plan area contains some landscape vegetation, primarily grasses and street trees, in parks that include A Street and Wormwood Parks, and along the edges of buildings and parking lots.

The City of Boston sent a letter to NHESP on January 2, 2019, requesting a regulatory review to identify threatened or endangered species or their critical habitat in the project area in addition to any potential effects on the Fort Point Channel. NHESP's response indicated that no Estimated or Priority Habitat of Rare Species, including rare plant species, is present in the project area. According to NHESP's online mapping tool, there are no natural communities or areas of biodiversity conservation interest in the project area (MassDEP 2017).

5.4.1.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts may be implemented that could potentially result in short-term negligible adverse effects on existing vegetation if the projects remove or trample the vegetation with construction equipment. Although ad hoc measures may reduce the risk of flood damage for specific areas, these measures would not substantially reduce the risk of flooding over the entire 100 Acres Master Plan area. In the long term, the 100 Acres Master Plan area would remain at risk of flood damage and larger areas of South Boston would flood over time because of climate change-related sea level rise. Flood waters would continue to deposit debris and sediments on the ground surface that could physically damage soil, which could smother and kill vegetation (Soil Science Society of America and American Society of Agronomy 2021). Construction may be required to address future flood damage, which could result in additional temporary effects on vegetation. Therefore, under the No Action alternative, continued flooding could have a long-term **negligible** adverse effect on vegetation within the project area and the greater 100 Acres Master Plan area.

Proposed Action

The Proposed Action may require removal of up to approximately 0.75 acres of vegetation along the Harborwalk. Vegetation along the Harborwalk that cannot be avoided would be restored following construction. Some shrubs and trees may be salvaged. Any healthy trees within the public way would only be removed with permission of the tree warden or Parks and Recreation Department after an inspection and public hearing (City of Boston 2020c). The deployable flood control measures are not expected to affect vegetation, as they would be deployed in roadways and sidewalks and would be stored in a warehouse in an industrial park. Vegetation may be removed to access the outfalls and install the backflow mitigation measures from land. All vegetation affected by the Proposed Action would be restored post construction. Therefore, there would be short-term negligible effects on vegetation in the project area from the construction of the Proposed Action.

The Proposed Action would create earthen berms with a 6-inch layer of topsoil and sod that would be planted with vegetation. In the long term, the Proposed Action would have a **negligible** beneficial effect on vegetation because it would increase vegetative cover in the project area and reduce the risk of flood damage to vegetation further inland.

5.4.2 Wildlife and Fish

NHESP is responsible for the conservation and protection of hundreds of species of wildlife and fish that are not hunted, fished, trapped, or commercially harvested in the state, as well as the protection of the natural communities that make up their habitats. The Department of Conservation and Recreation administers the Areas of Critical Environmental Concern (ACEC) program; ACECs are characterized by their quality, uniqueness, and significance of their natural and cultural resources (DCR 2021).

The Magnuson-Stevens Fishery Conservation and Management Act is the primary law governing marine fisheries management in U.S. federal waters and designates the National Marine Fisheries Service (NMFS) as the lead federal agency responsible for its implementation. First passed in 1976, the act fosters the long-term biological and economic sustainability of our nation's marine fisheries. One primary provision of the act is the designation of Essential Fish Habitat (EFH) for all species managed under the act. All federal agencies are required to assess the potential effects of proposed actions and alternatives on EFH, and federal agencies are to consult on any actions that could adversely affect EFH.

The Migratory Bird Treaty Act provides a program for the conservation of migratory birds that fly through lands of the United States. A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle. Most species native to North America are covered by the Migratory Bird Treaty Act. The lead federal agency for implementing the Migratory Bird Treaty Act is USFWS. 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 C.F.R. 10.12) as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities."

5.4.2.1 Existing Conditions

The project area and 100 Acres Master Plan area are primarily characterized by built urban infrastructure with minimal wildlife habitat. The habitat in the project area is limited to landscape vegetation, including street trees, along the Harborwalk and in Binford Street Park. Habitat in the 100 Acres Master Plan area is also limited to landscape vegetation, primarily street trees, in parks and around buildings and parking lots. Species that occupy the area, such as squirrels, geese, and gulls, are adapted to urban levels of noise, activity, and habitat contamination.

The City of Boston sent a letter to NHESP on January 2, 2019, requesting guidance about effects of the Proposed Action. NHESP's response indicated that no Estimated or Priority Habitat is present in the project area and the project does not require review for compliance with rare wildlife species section of the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.37, 10.59, and 10.58(4)(b)). According to NHESP's online mapping tool, there are no natural communities or areas of biodiversity conservation interest in the project area (MassDEP 2017). Furthermore, the project area is not designated as an ACEC (DCR 2021).

Fort Point Channel is water quality impaired (see **Section 5.2.1**) and does not provide a high-quality aquatic habitat for fish or shellfish. In addition, there is no riparian or aquatic vegetation to provide shade or cover along the channel edges. Because of the channel's function as a wharf and shipping access, the channel sides are relatively steep and uniform and do not provide shallow water habitats or variations in depth and cover that provide diverse conditions for aquatic life. However, fish species such as winter flounder (*Pseudopleuronectes americanus*) and bluefish (*Pomatomus saltatrix*) occur in Boston Harbor

and may use the Fort Point Channel (NMFS 2020). Fish species that do occur in the channel are expected to be adapted to poor water quality conditions or would only spend very short amounts of time in the channel.

According to the NMFS EFH online mapping tool, the Fort Point Channel potentially contains EFH for 25 fish species including, but not limited to, winter flounder, Atlantic wolffish (*Anarhichas lupus*) Atlantic cod (*Gadus morhua*), and yellowtail flounder (*Limanda ferruginea*). No Habitat Areas of Particular Concern (i.e., high-priority areas for EFH conservation) or special aquatic sites (e.g., submerged aquatic vegetation, saltmarsh, coral reefs) are in the project area (NMFS 2020).

The project area is within the Atlantic Flyway and there is the potential for migratory bird species to occur in the project area because of the presence of vegetation, such as street trees. The USFWS Information for Planning and Consultation tool indicates that many migratory birds have the potential to occur in or near the project area including a number of urban-adapted species (USFWS 2021). Nesting habitat for migratory birds is limited to landscape vegetation and possibly some infrastructure in the project area, such as building ledges and roofs.

5.4.2.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control measures could be implemented. This could potentially result in an adverse short-term negligible effect on wildlife and fish in and near the project area and the 100 Acres Master Plan area from construction-related noise and activity disturbances, both on land and in water, and erosion from ground disturbance that affects water quality. Additionally, vegetation may be removed during construction, which could affect the limited wildlife habitat in the area. Although ad hoc measures may reduce the risk of flood damage for the specific areas that they protect, these measures would not substantially reduce the risk of flooding over the entire 100 Acres Master Plan area in the long term. Construction may be required to address continued flood damage, resulting in additional construction effects on wildlife and fish. Flood-related pollutants would continue to enter nearby water bodies. Therefore, the No Action alternative would have a **negligible** long-term adverse effect on wildlife and fish species.

Construction of the ad hoc flood control measures could have a short-term negligible effect on EFH from construction-derived pollutants entering the channel, such as sediments, metals, and trash, as well as noise or vibration caused by any in-water work. In the long term, ongoing flood damage would trigger periodic construction activities that could cause additional construction-derived pollutants to enter the channel. Flood waters would continue to periodically inundate the area, which could transport debris and contaminants into the channel as well. Contamination from continued flood events would have a long-term **negligible** adverse effect on EFH.

Construction of ad hoc flood control measures and flood-related repairs may require vegetation removal or building repairs, which would have the potential to affect birds and their nests if the work is done during the breeding season. Thus, under the No Action alternative, construction of ad hoc flood control measures and flood-related repairs could have short and long-term **negligible** adverse effects on migratory bird species.

Proposed Action

Construction-related noise and activity disturbances would be short-term and would not substantially affect wildlife because wildlife in the project area is accustomed to urban levels of noise and activity. Vegetation removal may reduce the limited wildlife habitat in the project area; however, vegetation would be restored following construction. As discussed in **Section 5.2.1**, construction activities would be conducted in accordance with applicable permits. With the implementation of permit required BMPs, there would be negligible potential for effects on fish in the Fort Point Channel. Thus, the Proposed Action would have a negligible short-term adverse effect on wildlife and fish habitat from construction-related activities both in and out of water. Post-construction, the Proposed Action would have a **negligible** long-term beneficial effect on wildlife because of the small amount of additional vegetated open space (sod on the berms) that would be added to the project area. There would also be a **negligible** long-term beneficial effect on fish in the channel from the reduction in contaminates and debris carried by storm and floodwater runoff into the channel.

Construction of the Proposed Action has the potential to affect water quality within EFH by temporarily increasing erosion and siltation into the channel, potentially generating turbidity during in-water work, and inadvertently releasing hazardous fuels, oils, and lubricants from equipment used near or in the channel. In accordance with required permits (see **Section 5.2.1**), the City would need to implement construction BMPs and conditions to protect water quality including, but not limited to, measures to control erosion and sedimentation, reduce turbidity, and prevent the spread of hazardous waste. Construction of the Proposed Action may also generate underwater noise and result in benthic community disturbance from installation of the cofferdam. It is expected that installation of the cofferdam would require pile driving, not vibratory driving. Furthermore, the area is filled and developed with no intended future opportunity for inland migration of habitat. To avoid and minimize adverse effects to EFH and in conformance with 50 C.F.R. Part 600, Subpart J (600.905 – 600.930), FEMA initiated consultation with the NMFS Habitat and Ecosystem Services Division on September 10, 2021 (FEMA 2021b). NMFS provided a response on October 12th, 2021 that the proposed action may adversely affect EFH, specifically winter flounder. In order to avoid adverse effects to winter flounder spawning and egg development habitat, NMFS requested cofferdam installation and removal should take place outside of the winter flounder time of year from January 15 – June 30 of any year. Work may take place behind dewatered cofferdams during this time. As long as this condition is followed, there would be a **negligible** short-term adverse effect on EFH. Post-construction, the Proposed Action would reduce contaminants and debris in flood-related runoff that enters the channel and potentially affects EFH. However, the change in contaminant levels in the channel resulting from the Proposed Action would not be measurable; thus, the Proposed Action would have a **negligible** long-term beneficial effect on EFH.

Construction activities have the potential to affect migratory birds from vegetation removal for the creation of the mixed berm and floodwall features if the vegetation is removed during the breeding season. Construction of the deployable floodwalls would not affect potential nesting sites or migratory birds. If vegetation removal occurs between April 1 and September 15, the migratory bird breeding season, construction of the mixed berm and floodwall features may disturb vegetation and potentially affect migratory birds (USFWS 2021). If vegetation removal occurs during the migratory bird nesting season, the City would coordinate with USFWS to obtain any required authorization and provide documentation of coordination with USFWS to FEMA. Therefore, there would be a temporary negligible effect on migratory birds if vegetation removal is required within the breeding season and all potential

USFWS conditions are followed. Post-construction, the Proposed Action would have a **negligible** long-term beneficial effect on wildlife because vegetation affected by the project would be restored and a small amount of additional vegetated open space (i.e., sod on the berms) would be added to the project area.

5.4.3 Invasive Species

Executive Order 13112, Invasive Species, requires federal agencies to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health effects that invasive species cause to the extent practicable. Invasive species often prefer disturbed habitats and generally possess high dispersal abilities, enabling them to outcompete native species.

The Massachusetts Department of Agricultural Resources is the lead state agency responsible for the management of invasive plant species in accordance with state law. Invasive plant species are regulated by the state through the Massachusetts Prohibited Plant List, which prohibits the importation, sale, and trade of plants determined to be invasive in Massachusetts (Massachusetts Department of Agricultural Resources 2021).

In addition to invasive plant species, USDA establishes quarantines for invasive animal species that include the European gypsy moth (*Lymantria dispar*) (USDA 2021b). The quarantine for the emerald ash borer (*Agrilus planipennis*) was rescinded in January 2021 (USDA 2021a). MA CZM works to monitor and reduce the spread of invasive marine species in coastal waters of Massachusetts through the marine invasive species program (MA CZM 2021a).

5.4.3.1 Existing Conditions

The Massachusetts Prohibited Plant List contains 143 invasive species and was developed by the Massachusetts Department of Agricultural Resources in conjunction with the Massachusetts Invasive Plants Advisory Group (Advisory Group). According to the Advisory Group, there are 35 species within Massachusetts that are designated as invasive, i.e., non-native species that have spread into native or minimally managed plant systems in Massachusetts (Massachusetts Invasive Plants Advisory Group 2017). It is not expected that many invasive plant species are present in the project area because vegetation in the project area is primarily managed landscape species (see **Section 5.4.1**).

Emerald ash borer inhabits ash trees, which may be present in the project area. Emerald ash borer infestations have been documented in the state of Massachusetts (USDA 2021a). European gypsy moths are present in the state of Massachusetts and the city of Boston is within the federal EGM quarantine zone (USDA 2021b). European gypsy moth caterpillars feed on over 300 tree and shrub species and prefer deciduous trees, particularly oak trees, which may be present in the project area (USDA 2021b). Thus, both the European gypsy moth and emerald ash borer have the potential to occur in the project area. Invasive marine species, such as the colonial tunicates (B*otrylloides violaceus, Botryllus schlosseri, Didemnum vexillum, and Diplosoma listerianum*), may also occur in the channel or the Boston Harbor (MA CZM 2021a).

5.4.3.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, implementation of ad hoc flood control measures could result in soil and vegetation disturbance that creates suitable conditions for the establishment of invasive plant species (USDA and University of Georgia 2018). However, since the project area is highly developed, there would be minimal opportunities for invasive species to become established. There would be no effect on the potential presence or spread of emerald ash borer and European gypsy moth. Some trees could be lost under the No Action alternative, which might reduce available habitat for these invasive species, other trees would be planted to replace those lost.

If the implementation of ad hoc flood control measures requires in-water work, the transfer of equipment used in the water from one area to another could spread invasive marine plants and animal species if the equipment is not cleaned properly between locations. Therefore, the No Action alternative would result in short-term **negligible** adverse effects from the potential spread of invasive terrestrial and marine species.

Although ad hoc flood-control measures may reduce the risk of flood damage for specific areas, these measures would not substantially reduce the risk of flooding over the entire 100 Acres Master Plan area in the long term. Construction may be required to address continued flood damage, resulting in additional areas of disturbance. Flood waters would continue to damage and kill vegetation, such as trees, which could lead to the introduction and expansion of invasive plant species that thrive in newly disturbed areas (USDA and University of Georgia 2018). Thus, under the No Action alternative, there could be a long-term **negligible** adverse effect from the spread of invasive plant species.

Proposed Action

Construction of the Proposed Action would temporarily disturb soils and vegetation, creating suitable conditions for the growth and spread of invasive plant species. Equipment used for in-water work could also spread aquatic invasive species into the Fort Point Channel if the equipment is not cleaned properly before entering the channel and after being removed from the channel. The City would follow all conditions in forthcoming CWA permits for in-water work, which would minimize the spread of aquatic invasive species. The Proposed Action would include the placement of sod on top of exposed topsoil on the berms, covering areas of disturbance in which invasives could otherwise become established. Vegetation along the Harborwalk would be regularly maintained by the City, which would prevent the spread of invasives within the project area. No soil or vegetation disturbance would be required to implement or store the deployable flood control measures. Thus, the Proposed Action would result in a **negligible** short-term effect on the spread of invasive species.

Post-construction, the Proposed Action would reduce the risk of flood damage to existing vegetation, such as trees, within the 100 Acres Master Plan area, resulting in fewer opportunities for invasive plant species to become established. The Proposed Action would therefore have a negligible long-term beneficial effect by reducing the risk of invasive plant species spread. However, the protection of large deciduous trees may also preserve the preferred habitat for emerald ash borer and European gypsy moth in the project area, resulting in a potential **negligible** adverse effect.

5.4.4 Threatened and Endangered Species

The Endangered Species Act (ESA) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. USFWS and NMFS are the lead federal agencies for implementing the ESA. 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. "Take" under the ESA is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities (50 C.F.R. 10.12). Because the ESA defines an 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 C.F.R. 402.02), the action area where effects on listed species must be evaluated may be larger than the project area where project activities would occur.

5.4.4.1 Existing Conditions

According to the USFWS Information for Planning and Consultation tool, no proposed, threatened, or endangered species under the jurisdiction of USFWS occur in the action area, including the project area and 100 Acres Master Plan area (USFWS 2021). According to the National Oceanic and Atmospheric Administration (NOAA) Fisheries Greater Atlantic Region Section 7 Mapper, accessed September 7, 2021, there are two ESA-listed species of fish and four species of sea turtles that occur, or have the potential to occur, in the Fort Point Channel: Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), shortnose sturgeon (*Acipenser brevirostrum*), loggerhead turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*), green turtle (*Chelonia mydas*) and Kemp's ridley turtle (*Lepidochelys kempii*). The presence of listed species in the project area is very unlikely because the Fort Point Channel is enclosed and highly developed (R. Mesa, NOAA, personal communication, September 8, 2021).

The City of Boston sent a letter to NHESP on January 2, 2019, requesting a regulatory review to identify State-listed threatened or endangered species and their critical habitat in the project area. NHESP's response indicated that the project does not require review for compliance with the Massachusetts Endangered Species Act.

5.4.4.2 Potential Effects and Proposed Mitigation

No Action Alternative

As discussed above, listed species are very unlikely to occur in the Fort Point Channel because the channel is enclosed and highly developed. On September 8, 2021, NMFS confirmed that the presence of listed species in the project area is very unlikely; therefore, the No Action alternative would likely have no effect on listed species.

Proposed Action

FEMA requested technical assistance from NMFS on the potential for the Proposed Action to affect the listed species on September 7, 2021 (FEMA 2021c). On September 8, 2021, NMFS confirmed that the presence of listed species in the project area is very unlikely because the Fort Point Channel is enclosed and highly developed (NMFS 2021). Additionally, project work would be conducted from land and turbidity controls would be used for cofferdam installation, which would further limit any potential

effects of the Proposed Action on these species. Thus, FEMA determined the Proposed Action would have "No Effect" on listed species.

5.5 Cultural Resources

As a federal agency, FEMA must consider the potential effects of its actions upon cultural resources prior to engaging in any project. Cultural resources are defined as prehistoric and historic sites, structures, districts, buildings, objects, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. There are several laws a federal agency must consider when working with and identifying cultural resources. For the City of Boston Resilient Fort Point Channel project, FEMA will meet this obligation through its Section 106 of the National Historic Preservation Act of 1966 (NHPA) consultation. Section 106 of the NHPA, as amended and implemented by 36 CFR Part 800, outlines the required process for federal agencies to consider a project's effects to historic properties. The NHPA defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register." Eligibility criteria for listing a property on the National Register of Historic Places (NRHP) are found at 36 C.F.R. Part 60. While the definition of a cultural resource under NEPA can be broader, FEMA regularly uses Section 106 to meet its obligations to consider effects to cultural resources. For this project, FEMA determined that it was appropriate to use its NHPA review to fulfill its NEPA obligations.

Cultural resources determined to be potentially significant under the NHPA are subject to a higher level of review and federal agencies must consider the potential effects of their projects on those resources and consider steps to avoid, minimize, or mitigate those effects. To be considered significant, a cultural resource must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the NRHP. The term "eligible for inclusion in the NRHP" includes all properties that meet the NRHP listing criteria, which are specified in the Department of Interior regulations Title 36, Part 60.4 and NRHP Bulletin 15. Properties and sites that have not been evaluated at the time of the undertaking may be considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as nominated properties.

5.5.1 Identification of APE, Cultural Resources, and Consultation Process

Area of Potential Effect

Pursuant to 36 CFR 800.4(a)(1), the Area of Potential Effects (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. Within the APE, effects to cultural resources are evaluated prior to the undertaking for both Standing Structures (above ground resources) and Archaeology (below ground resources). The APE for this undertaking consists of all areas of ground disturbance, including staging and access areas not on hardened surfaces, and any locations from which permanent alterations will be visible. This consists of the area of ground disturbance associated with construction of the berm and the elevated Harbor Walk. Visual effects are limited to the surrounding properties from which the berm and elevated Harbor Walk are visible.

The Massachusetts Historical Commission (MHC) maintains a database of the Commonwealth of Massachusetts' historic properties: the Massachusetts Cultural Resource Information System (MACRIS), which is regularly updated. FEMA uses this database as part of its efforts to identify significant cultural resources that may be affected by a project. A FEMA Secretary of the Interior-qualified Historic

Preservation Specialist has conducted a search of MACRIS, the National Register of Historic Places National Resources Information Service (NRHP NRIS) database, reviewed historical aerial images and historic maps, written histories of the project area and the Natural Resources Conservation Service's (NRCS) Web Soil Survey to assess the potential for eligible resources within the project APE.

Cultural Resources

From the start of its construction and continuing to present day, the Fort Point Channel area in South Boston has been a place of business and a location for activities oriented to water transportation, industry, and commerce. The Fort Point area was first developed in the 1830s by the Boston Wharf Company (BWCo) and was one of the nation's leading marketplaces for wool. Today, many of the Fort Point area's extant manufacturing and warehouse buildings have been preserved as a local landmarks district, with several buildings converted into artists' studios and lofts. Other original BWCo buildings now house office space, hotels, restaurants, and commercial businesses. The area derives its historic significance from being a large and remarkably intact example of the kind of warehousing and manufacturing areas that were once vital to the economies of cities across the nation. Buildings in Fort Point Channel area date predominately from 1870-1915.

The Fort Point Channel area was once home to several well-known manufacturing names in the region during the late nineteenth through the early twentieth centuries. Both the American Sugar Refinery Company, one of many sugar processors in the area at the time, and New England Confectionary Company (NECCO) occupied large parcels in the neighborhood. Gillette World Shaving Headquarters has been in Fort Point Channel for over 100 years and continues to play an important role in the development of the area.

Consultation

FEMA consulted with the Massachusetts State Historic Preservation Office (SHPO), the Massachusetts Board of Underwater Archaeology (BUAR), and the Native American Tribal governments through the responsible Tribal Historic Preservation Officer (THPO), whose areas of interest include Suffolk County (Mashpee Wampanoag Tribe and Mashpee Wampanoag Tribe of Hay Head [Aquinnah]), under Section 106 of the NHPA. FEMA submitted its initial finding that the proposed action would have "No Adverse Effect" on historic properties to the SHPO and THPOs on March 10, 2021 (FEMA 2021d, 2021f and 2021g). FEMA also submitted letters to several cultural and historic non-profits within the Fort Point Channel neighborhood, including Boston Landmarks Commission, Historic Boston Inc., Friends of Fort Point Channel, Boston Preservation Alliance, and the Boston Tea Party Ships & Museum. April 9, 2021, the SHPO's office concurred that the project would have no adverse effect on the historic resources within the project area (FEMA 2021e). The SHPO's office also concurred that there are no archaeological concerns within the project area as the ground has been previously disturbed by construction and demolition activities throughout the history of the neighborhood (FEMA 2021e).

5.5.2 Historic (Standing) Structures

5.5.2.1 Existing Conditions

The project area is located within the boundaries of the Fort Point Channel Historic District, a historic district listed in the NRHP. The Fort Point Channel Historic District comprises roughly 55-acres in South Boston located across Fort Point Channel from downtown Boston. It contains 103 buildings and 11 structures, specifically four (4) bridges, a prominent chimney, two (2) sections of seawall (channel walls) along both sides of Fort Point Channel, a circa 1920s Boston Wharf Company roof sign, and a monumental milk bottle built to advertise a milk company. 89 buildings and nine (9) structures are considered contributing to the historic district. Three (3) of the channel's historic bridges, Summer Street (1898-1899), Northern Avenue (1908), and Congress Street (1930) are rare examples of their types.

The Fort Point Channel granite channel walls are contributing elements within the historic district. The Fort Point Channel Landmark District, a local historic landmark district, is also located within the project area. The boundaries of both districts overlap almost entirely with each other. The project is also located directly adjacent to the historic Gillette World Shaving Headquarters Complex and its associated sign, which FEMA evaluated for eligibility for listing in the NRHP. To the west on the Downtown Boston side, the U.S. Post Office General Mail Facility is within the viewshed of the APE.

U.S. Post Office-General Mail Facility

The U.S. Post Office-General Mail Facility, located at 25 Dorchester Avenue, is a circa 1935 building which was subsequently renovated and added on to in the 1960s and further renovated in the 1980s. The building is situated along the west side of Fort Point Channel. While the building is currently encased in a steel frame with an aluminum panel skin, the original structure had a brick frame in a Neo-Classical style. Following extensive renovations over the years as described, the U.S. Post Office-General Mail Facility has lost its integrity of design, materials, workmanship, and feeling. The original structure from 1935 is no longer visible. Therefore, the U.S Post Officer-General Mail Facilities lacks the necessary integrity to be eligible for listing in the NRHP.

Gillette Manufacturing Complex

The South Boston campus of Gillette is the location where this internationally renowned company began operations. The Gillette Company and brand originated in 1895 when salesman and inventor King Camp Gillette invented a safety razor that used disposable blades. The American Safety Razor Company was founded on September 28, 1901 in Boston by Gillette and other members of the project, and the company was renamed the Gillette Safety Razor Company in 1904. As the BWCo began to sell off portions of its land in the Fort Point Channel area, Gillette and other industries expanded. Based on historic maps, Gillette gradually grew its plant footprint during the 1910s and 1920s in part by taking over portions of the former American Sugar Refinery Company, which held a large foothold on land along the southern portion of Fort Point Channel between West First and West Second streets. Some buildings were repurposed while others were torn down and new ones constructed in their place. In the 1920s, part of West First Street was reconstructed and named Gillette Park as Gillette began to occupy more of the buildings in the area.

During the time of urban renewal in the 1950s and 1960s, many companies were leaving cities. Gillette, however, showed a confidence in the future of Boston by investing extensively in its South Boston campus along Fort Point Channel. A *Boston Globe* article from August of 1960 announced plans for

construction of a new $6 million Gillette plant. The Gillette Headquarters building (blade manufacturing building) facing Fort Point Channel was designed with a distinctive saw-tooth window configuration that represents the edge of a razor. The company sign bearing the words "Gillette World Shaving Headquarters" sits atop this edge of the building. The buildings included a new manufacturing plant, shipping and receiving building, and office facilities.

FEMA determined that the Gillette Manufacturing Complex is eligible for listing in the NRHP for its association with significant events and persons that have contributed to history, mainly the invention of the safety razor by King Camp Gillette which changed the world of shaving. The Gillette Manufacturing Complex is significant at both the local, state, and national levels for its associations with the history of manufacturing and industrial development in Boston (local significance), which affected the economy of both Massachusetts and New England as a whole (state significance). Gillette is an internationally recognized name that revolutionized the manufacturing of razors through the invention of the safety razor (national significance) and continues to maintain a presence and reputation around the world as a leader in the shaving industry.

The Gillette Manufacturing Complex has been a significant contributor to the economic growth and vitality of Boston throughout its more than 100 years of history in Fort Point Channel. As previously noted, during the time of urban renewal in the 1950s and 1960s when many companies were leaving cities, such as Boston, Gillette invested extensively in its South Boston campus and helped to bolster the local economy by staying in Fort Point Channel.

The Gillette Headquarters building is unique in its design with its razors edge facing Fort Point Channel that was designed to mimic the company's product. Although the buildings within the Gillette complex have been greatly altered over the lifespan of the complex (demolitions, new construction, reuse of buildings), these changes have been made to allow the company to adapt to new manufacturing needs. The complex retains sufficient integrity of location, feeling, and association.

Gillette Sign

The large sign with illuminated letters reading "Gillette World Shaving Headquarters" sits atop the Gillette Complex facing Fort Point Channel. It is visible not only to pedestrians in the city, but also those traveling along Interstate-93 through the city and to those who take trains to and from South Station. The sign has been a Boston landmark for decades and has been associated with the history of Gillette in the Boston area since it was constructed in the 1960s when the Gillette plant was expanded.

The sign was constructed by the Donnelly Electric Manufacturing Company of Boston. The company was founded in 1850 was one of the first manufactures of neon advertising signs in New England. The use of large-scale illuminated displays intended to be seen over long distances were an innovation of the automobile era and the company designed and produced an array of signs in the Boston area, many of which have since been dismantled. Surviving signs in the area include the Gillette World Shaving Headquarters sign, the NRHP-listed Shell Oil Company sign in Cambridge, and the Stop & Shop sign on the building adjacent to the Shell sign site.

The Gillette sign was restored in 2010 as part of Gillette's multimillion-dollar renovation project for the aging plant. At the time of the restoration, the sign stretched 400 feet long, stood 16 feet tall, and contained 5,000 feet of neon tubing. When the sign was restored, the neon tubing was replaced within over 14,000 light emitting diode (LED) modules, which are still utilized presently. Although the inner

workings of the original neon have been removed, and is no longer linked to the neon sign era, the sign still has the illuminated appearance as originally constructed. FEMA has determined that the sign is eligible as a contributing element within the eligible Gillette Complex as it adds to the overall significance of the complex.

5.5.2.2 Potential Effects and Proposed Mitigation

No Action Alternative

If no federal action is taken, the implementation of ad hoc flood control measures would continue to be constructed. Adjacent commercial, institutional, and residential properties within Fort Point Channel would remain at risk of flood damage with potential damage to historic properties in the neighborhood. Effects to historic structures would be **minor**.

Proposed Action

Under the Proposed Action, there would be no direct physical construction effects to any buildings within the APE. Both historic and non-historic resources within the Fort Point Channel neighborhood would be protected from the 100-year flood event. The construction of these flood mitigation measures will not adversely affect the characteristics of the historic properties within the project area as determined through consultation with the SHPO's office. However, based on the condition of the existing channel walls as assessed during the construction phase, additional work could be necessary to stabilize or repair the walls. To mitigate the effects of such repairs FEMA would add a special condition to the project that the City of Boston must notify FEMA of the repair work and all repair or replacement work must be in-kind. In-kind shall mean that it is either the same or similar material, and the result shall match all physical and visual aspects, including form, color, and workmanship. Therefore, any new stones or mortar, or repair work on the channel walls will match the existing channel walls in materials, size, and color to minimize the effect to the historic channel walls.

As many parcels to the east of the APE are paved parking lots, minor visual effects would be anticipated. To the west on the Downtown Boston side, the only building with possible views of the project area is the U.S. Post Office General Mail Facility, with its loading docks facing Fort Point Channel. The Gillette World Shaving Headquarters complex, which is located adjacent to the Harbor Walk, is also visible from parts of Interstate 93 (expressway) and the railroad tracks to the west.

Construction related effects to historic (standing) structures would be **none** and there would be **minor** long-term beneficial effects to historic structures from flood-related damages.

5.5.3 Archaeological Resources

5.5.3.1 Existing Conditions

According to MACRIS, and other archaeological surveys (e.g., conducted for the construction of the Central Artery/Third Harbor Tunnel Project) there are no previously identified precontact or historic archaeological sites within the APE. Historic maps and atlases show that the Fort Point Channel area within the APE was previously disturbed by the following: demolition of a large manufacturing building along the channel during the Urban Renewal period of the 1950s and 1960s; construction of the central artery tunnel under a portion of the channel and the adjacent parcel where the Gillette pump house is located; construction of portions of the Gillette complex in the 1960s; and construction of the adjacent parking lots to service both Gillette and the surrounding properties.

5.5.3.2 Potential Effects and Proposed Mitigation

No Action Alternative

There are no known archaeological resources within the project area. If no federal action is taken, there would be **negligible** effects at the project site from ad hoc flood mitigation projects.

Proposed Action

No effect to any archaeological resources is expected resulting from the proposed project because there are no known archaeological resources identified within or adjacent to the project area, and the areas where ground disturbance will occur are previously disturbed as confirmed by the SHPO's office.

The extent of ground disturbance for the Proposed Action would be limited to the construction areas of the earthen berm and elevated Harbor Walk. The width of ground disturbance for the berm in Segments 1 and 3 would be limited to 45 feet along the length of the segments with a depth of two feet. This depth is minor and would be likely limited to previously disturbed soils. The ground disturbance for the elevated Harbor Walk in Segment 2 would be limited to areas that have been previously disturbed by construction on the existing Harbor Walk. Therefore, FEMA has determined that the Proposed Action would unlikely effect any unknown archaeological resources as the soils are previously disturbed and no further identification efforts are necessary. FEMA would condition the project in the event of unanticipated archeological discoveries. Effects to archaeological resources would be **negligible**.

5.6 Socioecomonic Resources

5.6.1 Land Use and Planning

As described in **Section 3.0**, South Boston was identified as a focus area for climate resilience initiatives in the Climate Ready Boston plan (Green Ribbon Commission 2016). This plan identifies and prioritizes flood entry pathways that should be addressed to meet climate resilience goals. In addition, the project area is governed by the 100 Acres Master Plan that provides a framework for steering future redevelopment including flood control measures and open space considerations. As development and redevelopment occur, as it has in this area for over 100 years, the 100 Acres Master Plan defines the land uses along the Fort Point Channel. One component of the 100 Acres Master Plan is the open space concept plan that designates approximately 60 feet inland of the existing Harborwalk, between Binford Street and Necco Court (adjacent to Segment 1 of the Proposed Action) to be vegetated open space in future private redevelopment proposals (City of Boston 2020b).

5.6.1.1 Existing Conditions

Existing land uses in the project area are recreation, consisting of the Harborwalk trail, which is an urban trail system that runs parallel to the shoreline, and surface parking. Adjacent to the project area, land use is predominantly surface parking, with commercial and industrial uses farther inland. The recently redeveloped 5 Necco Street parcel (previously the GE facility) is located to the north, which is a science and technology center that incorporated raised landscaping features and open space fronting the Fort Point Channel (City of Boston 2021c). The Gillette pump house and industrial manufacturing facility are to the south.

5.6.1.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts may be implemented that could temporarily reduce access to existing buildings and parking during construction or implementation. Redevelopment that is likely to occur could include flood protection measures in alignment with the 100 Acres Master Plan, such as the raised landscaped berm incorporated into the recently approved 15 Necco Street redevelopment project (City of Boston 2020b). The inclusion of flood-protection measures during redevelopment could temporarily reduce access to existing adjacent buildings and parking during construction and/or during implementation. Thus, there would be a negligible short-term effect on land use as ad hoc measures are constructed and implemented.

In the long term, measures implemented during redevelopment or on an ad hoc basis may reduce the risk of flood damage for the specific areas that they protect; however, these measures would not substantially reduce the risk of flooding for the entire 100 Acres Master Plan area. Some ad hoc measures may be consistent with the Climate Ready Boston plan and the 100 Acres Master Plan, while other measures may not be. However, neither plan envisions an ad hoc patchwork of flood protection measures, and flood protection measures may be constructed in places envisioned for other land uses in the plans. The No Action alternative would not be consistent with existing land-use plans and would have a minor long-term effect on land use in the 100 Acres Master Plan area.

Proposed Action

Under the Proposed Action, construction activity would reduce access to existing surface parking in the project vicinity and the Harborwalk, as work areas would be blocked off. Alternative routing for the Harborwalk would be provided, as needed, and access to the Gillette Pump House and manufacturing facility would be maintained. Some areas that are currently paved and used as parking lots would be converted to flood protection structures and open space. Deployment of the interim flood control measures would temporarily require street closures, which could reduce access to streets and buildings directly adjacent to closures. However, this would only occur during flooding events when access would already be reduced and would not alter current land use. Therefore, there would be minor short-term adverse effects from reduced access to existing buildings and streets directly adjacent to the project site during construction and from deployment of the interim flood control measures during floods.

Post-construction, some surface parking areas would be converted to the mixed berm and floodwall feature. The Proposed Action would reduce the risk of flood hazards in the 100 Acres Master Plan area. The mixed berm/floodwall is a component of the adopted 100 Acres Master Plan and is consistent with the Climate Ready Boston plan. The Proposed Action would enhance and maintain the Harborwalk, an existing public space, consistent with the 100 Acres Master Plan. Thus, the Proposed Action would result in a moderate long-term benefit by implementing a substantial component of adopted land use plans that enhance recreational resources, open space, and increase South Boston's resilience to climate change.

5.6.2 Noise

EPA developed federal noise emission standards in accordance with the Noise Control Act of 1972. The EPA identified major sources of noise and determined appropriate noise levels for activities that would infringe on public health and welfare in accordance with the law. The EPA identifies a 24-hour exposure level of 70 decibels as the level of environmental noise that would prevent any measurable hearing loss over a lifetime (EPA 1974). Noise levels of 55 decibels outdoors and 45 decibels indoors are identified as "preventing activity interference and annoyance" (EPA 1974). Areas of frequent human use that would benefit from lowered noise levels are identified as sensitive receptors: typical sensitive receptors include residences, schools, churches, hospitals, nursing homes, and libraries. The Federal Highway Administration established acceptable noise levels and ranges for construction equipment (FHWA 2006) and the Occupational Safety and Health Administration established thresholds for occupational noise exposure to protect the health and safety of workers (29 C.F.R. 1926.52).

The City regulates noise levels through the City of Boston Code, Ordinances, Title 7, Section 50: Regulations for the Control of Noise in the City of Boston, which prohibits construction noise levels above 85 decibels from 50 feet away in industrial districts such as the project area (City of Boston 2021a). Land uses that are considered sensitive to noise effects are referred to as "sensitive receptors." Noise sensitive receptors consist of, but are not limited to, schools, residences, libraries, hospitals, and other care facilities.

5.6.2.1 Existing Conditions

The project area is located in urban South Boston and typical noise sources include cars, trucks, buses, sirens, water discharge from nearby industrial facilities, and construction noise. The closest noise sensitive receptors to the project area include the 35 Channel Center Street condos and the Sunrise Learning Academy, both located approximately 830 feet east of the project area.

5.6.2.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts may be implemented that could temporarily increase noise levels during construction. Although ad hoc measures may reduce the risk of flood damage for the specific areas that they protect, the 100 Acres Master Plan area would remain at risk of flooding, which could result in damage that must be repaired. Construction activities to repair flood damage would temporarily increase noise levels in the immediate vicinity of the work, but the effects would not extend very far because of the urban nature of South Boston. Any construction that may occur would not exceed EPA standards or regulatory thresholds for noise established by the Federal Highway Administration, the Occupational Safety and Health Administration, and the City. There would be a **negligible** long-term adverse effect because the continued risk of flooding would periodically generate associated construction noise from repairs.

Proposed Action

Under the Proposed Action, construction activities would temporarily increase noise levels in the project vicinity but would not exceed EPA standards or regulatory thresholds established by the Federal Highway Administration, the Occupational Safety and Health Administration, and the City. Adherence with these standards would minimize sound exposure and ensure noise levels would not cause hearing impairment or

permanent damage for workers. Based on the type of construction equipment proposed for use (**Section 4.2**), construction noise would be expected to attenuate with distance to the background noise levels expected in an urban commercial/industrial area within 500 feet of the equipment. No noise sensitive receptors are present within the project vicinity (within 500 feet). Therefore, there would be a **negligible** short-term increase in noise levels during construction. Post-construction, noise levels would return to pre-construction levels and the risk of flooding would be reduced thus reducing occasional increases in noise from flood-related repairs. Deployment of interim flood control measures would not produce noise levels that exceed the existing ambient noise levels. Therefore, the Proposed Action would have a **negligible** long-term beneficial effect on noise levels.

5.6.3 Transportation

5.6.3.1 Existing Conditions

The project area is located in urban South Boston and encompasses the Harborwalk along the shoreline. The Harborwalk is a major trail that connects South Boston to other neighborhoods, such as the Seaport District, Downtown Waterfront, North End, and Charleston. East of the project area (inland) is A Street, a north-south minor arterial of South Boston (Massachusetts Department of Transportation 2021). A Street intersects with the local roadways—Necco Street, Binford Street, and Dorchester Avenue. Necco Street is located at the northern end of the project area but does not provide access to the project site or to proposed staging areas. Binford Street is located at the north-south halfway point in the project area and provides access to the project site as well as proposed staging areas, including the Channelside public parking lot. Dorchester Avenue is located at the southern end of the project area and provides access to the project site and proposed staging areas (**Appendix A, Figure 2)**. I-90 Massachusetts Turnpike is buried roughly 25 feet or more below ground and would not be affected by the alternatives as shown in **Section 5.6.2** and therefore will not be evaluated. Rail lines are present west of the Fort Point Channel along the shoreline, and a rail yard is located southwest of Dorchester Avenue, adjacent to the 100 Acres Master Plan area.

The Massachusetts Bay Transportation Authority (MBTA) provides transit service to the City of Boston. No transit stops are located within the project area. East of the project area, A Street is used for bus route 11, which operates daily from 12:35 a.m. to 11:45 p.m. and connects the neighborhood of South Boston to the Financial District downtown (MBTA 2021a, 2021b). The closest subway station is located one block south of the project area at the intersection of West Broadway and Dorchester Avenue. No docks for ferries or ferry routes are located in or near the project area (MBTA 2021c).

5.6.3.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts may be implemented that could require street and sidewalk closures. Although ad hoc measures may reduce the risk of flood damage for the specific areas that they protect, these measures would not substantially reduce the risk of flooding for the entire 100 Acres Master Plan area in the long term. Flooding would continue to inundate the Harborwalk and streets, resulting in roadway and sidewalk closures, rerouting of transit services, and could inhibit use of the rail yard (Boston Harbor Now 2021). Construction for flood-related repairs may result in increases in traffic and congestion, road closures, or disrupted transit services that could worsen with sea level rise. Therefore, periodic construction activities for ad hoc flood control measures would

have minor short-term effects on motorized and nonmotorized transportation. Continued flooding and flood damage that requires repair would result in a minor long-term adverse effect from road closures, transit service cancellation, and rerouting of both motorized and nonmotorized transportation modes.

Proposed Action

Under the Proposed Action, construction activities for the mixed berm and floodwall features would require the temporary closure and rerouting of Harborwalk users but would not require street closures. Construction for interim flood control measures would require temporary roadway and sidewalk closures in proximity to the work. Construction equipment and materials would be staged and stored on existing surface parking lots off Binford Street, which may reduce the availability of parking. Vehicles, equipment, and personnel would access staging sites and the project area via A Street and Binford Street. The project would likely require numerous trucks to transport materials such as concrete blocks and earth and thus could result in additional traffic on nearby streets. Although over 11,000 cubic yards of material would need to be imported, it would be brought to the site over the course of the construction (approximately 2 years), and the truck traffic to and from the site would not be noticeable in the average daily traffic on surrounding streets. Trucks would be staged off existing streets so that there would not be an increase in congestion from trucks waiting to access the construction zone. No rerouting of transit services or rail services would occur. Therefore, the Proposed Action would have a **minor** short-term effect on transportation from trail closures and rerouting, reduced available parking, and some additional traffic during construction.

Deployment of the interim flood control measures would temporarily require street and sidewalk closures, which would affect both motorized and non-motorized access. Street closures could also reduce emergency response times but would only occur during flooding events when streets would likely already be closed because of flood water inundation. Post-construction, the Proposed Action would reduce the risk of flooding in the 100 Acres Master Plan area that currently results in repeated street closures and reduced transit services. Rail services would not be affected by or benefit from the Proposed Action. Therefore, the Proposed Action would have a **minor** long-term beneficial effect from reduced risk of trail, road, and transit closures caused by flooding and flood damage.

5.6.4 Public Services and Utilities

5.6.4.1 Existing Conditions

The project area is characterized by large amounts of buried infrastructure including electrical lines, communication conduits, industrial raw water intakes and outfalls from the Gillette facility, stormwater infrastructure, and the I-90 Massachusetts Turnpike, which is buried approximately 25 feet underground (City of Boston 2020a). The construction of the turnpike included concrete slurry walls close to the ground surface that are still present. There are a series of walkway lights and associated buried electrical lines along the Harborwalk. No overhead power lines or drinking water pipes are present.

The stormwater infrastructure includes 14 outfalls in the project area that flow into Fort Point Channel. Stormwater infrastructure in South Boston is part of a combined sewer overflow system that collects rainwater runoff, domestic sewage, and industrial wastewater in the same pipes (Massachusetts Water Resources Authority 2021). Thus, when stormwater levels are too high, such as when flooding occurs, the combined sewer overflows and can carry human and industrial waste into waterways or get backed up and flood sewers and streets.

5.6.4.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts may be constructed; however, they would be unlikely to disrupt or increase demand on public services and utilities. Thus, there would be no short-term effect. Although ad hoc measures may reduce the risk of flood damage for the specific areas that they protect, these measures would not substantially reduce the risk of flooding for the entire 100 Acres Master Plan area in the long term. Flooding could continue to disrupt electric services; overflow combined sewer lines, causing water quality effects and potentially backing up pipes; and damage drainage outflows. Continued flooding could require repairs that may disrupt or increase demand on public services and utilities. Therefore, there would be a **minor** long-term effect on public services and utilities from flood-related damage and disruptions.

Proposed Action

Under the Proposed Action, construction activities would include the temporary support of utilities running along the Harborwalk to ensure that no utilities would be disrupted during project implementation. The construction equipment would be self-contained and thus not increase demand on utilities and services. Underground electrical lines that power Harborwalk lighting would be relocated as needed for project implementation but would not affect Harborwalk users, as they would be rerouted during construction. Interim flood control measure implementation would not disrupt or increase demand on public services or utilities and thus would have no effect. Fourteen drainage outfalls in the project area would be fitted with backflow preventers to inhibit seawater intake and might be replaced if the pipes are found to be aged and/or damaged. The backflow preventers would reduce the risk of the combined stormwater pipes from backing up in the event of high water and flooding in the channel. Ground disturbance would not reach depths that would affect the buried I-90 turnpike or supportive slurry walls. As described in Section 5.2.1, the project would likely be subject to state and local permits, including an NPDES Construction General permit, that would identify measures to avoid erosion and effects on water quality from construction activities. In addition, alterations to the outfalls may trigger requirements to revise existing NPDES discharge permits for the outfalls. The City would be responsible for obtaining any necessary permits and following all conditions of necessary permits. Therefore, there would be a **negligible** short-term effect on public services and utilities during construction activities.

Post construction, the Proposed Action would not require ongoing use of public services or utilities, and thus no long-term increase in demand for services and utilities would occur. Deployment of interim flood control measures would not disrupt or alter public services and utilities, as they would not be attached where utilities are located and would not require connection to utilities to operate. The Proposed Action would reduce the risk of flooding and flood related damage, reducing potential disruption to public services and utilities. Therefore, under the Proposed Action, there would be a **minor** long-term beneficial effect from the reduced risk of flooding and associated power outages and sewage backup.

5.6.5 Public Health and Safety

5.6.5.1 Existing Conditions

The project area is within District C-6 for police and the Emergency Medical Services, which includes one ambulance located within the police station at 101 W Broadway, just south of the 100 Acres Master Plan area (City of Boston 2021b). The project area is within District 6 of the Boston Fire Department, which is located at 272 D Street, approximately 0.50 miles southeast of the project area (City of Boston 2008). The closest hospital is the Tufts Medical Center located west of the Fort Point Channel at 860 Washington Street.

5.6.5.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, construction of ad hoc flood control efforts could affect emergency response times from construction-related detours or lane closures. However, potential closures would be temporary, and rerouting would be provided, resulting in a negligible short-term effect on response times. Although ad hoc measures may reduce the risk of flood damage for the specific areas that they protect, these measures would not substantially reduce the risk of flooding over the entire 100 Acres Master Plan area in the long term. Flooding would continue to occur in the 100 Acres Master Plan area, and it could be exacerbated by sea level rise, potentially effecting a larger portion of the South Boston area over time. Flooding would continue to require road closures, which could increase emergency response times, cause power outages, and back up sewage lines, thus exposing people to health hazards. Therefore, there would be a **minor** recurring long-term effect on public health and safety from periodic flooding.

Proposed Action

Under the Proposed Action, both the berm and floodwall construction area and the staging areas would be located away from streets on existing parking lots. Construction would not require street closures that could increase emergency response times. Construction of the interim flood control measures would require the temporary closure of streets and sidewalks in the vicinity of the work. Construction activities would not require police or emergency vehicle presence. Thus, the short-term effect on public health and safety would be **none**.

Post-construction, the Proposed Action would reduce the risk of flooding and associated public health and safety concerns such as the rerouting of emergency vehicles around flooded areas, backup of combined sewer systems, and other health hazards from flooding. Deployment of the interim flood control measures would temporarily require street closures but would only occur during flooding events when streets would likely already be closed for safety. Therefore, there would be a **minor** long-term beneficial effect from the reduced risk of flooding and associated public health and safety concerns.

5.6.6 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires agencies to identify and address the disproportionately high and adverse human health or environmental effects its activities may have on minority or low-income populations. The State of Massachusetts also considers those with limited English proficiency during an environmental justice analysis. The EPA's Environmental Justice Screening and Mapping Tool (EJ Screen), the Massachusetts Environmental Justice Viewer, and census data were used to evaluate the

demographic characteristics of the project area and surrounding community. The EJ Screen analysis is based on the U.S. Census Bureau 2015 to 2019 American Community Survey 5-year summary data at the census block group level (EPA 2021b).

Environmental justice populations include minority, low-income, and limited English proficiency populations, and are defined by the state of Massachusetts as those that meet any of the following criteria:

- Block group whose annual median household income is equal to or less than 65 percent of the statewide median ($81,215 in 2018) (low income)
- 25 percent or more of the residents identify as a race other than white (minority)
- 25 percent or more of households have no one over the age of 14 who speaks English only or very well (limited English proficiency)

5.6.6.1 Existing Conditions

The project area is located within a single block group (block group 250250612001) that also encompasses the 100 Acres Master Plan area. The population in the block group does not meet any of the criteria for environmental justice populations, as shown in **Table 5.3** (EPA 2021b, U.S. Census Bureau 2019). Thus, environmental justice populations are not expected to be present adjacent to or near the project area.

Table 5.3. Environmental Justice Demographics

Geographic Area	Census Block Group	Percent Minority (%)	Percent Limited English Proficiency (%)	Median Household Income	Earning Below 65% of State Median Income (Y/N)	Environmental Justice Population Present (Y/N)
100 Acres Master Plan area[1]	250250612001	14	1	$193,068	N	N
Commonwealth of Massachusetts	-	28	6	$81,215	Not Applicable	Y

[1] Block group 250250612001 encompasses both the project area and the larger 100 Acre Master Plan area.

5.6.6.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts may be implemented that would produce noise and emissions. Although ad hoc measures may reduce the risk of flood damage for the specific areas that they protect, these measures would not substantially reduce the risk of flooding for the entire 100 Acres Master Plan area in the long term. Since there are no environmental justice communities in or near the project area, they would not be affected. Therefore, the No Action alternative would not result in a disproportionately high or adverse effect on environmental justice communities.

Proposed Action

Under the Proposed Action, construction noise and activity would not be expected to effect environmental justice populations, as they are not present within or near the project area. Similarly, there would be no effect on environmental justice populations after construction. Therefore, there would be no disproportionately high or adverse effects on environmental justice populations.

5.6.7 Hazardous Materials

Hazardous materials and wastes are regulated under a variety of federal and state laws, including 40 C.F.R. 260, the Resource Conservation and Recovery Act (RCRA) of 1976, the Solid Waste Act, the Toxic Substances Control Act, the Comprehensive Environmental Response, Compensation, and Liability Act as amended by the Superfund Amendments and Reauthorization Act, and the Clean Air Act of 1970. Occupational Safety and Health Administration standards under the Occupational Safety and Health Act seek to minimize adverse effects on worker health and safety (29 C.F.R. 1926). Evaluations of hazardous substances and wastes must consider whether any hazardous material would be generated by the proposed activity and/or already exists at or in the general vicinity of the site (40 C.F.R. 312.10). If hazardous materials are discovered, they must be handled by properly permitted entities per statutes listed in 310 CMR 30.000.

5.6.7.1 Existing Conditions

A review of the project area and 100 Acres Master Plan area was performed using EPA's NEPA Assist online tool. The NEPA Assist review identified one RCRA-regulated hazardous waste generator site that intersects the project area and 16 additional RCRA-regulated hazardous waste generator sites within the 100 Acres Master Plan area (EPA 2021d). The regulated site intersecting with the project area is the Gillette manufacturing facility. The Gillette manufacturing facility is a hazardous waste producer, and all hazardous materials are located within the Gillette manufacturing building. The project area is located on the portion of the Gillette property that is presently used for the existing Harborwalk. There are no Superfund sites (site regulated under the Comprehensive Environmental Response, Compensation, and Liability Act) in or near the project area. There are no known contaminated soils or hazardous materials within the project footprint where ground disturbance and excavation would occur.

5.6.7.2 Potential Effects and Proposed Mitigation

No Action Alternative

Under the No Action alternative, some ad hoc flood control efforts could occur, resulting in the potential for construction-related hazardous waste spills that would be avoided through compliance with federal, state, and local laws. Although ad hoc measures may reduce the risk of flood damage for the specific areas that they protect, these measures would not substantially reduce the risk of flooding over the entire 100 Acres Master Plan area in the long term. Flooding could affect RCRA-regulated sites within the project vicinity and pose a risk to human health and safety by causing accidental releases of hazardous materials. Floodwaters that inundate streets and buildings could contain hazardous substances such as commercial and industrial chemicals (Brennan et al. 2021). Receding floodwaters could carry hazardous wastes and materials into the Fort Point Channel. Thus, there would be a **minor** long-term adverse effect from the continued risk of flooding and damage that could lead to the dispersal of hazardous materials.

Proposed Action

The Proposed Action would include the use of mechanical equipment, such as graders and excavators, which could release fuels, oils, and lubricants through inadvertent leaks and spills. Construction activities would be temporary, and the use of equipment in good condition, while following BMPs and conditions specified in the NPDES permit, would reduce the threat of leaks and spills. Therefore, there would be a negligible short-term effect from the use of vehicles and equipment and the associated risk of hazardous leaks and spills. The Proposed Action would not include any work on or in the Gillette manufacturing facility building and all of the work on the Gillette property would occur within the existing footprint of the Harborwalk. Therefore, there would be no potential for the release of hazardous materials located within the building. Deployment of interim flood control measures would not affect RCRA-regulated sites, as the flood control measures would not direct floodwaters to those sites or be connected to them in any way. Post-construction, the Proposed Action would reduce the risk of flooding and associated potential damage to facilities regulated by the RCRA, reducing the potential for flood-related spills and release of hazardous materials. Thus, the Proposed Action would have a **minor** long-term beneficial effect from the reduced risk of flood-related release of hazardous waste and damage to RCRA-regulated facilities.

5.7 Cumulative Effects

This Environmental Assessment considers the overall cumulative effect of the Proposed Action and other actions that are related in terms of time or proximity. While consideration of cumulative effects are no longer required under regulations as of September 14, 2020, the cumulative effects text is retained in this document for the added perspective on potential effects provided. Cumulative effects represent the "effect on the environment which results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. 1508.7 pre-2020). 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 Clean Water Act Section 404(b)(1) guidelines, the regulations implementing the conformity provisions of the Clean Air Act the regulations implementing Section 106 of the National Historic Preservation Act, and the regulations implementing Section 7 of the Endangered Species Act.

The Proposed Action is two of eight proposed flood mitigation measures at the Fort Point channel as part of an ongoing effort through the City of Boston's Climate Ready Boston plan (Green Ribbon Commission 2016). The mitigation measures comprise three near-term and five mid-term projects (see **Appendix A, Figure 7**). The three near-term projects, anticipated to be completed by 2025, include the Proposed Action, as well as two additional projects. The second project includes the partially completed flood mitigation features by the Alexandria Real Estate Equities Inc. property (see **Section 3**). This project includes additional planned improvements between the Alexandria Real Estate Equities Inc. improvements and the northern end of the Proposed Action. The Alexandria Real Estate Equities flood defense system would connect to the Proposed Action by having matching design flood elevations and would be completed during or shortly after the construction of the Proposed Action. The third project includes additional mitigation measures at the Arcade along Fort Point Channel between Summer Street and the completed portion of the Alexandria Real Estate Equities Inc. development mitigation measures. Designs have not been completed for this portion, but it has an anticipated completion date of 2025.

The remaining five mitigation measure projects are not anticipated to be completed until 2040. Three of the projects are located along the Fort Point Channel between Seaport Boulevard and Summer Street at Martin's Park, the Boston Children's Museum, and between Congress Street and Summer Street. The fourth project includes a proposed stormwater park space east and adjacent to the northern section of the Proposed Action. The park would likely extend up to Hull Road between the National Alexandria Real Estate Equities Inc. development and the Gillette property. The fifth project would be located on the south end of the Fort Point Channel on the south side of Dorchester Avenue. Because the projects are not anticipated to begin the design phase until 2025, there is insufficient information to provide more than a generalized evaluation that the projects would contribute to reductions in flooding in South Boston and would make the area more resilient against sea level rise. Any construction-related effects would be separated temporarily and spatially, and there would not be any cumulative effects related to short-term construction activities. Therefore, they are not considered in the cumulative effect analysis.

The three near-term projects are designed as stand-alone improvements to reduce flooding within a defined area and each project has independent utility. However, the projects as a whole are expected to be

physically connected once complete and may have a cumulative effect on environmental resources throughout the 100 Acres Master Plan Area. Water quality and floodplain resources could be affected when considering all the projects as a whole.

- **Water Quality** – Implementation of the Proposed Action in combination with the other near-term projects would reduce the risk of flood damage to a larger area that includes the area south of Summer Street to the 100 Acres Master Plan area. The flood control measures would likely further reduce the potential to transport debris, sediments, and contaminants such as raw sewage directly into Fort Point Channel. The Alexandria Real Estate Equities Inc. flood control measures would be at the same elevation as the Proposed Action and connect to it. This would potentially eliminate a source of runoff when flooding occurs, as the connected projects would prevent runoff from a larger area. The project at the arcade may also connect at the northern end of the Alexander Real Estate Equities Inc. flood berm, potentially reducing further runoff from flood related wash. Therefore, there would be a **negligible**, cumulative, long-term beneficial effect on water quality.
- **Floodplain** – The other near-term projects in addition to the Proposed Action would be likely to provide protection to a larger area that includes the infrastructure between Summer Street and the Gillette property that could reduce further inland flooding, as they would likely be linked together. The extra flood protection would likely reduce the amount of runoff and debris entering the floodplain. Therefore, there would be a minor long-term beneficial effect on the protection of infrastructure in the floodplain and a **negligible** long-term beneficial effect on the health of the floodplain.

Within the 100 Acres Master Plan area, Related Beal submitted a Letter of Intent to construct an approximately 6.5-acre residential and commercial building at the 244–284 A Street lot (Boston Planning and Development Agency 2021). There could be concurrent construction occurring with this project and the Proposed Action, which could cause a short-term effect on traffic, noise, and temporary air emissions in the area. However, the effect would be negligible because of the built up urban area already contributing to those resources. The proposed development would be built regardless of whether the Proposed Action would take place and would likely have its own flood mitigation measures. The project site would likely not affect the harbor trail, as the construction would remain within the footprint of the 6.5-acre lot. As a result, there would be no long-term cumulative effect because of the 244–284 A Street development, as there would be no connecting infrastructure with the Proposed Action.

6.0 PERMITS AND PROJECT CONDITIONS

The City of Boston is responsible for obtaining all required federal, state, and local permits. While a good faith effort was made to identify all necessary permits for this Environmental Assessment, the following list may not include every approval or permit required for this project. Before, and no later than, submission of a project closeout package, the City must provide FEMA with a copy of the required permits from all pertinent regulatory agencies.

Additionally, FEMA would require the City to adhere to the following conditions during project implementation. Failure to comply with grant conditions may jeopardize federal funds.

1. Before construction begins, the City must obtain any required Clean Water Act Section 404 and 401 permits from USACE and MassDEP, respectively, and comply with all terms and conditions of the issued permits.
2. Before construction begins, the City must obtain any required NPDES permits from EPA and comply with all terms and conditions of the issued permit.
3. Before construction begins, the City must obtain with any required River and Harbors Act Section 10 Permit from USACE and comply with all terms and conditions of the issued permit.
4. Before construction begins, the City must obtain a MassDEP's Chapter 91 Waterway License and comply with all terms and conditions of the issued permit.
5. Before construction begins, the City must obtain a local certificate that demonstrates that the cumulative effect of the Proposed Action, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community (44 C.F.R. 60.3 and 44 C.F.R. 9.11(d)(4)) and comply with all terms and conditions of the issued certificate.
6. Before construction begins, the City must obtain approval from the local permitting official responsible for floodplain development to demonstrate that the Proposed Action is consistent with the criteria of the National Flood Insurance Program (44 CFR part 59 et seq.) or any more restrictive federal, state, or local floodplain management standards (44 C.F.R. 9.11(d)(6)) and comply with all terms and conditions of the issued permit. A copy of the approval/permit, or documentation from the permitting official that an approval/permit is not required, shall be forwarded to the state and FEMA for inclusion in the administrative record.
7. Before construction begins, the City must obtain a local certificate that demonstrates that the cumulative effect of the Proposed Action, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community (44 C.F.R. 60.3 and 44 C.F.R. 9.11(d)(4)) and comply with all terms and conditions of the issued certificate.
8. Before Construction begins, the City must submit a conditional letter of map revision ("CLOMR") request pursuant to 44 C.F.R. § 65.8 and part 72 (FEMA 2021a).
9. Following construction of the Proposed Action, the City must apply for a Letter of Map Revision in accordance with 44 C.F.R. 65.6.
10. Before construction begins, the City must submit a Notice of Intent with the Boston Conservation Commission seeking a determination that the Proposed Action would not adversely affect any area subject to protection under the Wetlands Protection Act.

11. Before construction begins, the City must consult with the Massachusetts Office of Coastal Zone Management and obtain a favorable Coastal Consistency Determination. The City must comply with all terms and conditions of the issued Coastal Consistency Determination.
12. In order to avoid adverse effects to winter flounder spawning and egg development habitat, cofferdam installation and removal should take place outside of the winter flounder time of year from January 15 – June 30 of any year. Work may take place behind dewatered cofferdams during this time.
13. If vegetation removal occurs during the migratory bird nesting season, the City must coordinate with the U.S. Fish and Wildlife Service to obtain any required authorization and must provide documentation of coordination with FEMA.

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

NEPA, its implementing regulations, and FEMA procedures stress the importance of engagement with partner agencies, applicants, and the public to the extent practicable while preparing an environmental assessment. To solicit input on the project and its potential effects, FEMA distributed an Environmental Assessment scoping document to the following agencies on June 16, 2021:

- EPA, Region 1
- HUD, Region 1
- NMFS, Habitat and Ecosystem Services Division
- NMFS, Protected Resources Division
- USACE, New England District
- USFWS, New England Field Office
- Mashpee Wampanoag Tribal Historic Preservation Office
- Wampanoag Tribe of Gay Head (Aquinnah) Tribal Historic Preservation Office
- MA Office of Coastal Zone Management
- MA Division of Fisheries and Wildlife
- MA Natural Heritage & Endangered Species Program
- MA Waterways Regulation Program MA Emergency Management Agency
- MA Department of Conservation and Recreation
- MA Department of Environmental Protection
- MA State Historic Preservation Office
- MA Environmental Policy Act Office
- The City of Boston
- Charles River Watershed Association
- Boston Landmarks Commission
- FEMA also submitted letters to several cultural and historic non-profits within the Fort Point Channel neighborhood, including Boston Landmarks Commission, Historic Boston Inc., Friends of Fort Point Channel, Boston Preservation Alliance, and the Boston Tea Party Ships & Museum

Following the distribution of the scoping checklist, FEMA received correspondence from the EPA on July 12, 2021, requesting a copy of the Environmental Assessment when it is available for review. NMFS provided comments on July 27, 2021, that included additional documents and information on sea level rise in the Boston area. NMFS comments included the following notes 1) Fort Point Channel is designated as EFH, 2) hardened shorelines may effect natural aquatic and floodplain functions including habitat, 3) requested consideration of the flood pathway just west of the project area to protect the railways, and 4) recommended that sea level rise assessments employ the intermediate-high (1.5 meter) or high (2.0 meter) scenarios from the "Global and Regional Sea Level Rise Scenarios for the United States" (NOAA 2017). FEMA responded to NMFS's comments on September 10, 2021 (FEMA 2021h).

FEMA sent notification regarding the availability of the draft Environmental Assessment for review and comment to the same agencies that were contacted with the NEPA Scoping Document.

Substantive comments received during the public review period will be addressed in the final Environmental Assessment. The public is invited to submit written comments by emailing david.robbins@fema.dhs.gov and eric.kuns@fema.dhs.gov or via mail to FEMA Region 1, 99 High Street Boston, MA 02110 Attn: Regional Environmental Officer. If no substantive comments are received from public or agency reviewers, the draft Environmental Assessment and Finding of No Significant Impact (FONSI) will be adopted as final.

8.0 LIST OF PREPARERS

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Appendix A Maps and Figures

Figure 1: Project Vicinity Map

Figure 2: Project Location Map

Figure 3: 100 Acre Master Planning Area

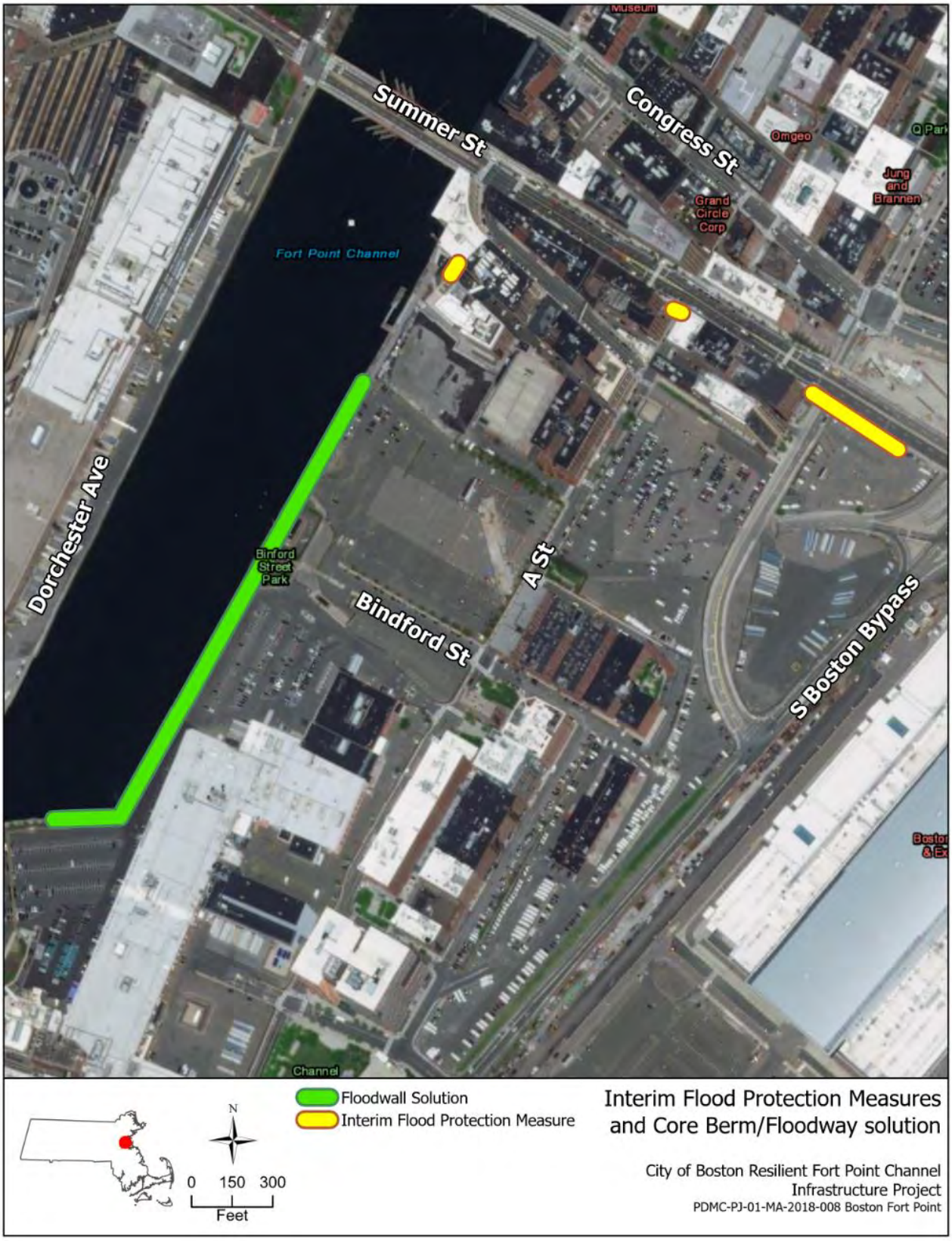

Figure 4: Interim Flood Control Measures

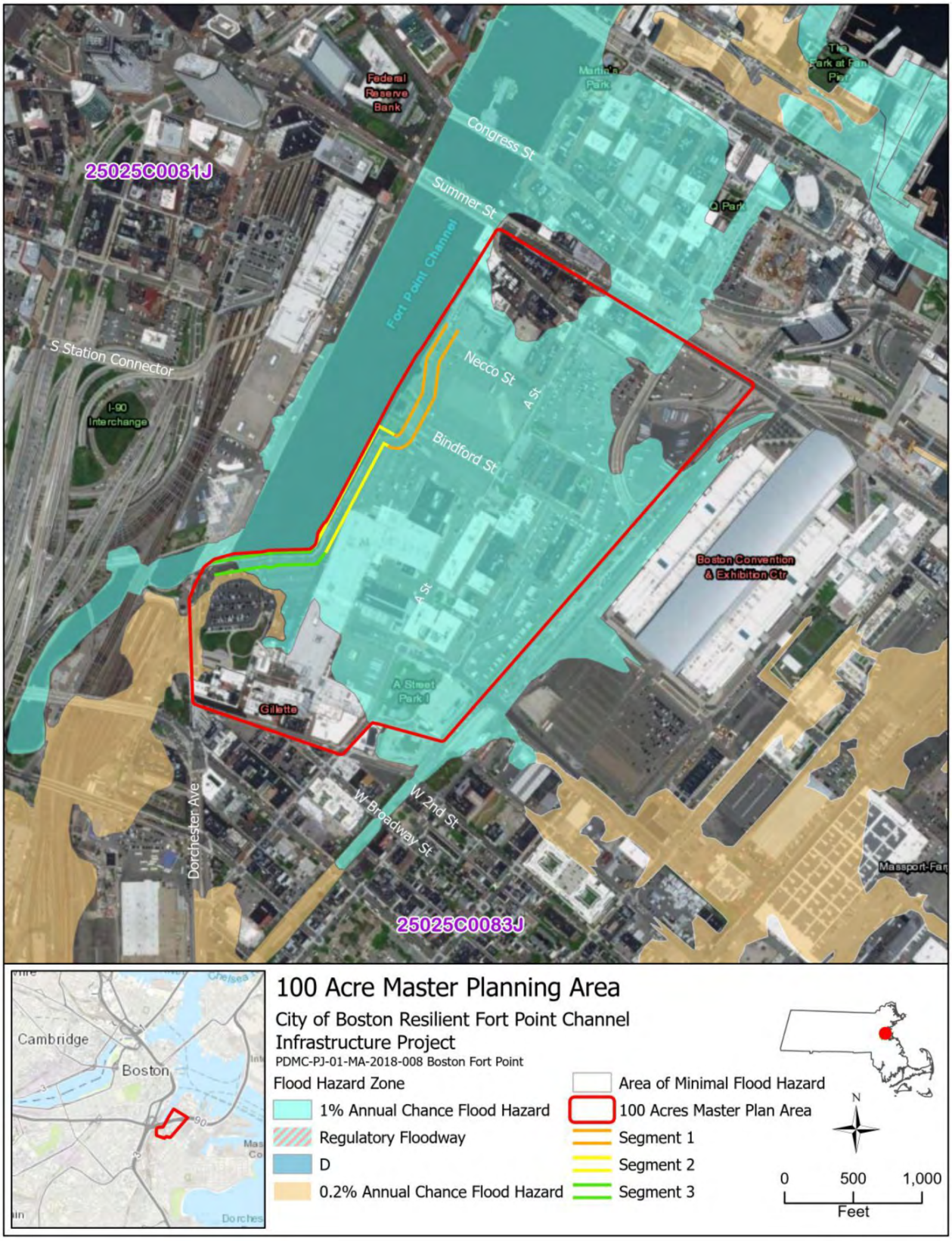

Figure 5. FIRM (Flood Insurance Rate) Map

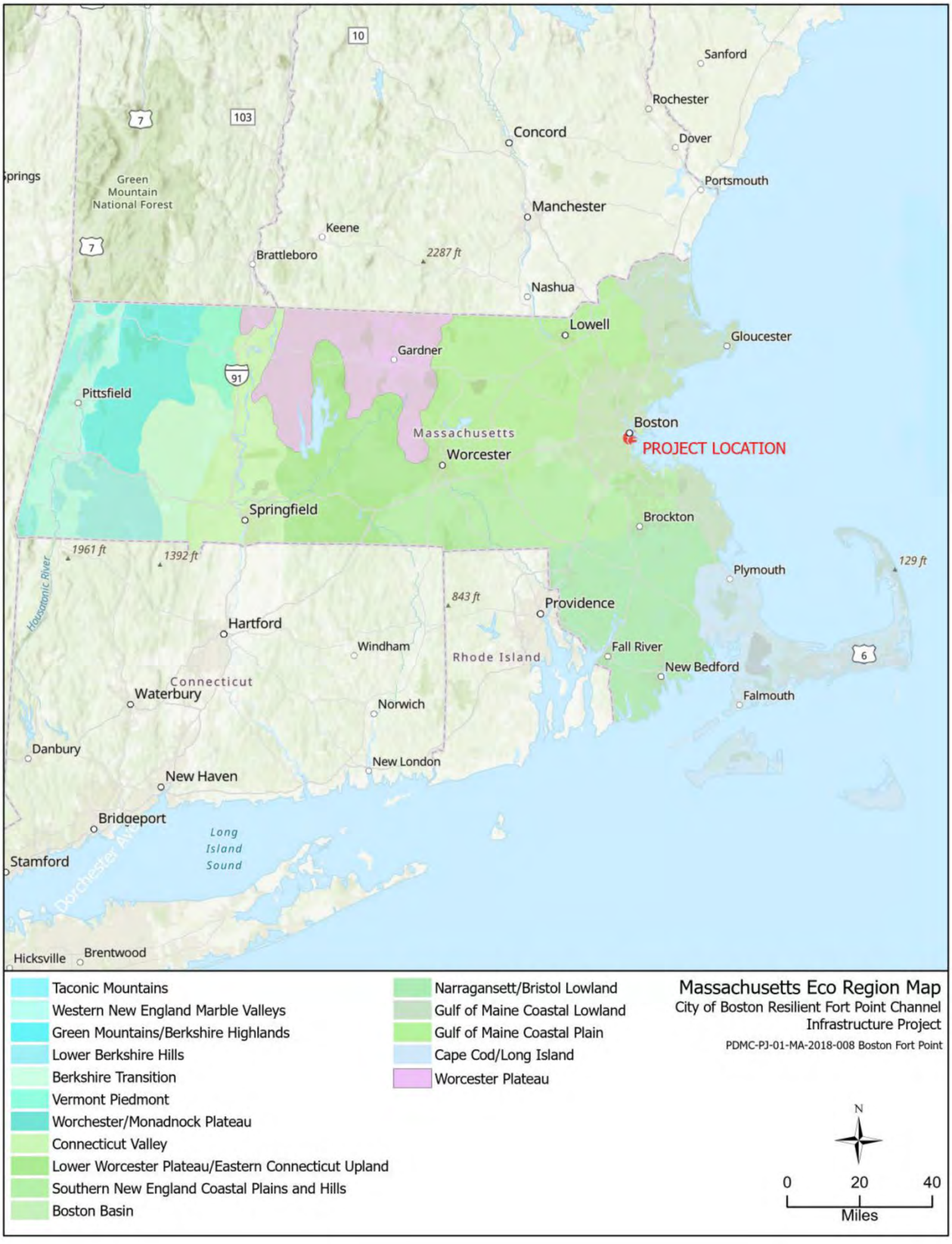

Figure 6. Massachusetts Ecoregions

Figure 7. Environmental Justice Populations

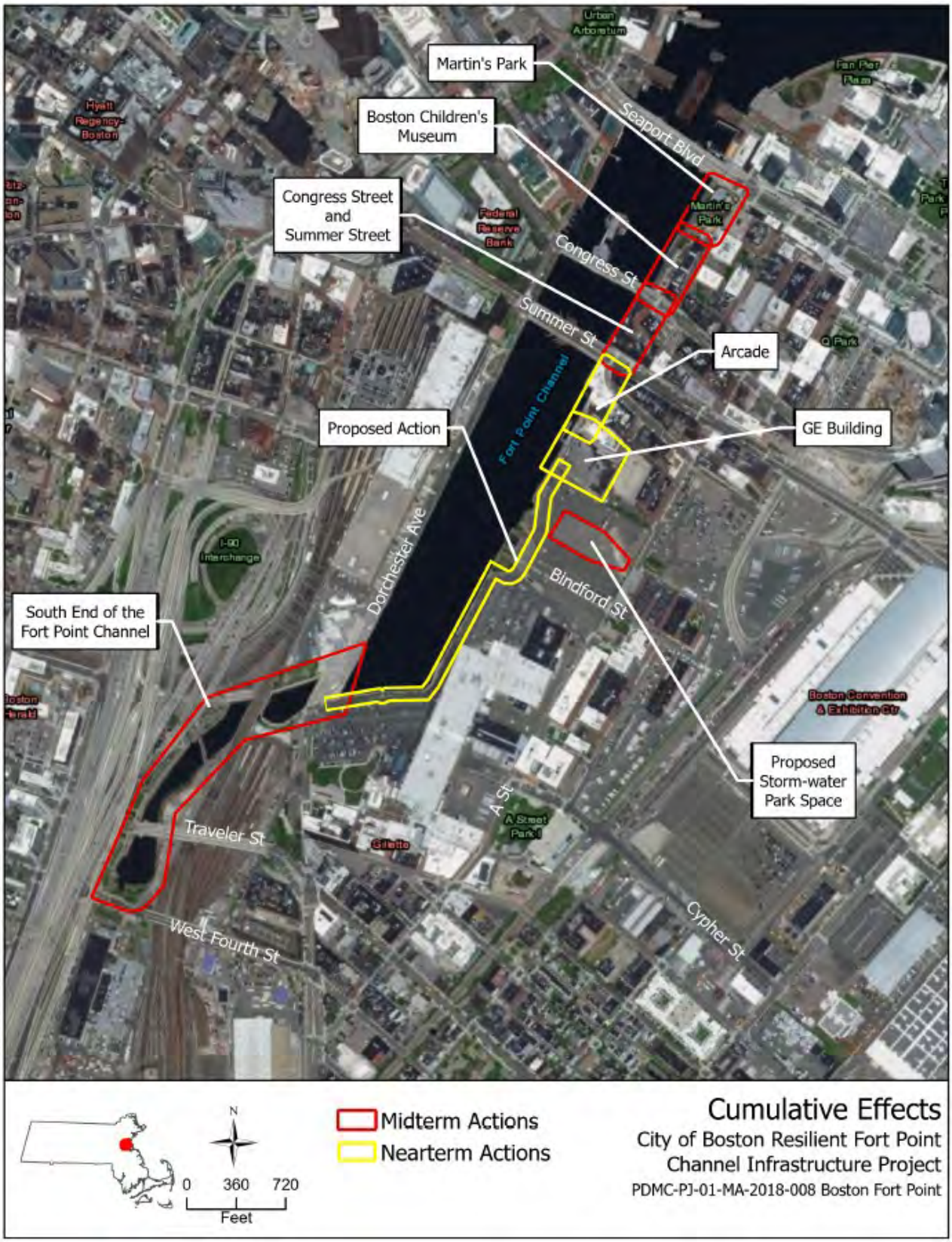

Figure 8. Climate Ready Boston Planned Projects

Appendix B Documents

Document 1

Scope of Work and Technical Memorandum

TECHNICAL MEMORANDUM

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Rich McGuinness, City of Boston

Copies:

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From:

Brett McMann, PE, Arcadis

Timothy Nelson, Arcadis

Kelli Thurson, CFM, Arcadis

Date:

January 2019

Arcadis Project No.:

LA003330.0006

Subject:

City of Boston FY2018 Pr- Disaster Mitigation Grant Program Application

Resilient Fort Point Channel Infrastructure Project

Flood Defense Conceptual Design and Cost Estimating Methodology

INTRODUCTION

This memorandum presents an overview of the conceptual design and cost estimating approach for the City of Boston's application to FEMA's Pre-Disaster Mitigation (PDM) Grant Program to implement resilient flood protection infrastructure for Fort Point Channel. The proposed flood protection infrastructure will consist of a mix of earthen berms and mitigation of existing floodwalls for a 2,300 linear foot stretch of Fort Point Channel. This overview of the project design includes a description of the project site, the design flood elevation, and the proposed resilience features and site conditions that must be factored into the solution.

FEMA requires that all costs included in a funding application be necessary, reasonable, and allocable, consistent with provisions of 2 CFR Part 200. The City relied upon technical specialists and engineers to prepare the enclosed conceptual design and identify anticipated costs by line item, including those needed for further investigations, permitting, and construction of the project. The technical specialists and engineers used basic cost estimating guidelines presented in FEMA grant program guidance to develop cost estimates. The second portion of

this memorandum provides descriptions of the methods and resources used and assumptions made to estimate costs for the City's application.

SITE DESCRIPTION

The proposed project focuses on improving flood protection in the 100 Acres Master Planning Area (project site), the most critical flood pathway on the eastern shoreline of the Fort Point Channel and one of the most critical in the entire City of Boston. The project site is the lowest site along the channel, and water currently and frequently overtops the existing shoreline during astronomical high tides and coastal storm events. The project site includes the Gillette World Shaving Headquarters, an important manufacturing facility and job site that has been operational for about over 117 years.

Over time, flood waters that enter through this site will extend further inland toward neighborhoods including South Boston and toward the Boston Convention and Exhibition Center. By the 2030s, with 9 inches of eustatic sea level rise, it will have a 20 percent (1 in 5) annual chance of flooding during a coastal storm event. By mid- to late- century, the 100 Acres Master Planning area is the first area along the channel expected to flood at least monthly and flood pathways will extend into inland Boston neighborhoods, connecting with pathways from Dorchester (south) and the Charles River (west).

The proposed project will directly benefit 31 properties and approximately 814 residents exposed to present and future flood risk, with many additional residents benefitting from the aesthetically enhanced waterfront. This includes one of New England's largest artists' communities with 300 artists who produce work in a wide array of media, Artists for Humanity (a youth and cultural community resource in creative industries), environmental sciences and renewable technologies companies, the Proctor & Gamble/Gillette plant, the Boston Convention and Exhibition Center, owners and occupants of several historic buildings located in the Fort Point Channel Landmark District, and all who will use and reside in the 100 Acres Master Plan area being planned. As the existing surface parking lots in the area are converted into a 24-hour resilient mixed-use neighborhood anchored by over 11 acres of new public open space and almost 5.9 million square feet of development in the 100 Acres Master Plan area, residents, workers, and visitors of all trades will benefit from flood protection along the Channel shoreline. Additionally, significant portions of A Street and Haul Road/South Boston Bypass are within the benefitting area and are expected to benefit from the project. A Street is an MTA bus route and Haul Road/South Boston Bypass serves as an evacuation route for the city of Boston. Both are also primary thoroughfares and truck and shipping access routes.

CONCEPTUAL DESIGN

Design Flood Elevation

According to the current FEMA Flood Insurance Rate Map (FIRM), the entire project site is located within the 100-year floodplain. The site's 100-year flood elevation (Base Flood Elevation) is El. 10 NAVD88 according to FIRM 25025C0081J – effective March 16, 2016. While the Suffolk County Flood Insurance Study provides stillwater elevations for the project site for the 1% annual chance flood event and the 0.2% annual chance flood event (the 100 and 500-year flood events, respectively), the City acknowledges the

Boston Harbor Flood Risk Model (BH FRM)[1] as the best available data to represent the dynamic nature of coastal storm events and sea level rise. The BH FRM was developed in 2015 through an initiative by MassDOT and the Federal Highway Administration to assess the vulnerability of Boston's Central Artery/Tunnel (CA/T) Project to sea level rise and extreme storm events. The study evaluated sea level rise scenarios for four distinct time periods (2013, 2030, 2070, and 2100). The results of the simulations were used to generate maps of potential flooding and associated water levels for the 10%, 2%, 1%, and 0.1% annual chance flood events, including peak wave crests.

The City of Boston used the BH FRM models in the Climate Ready Boston (CRB) 2016 citywide vulnerability assessment. CRB reviewed the nature of four flood probabilities (10%, 2%, 1%, and 0.1%) for three sea level rise scenarios: 9 inches, 21 inches, and 36 inches. The CRB flood data for 9 inches and 36 inches of sea level rise are largely identical the the MassDOT-FHWA data for 2030 and 2070, respectively, while the data for 21 inches of sea level rise were created specifically for Climate Ready Boston. The expected water levels for the 21-inch sea level rise scenario were interpolated from the MassDOT 2030 and 2070 data. Table 1 below depicts the water levels for each sea level rise scenario. Water levels include sea level rise and peak wave crests.

TABLE 1: CURRENT AND FUTURE WATER LEVELS

Sea Level Rise Scenario[2]	10% AEP Water Surface Elevation	2% AEP Water Surface Elevation	1% AEP Water Surface Elevation	0.1% AEP Water Surface Elevation
2013 (current conditions)	8.4	9.2	9.8	10.5
2030 (also known as the CRB 9 inch SLR scenario)	9.4	10.5	11	11.5
2050 (values interpolated from the 2030 and 2070 SLR scenarios)	10.7	11.6	12.1	13.1
2070 (also known as the CRB 36" SLR scenario)	11.9	12.8	13.3	14.6

[1] Bosma, Kirk, et al. "MassDOT-FHWA Pilot Project Report: Climate Change and Extreme Weather Vulnerability

Assessments and Adaptation Options for the Central Artery." MassDOT FHWA Report. June 2015. https://www.

massdot.state.ma.us/Portals/8/docs/environmental/SustainabilityEMS/Pilot_Project_Report_MassDOT_FHWA.pdf.

[2] Elevations specific to the Fort Point Channel

Technical specialists and engineers hired by the City have identified the project's appropriate and most effective design elevation as 14 feet NAVD88. This elevation is justified through the following assumptions and application of best practices when planning for sea level rise in capital projects:

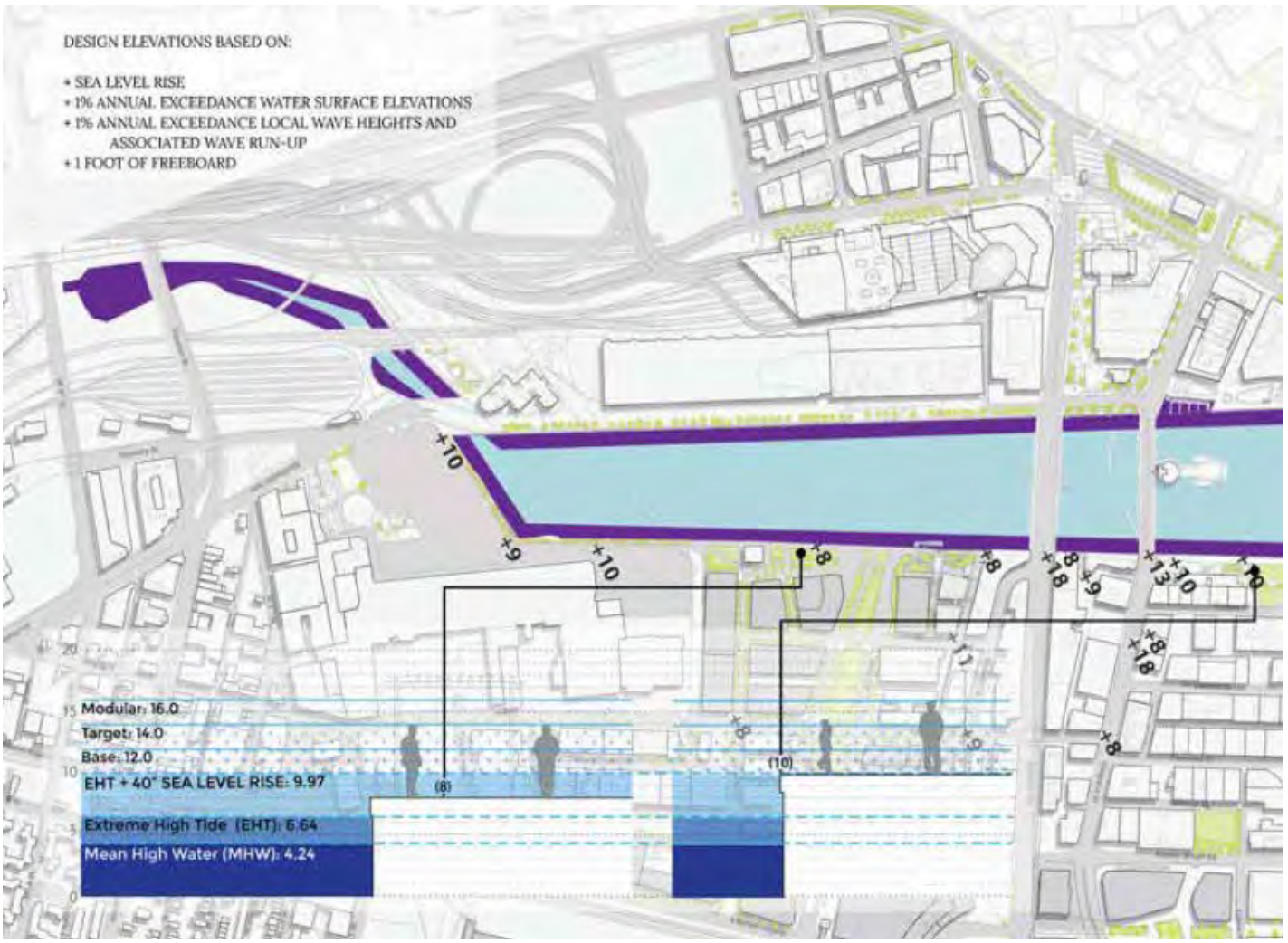
- A conservative useful life of the proposed project is 35 years[3]. If the proposed project is implemented by 2023, the project is expected to be effective until 2058. The expected flood elevation of the 1% AEP event in 2050 is roughly 12 feet NAVD. According to ASCE 24-14, *Flood Resistant Design and Construction*, a Class 4 structure in Zone A should consider a design elevation of the 1% flood elevation plus two feet of freeboard[4]. Incorporating two feet of freeboard into the 1% flood elevation expected over the life of the project provides a 14 foot NAVD design elevation.

The City's most recent study on the area, Coastal Resilience Solutions for South Boston, identified "base", "target", and "modular" levels of protection. These levels of protection were intended to represent the near-, mid-, and long-term adaptation elevations required to combat the 1-percent annual exceedance probability flood event in 2030, 2050, and 2070 with respective amounts of sea level rise in each timeframe. In the Fort Point Channel, the base level of protection recommended by the City is 14 feet NAVD. This elevation accounts for an anticipated sea level rise, wave runup, and freeboard to provide protection up to the 1-percent flood in 2050 and 2070 per the South Boston study (Figure 1).

[3] FEMA identifies major and concrete infrastructure, including floodwalls, as having acceptable project useful life limits of 35-100 years. The project's useful life is limited to 35 years due to the need for additional flood protection solutions in South Boston to mitigate flood pathways that may affect the project area. This is described in further detail in the Benefit Cost Analysis Technical Memo submitted with the project application.

[4] Flood Design Class 4 structures are those that pose a substantial risk to the community at large in the event of a failure, disruption of function, or damage by flooding. Considering the widespread impacts that will be mitigated by implementation of the proposed project, including protection of critical emergency evacuation routes, the City has identified the 100 Acres Master Planning area solution a Class 4 structure. https://www.fema.gov/media-library-data/1436288616344-93e90f72a5e4ba75bac2c5bb0c92d251/ASCE24-14_Highlights_Jan2015_revise2.pdf

FIGURE 1: DESIGN ELEVATIONS FROM COASTAL RESILIENCE SOLUTIONS FOR SOUTH BOSTON



It should be noted that although the proposed features address the lowest portions of Fort Point Channel, they have the ability to be tied into a larger proposed system in South Boston, where overall effectiveness will increase. Approximate elevations within the site and vicinity are as follows:

TABLE 2: APPROXIMATE SITE ELEVATIONS

Elevations of Interest	Elevation (ft. NAVD88)	Elevation (ft. MSL)	Elevation (ft. NGVD29)	Elevation (ft. BCB)	Elevation (ft. MTA-CA/T)
Current Seawall Crest/Harbor Walk (Avg.)	8.00	10.69	10.18	15.83	110.18
Gillette Facility First Floor	12.00	11.69	11.18	16.83	111.18
General Electric (GE) Facility First Floor	13.00	12.69	12.18	17.83	112.18
Crown Elevation of Proposed Berm	14.00	13.69	13.18	18.83	113.18
Crown Elevation of Proposed Seawall Elevation	14.00	13.69	13.18	18.83	113.18
Parking Lot Elevation	8.00	7.69	7.18	12.83	107.18

All elevations noted herein are relative to the NAVD88 datum. Table 3 below depicts datum conversions relevant to the project site. All tidal datums are referenced to the NOAA tide gauge station in Boston (Station ID 8443970).

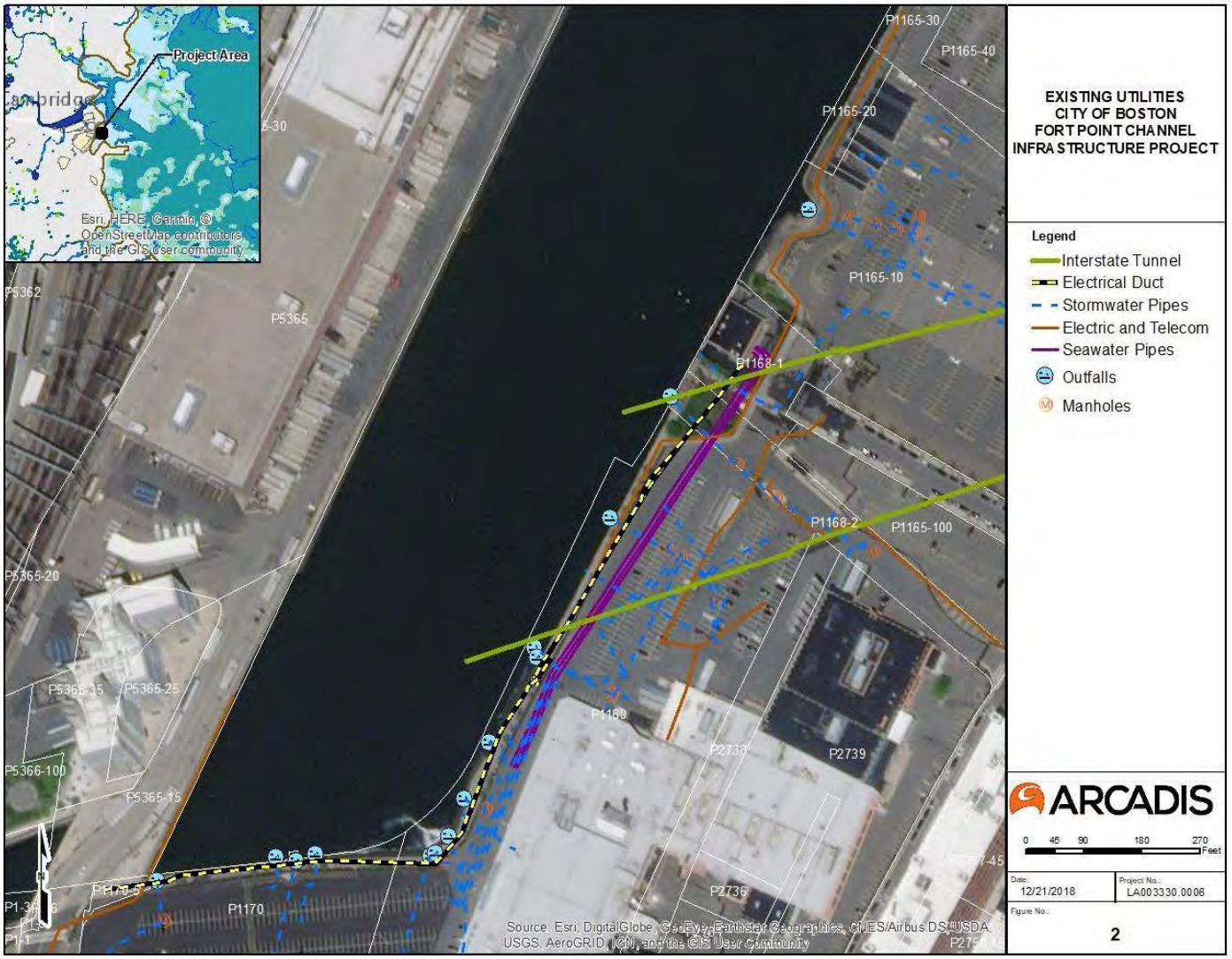
TABLE 3: DATUM CONVERSIONS

Elevations of Interest	Elevation (ft. NAVD88)
Boston MTA-CA/T Datum	99.18
Boston City Base Datum (BCB)	6.46
Mean Higher High Water (MHHW)	4.76
Mean High Water (MHW)	4.32
North American Vertical Datum (NAVD88)	0.00
Mean Sea Level (MSL)	-0.31
National Geodetic Vertical Datum (NGVD29)	-0.82
Mean Low Water (MLW)	-5.17
Mean Lower Low Water (MLLW)	-5.51

Proposed Resilience Features

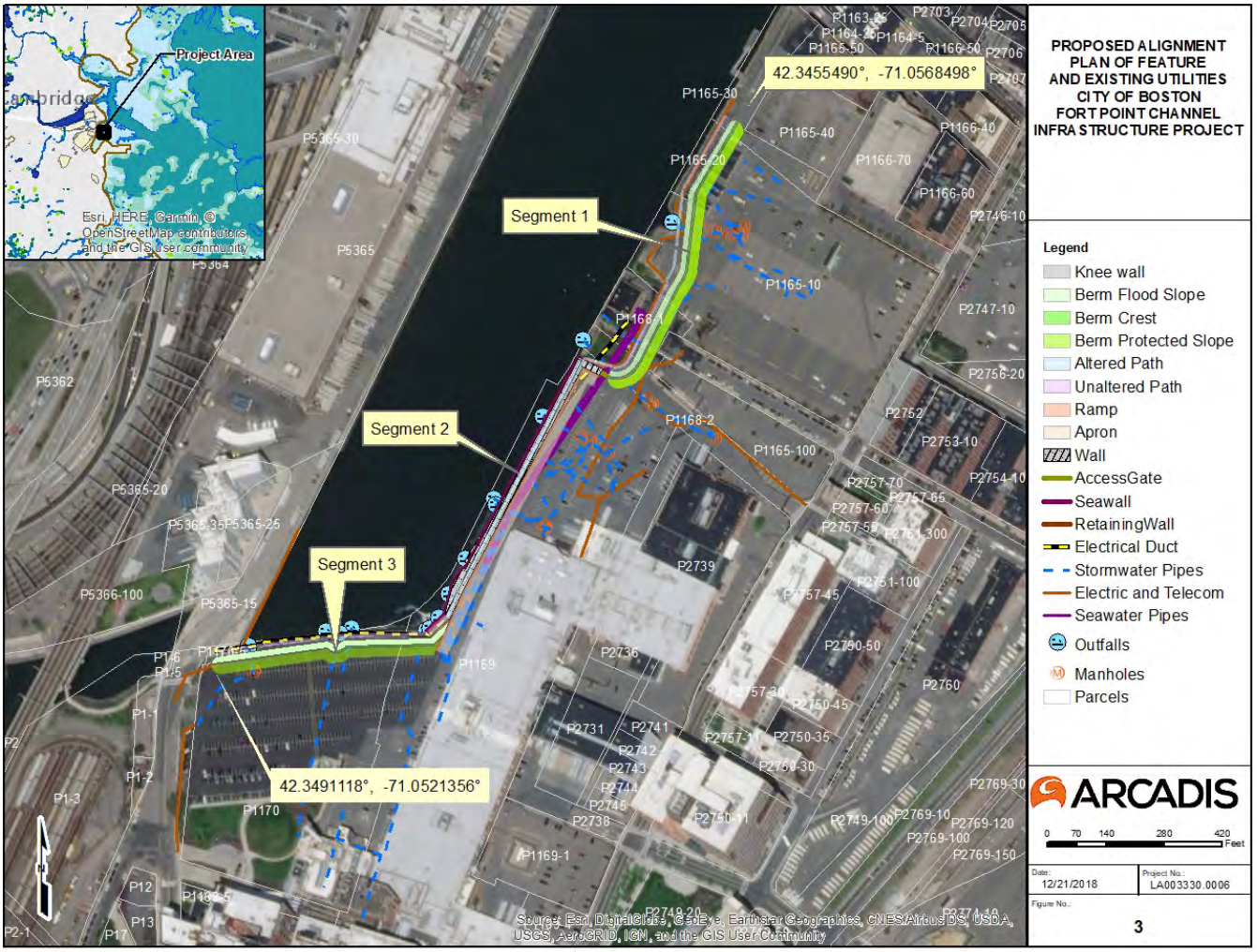
The site is characterized by a large amount of buried infrastructure (Figure 2), including electrical and communications conduits, industrial raw water intakes and outfalls from the Gillette facility, stormwater pipes, and multiple features associated with the I-90 Massachusetts Turnpike buried roughly 25 ft. or more below grade. During the burial of I-90 beneath the Fort Point Channel (the CA/T Project), large concrete slurry walls were built to facilitate tunnel construction and remain in place below the ground surface. The summation of the vast amount of existing buried infrastructure limits and in many cases precludes extensive use of driven piles, sheeting, or slurry walls as part of flood protection features on the surface.

FIGURE 2: EXISTING UTILITIES



The proposed resilience feature layout is shown in Figure 3. The features will consist of earthen berms and knee walls, a deployable flood gate, an elevated seawall/harbor walk section which functions as a floodwall, and protection of stormwater infrastructure. For planning purposes, the features are divided into three segments: Segment 1 running from the General Electric (GE) Facility at the proposal's northern boundary south to the Gillette pump house, Segment 2 from the Gillette pump house to the turn in the Fort Point Channel, and Segment 3 from the turn in the Fort Point Channel to Dorchester Avenue. The entire proposed resilience feature will have a ground disturbance footprint of 108,435 square feet, or 2.48 acres. All proposed features lie within the regulatory floodplain. Of the three proposed segments, Segment 1 will have the most independent utility as it protects the 100 Acres Master Planning area, which sits on the lowest elevation along the channel and is a flood pathway entrance.

FIGURE 3: FEATURE LAYOUT



Segment 1 is 728.5 ft. long with an average existing ground elevation of 8.3 ft. (NAVD88). It starts at 42.3455490°, -71.0568498°, and ends at 42.3457195°, -71.0547908°. The segment starts at the GE property line on the northern edge of the proposed site. GE has incorporated resilient engineering strategies into the property and has elevated features at approximately El. +13.0' NAVD88. The proposed berm will tie in to these features and run south parallel to the existing Harbor Walk. It will partially encircle the Gillette pump house used for raw seawater intake for industrial use. The berm segment will terminate at a 15-foot wide access driveway for the pump house, which will employ a FloodBreak or similar passive deployable flood gate. It was assumed vehicular access would be required to be maintained at all times to the Gillette facility, thus requiring a flood gate. A knee wall on the flood side of the berm feature will be incorporated to minimize the lateral width required for the proposed berm. The berm will have a 5-foot crown width and 4H:1V flood-side and protected-side slopes. The proposed width of the feature is 45 feet, resulting in a total expected ground disturbance footprint of 0.75 acres (32,782 square feet). General ground disturbance required for the proposed work is expected to a depth of 2', but could be greater at utility crossings pending the need for additional utility protection. Where municipal or industrial outfalls are located, backflow prevention fittings, in the form of flap gates, will be installed. Since the outfalls cross under the proposed feature, they will be at risk of misalignment or cracking due to differential settlement induced by the berm. The project proposes to strengthen the sections of line with modern pipe directly under the proposed features where necessary. A typical section for proposed Segments 1 and 3 can be found below in Figure 4. The proposed feature layout for Segment 1 is shown in Figure 5.

FIGURE 4: SEGMENT 1 AND SEGMENT 3 BERM CROSS-SECTION

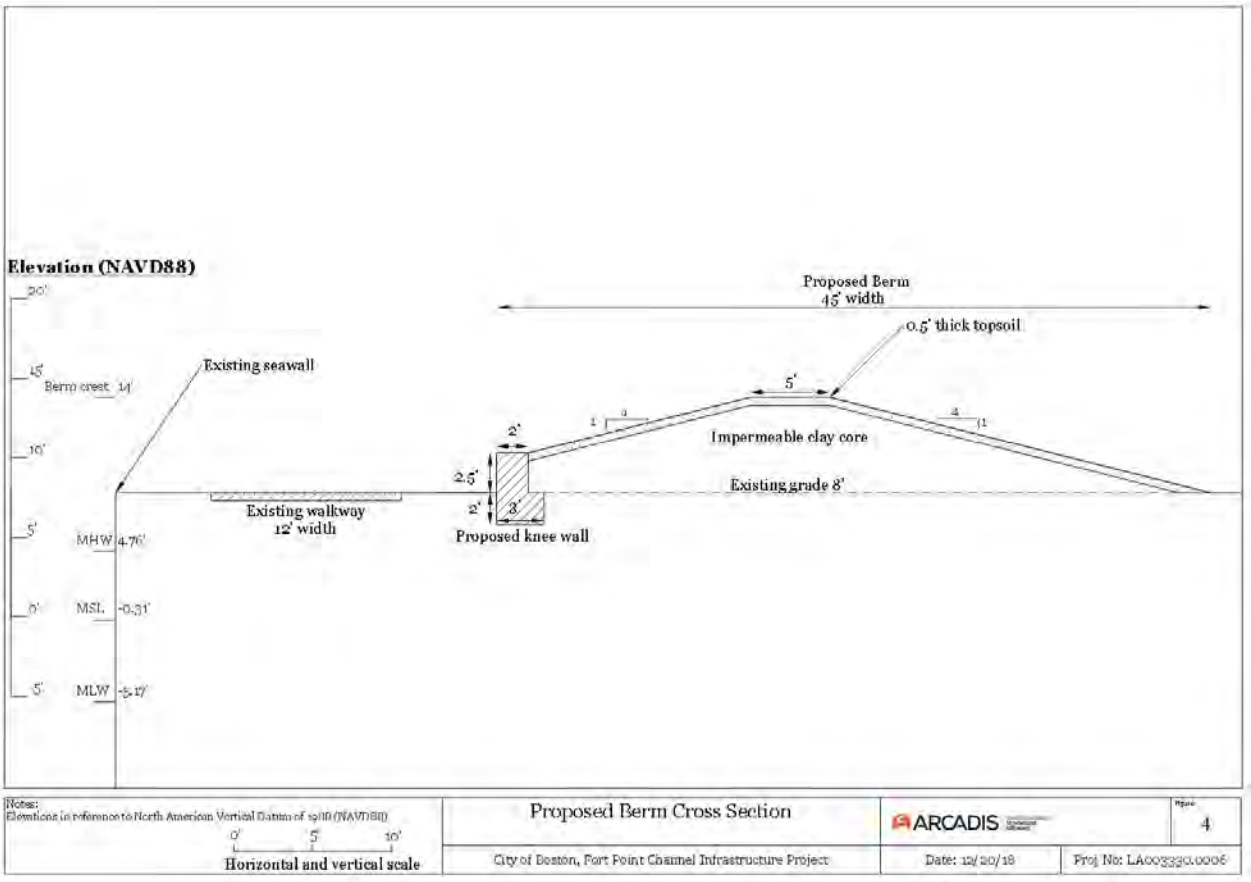
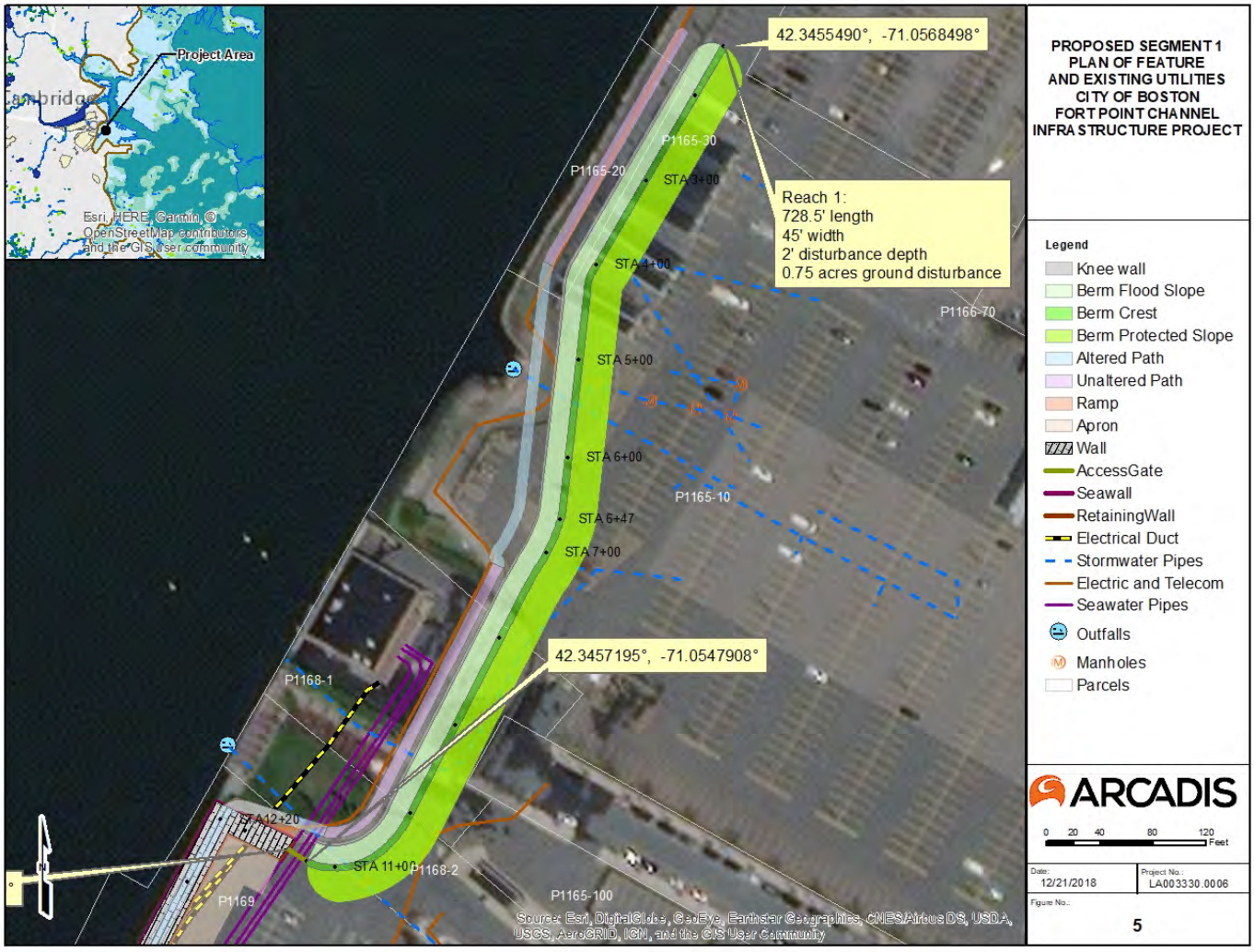


FIGURE 5: SEGMENT 1 ALIGNMENT



Segment 2 is 816 ft. long with an average existing ground elevation of 9.4 ft. (NAVD88). It starts at 42.3457638°, -71.0549170° and ends at 42.3474564°, -71.0533691°. The segment starts at the Gillette pump house access driveway and runs along the existing Harbor Walk southward until the western turn in the Fort Point Channel. Since there are large buried industrial pipes and electrical conduit running underground from the Gillette pump house parallel to the Harbor walk, limited space is available for an earthen berm. Furthermore, Gillette has noted they require vehicular access between their facilities and the Harbor walk, generating a pinch point near the turn in the Fort Point Channel. The flood protection feature is envisioned to consist of a double retaining wall of granite blocks matching those of the seawall. The granite blocks would extend the seawall's crest elevation to the required design elevation (approximately 6 vertical feet to reach 14 feet NAVD88). The protected side would also make use of granite blocks as a retaining wall feature, with impermeable fill in between the elevated seawall and rear retaining wall. The blocks would rest on concrete footing. All blocks would be doweled together as the upper layers of existing seawall are now with rebar rods. The total top width of the feature would be 18' wide, with a 12' wide shared use path for the Harbor Walk located on its crest. Ground disturbance expected for the width of the alignment is approximately 50 feet, for a total ground disturbance footprint of 40,800 square feet (0.93 acres). General ground disturbance required for the proposed work is expected to a depth of 2' but could be greater at utility crossings. Where municipal or industrial outfalls are located, backflow prevention fittings, in the form of flap gates, will be installed. Since the outfalls cross under the proposed feature, they will be at risk of misalignment or cracking due to differential settlement induced by the berm. The project proposes to strengthen the sections of line with modern pipe directly under the proposed features where necessary. A typical section for the proposed Segment 2 can be found below in Figure 6. The proposed feature layout for Segment 2 is shown below in Figure 7.

FIGURE 6: SEGMENT 2 CROSS-SECTION

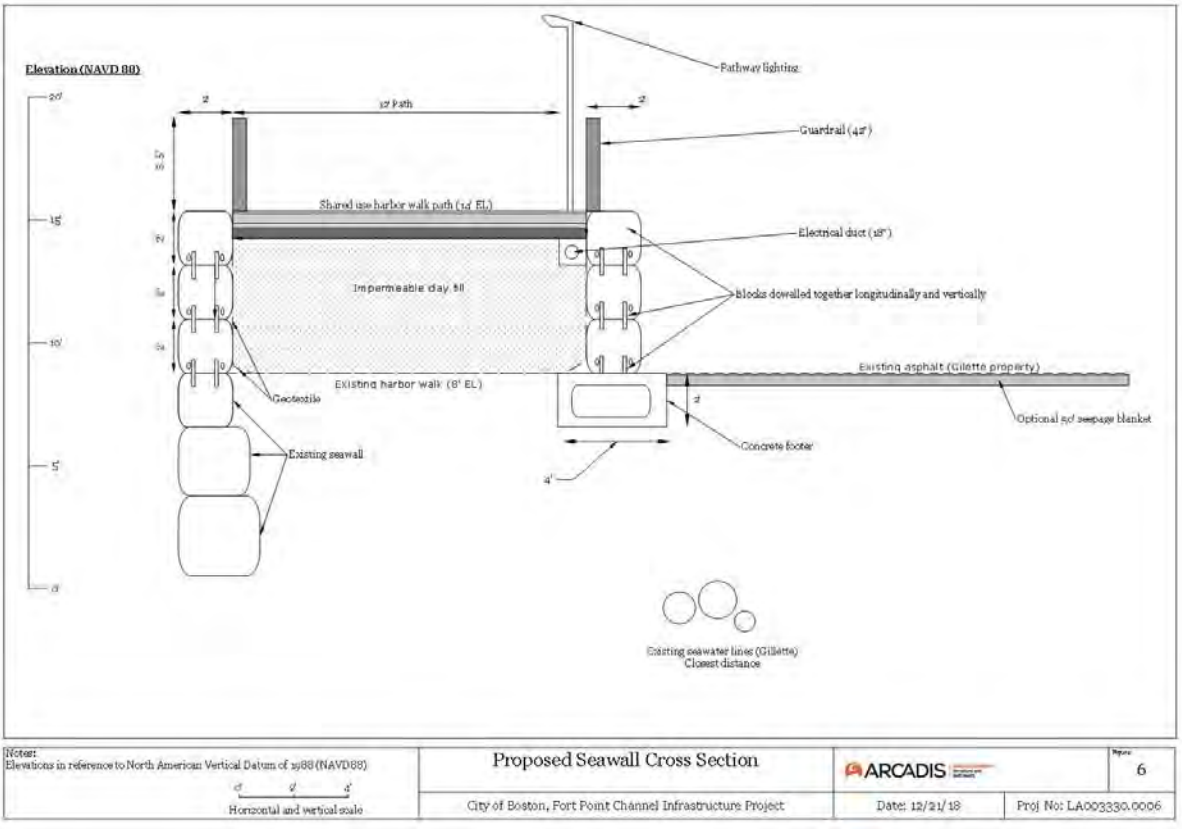
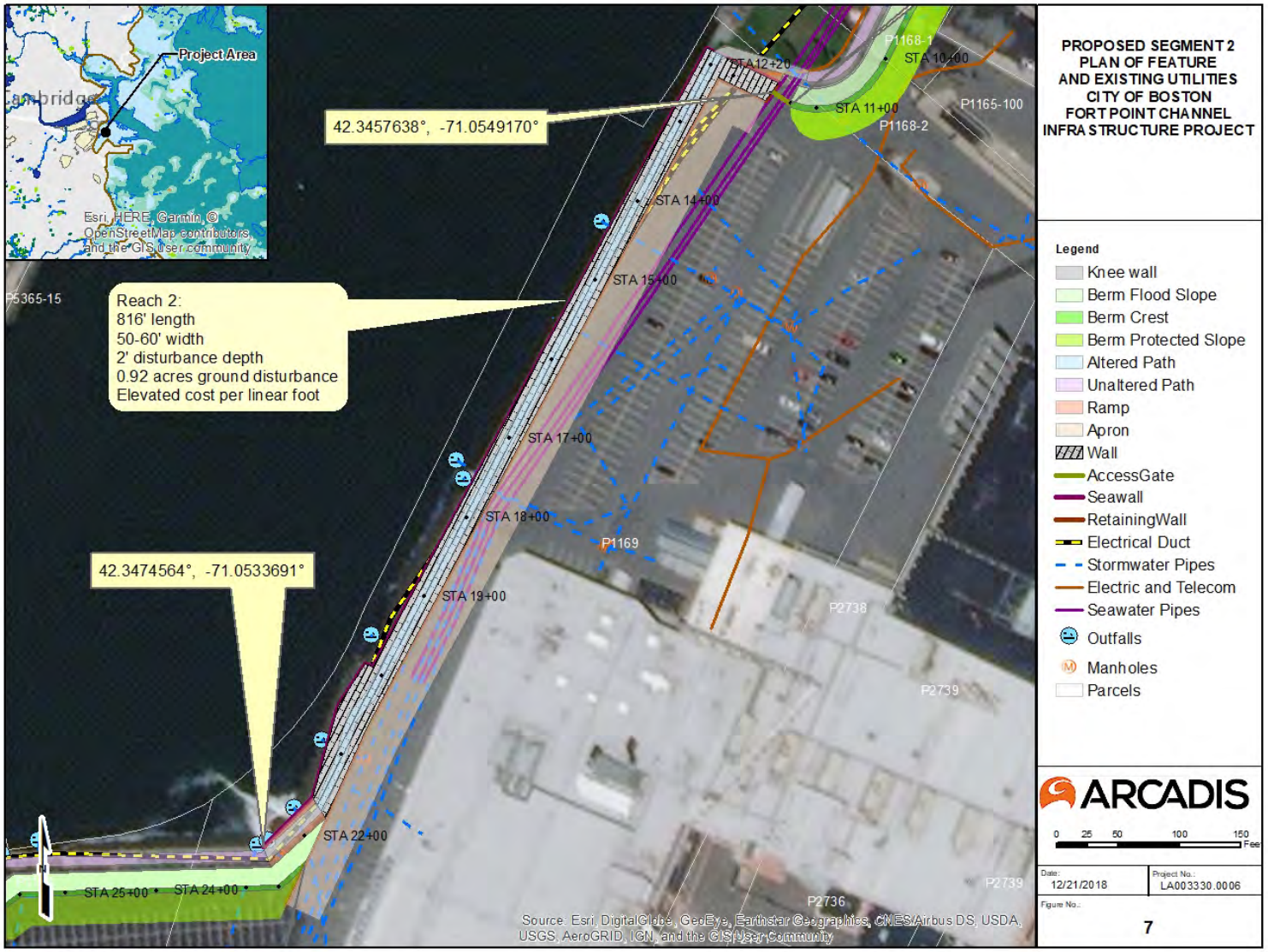


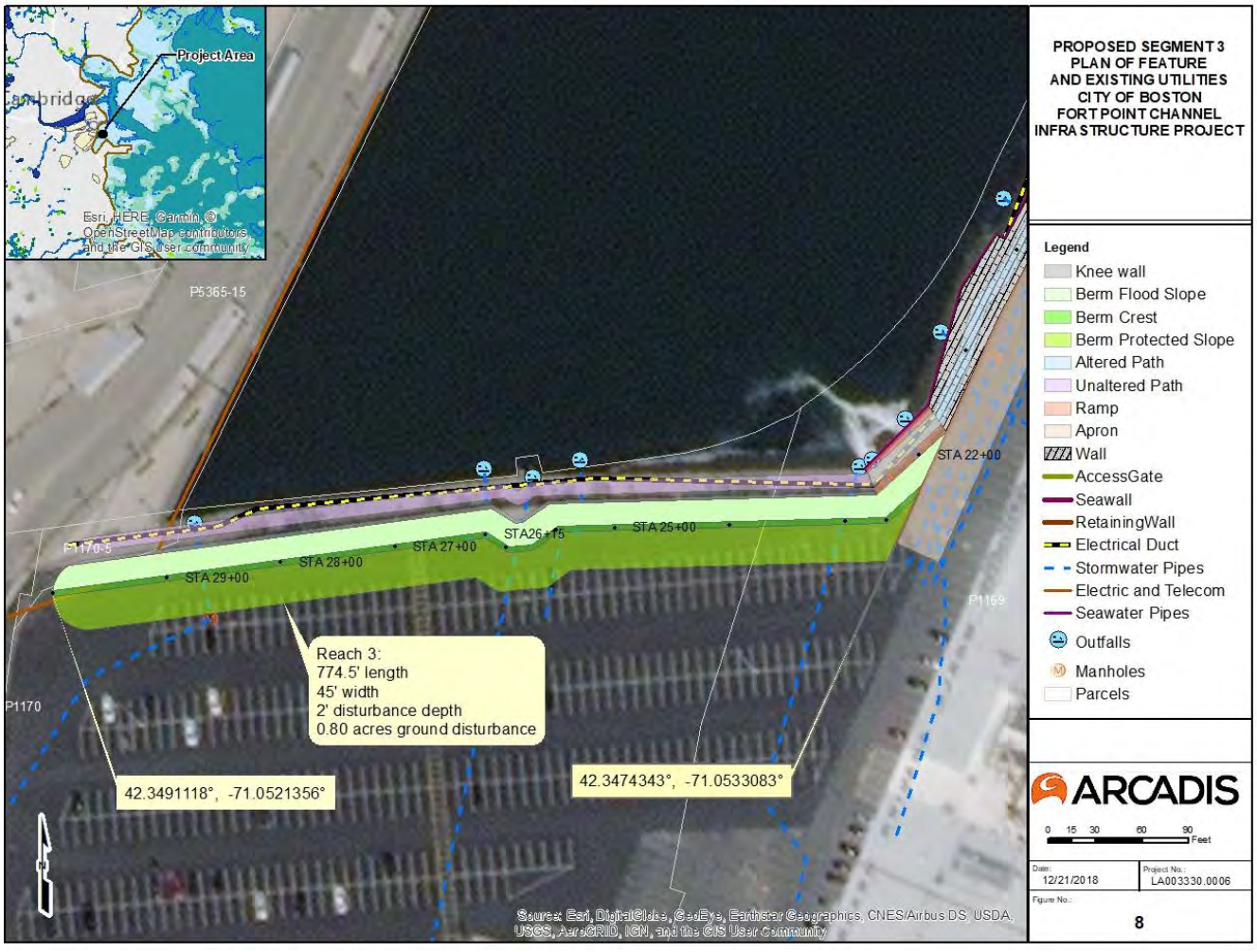
FIGURE 7: SEGMENT 2 ALIGNMENT



Segment 3 is 774.5 ft. long with an average existing ground elevation of 9.4 ft. (NAVD88). It starts at 42.3474343°, -71.0533083° and ends at 42.3491118°, -71.0521356°. Similar to Segment 1, the width of ground disturbance will be limited to 45’ along the length of Segment 2, resulting in a 34,852.5 square-foot ground disturbance footprint (0.80 acres). Disturbance is expected to a depth of 2’, but will be greater at utility crossings. The segment runs parallel to the existing Harbor walk from the westward turn in the Fort Point Channel to Dorchester Avenue. It will be situated on existing Gillette facility parking lots. Where municipal or industrial outfalls are located, backflow prevention fittings, in the form of flap gates, will be installed. Since the outfalls cross under the proposed feature, they will be at risk of misalignment or cracking due to differential settlement induced by the berm. The project proposes to strengthen the sections of line with modern pipe directly under the proposed features where necessary. It will mirror Segment 1 in design as an earthen berm, with a knee wall to limit lateral width.The proposed feature layout is shown below in Figure 8.

It should be noted that the proposed features in all three segments have no permanent intrusions into the channel. Intermittent barge access in the channel may be required for backflow preventer installation on outfalls and for some seawall modifications, but there will be no fill or new construction in the channel.

FIGURE 8: SEGMENT 3 ALIGNMENT



Existing Infrastructure

Utilities running along the proposed alignment will need to be temporarily supported during construction, or in the case of certain buried lines of age, possibly relocated and replaced. In general, crossing utilities will pass under the proposed features in sleeves and will be fitted with TideFlex or similar backflow preventers at their outfalls.

Known underground and overhead utilities include the following:

Segment 1:
- Buried stormwater utilities servicing the Gillette paved parking lots and a large stormwater outfall north of the Gillette pump house.
- A small buried electrical conduit servicing the Harbor Walk lighting.
- 42-inch, 36-inch, and 24-inch diameter raw water intake pipes which intake seawater from the Fort Point Channel at the pump house and transport it south to the Gillette facilities. These run roughly parallel to the Harbor Walk.

Segment 2:
- Buried stormwater utilities servicing the Gillette paved parking lots and several large stormwater and industrial water outfalls from the Gillette facility.
- A small buried electrical conduit servicing the Harbor Walk lighting.
- A large buried communications and electrical bank running parallel to the Gillette seawater conduits
- 42-inch, 36-inch, and 24-inch diameter raw water intake pipes which intake seawater from the Fort Point Channel at the pump house and transport it south to the Gillette facilities. These run roughly parallel to the Harbor Walk.

Segment 3:
- Buried stormwater utilities servicing the Gillette paved parking lots and several large stormwater and industrial water outfalls from the Gillette facility.
- A small buried electrical conduit servicing the Harbor Walk lighting.
- A secondary smaller pump house (buried) for the Gillette facilities intake/discharge of raw seawater for industrial use.

Based on available geotechnical boring data, the underlying strata is comprised of soft clay and mud fill to approximately 25-30’ below the surface of the project site, as much of Boston’s coastal shores are comprised of artificially filled areas. Below this layer, alternating layers of hard and soft compressible clays, mixed with sporadic sand and shell lenses extend down to refusal of most boring records at approximately 70 ft. below existing grade. The existence of compressible layers at depth will likely lead to proposed flood protection features being subjected to consolidation settlement; however, appropriate design, construction measures, and construction sequencing may be enacted to prevent the proposed features from settling below their intended elevations. Furthermore, as is common with many earthen flood protection features, periodic maintenance may be required to maintain the design elevation. The permeable upper layers may also necessitate anti-seepage measures such as slurry wall installation down to the impermeable clay layers. Detailed additional investigation will be required to determine the in-situ soil properties with regard to water seepage through the upper soil layers and settlement due to placed overburden.

Supports for the deployable flood gate at the Gillette pump house will comprise channeled beams embedded into the gate’s base/concrete footing. In the event a major storm is forecast, aluminum stop logs would be inserted between the soldier piles to form the flood gate defense.

Long-term Maintenance Requirements

Expected maintenance action requirements and frequency are detailed in Table 4 below. An annual expected Operations and Maintenance (O&M) cost allowance of $155,000 has been estimated to cover maintenance tasks.

TABLE 4: ANTICIPATED MAINTENANCE REQUIREMENTS

Description of Task	Frequency	Comments
Inspection of earthen berms for damage	Annually	Includes man-made damage (tire ruts from mowing), rodent holes, or natural wear (erosion from precipitation runoff)
Inspection of concrete walls for damage	Annually	Includes checking for cracks, differential settlement, corrosion at joints, etc.
Mowing of sodded portions during the growing season	Biweekly (during growing season only)	
Inspection and testing of deployable flood gate and outfall flap gates. Checking for corrosion.	Annually	
Re-sealing and/or re-grouting of any joints in walls	As-needed	
Addition of earthen fill to berm sections to combat settlement	As-needed	This activity would occur only if the berm settled to an elevation below the design elevation. It could be combated with initial overbuild as well.

Project Risks

The largest risks to the project's viability, cost, and schedule are threefold: the presence of extensive (and often old) buried infrastructure near the Gillette facilities and the poor upper soil layers' ability to withstand increased overburden and prevent seepage. Although this memorandum was based upon efforts to map and plan around what known buried infrastructure exists, construction projects in older urban areas often unearth unanticipated conditions in the field which were not reflected in utility record drawings. All subterranean infrastructure data collected for this project is included in **Attachment 2** for reference. Upon further field investigation, the understanding of buried infrastructure and its importance will evolve. Furthermore, the Interstate 90 tunnel system is buried (at varying depths) under the project site. The City has reached out to Massachusetts Department of Transportation to coordinate further design phases and determine allowable ground disturbance methods and extents, and allowable overburden pressure.

Geotechnical investigation and design will refine the project requirements in several ways:

- It will inform the amount of overbuild or periodic maintenance required to maintain the design elevation to combat ground settlement due to the weight of the placed fill.
- It will inform the design over buried utilities in order to ensure their continued function.
- And finally, it will inform the means (possibly) required to combat seepage, although this is of low concern due to the transient nature of storm surge and tidal events. Seepage control measures could also increase the depth of disturbance of all three segments of the project.

Pending further investigations, all three of the factors listed above could affect the project's proposed features in the future.

SCHEDULE OF WORK

The proposed project schedule identifies major milestones with target dates for meeting each milestone. Proposed schedules must not exceed the grant period of performance. FEMA expects to announce awards on October 1, 2019 and the deadline for Resilient Infrastructure projects is April 1, 2023.

TABLE 5: SCHEDULE OF WORK

Description of Task	Starting Point	Unit of Time	Duration (days)	Unit of Time	Work Completed by
State and Local contracting process	1	days	90	days	City of Boston and MEMA
Design procurement	91	days	90	days	City of Boston
Site investigations, design, public engagement, permitting	181	days	350	days	City of Boston and design/professional services consultant
Construction procurement	546	days	90	days	City of Boston
Construction	636	days	630	days	City of Boston and construction contractor
Inspections and closeout	1,366	days	30	days	City of Boston and MEMA

COST ESTIMATING METHODOLOGY

Calculations were prepared to confirm the design concepts and to obtain quantities for major items. Unit prices were estimated using a combination of local contractor or supplier cost information and nationally published cost information.

Local Contractor or Supplier Cost Information

When available, the project or unit cost estimates provided are based on recent local contractor bid or cost information provided by local contractors or suppliers for a specific type of construction, project element, or item.

Nationally Published Cost Information

Where recent contractor bids or construction cost information was not available, cost estimates were developed using recent similar projects along the eastern seaboard of the U.S., from locations such as New York, NY and Norfolk, VA for which the preparing party had direct knowledge or involvement. Additionally, nationally published 2018 RSMeans Heavy Construction Cost Data was used for national average cost estimates. The RSMeans cost data are based on national average costs and then adjusted with the RSMeans heavy construction location factor for the closest nearby city with similar economic characteristics, and standard location specific adjustment factors provided by the local building officials or references such as the U.S. Army Corps of Engineers Construction Cost Index. Cost estimates are developed to estimate reasonable and necessary costs for construction materials, labor, and equipment and related site work.

ASSUMPTIONS

Cost Estimate Item as a Percentage of Construction Costs

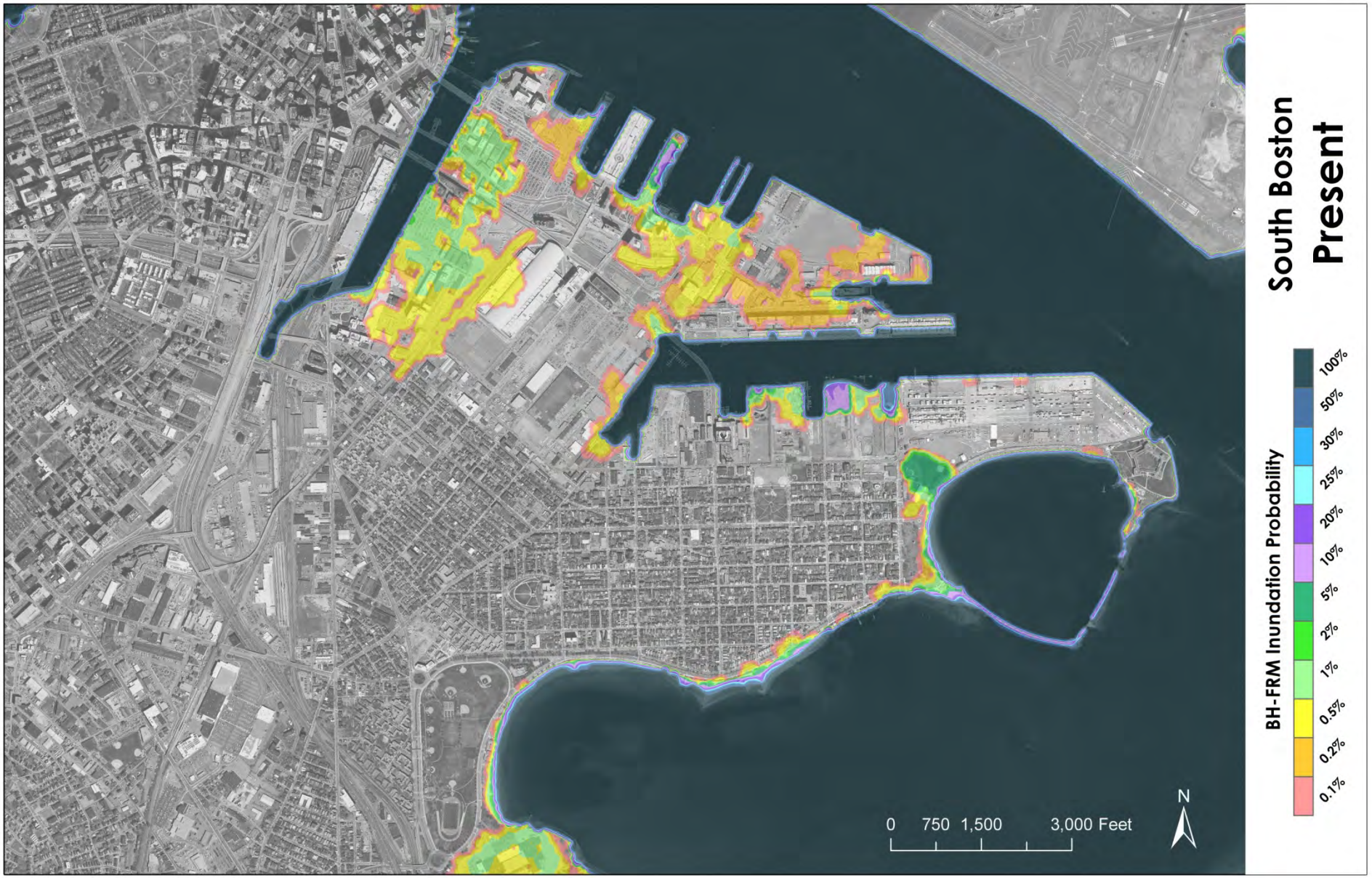
Several cost items are estimated as a percentage of the construction cost due to the preliminary nature of the estimate. These include geotechnical investigations, surveys and assessments, design, and permitting, and costs associated with inspections, testing, and engineering support during construction. The percentages assigned for each of these items is based on percentages commonly used in the industry for the specific items or on standard industry practice and knowledge. Pre-award costs represent the cost incurred for development of the grant application. Grant management costs are also included in the cost estimate as the allowable five percent of the cost of engineering and construction.

ATTACHMENTS

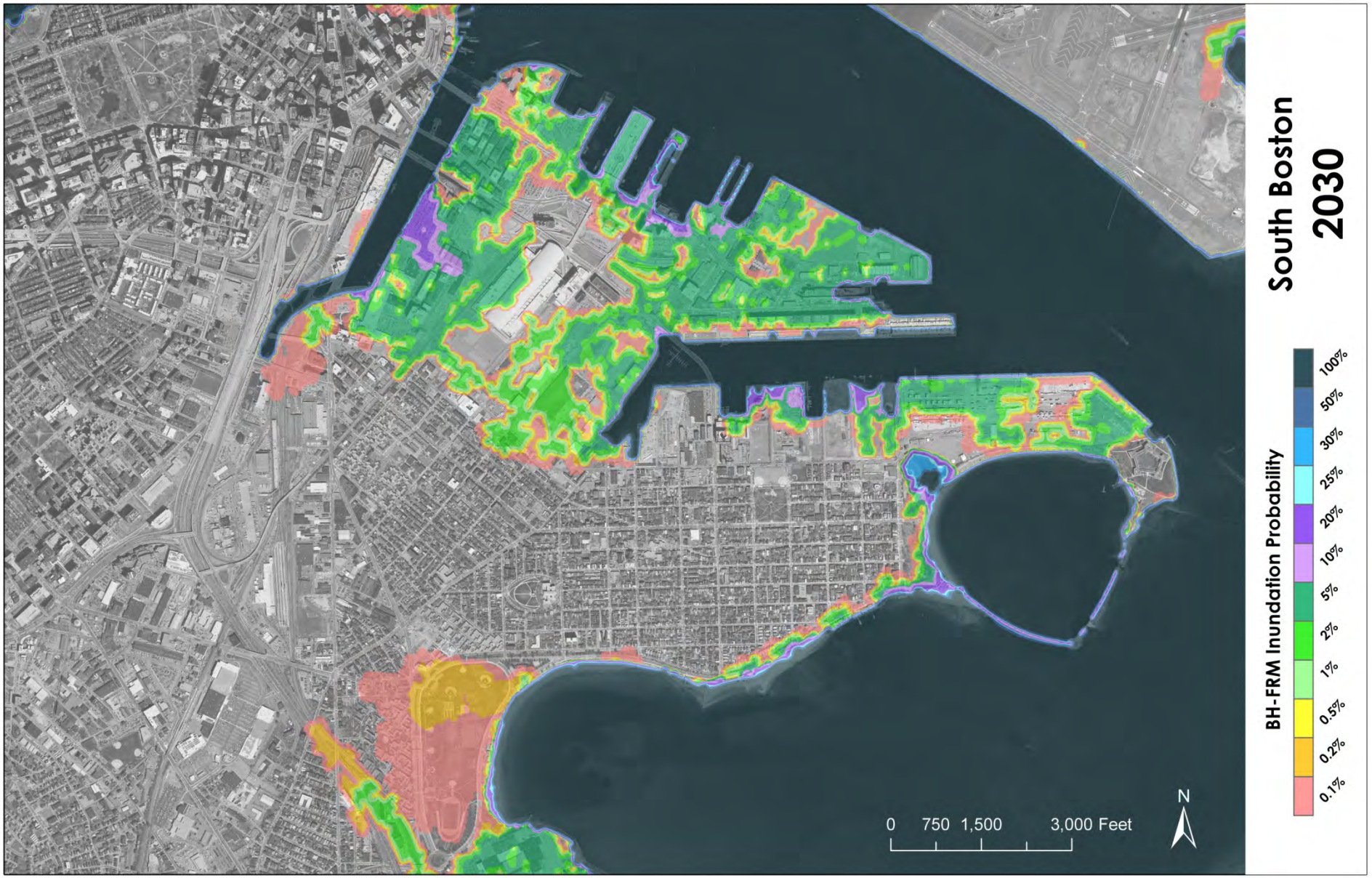
Memo Attachment 1. Cost Estimate

Memo Attachment 2. Existing Surveys and Subterranean Infrastructure

Document 2
BH FRM Coastal Storm and Sea Level Rise Models


South Boston
Present
BH-FRM Inundation Probability
100%
50%
30%
25%
20%
10%
5%
2%
1%
0.5%
0.2%
0.1%
0 750 1,500 3,000 Feet
N

0 ft SLR


South Boston
2030
BH-FRM Inundation Probability
100%
50%
30%
25%
20%
10%
5%
2%
1%
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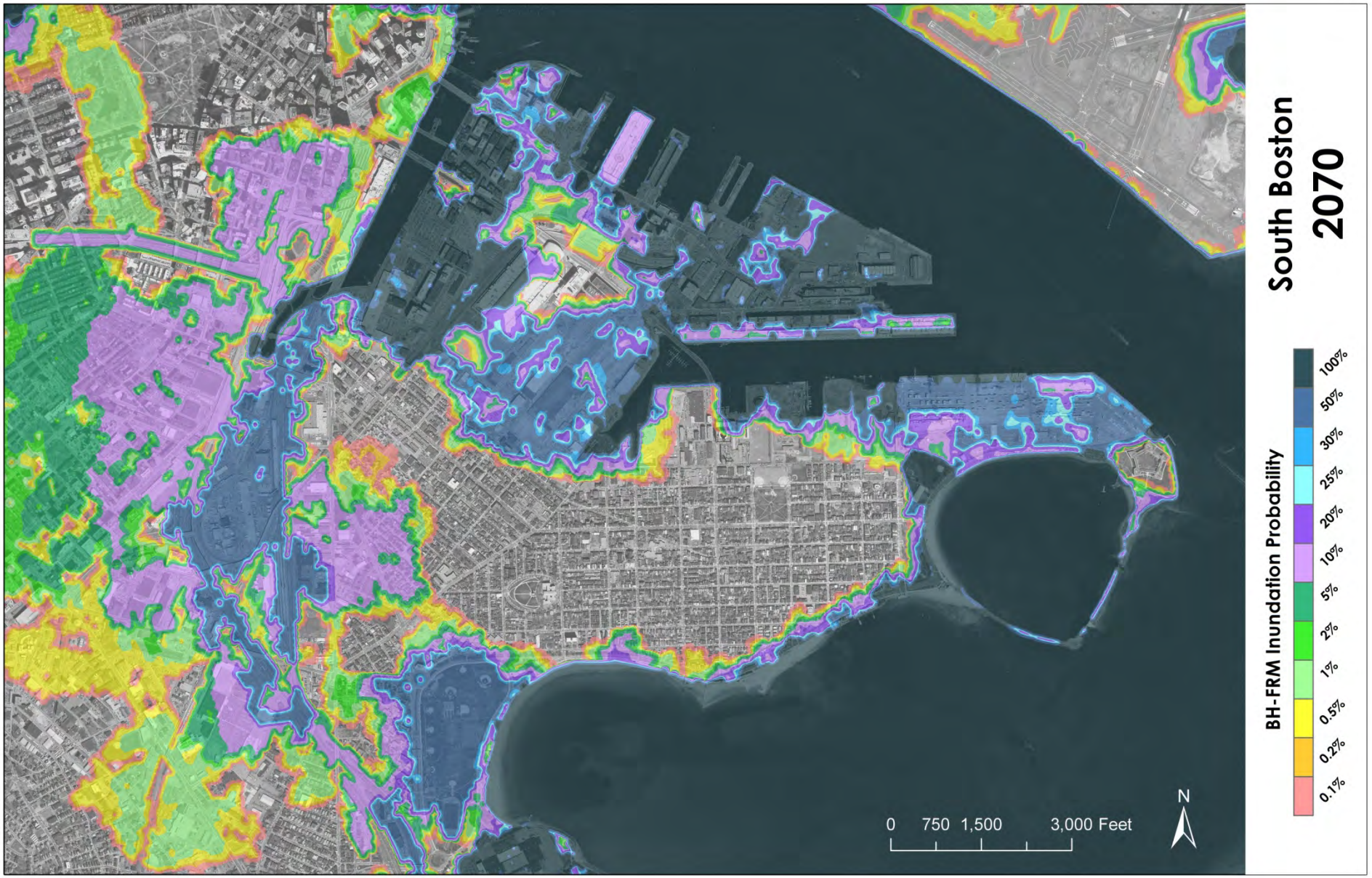
0 750 1,500 3,000 Feet
N

~8 inches SLR



~40 inches SLR

BH-FRM 1% Inundation Depth

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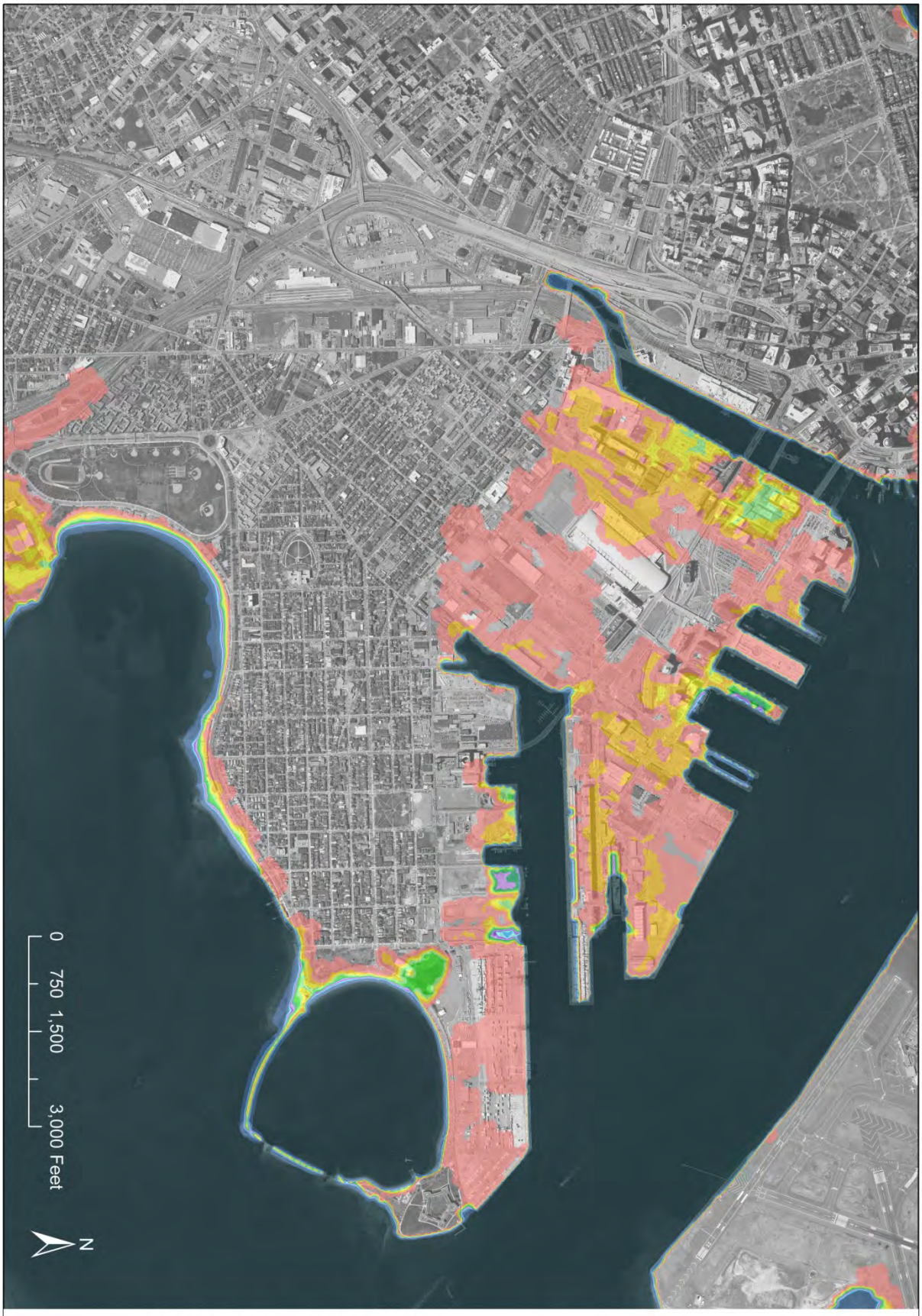
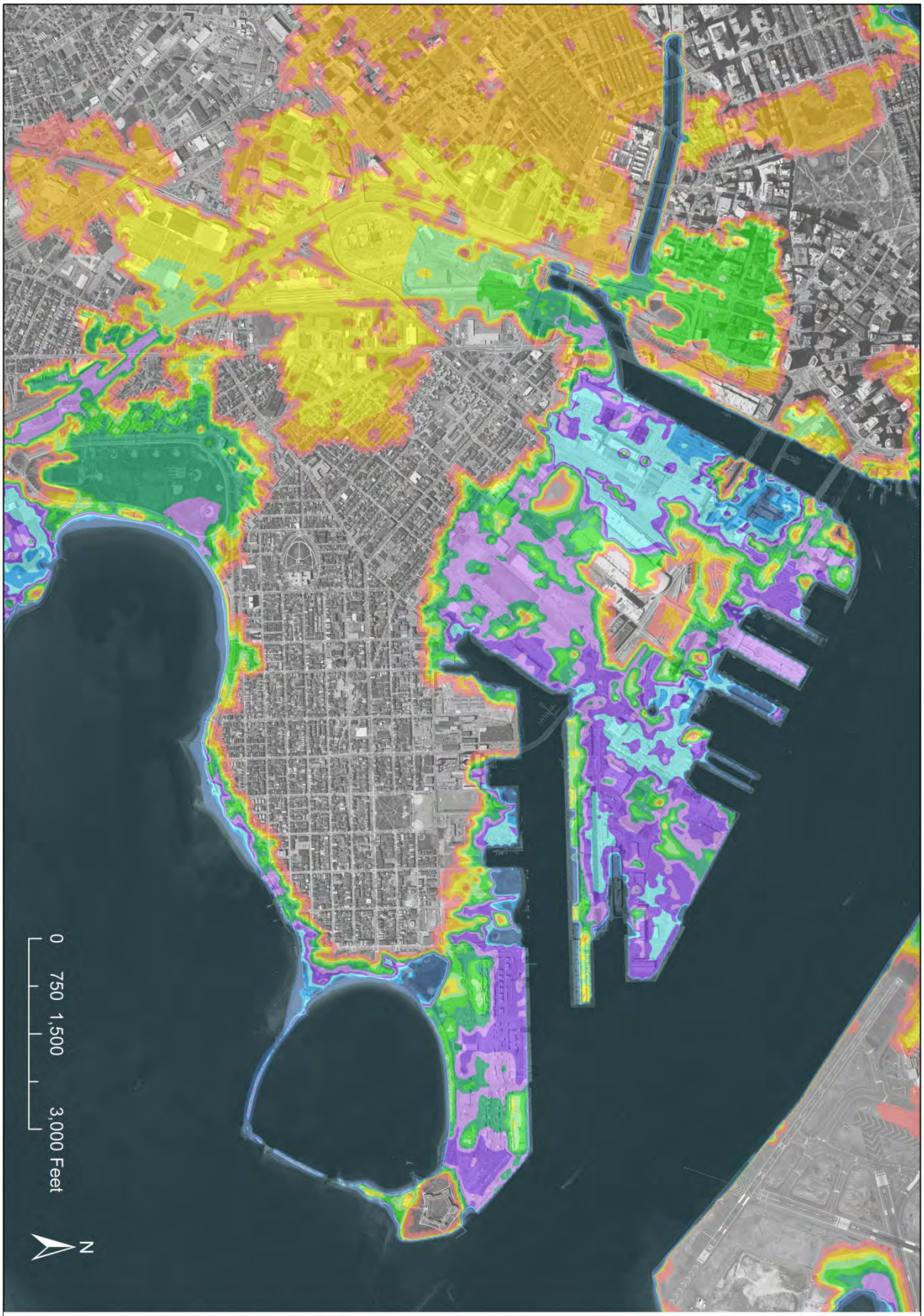
South Boston
Present



BH-FRM 1% Inundation Depth

0.5 ft | 1 ft | 1.5 ft | 2 ft | 2.5 ft | 3 ft | 3.5 ft | 4 ft | 4.5 ft | 5 ft | 10 ft | > 10 ft

South Boston
2030



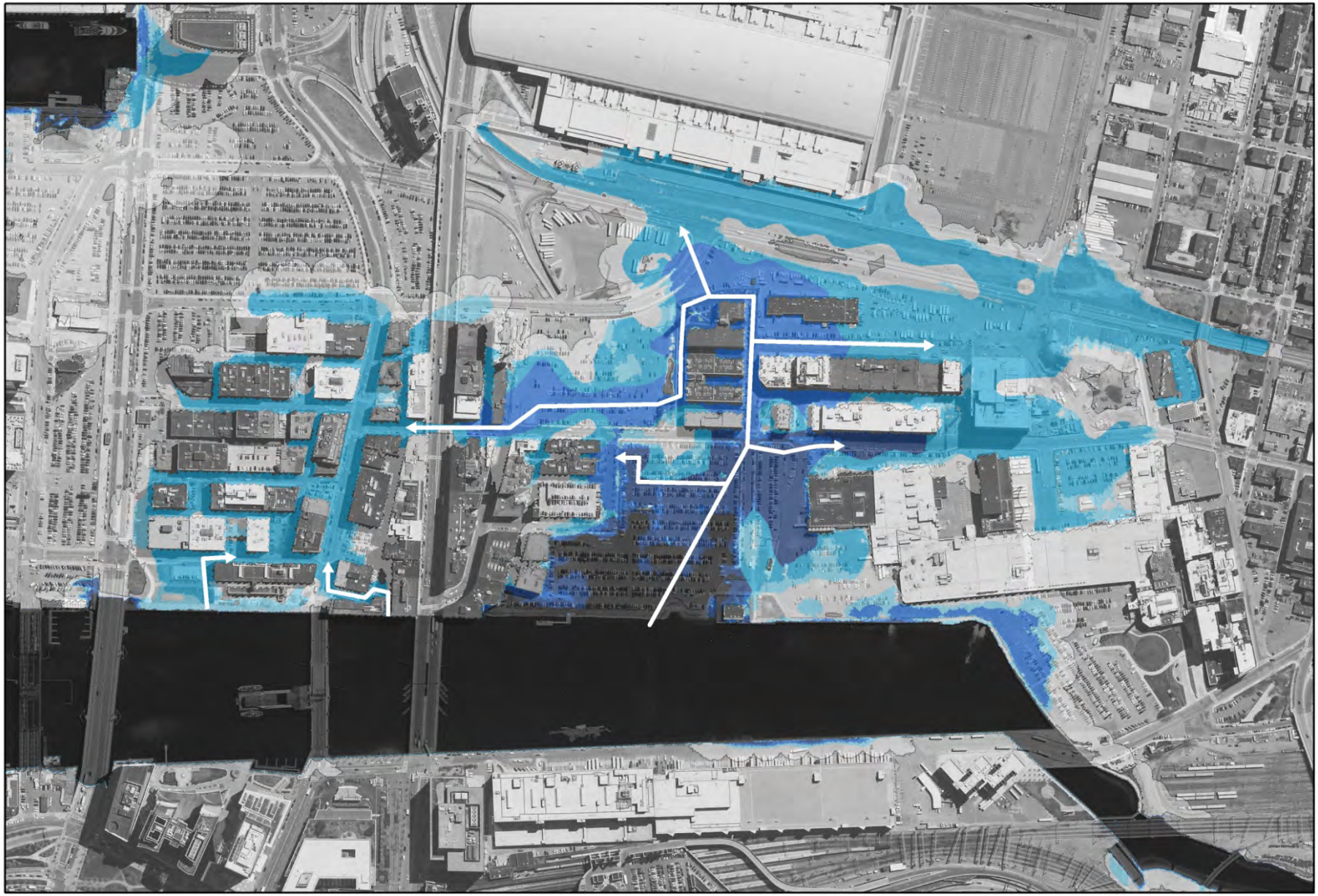
BH-FRM 1% Inundation Depth

0.5 ft | 1 ft | 1.5 ft | 2 ft | 2.5 ft | 3 ft | 3.5 ft | 4 ft | 4.5 ft | 5 ft | 10 ft | > 10 ft

South Boston
2070

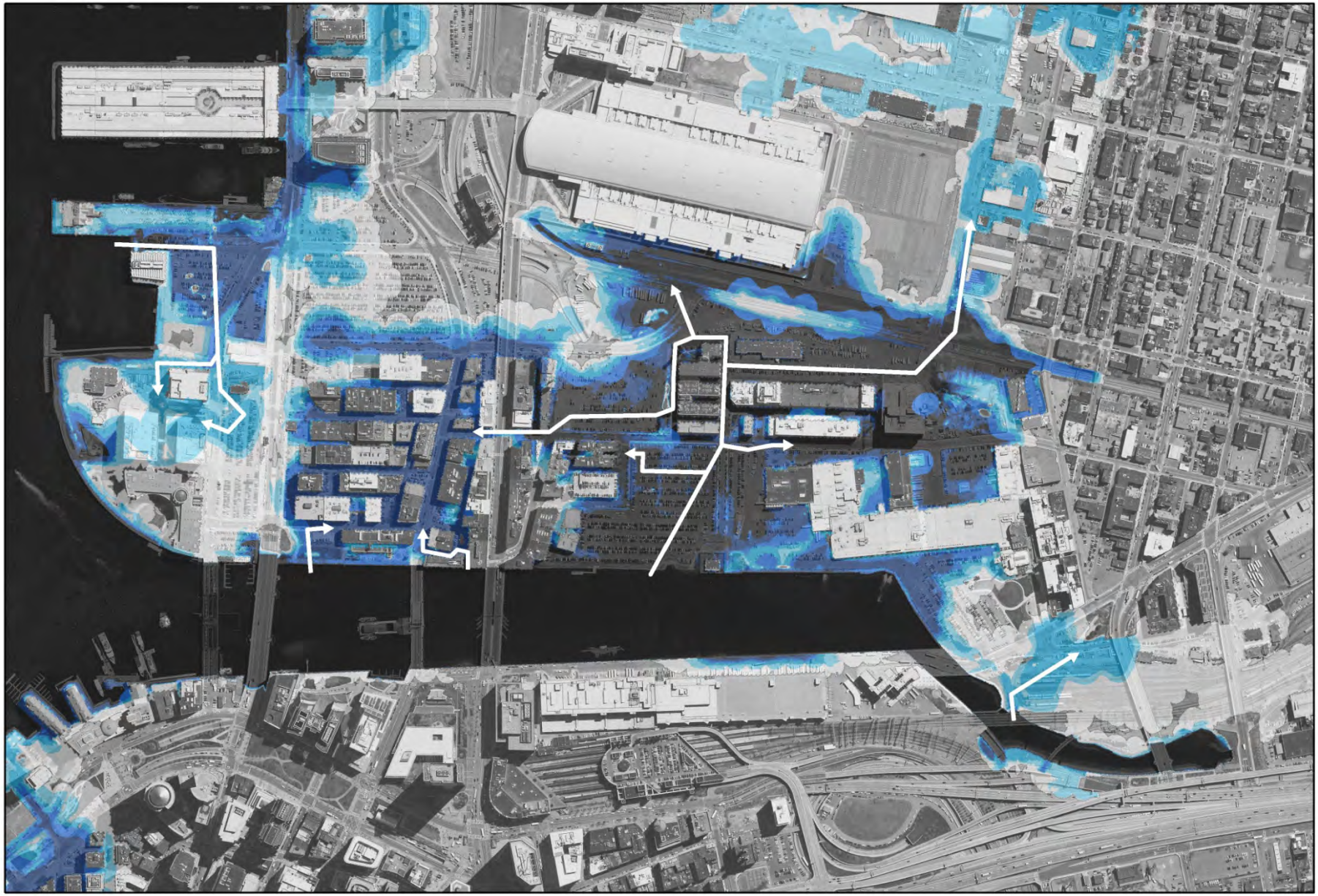
South Boston - Present

Fort Point Channel - Flood Pathway Analysis



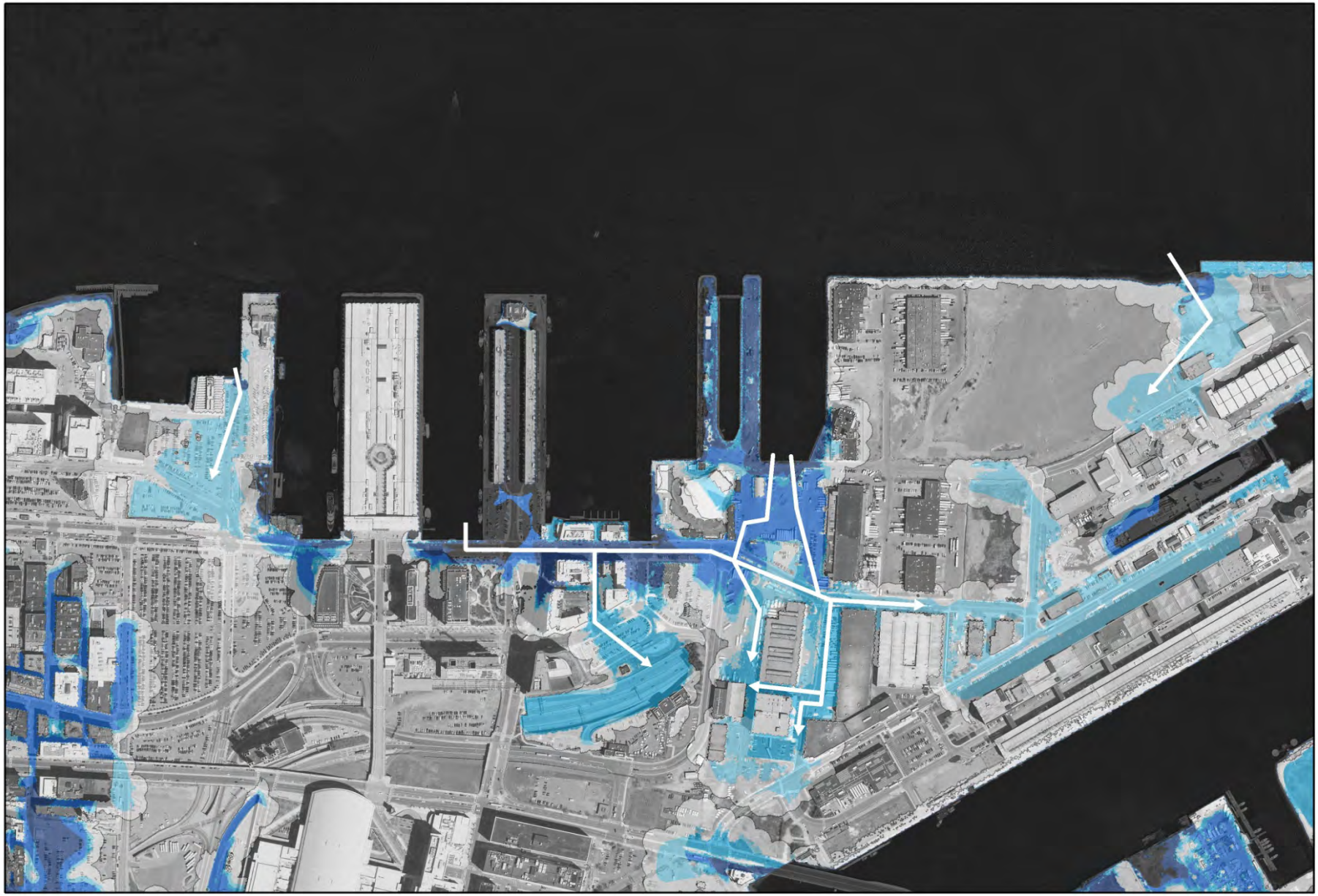
South Boston - 2030

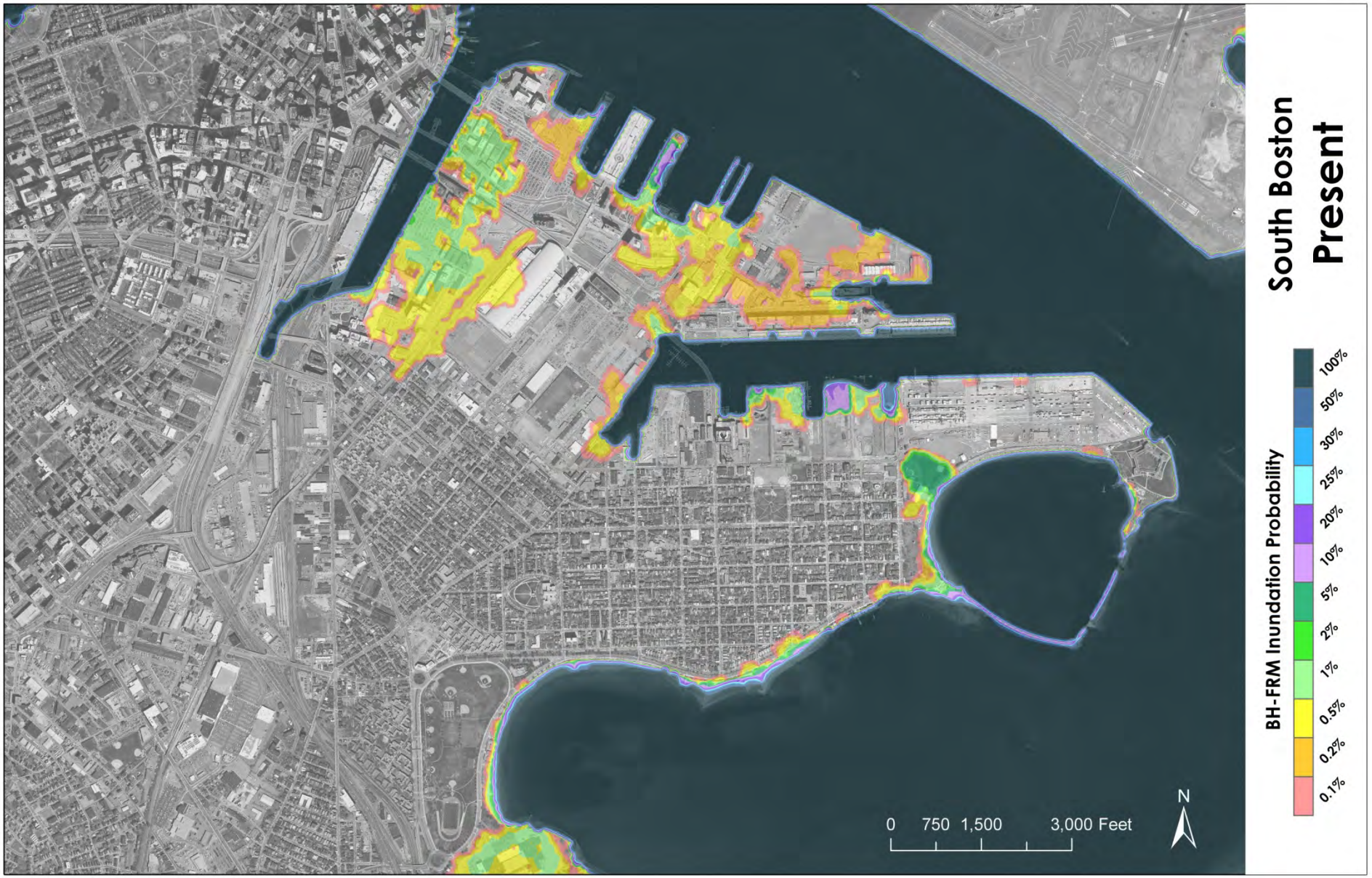
Fort Point Channel - Flood Pathway Analysis



South Boston - Present

Seaport - Flood Pathway Analysis




South Boston
Present
BH-FRM Inundation Probability
100%
50%
30%
25%
20%
10%
5%
2%
1%
0.5%
0.2%
0.1%
0 750 1,500 3,000 Feet
N

0 ft SLR

Document 3

8-Step Floodplain Review

DRAFT

EXECUTIVE ORDER 11988 FLOODPLAIN MANAGEMENT 8-STEP ANALYSIS (44 CFR PART 9)

TITLE: City of Boston Resilient Fort Point Channel Infrastructure Project

LOCATION: City of Boston, Fort Point Channel (approximately 42.349072, -71.052323 to 42.345684, -71.056507)

PROPOSED ACTION: The City of Boston (City) proposes to construct 2,300 linear feet of mixed berm and floodwall mitigation features along a portion of the southeast edge of Fort Point Channel.

DESCRIPTION OF PROJECT: Under the Proposed Action Alternative, the City would construct approximately 2,300 linear feet of mixed berm and floodwall mitigation features along a portion of the southeast edge of the Fort Point Channel shoreline, between the GE Facility and Dorchester Avenue. These features would be certified as flood protection measures in accordance with 44 CFR 65.10.

The project would be within an area referred to as the 100 Acres Master Planning area, which is bounded by Fort Point Channel and A Street to the west, Summer Street to the north, the South Boston Bypass Road/Haul Road to the east, and West First Street and Mt. Washington Avenue to the south. The purpose of the project is to reduce flood damage in the 100 Acres Master Planning Area and South Boston. The Fort Point Channel is a flood entry point into Boston and the project site is located at the lowest elevation along the channel. Flood protection would consist of three design segments.

Segment 1 would extend from the GE Facility at the northern boundary south to the Gillette pump house and would be approximately 728.5 feet long. Flood protection in Segment 1 would be located landward of the existing Harborwalk and would include an earthen berm with a 5-foot crown width and 4H:1V flood-side and protected side slopes. The earthen berm would be elevated to approximately 14.6 feet NAVD88 to account for anticipated sea level rise and wave run-up. A knee wall on the seaward side of the berm feature would be incorporated to minimize the lateral width required for the berm to 45 feet. The knee wall would be raised to approximately 10.5 feet NAVD 88. The berm would terminate at a 15-foot wide access driveway for the pump house and would employ a Flood Break or similar passive deployable flood gate at the driveway.

Segment 2 would extend from the Gillette pump house to the western turn in the Fort Point Channel and would be approximately 816 feet long. Segment 2 would consist of a double retaining wall of granite blocks matching those of the existing seawall. The seaward side of the retaining wall would raise the existing seawall's crest elevation approximately 6 vertical feet to reach 14 feet NAVD88. The landward side would also make use of granite blocks as a retaining wall feature, with impermeable clay fill in between the seaward and landward walls. The total width of the feature would be 18 feet wide, with a 12 foot wide shared use path for the Harborwalk located on its crest. The blocks would rest on a concrete footing. All blocks would be doweled together with rebar rods.

Segment 3 would extend from the western turn in the Fort Point Channel to Dorchester Avenue and would be 774.5 feet long. Segment 3 would have a similar earthen berm as described for the Segment 1 flood protection. Along all three segments, where municipal and industrial outfalls are

located, backflow prevention fittings, in the form of flap gates, would be installed on each outfall. Sections of outfall pipe located below the proposed features would be strengthened where necessary to reduce the risk of misalignment during settlement.

STEP 1 Determine whether the proposed action is located in the 100-year floodplain (500-year floodplain for critical actions)

The project area is located within a special flood hazard area (Zone AE) subject to inundation by the one percent annual chance flood, as shown on the FEMA Flood Insurance Rate Map panel 25025C0081J dated March 16, 2016. The project area is also in a coastal area that is subject to wave action and future sea level rise. No wetlands occur in or adjacent to the project area.

STEP 2 Notify the public at the earliest possible time of the intent to carry out an action in a floodplain and involve the affected and interested public in the decision-making process.

An Initial Public Notice was posted in the following location(s): *The Herald* on April 13, 2021 and the City newsletter.

STEP 3 Identify and evaluate practicable alternatives to locating the proposed action in a floodplain (including alternatives sites, actions and the "no action" option). If a practicable alternative exists outside the floodplain FEMA must locate the action at the alternative site.

Alternatives:

1. No Action Alternative – Under the No Action Alternative, no FEMA funded flood protection would be constructed along the Fort Point Channel. Some flood protection measures may occur; however, these would likely be smaller ad hoc and uncoordinated actions providing localized protection and would occur over a longer range of time. For the reasonably foreseeable future, high water events and future sea level rise would continue to flood the 100 Acre Master Planning Area and South Boston, damaging infrastructure and property. During high water events, water would continue to inundate streets necessitating road closures and disrupting public transportation systems. Flooded sewage systems could back up causing raw sewage to come up into the streets and buildings. Water would continue to inundate buildings and basements, posing risks to electrical facilities and potentially requiring evacuations. Debris collected in floodwaters would continue to flow out into the channel when floodwaters recede.
2. Proposed Alternative – The proposed alternative includes the use of earthen berms, knee walls, and retaining walls to reduce flood damage along the lowest point in the seawall on Fort Point Channel. Segment 1 and Segment 3 would consist of earthen berms raised to approximately 14 feet NAVD88 with a knee wall on the seaward side. Segment 2 would consist of retaining walls raised to approximately 14 feet NAVD88. These features would protect adjacent infrastructure and property from wave run-up during storms and future sea level rise based on the Boston Harbor Flood Risk Model.

3. Alternative 2: Flood Gates–One alternative to the proposed action was analyzed within the floodplain. Alternative 2 would construct flood protection at the mouth of Fort Point Channel by installing a flood gate or series of gates able to be closed in advance of high-water events. Flood control gates would be constructed within the channel's banks and would remain open for the large majority of time for proper stormwater evacuation and daily tidal exchange. This alternative would require more specialized engineering and would require larger upfront costs than the Proposed Alternative. Alternative 2 would have a shorter design life and require more frequent closures of the gate over time as sea levels rise, limiting effectiveness and increasing potential environmental impacts as compared to the Proposed Alternative. The environmental impacts of construction in the water and the alterations to the aquatic habitat and long-term aquatic processes would be substantially greater than the Proposed Alternative. Alternative 2 would provide less opportunity for social benefit and was not the preferred alternative during consultation with environmental agencies. This alternative was determined to be technically and financially impracticable.
4. Alternatives Outside the Floodplain – There are no practicable alternatives outside the floodplain. The purpose of the proposed project is to reduce damage from flooding in the 100 Acre Master Planning area. This area is already heavily developed (urbanized) and it is not practicable to move existing streets, utilities, and private development outside of the floodplain. The Fort Point Channel is a critical flood pathway for the South Boston Waterfront according to the Boston Harbor Flood Risk Model. The project site is at the lowest elevation along the channel, and currently water frequently overtops the existing shoreline during astronomical high tides and coastal storm events.

STEP 4 Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and the potential direct and indirect support of floodplain development that could result from the proposed action. 44 CFR Part 9.10

The Proposed Action would result in a minor short-term adverse effect on the 100-year floodplain due to construction in the floodplain. Construction activities could cause an accidental release of hazardous waste during the construction period from unknown underground sources or minor leaks from construction equipment and ground disturbing activities could cause sediment to runoff into nearby water systems.

The Proposed Action would result in a minor long-term adverse effect on the 100-year floodplain due to fill placement in the floodplain that would alter the natural path of water during high water events. Ground disturbance and the potential biological impacts of building the flood control structures in the floodplain would be minimal because the area has been developed and redeveloped for more than 100 years. Areas that are currently paved and used as parking lots would be converted to flood protection structures and open space. The Proposed Action would not discharge fill or riprap within Waters of the U.S. and the project would not alter the course of flow of the Fort Point Channel.

In the long-term, the project would decrease the risk of flood damage from high water events and sea level rise in the 100 Acre Master Planning Area and protect existing structures, utilities, and public health and safety. The construction of earthen berms would include a 6-inch layer of topsoil and sod, having a positive impact on the floodplain as it would add some level of permeability. The Proposed Action would enhance and protect the Harborwalk, an existing public space and social resource. The berms and floodwall would reduce the potential for debris to be carried into the channel when floodwaters recede. In addition to the independent utility of the Proposed Action in reducing the risk of flooding in the 100 Acre Master Planning area, the Proposed Action would work in conjunction with existing flood mitigation measures north of the project area to protect the larger Fort Point area.

The Proposed Action would not directly support any specific development proposal within the floodplain; however, it could indirectly support future development. Although, private development decisions are not directly contingent upon floodplain protection, the addition of flood protection measures may indirectly support redevelopment of the urban spaces in the project area. The Proposed Action does not include the addition of, or improvements to, roadways or utilities that would support expanded urban uses of the project area. Any redevelopment that might occur would be subject to local and state floodplain development regulations, as well as the stipulations of the 100 Acre Master Plan, which requires additional greenspace and the creation of permeability along the channel's edge (approximately 2.18 acres).

STEP 5 Minimize the potential adverse impacts and support to or within floodplains to be identified under Step 4, restore and preserve the natural and beneficial values served by floodplains.

Because the project area already is developed, many of the traditional approaches for minimizing and avoiding floodplains are not practicable to this project. The Proposed Action is functionally dependent on its location in the floodplain (44 CFR 9.11(d)(1)(i)) and potential impacts would be minimized (44 CFR 9.11(d)(5)). FEMA would require the following conditions to avoid and minimize potential adverse impacts identified in Step 4:

- The Subapplicant must obtain a local certificate that demonstrates no rise in the base flood elevation anywhere within the community (44 CFR 60.3 and 44 CFR 9.11(d)(4)).
- Following the construction of the Proposed Action, the Subapplicant must apply for a Letter of Map Revision in accordance with 44 CFR 65.6.
- The Subapplicant would implement the project in accordance with all local and state regulations and in accordance with 44 CFR 9.11(d)(6).
- The Subapplicant must obtain and comply with any required Section 404 and 401 permits from the U.S. Army Corps of Engineers and the Massachusetts Department of Environmental Protection, respectively, to comply with the Clean Water Act. These permits would include conditions to avoid, minimize, and mitigate for impacts on water quality, including but are not limited to:
    - Siltation and erosion control measures (e.g., silt fences)
    - Turbidity control
    - Site restoration measures (e.g., replanting exposed soils with native vegetation)
    - Minimizing work within the water

- Prevention of accidental release of hazardous waste

- The Subapplicant would implement floodplain regulations in accordance with federal minimum requirements for participation in the National Flood Insurance Program.

The Proposed Action would mitigate flood damage to structures and property in the 100 Acre Master Planning area, protecting facilities, residences, and businesses from future flood events and sea level rise. Existing paved surfaces would be converted to earthen berms which would include 6 inches of topsoil and be planted with sod, adding minor benefit to water resources through filtration of precipitation. The Proposed Action would protect Waters of the U.S. by reducing the potential for debris to be carried into the channel during flooding and high-water events. The Proposed Action would reduce the need for flood-related repairs and the associated use of construction equipment that could generate spills of lubricants and fuels. There could also be a reduction in flooding of facilities regulated by state and federal hazardous materials laws that currently occur in the project area and vicinity.

STEP 6 Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards or impacts on wetlands, the extent to which it will aggravate the hazards to others, and its potential to disrupt floodplain and wetland resources and second, if alternatives preliminarily rejected at Step 3 are practicable in light of the information gained in Steps 4 and 5. FEMA shall not act in a floodplain unless it is the only practicable location.

The Proposed Action remains practicable because it meets the purpose and need of the project to protect the 100 Acre Master Planning Area from flooding and flood damage and the minimization measures described in Step 5 would minimize adverse impacts to the floodplain. The proposed action is functionally dependent on its location in the floodplain. The alternatives eliminated in Step 3 remain impracticable because (a) the No Action Alternative does not meet the purpose and need of the project (does not reduce flood hazards in the 100 Acre Master Planning area), and (b) Alternative 2, Flood Gates (gates at the mouth of the channel) would be more technically and financially demanding, have a shorter design life, require more frequent closures over time as sea levels rise, and would have greater short- and long-term environmental impacts, and (c) Alternatives Outside the Floodplain (i.e. relocation infrastructure) would be prohibitively expensive and impracticable.

STEP 7 Prepare and provide the public with a finding and public explanation of any final decision that the floodplain is the only practicable alternative.

The final public notice will be included as part of the environmental assessment public notice.

STEP 8 Review the implementation and post - implementation phases of the proposed action to ensure that the requirements stated in Section 9.11 are fully implemented.

The FEMA grant would be conditioned for the Subapplicant to secure federal, state, and local permits for work in the floodplain. Compliance with all federal, state, and local permits will be determined as part of the grant closeout process. Full detail of the conditions placed on the grant can be found in the Record of Environmental Consideration.